HUSZPO HRVATSKA UDRUGA STRUČNJAKA ZAŠTITE PRIRODE I OKOLIŠA

PRVA REGIONALNA KONFERENCIJA O PROCJENI UTJECAJA NA OKOLIŠ

FIRST REGIONAL CONFERENCE ON ENVIRONMENTAL IMPACT ASSESSMENT

ZBORNIK RADOVA

PROCEEDINGS

ZADAR, HRVATSKA / ZADAR, CROATIA

18.- 21. rujna 2013. / September 18th - 21st, 2013

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pod pokroviteljstvom / under the auspices of

Ministarstva zaštite okoliša i prirode Republike Hrvatske / the Ministry of Environmental and Nature Protection of the Republic of Croatia

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Iznimna mi je čast i veliko zadovoljstvo što Vas u ime Hrvatske udruge stručnjaka zaštite prirode i okoliša, kao predsjednica njezinog Upravnog odbora, mogu pozdraviti i obratiti vam se s nekoliko prigodnih riječi.

Konferencija je organizirana pod pokroviteljstvom Ministarstva zaštite okoliša i prirode i koristim ovu prigodu da se u ime Udruge zahvalim (resornom) ministarstvu a posebno ministru Zmajloviću što je prepoznao značaj ovog skupa.

Dozvolite mi da vam na samom početku ukratko predstavim Hrvatsku udrugu stručnjaka zaštite prirode i okoliša koja je organizator ovog skupa.

Udruga je osnovana 2004. godine od strane renomiranih tvrtki i stručnjaka koji se u Hrvatskoj profesionalno bave zaštitom prirode i okoliša. U ovom trenutku okuplja više od 60 tvrtki i individualnih članova.

Glavni ciljevi udruge su da u našem svakodnevnom radu:

- unaprjeđujemo stručna znanja i profesionalnost u obavljanju stručnih poslova zaštite prirode i okoliša,
- promičemo strukovnu etiku i
- surađujemo s domaćim i međunarodnim organizacijama i udrugama koje se bave ovim interdisciplinarnim područjem.

Donijeli smo hrabru odluku organizirati konferenciju kako bi na jednom mjestu okupili: profesionalce, znanstvenike, predstavnike upravnih tijela, predstavnike lokalne i područne samouprave, nevladine organizacije, stručnjake za odnose s javnošću, investitore i developere iz Hrvatske, regije ali i šire, koji sudjeluju u postupku procjene utjecaja na okoliš i koji su spremni ovdje podijeliti svoja znanja i iskustva.

Danas možemo reći da je konferencija bila uspješna radi iznimno velikog broja radova i iznenađujuće velikog broja sudionika. To nas kao organizatore posebno raduje te ukazuje da su teme o kojima smo raspravljali aktualne i značajne. Zahvaljujemo se svim sudionicima što su odvojili vrijeme, našli volju i sredstva kako bi sudjelovali na konferenciji, osobito u ovima teškim vremenima u kojima se svi nalazimo.

Vjerujem da smo mi kao organizatori ovog skupa ispunili Vaša očekivanja te da smo u konstruktivnom dijalogu podijelili naša znanja, iskustva i stavove o glavnim temama ove konferencije.

Teme su redom:

- Strateška procjena utjecaja na okoliš
- Procjena utjecaja na okoliš
- Natura 2000 – procjena utjecaja na ekološku mrežu
- Sudjelovanje javnosti u postupku procjene utjecaja na okoliš
- Zaštita okoliša i financiranje projekata

Ove su teme s aspekta zaštite prirode i okoliša ključne, posebice s obzirom na veliki investicijski potencijal u regiji koji je potrebno planirati i realizirati vodeći istovremeno brigu o očuvanju kvalitete prirode i okoliša.

Svjedoci smo da je u praksi vrlo često narušen odnos između dionika u postupku procjene utjecaja na okoliš što dovodi do usporavanja cijelog procesa a time i nesigurnosti u pogledu pripreme i realizacije investicija kao preduvjeta gospodarskog rasta.

Jedan od glavnih ciljeva konferencije je upravo uklanjanje barijera u komunikaciji i povećanju razumijevanja i povjerenja između zainteresiranih strana uz poštivanje stručnih znanja i najbolje prakse.

Brojni stručni radovi, a njih je više od 150, koji su predstavljeni tijekom ove konferencije te tematski okrugli stolovi nose u sebi kritičnu masu znanja i najbolje prakse koji mogu motivirati promjene na bolje.

Svjesni smo da moramo krenuti prvo od sebe i mijenjati postojeće obrasce ponašanja. Upravo zato ova je konferencija bila prva „ugljično neutralna“ konferencija u Hrvatskoj i regiji s kompenziranim emisijama stakleničkih plinova. Ulaganjem u jedinice smanjenja stakleničkih plinova ostvarenih kroz projekte obnovljivih izvora energije i pošumljavanja neutralizirane su emisije dolaska i odlaska sudionika na konferenciju, noćenja, logistike i prostora.

Zahvaljujemo pokrovitelju, sponzorima, članovima Organizacijskog, Znanstvenog i Savjetodavnog odbora, autorima, uvodničarima, panelistima okruglih stolova, moderatorima, sudionicima te svima ostalima koji su pomogli uspješnoj realizaciji prve konferencije ovakvog opsega i teme u regiji!

Dozvolite mi da se posebno zahvalim svim sponzorima bez čije financijske potpore ova konferencija ne bi mogla biti organizirana.

Iako je ovo bila prva konferencija planiramo zadržati štafetu i učiniti ovakve konferencije tradicionalnima.

Marta Brkić,
predsjednica Udruge

It is a great honour and pleasure to welcome you, on behalf of the Croatian Association of Professionals in Nature and Environmental Protection, as its Executive Board President, and to address you with some relevant information.

The Conference was organized under the auspices of the Ministry of Environmental and Nature Protection, and I would like to use this opportunity to thank, on behalf of the Association, the Ministry and especially the Minister, Mr. Zmajlović, for recognizing the importance of the event.

At the beginning, allow me to briefly introduce to you the Croatian Association of Professionals in Nature and Environmental Protection which is the organizer of the event.

The Association was established by well-respected companies and individual experts that work professionally in the field of environmental and nature protection, back in 2004. Currently, it has more than 60 members, companies as well as individual members.

Main aims of the Association that are incorporated in our everyday operations are:

- advancing the expert knowledge and professionalism in performing expert tasks in the field of environmental and nature protection,
- advancing professional ethics,
- cooperating with domestic and international organizations and associations in this interdisciplinary field.

We have made a brave decision to organize a conference so it would bring together: professionals, scientists, authorities' representatives, local and regional government representatives, nongovernmental organizations, public relations experts, investors and developers from Croatia, region and further still, who participate in the environmental impact assessment procedures and who are willing to share their knowledge and experiences.

Today, we can say the Conference was a success because of an exceptionally large number of papers and a surprising number of participants. This makes us, as organizers, especially joyful since it suggests that the topics that were discussed are current and relevant. We thank all of participants for finding time, enthusiasm and financial means to participate at the Conference, especially in these hard times we are all living in.

I believe that we, as the organizers of this gathering, have lived up to your expectations, and that we have shared our knowledge, experiences and opinions on the topics of this conference in a constructive dialogue.

The topics were the following:

- Strategic Environmental Impact Assessment
- Environmental Impact Assessment
- Natura 2000 – Ecologic Network Impact Assessment
- Public participation in the Environmental Impact Assessment procedure
- Environmental protection and project financing

These topics are crucial from the nature and environmental protection perspective, especially given the significant investment potential of the region that has to be planned and realized, while making sure that the quality of nature and environment is protected.

We are witness that in practice there is often a discord between the stakeholders in an environmental impact assessment procedure which delays the entire procedure and introduces uncertainties regarding investment preparation and realization, which is a precondition of economic growth.

One of the main goals of the Conference was to remove communication barriers and increase mutual understanding and trust between the stakeholders, all the while respecting expert knowledge and best practice.

Numerous expert papers, more than 150 of them, which were presented during the Conference as well as theme round tables have brought forth a critical mass of knowledge and best practice that can motivate changes to the better.

We are aware that we must start from ourselves if we wish to change the existing behavioural patterns. This is exactly why this was the first “carbon neutral” conference in Croatia, and the region, which means that all of the greenhouse gas emission from the event were compensated. By investing in greenhouse gas reduction units created through renewable energy resources projects and forestation, emissions of participant transport and lodging, conference logistics and venue were neutralized.

We would like to thank our patron, sponsors, members of the Organizing, Scientific and Advisory Committees, authors, key lecturers, round table panellists, moderators, participants and all others that have contributed to the successful realization of the first conference of such scale and topic in the region!

Allow me to specially thank all sponsors without whose financial support this conference could not be organized.

Even though this was only the first Conference, we plan to keep the positive momentum and make it a traditional event.

Marta Brkić,
Association President

Procjena okoliša danas

Prof.dr.sc. Nenad Mikulć, predsjednik Znanstvenog odbora

U uvodnom izlaganju ću iznijeti pretežno naša iskustva u Republici Hrvatskoj. Držim da nam je mnogo toga zajedničko i da ta iskustva mogu biti od koristi posebno za one naše susjedne i prijateljske države pred kojima je trnovit pristupni put u Europsku uniju.

Procjena utjecaja pojedinačnog zahvata (projekta) - PUO

Prva iskustva bilježimo u SAD, Kanadi , Australiji i Novom Zelandu ranih '70-tih godina prošlog stoljeća, '80-tih godna širi se u Europi koja 1985 godine donosi Direktivu EU EIA Directive 85/337 da bi od '90-tih godina postala globalna i danas se primjenjuje u gotovo svim državama svijeta. I dok se metodološke cjeline postupka od države do države uglavnom bitno ne razlikuju (ocjena o potrebi procjene, određivanje sadržaja studije, opis zahvata i okoliša, opis i vrednovanje utjecaja, predlaganja mjera ublažavanja i programa monitoringa), postupci ocjene Studijske dokumentacije i vrednovanja prihvatljivosti zahvata svaka država uredila je shodno svome pravnom sustavu i stečenim iskustvima. Od detaljno uređenog upravnog postupka u kojemu sudjeluju nositelj zahvata, nadležna tijela, izrađivači studijske dokumentacije i javnosti, a koji završava upravnim aktom o prihvaćanju ili ne prihvaćanju namjeravanog zahvata, do gotovo neobvezatnog suradničkog odnosa nositelja zahvata i njegovog projektanta sa stručnjacima zaštite okoliša i službenicima nadležnih tijela. Na prostoru Europske unije kao i zemljama kandidatima obvezatnom primjenom Direktive postignuto je značajno ujednačavanje postupka, ali naravno da određene razlike i dalje postoje, pogotovo u načinu ocjene zahvata. U Republiku Hrvatsku, kao obvezatan, uvodi se postupak procjene utjecaja na okoliš 1984. godine Pravilnikom o izradi studije o utjecaju na okolinu; pod zakonskog propisa tadašnjeg Zakona o prostornom planiranju i uređivanju prostora. U sklopu usklađivanja zakonodavstva o zaštiti okoliša sa zakonodavstvom EU krajem 2007. donesen je novi Zakon o zaštiti okoliša (nedavno i treći), a sredinom 2008. i dvije nove uredbe kojima je uređeno područje procjene utjecaja na okoliš i sudjelovanja javnosti.

Za razliku od nadležnih tijela Europske unije, nadležna tijela u Hrvatskoj do sada nisu analizirala učinak njihove primjene u praksi s ciljem daljnjeg unapređivanja. Iz različitih, često i potpuno suprotstavljenih perspektiva, oba ova područja kritiziraju pojedini sudionici PUO.

Od prvih početaka do danas izrađeno je preko 2 000 Studija i provedeno isto toliko postupaka. Što o kvaliteti tog za zaštitu okoliša temeljnog instrumenta misle dionici pokazuje istraživanje koje je Hauska & Partner u okviru partnerske suradnje s Hrvatskom udrugom stručnjaka za zaštitu prirode i okoliša organizirala u razdoblju od 24.5. do 1.7.2013. s ciljem istraživanja stavova relevantnih sudionika u pojedinim pitanjima PUO i sudjelovanja javnosti. Dobiven je prvi cjeloviti uvid u kojoj mjeri PUO u Hrvatskoj doprinosi donošenju kvalitetnijih odluka a što je, kako navodi Barry Sadler (2006), pravi 'lakmus test' za sagledavanje učinkovitosti i uloge PUO na donošenje kvalitetnijih odluka.

Primjetno je i različito razumijevanje svrhe PUO među različitim skupinama, ima li ishod postupka PUO isključivo ulogu savjeta za donositelja odluka, ili pak može poslužiti i kao sredstvo okolišnog 'veta' za pojedine projekte, odnosno mjeri li se uspješnost sudjelovanja time što je naprosto omogućeno veće sudjelovanje javnosti ili

time što je rezultiralo nedvojbeno boljim odlukama. Ova dilema prisutna je i u trenažnim materijalima UNEP 2002.

Istraživanje je također potvrdilo visoku razinu kompleksnosti PUO, posebno društvene, jer su stavovi sudionika o mnogim pitanjima oprečni, što posredno upućuje i na značajne razlike u vrijednostima i/ili dijagnozi pojedinih problema u praksi. Rješenje stoga nije u pronalaženju pojedinačnih brzinskih rješenja za pojedine nedostatke, a bez sagledavanja međusobnih poveznica i mogućih nenamjeravanih posljedica takvih rješenja. Rješenje je u organiziranju procesa koji će omogućiti dublje sagledavanje različitih perspektiva, motiva i šireg konteksta donošenja odluka i usmjeriti se na pronalaženje onih rješenja koja će unaprijediti djelotvornost PUO u cjelini, a ne neke njegove pojedine nedostatke.

Strateška procjena na okoliš plana i programa (SPUO)

Negdje prethodno, negdje usporedno, a negdje iz Procjene utjecaja na okoliš pojedinačnog zahvata razvija se i postupak Strateške procjene utjecaja na okoliš politika (strategija), plana, programa, pravnih propisa. Zamišljen je kao elastični i mekani oblik suradnje pri izradi i donošenju tih dokumenata, njihovih izrađivača, stručnjaka zaštite okoliša i drugih sektora te javnosti.

Također, prisutna u velikom broju zemalja svijeta ova procjena razvija se kao temeljni instrument održivog razvitka. Autori navode uglavnom dva pristupa:

- Strateška procjena provodi se u tijelima nadležnim za zaštitu okoliša gdje se u suradnji s drugim sektorima razmatraju pitanja zaštite okoliša, te gospodarska i društvena pitanja,
- Strateška procjena svakog od tri pitanja održivog razvitka provodi se u suradnji s tijelima nadležnim za pojedini sektor, a koordinacija i sinteza odvija se u nezavisnoj instituciji ili tijelu.

U države Europske unije uvodi se 2001. godine SPUO Direktiva (SEA Directive 2001/42/EC) i tu direktivu prenose u svoj pravni sustav sve države EU i sve države pristupnice EU. U paneuropskom prostoru UNECE uvodi se kroz Protokol o strateškoj procjeni Espoo konvencije u Kijevu 2003. godine.

Spomenimo na ovome mjestu i Sofijsku inicijativu o EIA (1995-2003) koju je vodila Republika Hrvatska uz logističku potporu REC-a i često uz suradnju s WHO. Kroz Sofijsku inicijativu razmjenjivala su se iskustava između država istočne i jugoistočne Europe. Sofijska inicijativa posebnu pažnju posvećivala je SPUO i time pridonijela razumijevanju tog instrumenta i dala snažnu podršku inicijativama za pravno uređenje postupka SPUO.

Republika Hrvatska SPUO uvodi pri transpoziciji Acquisa u hrvatski pravni sustav Zakonom o zaštiti okoliša te podzakonskim propisima. Prenosi se i Direktiva o staništima (Habitat Directive 92/43/EEC) te se ratificira i Aarhuška konvencija. Ratificiran je također Protokol o SPUO Espoo konvencije. Strateška procjena uređena je kao objedinjeni postupak s postupkom prema Direktivi o staništima.

Uveden je u odnosu na druge države relativno kasno i do sada je provedeno, ili je u postupku, svega 10-tak strateških procjena. Iskustva pokazuju da nije postignuta osnovna svrha postupka, a to je tijekom izrade plana i promišljanja varijanti, suradnja izrađivača plana sa stručnjacima zaštite okoliša i s javnosti. Kako se radi isključivo o

dokumentima koje izrađuju tijela državne uprave, regionalne i lokalne samouprave odabir izrađivača Strateških studija obavlja se putem javne nabave. Kad se zbroje sve aktivnosti od odluke do kraja postupka dobiva se preko 400 dana trajanja postupka. Međutim niti to ne bi trebao biti razlog očito, blago rečeno, nevoljkog prihvaćanja obveze njegove provedbe. Na ovome mjestu bilježimo neke od pojava na koje svakako treba obratiti pažnju; nepoznavanje obveza, a pogotovo prednosti provedbe SPUO pri izradi prijedloga odgovarajućih dokumenata, izbjegavanja provedbe postupka, nedostatna komunikacija između sudionika, nedostatna edukacija sudionika, kasno i nedovoljno uključivanje javnosti u postupak, nedovoljno razvijene podloge plana i programa koje se koriste u izradi strateških studija, nedovoljno jasan postupak vezano za utvrđivanje prevladavajućeg javnog interesa i kompenzacijskih uvjeta za planove/programe...

Niti udruge civilnog društva („zeleni“) nisu prepoznale taj postupak kao područje svog djelovanja. Radije se fokusiraju na pojedinačne projekte gdje je poznat investitor i gdje se lakše mobilizira javnost.

Kako se sa Strateškom procjenom tj. izradom Strateške studije kreće u ranoj fazi izrade dokumenta (plana, programa…), dakle često tek prvim nacrtom, logična je stalna suradnja s izrađivačima dokumenta. Nažalost to je vrlo često usporedan, a katkad i postupak koji dokument procjenjuje u visokoj fazi njegove gotovosti.

Do tog zaključka dolazi i Stenek i sur. u radu s ove Konferencije. Autori su analizirali postupak Strateške procjene jedne županije i pratili su mjere i uvjete zaštite prirode i ciljeva očuvanja prema Direktivi o staništima. U konačnu inačicu plana ugrađene su samo mjere i uvjeti dani po posebnom propisu, a iz SPUO postupka nije ugrađen niti jedan uvjet/mjera. Samo monitoring i istraživanja!?

Operativni program za okoliš temeljni je programski dokument za povlačenje sredstava EU fondova koja su namijenjena za provedbu kohezijske politike Europske unije u sektoru okoliša u Republici Hrvatskoj. OP se prvenstveno veže na ciljeve i prioritete Nacionalnog strateškog referentnog okvira (NSRO) koji predstavlja temeljni referentni instrument za programiranje EU fondova u području kohezijskih i regionalnih politika. OP doprinosi postizanju općeg cilja NSRO-a, odnosno „ubrzavanja gospodarskog rasta i poticanja zapošljavanja kako bi se postigla stvarna konvergencija“. Provedba OP-a će štoviše doprinijeti trima strateškim ciljevima NSRO-a, te će izravno utjecati na Tematski prioritet 2 NSRO-a: Unapređenje okolišne infrastrukture i kakvoće vezanih usluga.

Razvidna su dva problema:
Prvo, postupak izrade SPUO za OP 2014.-2020. započeo je, kao i obično, prekasno što može dovesti do nekvalitetne SPUO te drugo, ne postoji Operativni program za okoliš koji treba usvojiti, već samo krovni OP iz područja kompetitivnosti i kohezije, što može dovesti da gospodarski razvoj zasjeni načela zaštite okoliša.

Pošaljimo poruku s ove Konferencije svim nadležnim tijelima da je SPUO ne samo obvezujući postupak, već i postupak koji u ranoj fazi izrade planskih i programskih dokumenta osigurava uravnotežen održivi razvitak. Zbog toga, posebno u izradi SPUO za OP 2014.-2020. moraju uključivati vodeći međunarodni i domaći stručnjaci i primjenjivati najbolje tehnike i modeli.

Kontrola kvalitete i monitoring

Prema Direktivi u PUO štete okolišu trebaju se kontrolirati na izvoru tj. u najranijoj fazi planiranja i odlučivanja treba se voditi računa o utjecajima zahvata na okoliš. Tu se postavlja nekoliko osnovnih pitanja. Koja je uloga PUO ako se tako i tako svi standardi okoliša moraju zadovoljiti? Da li PUO unapređuje projekt ili samo ispravlja najveće greške? Što je u stvari „*good practice*"? Da li ste ikada bili pohvaljeni za dobar posao u PUO? Da li se studije o utjecaju na okoliš izrađuju da bi se dobile kvalitetne informacije, temeljem kojih će se donositi odluke ili je svrha da se unaprijedi projekt namjeravanih zahvata? To nije isto! Idealno bi bilo oboje, ali danas je naglasak uglavnom na procjenu utjecaja i mjere ublažavanja. Pitanja koja slijede; Koliko Studija o utjecaju na okoliš se zaista bave istraživanjima opcija projektnih rješenja: lokacijama, materijalima i korištenim resursima... Nisu li mnoge važne odluke vezane uz projektna rješenja u stvari donesene prije PUO što taj postupak i proces pretvara i birokratsku provjeru na kraju priče. Kao bi mogli unaprijediti taj proces? J.Dusik i N.Mikulić na nedavnom sastanku u Wroclawu, gdje su raspravljani prijedlozi amandmana na Direktivu o PUO, dali prijedlog da se u PUO razmisli o mogućim dobrim iskustvima primjene Direktive o objedinjenim uvjetima zaštite okoliša (OUZO). OUZO daje informacije o utjecajima i nudi najbolje referencirane tehnike kao rješenje. U usporedbi s PUO, OUZO je više proaktivan. Rasprave o referenciranim tehnikama i tehnologijama inspiriraju i unapređuju projekt. Te rasprave vrlo su korisne za raspravu s poduzetnicima i zainteresiranom javnosti.

Nameće se stoga pitanje: Da li postoji mogućnost uvođenja obvezatne usporedbe predloženih rješenja s najboljim referenciranim rješenjima u PUO? Takove reference mogle bi se lako uspostaviti za niz tipova razvojnih projekata; supermarketi, autoceste, vjetroparkovi... RDNRT („*BREF*") tip alternativa mogao bi biti korišten i u postupku određivanja sadržaja studije.

I sada dolazimo do pitanja koje često postavljaju udruge civilnog društva tražeći „nezavisnu izradu i ocjenu studije". Tko je najvjerodostojniji/najkompetentniji za ocjenu kvalitete studijske dokumentacije i ocjenu prihvatljivosti namjeravanog zahvata? Nadležna tijela uprave? Nezavisni stručnjaci koji nisu radili na izradi SUO? Udruge civilnog društva ili stručno povjerenstvo?

Treba znati da u većini država svijeta ocjena namjeravanog zahvata kroz PUO je zakonom uređeni postupak uglavnom u nadležnosti tijela nadležnog za okoliš. Postupak je uređen na način da nositelj zahvata temeljem SUO procjenjuje utjecaje i uvjerava državu da namjeravani zahvat neće imati značajne negativne utjecaje na okoliš. Država to provjerava jednim od gore opisanih načina. Rješenja u praksi su naravno različita. U Hrvatskoj to je povjerenstvo sastavljeno od predstavnika nadležnih tijela, predstavnika stručnih i znanstvenih institucija i predstavnika lokalne i regionalne samouprave. U Italiji npr. to je su od države ugovoreni nezavisni stručnjaci koji u timovima sastavljenim za svaku SUO daju svoje mišljenje. Za vrijeme trajanja ugovora s državom ne mogu izrađivati SUO ili obavljati neke druge poslove koji bi bili konfliktni s njihovom zadaćom.

Pravni sustav u kojemu se danas provodi postupak PUO zahtjeva izbalansirani pristup u razini zahtjeva prema SUO. Nisu dobre pojave da, pogotovo kod danas novog instrumenta ocjene prema Direktivi o staništima, autori pojedinih poglavlja, često ugledni znanstvenici i nastavnici na Sveučilištu, koji su izvanredni taksonomi i poznavatelji neke skupine životinja ili biljaka ili ekologije neke vrste, svode svoj doprinos na nabrajanje vrsta, bez da su si dali truda da nauče što znače „ciljevi

očuvanja“ i mjere njihove zaštite. S druge strane pojedinci iz redova državnih institucija postavljaju visoke znanstvene kriterije primjerene izradi vrhunskih znanstvenih radova. Očekivali smo danas da ćemo na ovome našem skupu, nesumnjivo najznačajnijem stručnom i znanstvenom događanju u regiji na području PUO i ocjene prema Direktivi o staništima, imati prilike da vidimo i njih i njihove radove.

Pitanje kvalitete i vjerodostojnosti SUO ovisi o nizu činitelja, ali svakako su na prvom mjestu poslovni moral i stručnost ovlaštenika, realna cijena studije i dostupnost podataka. No izgleda, sudeći prema iskustvima Republike Poljske, jedne od najsposobnijih država za povlačenje sredstava iz fondova EU, najučinkovitiji instrument garancije kvalitete SUO je diskreciona ocjena Europske komisije odnosno istaknutih financijskih institucija. Ako su oni ocijenili da SUO nema zadovoljavajuću kvalitetu, da nije bilo Strateške procjene, da javnosti nije bila uključena na odgovarajući način, da Direktiva o staništima nije primijenjena na odgovarajući način, da nisu obavljene konzultacije prema Espoo konvenciji... i to bez obzira na provedenu nacionalnu zakonsku proceduru, uskratili su financiranje projekta. Uvidjevši da je kvaliteta nužna investitori – nositelji zahvata počeli su tražiti najkvalitetnije izrađivače SUO.

Kad govorimo o podacima, danas preko 20 godina kako je Vlada Republike Hrvatske prihvatila prvi prijedlog uspostave informacijskog sustava, tada za prostor i okoliš, nikako ne možemo biti zadovoljni javno dostupnim bazama podataka. Tamo podataka valjanih za izradu SUO uglavnom nema ili nisu uređeni na način da se mogu koristiti u tu svrhu ili zahtijevaju veliki angažman visoko obrazovanih državnih službenika prenatrpanih poslom da ih u nesređenim bazama pronađu. Nadalje negdje se je država obvezala kroz pravne propise da će osigurati podatke (kao npr. o Ekološkoj mreži odnosno budućoj NATURI 2000), a tih podataka nema ili su zastarjeli i nevjerodostojni. I sada dolazi do situacije da oni koji bi trebali dobiti podatke temeljem kojih će obavljati procjene svojih zahvata, moraju obavljati detaljna, a često i proširena istraživanja, a oni koji su trebali osigurati podatke ocjenjuju kvalitetu tih istraživanja.

Nažalost taj bogati fond podataka iz SUO iz raznih razloga uglavnom se ne unosi u javno dostupne baze podataka iako su pribavljeni od, po državi, akreditiranih ovlaštenika. To često dovodi do toga da se istraživanje istih područja više puta plaća istim ljudima, a za potrebe različitih investicija.

Monitoring je instrument ne samo kontrole predviđanja i procjena izvršenih pri izradi SUO već postaje aktivni instrument korekcije i donošenja novih odgovarajućih mjera zaštite okoliša i prirode. Nadalje dobiveni rezultati bi trebali doprinijeti obogaćivanju baza podataka. Kvalitetne javno dostupne baze podataka kako o okolišu tako i SUO nužan su preduvjet za kvalitetne procjene pogotovo procjene sinergije s postojećim ili planiranim zahvatima kako u Strateškoj procjeni tako i u obuhvatu namjeravanog zahvata. I ovdje moramo ukazati na činjenicu da je Zakonom o zaštiti okoliša iz 2007. godine uređeno da se podaci dobiveni monitoringom propisanim kroz postupak PUO dostavljaju Agenciji za zaštitu okoliša. Do danas, prema našem saznanju, niti jedan takav podatak nije niti dostavljen niti unesen u odgovarajuće baze AZO.

Ocjena prihvatljivosti za Ekološku mrežu

Tu za Hrvatsku ne bi trebali biti neki novi izazovi. Trebamo iskoristiti to što smo, za razliku od drugih EU zemalja, imali OPEM postupak gotovo 6 godina prije ulaska i „vježbali se“, odnosno trebamo iskoristiti činjenicu što već 6 godina provodimo članak 6 Direktive o staništima, samo na nacionalnoj ekološkoj mreži. Postupak se zbog Nature 2000 neće korijenski mijenjati. Ali su se kroz godine nakupili problemi koje treba

prepoznati i naći rješenja, odnosno proučiti i primijeniti rješenja drugih, nama bliskih država. S nacionalnom ekološkom mrežom smo naučili puno toga. Idemo sada s Naturom bit pametniji.

Ono što nas čeka, a što moramo napraviti za Naturu jest zonacija i to ne ona u smislu upravljanja, već ona o rasprostranjenosti vrsta unutar Natura 2000 područja. Naime, naša Natura 2000 područja su jako velika, neka vrlo heterogena i često imaju hrpu ciljnih vrsta i staništa. Te vrste i staništa najčešće nisu prisutne na cijeloj površini područja, već samo u određenim dijelovima pa ovakva zonacija (koju npr. ima Slovenija i Danska) omogućuje bržu procjenu koja se koncentrira na ciljne vrste prisutne na samom području zahvata.

Danas možemo ocijeniti da postoji dio mjera ublažavanja koje predlažemo i propisujemo, a da iskreno nismo sigurni u njihovu učinkovitost. Zbog toga se moramo usmjeriti na praćenje učinkovitosti mjera ublažavanja koje se propisuju i u skladu s rezultatima ih prilagođavati. Pri tome programi praćenja moraju se usmjeriti na onu ciljnu vrstu na koju zahvat ima ili može imati značajan utjecaj.

Kompenzacijske mjere su sigurno najosjetljivije pitanje postupka OPEM. I na njih smo najmanje spremni. Nije tajna da se te mjere u zemljama EU nastoje nadomjestiti mjerama ublažavanja. Mislim da ćemo i mi morati tome pribjegavati jer je kompenzacija nešto što svi želimo izbjeći. Ako i nađemo zamjensko područje na kojem bi npr. umjetno stvarali neko stanište javlja se niz otvorenih pitanja; u čijem je vlasništvu zemljište, što je tu predviđeno prostorno-planskom dokumentacijom, mora li se mijenjati prostorni plan, mora li se nekoga obeštetiti za taj prostor… A da bi uopće do nje došli, moramo sukladno Direktivi i tumačenjima Europskog suda pravde - ECJ-a, biti sigurni da nema alternativa za postizanje cilja zahvata, a koje bi bile manje štetne od samog zahvata. Da li je zaista na nositelju zahvata ili ovlašteniku da dokazuje nepostojanje alternativnih rješenja ili npr. da je alternativa za novu autocestu povećanje kapaciteta obližnjeg aerodroma?

Procjena utjecaja zahvata na Ekološku mrežu bremenita je nedostatkom znanja, iskustva, pa i razumijevanja postupka kod svih dionika. Ovlaštenici (izrađivači SUO) traže i mole da se organiziraju radionice na kojima bi se raspravila problematična pitanja i pokušala zajedno naći rješenja. Uz sve razumijevanje za nedostatak ljudskih resursa držimo da bi edukacija dionika i sebe samih morala bi biti jedna od glavnih obveza i aktivnosti onih u čijoj je postupak nadležnosti. Rokovi su novim zakonima skraćeni, država se kune u investicije i ubrzavanje postupaka. Nije dovoljno rješavati samo administrativne prepreke. Jednako ako ne i veća prepreka je nedostatak znanja i nerazumijevanje postupaka, kao i mogućih šteta koje iz toga proizlaze.

I na kraju valja reći da to što govorimo o problemima govorimo zato da potaknemo raspravu i razmjenu iskustava svih danas prisutnih sudionika. Zbog toga smo sigurni da ćemo s ove Konferencije otići zadovoljni, obogaćeni s novim spoznajama i mogućnostima.

Environmental assessment at present

Professor Nenad Mikulć, PhD, Scientific Committee Chair

Although in this introductory speech I will talk mainly about our experiences in the Republic of Croatia, I believe that we have a lot in common and that this experience is valuable for our neighbouring countries that have yet to walk the challenging accession path on their way to the European Union.

So, let us begin with the

Impact assessment of individual interventions (projects) - EIA

The first recorded examples date from the early 1970s in the USA, Canada, Australia and New Zealand, in the 1980s it spread through Europe and in 1985 the EIA Directive 85/337/EEC was adopted; since the 1990s the impact assessment has become a global phenomenon and today it is applied in most world countries. While methodological units of the procedure do not differ significantly from state to state (screening, scoping, description of the project and the environment, description and evaluation of impacts, proposing mitigation measures and monitoring programme), the assessment of the Study documentation and evaluation of impact of the project are regulated by each country in accordance with its legal system and experience; from a thorough administrative procedure which includes the developer, competent authorities, practitioners and the public, which is concluded with an administrative act either accepting or rejecting the planned project, to almost optional cooperative relationship of the developer and his project designer with environmental experts and competent authorities' staff. Mandatory application of the Directive in the territory of the EU and candidate countries resulted in significant unification of the procedure, although certain differences persist, especially in the assessment of the project. In 1984, the Republic of Croatia introduced the environmental impact assessment as mandatory in the Ordinance on preparation of the environmental impact study; a subordinate regulation under the then Physical Planning and Zoning Act. In the framework of harmonisation of environmental protection legislation with EU legislation, in late 2007 the new Environmental Protection Act was adopted (and the third one just recently), while in mid-2008 two new regulations were adopted governing the field of environmental impact assessment and public involvement.

Unlike the competent EU authorities, the competent authorities in Croatia have yet to analyse the effect of their application in practice with a view to further improvement. On account of different, often completely opposite perspectives, both these areas are criticised by certain participants in the EIA process.

From the start to the present day, more than 2,000 studies have been prepared and as many procedures carried out. What the stakeholders think of the quality of this fundamental environmental instrument is shown in research conducted by Hauska & Partner within the partner cooperation scheme with the Croatian Association of Professionals in Nature and Environmental Protection in the period from 24th May to 1st July 2013, aimed at examining the attitudes of the relevant participants regarding certain Environmental Impact Assessment (EIA) considerations and public involvement. The first comprehensive insight was obtained regarding the extent to which the EIA procedure in Croatia contributes to quality decision-making which is, citing Barry

Sadler (2006), a proper 'litmus test' for the performance and impact of EIA on making higher quality decisions.

Different perception of the purpose of EIA is noticed among different groups, and whether the outcome of the EIA process is only advisory to the decision maker, whether it could serve as an environmental 'veto' on certain projects, i.e. is the success of participation measured by simply allowing a higher degree of public involvement or by resulting in an undoubtedly better decision. This dilemma is also present in the UNEP 2002 training material.

The research also confirmed that the EIA procedure is highly complex, especially in social terms, as the attitudes of participants on many issues are conflicting, which indirectly indicates significant differences in values and/or identification of certain problems in practice. Thus, the solution is not in finding individual rapid solutions to certain deficiencies without considering the links and potential consequences of such solutions. The answer is to organise the process that will allow an in-depth consideration of different perspectives, motives and a wider context of decision-making, and focus on finding such solutions that will improve the efficiency of the overall IEA, not only some of its shortcomings.

Strategic Environmental Assessment of plans and programmes (SEA)

The procedure of Strategic Environmental Assessment of policies (strategies), plans, programmes and legislation was developed in some places prior to, in some concurrent with and in others it resulted from the Environmental Impact Assessment of individual projects. Envisaged as a flexible form of cooperation between the persons preparing the documents, environmental experts and other sectors and the public, for the purpose of preparing and adoption of the above documents.

This type of assessment, employed in a large number of countries worldwide, is evolving as the fundamental instrument of sustainable development. The authors mainly list two approaches:

- Strategic assessment is carried out by the authorities responsible for environmental protection and, in cooperation with other sectors, environmental considerations are examined, as well as economic and social issues,
- Strategic assessment of each of the three sustainable development issues is conducted in cooperation with the authorities responsible for the respective sector, while coordination and integration is carried out by an independent institution or body.

In 2001, the EU passed the SEA Directive (*2001/42/EC*), which was transposed into the legal systems of all EU Member States and acceding countries. It was introduced in the pan-European area UNECE by means of the Protocol on Strategic Environmental Assessment to the Espoo Convention in Kiev in 2003.

Let us also mention the Sofia EIA Initiative (1995-2003), which was headed by the Republic of Croatia with the organisational assistance from REC, often in cooperation with WHO. The Sofia Initiative helped to exchange experiences among Eastern and South-eastern European countries. The Sofia Initiative paid special attention to the SEA process thus contributing to a better understanding of this instrument and providing strong support to the initiatives for legal regulation of the SEA procedure.

The Republic of Croatia introduced the SEA in the process of transposition of the *acquis communautaire* in the Croatian legal system with the Environmental Protection Act and subordinate legislation. The Habitats Directive (Directive 92/43/EEC) was also transposed and the Aarhus Convention ratified. In addition, the SEA Protocol to the Espoo Convention was ratified. The Strategic Environmental Assessment is regulated as an integrated process following the procedure under the Habitats Directive.

In comparison to other states, it was introduced relatively late and so far only around 10 strategic environmental assessments have been completed or are under way. Experience shows that the main purpose of the procedure has not been achieved, which is the cooperation of the authors of the plan with environmental experts and the public during the preparation of the plan and while examining all possibilities. As these are specifically the documents prepared by the state administration bodies and local and regional self-government bodies, the selection of authors preparing Strategic Studies is conducted in a public procurement procedure. Once all activities are summed up, from the decision to the end of the procedure, the resulting duration is more than 400 days. However, not even this should not be the reason for the obvious – to put it mildly – reluctance to accept the obligation of its implementation, so here are some noteworthy facts; not being familiar with the obligations and particularly the advantages of the SEA implementation in preparing proposals for relevant documents, avoiding the procedure, insufficient communication between the participants, insufficient education of the participants, late and deficient public involvement in the procedure, inadequately developed plan and programme background documents to be used in drawing up strategic studies, unclear procedure in relation to establishing the overriding public interest and compensation measures for the plans/programmes...

Neither have civil society associations ("the Greens") recognised this procedure as a field of their activity. Instead, they focus on individual projects where the investor is known and the public is more easily mobilised.

Since the Strategic Environmental Assessment, i.e. drafting of the Strategic study, starts in the early stage of preparation of the documents (plan, programme…), meaning often having only the initial draft, it would be logical to have continuous cooperation with the authors of the document. Unfortunately, it is often a parallel procedure, sometimes assessing the document when it is almost completed.

This conclusion is reached by Stenek *et al.* in the course of this Conference. The authors analysed the SEA procedure in one county, they monitored environmental measures and conditions and environmental protection objectives under the Habitats Directive. The final version of the plan incorporates only the measures and conditions under the special regulation, and not a single condition/measure under the SEA procedure. Only monitoring and research!?

The Environmental Operational Programme is the fundamental programming document for withdrawing the resources from EU funds earmarked for the implementation of the EU cohesion policy in the environmental sector in Croatia. The OP primarily relies on the objectives and priorities of the National Strategic Reference Framework (NSRF), which is the basic reference tool for EU funds programming in the area of the Cohesion and regional policies. The OP contributes to achieving the general objective of the NSRF, i.e. "acceleration of economic growth and fostering employment to support actual convergence". Moreover, the implementation of the OP will contribute to the

three strategic objectives of the NSRF, and it will directly influence the NSRF Priority 2: Improving the environmental infrastructure and quality of related services.

Two problems are quite obvious:
First, the SEA preparation procedure for the OP 2014 – 2020 started too late, as usual, which can result in low quality SEA.
Second, there is no Environmental Operational Programme to be adopted but only the umbrella OP in the areas of competitiveness and cohesion, which can lead to economic development overshadowing environmental protection principles.

Let us send a message from this Conference to all competent authorities that the SEA is not only a binding process, but also the process which, in the early phase of preparation of plans and programmes, provides for balanced sustainable development. On account of this, and in particular for preparing the SEA for the 2014-2020 Operating Programme, the leading international and national experts must be included and the best techniques and models applied.

Quality control and monitoring
Under the EIA Directive adverse effects on the environment have to be controlled at source, i.e. the impact of a project on the environment should be considered at the earliest stage of planning and decision-making. Several important questions should be asked here. What is the role of EIA if all environmental standards have to be met anyway? Does the EIA improve the project or simply rectifies the biggest mistakes? What is actually "good practice"? Have you ever been praised for a job well done in the EIA? Are environmental impact studies prepared in order to get quality information as the basis for making decisions, or is their purpose to improve the planned project? These two are not one and the same! Both would be ideal, but nowadays the focus is mainly on impact assessment and mitigation measures. So, the following questions are raised: How many environmental impact studies are really concerned with analysing design solution options: locations, materials and used resources... Aren't many important decisions related to project solutions actually adopted before the EIA, which turns this process into a bureaucratic verification at the end of the road? How could this process be improved? In a recent meeting held in Wroclaw discussing the proposals of amendments to the EIA Directive, J. Dusik and N. Mikulić suggested that the EIA should consider favourable experiences of applying the IPPC Directive. The IPPC provides information about the impacts and offers the best-referenced techniques as solution. In comparison to the EIA, the IPPC is more proactive. The discussions about the referred techniques and technologies are inspiring and they enhance the project. These discussions are very useful for debating with the businesses and interested public.

Subsequently, the question arises: Is there a possibility to introduce mandatory comparison of proposed solutions with the best-referenced solution in the EIA? Such references could easily be established for a number of different types of development projects; supermarkets, highways, windfarms... The BREF-type alternative could also be used in the process of scoping.

And here we come to the question often put forward by the civil society organisations calling for an "independent preparation and assessment of the study". Who is the most trustworthy/most competent to assess the quality of the study document and evaluate the acceptability of the planned project? The competent administrative bodies? Independent experts who did not participate in the preparation of the EIA? Civil society organisations or an expert committee?

We have to be aware that in the majority of countries worldwide the assessment of the planned project by means of an EIA is the process regulated under the law and is mainly in the scope of the environmental authority. The procedure is regulated so that based on the EIA study the developer estimates the impacts and tries to convince the state that the planned project will not have significant adverse impacts on the environment. The state verifies this using one of the above methods. In practice, the solutions are varied. In Croatia, this is a committee consisting of the representatives of competent bodies, representatives of professional and scientific institutions and local and regional self-government representatives. In Italy, for example, these are independent experts commissioned by the state and nominated into teams formed for each EIA study to give their opinion. During the contract with the state they cannot prepare EIA studies or perform any other tasks that could be in conflict with their assignment.

The legal system under which the EIA is conducted calls for a balanced approach at the level of requirements for the EIA studies. It is not really proper that, especially with the currently new assessment instrument under the Habitats Directive, the authors of certain chapters, quite often renowned scientists and university lecturers, who are exceptional taxonomists and an authority on a certain type of fauna or flora or ecology, reduce their contribution to itemising the species without making any effort to learn what "qualification features" and measures to protect them really mean. On the other hand, some people in the state administration institutions set such high scientific criteria appropriate for preparing superior scientific papers. Hence, it was our expectation that here today, at this Conference, which is undoubtedly the most important professional and scientific event in the region concerning the EIA procedure and evaluation pursuant to the Habitats Directive, we would have the opportunity to see their work as well.

The issue of quality and authenticity of the EIA studies depends on a number of factors, but in the first place on the business morals and expertise of the developer, the realistic price of the study and availability of data. It seems, however, judging by experience of the Republic of Poland, one of the most successful countries in withdrawing the resources from EU funds, that the most effective guarantee of the quality of the EIA study is the discretionary evaluation of the European Commission and prominent financial institutions. If they judge that the quality of the EIA study is not acceptable, that there was no strategic assessment, that the public was not adequately included, that the Habitats Directive was not appropriately applied, that consultations were not conducted pursuant to the Espoo Convention…. regardless of compliance with the national legal procedure, they deny financing to the project. Seeing that quality was indispensable the investors – developers started looking for the highest quality authors to prepare the EIA studies.

When we speak about the data today, more than 20 years after the Government of the Republic of Croatia approved the first proposal to set up the IT system for certain locations and the environment, we cannot be satisfied with the publicly available databases. In general, these databases do not contain valid data for preparing the EIA studies, nor are organised in the manner to be used for this purpose, or they require a high level of involvement on the part of highly qualified and overburdened civil servants to find them in disorganised databases. Moreover, in some cases the state pledged in legal acts that it shall provide the data (for example, on the Ecological Network, i.e. the future NATURA 2000), but these data are not available or are obsolete and not authentic. And then we come across the situation where those who should obtain the data as the basis for the assessment of their project, they have to carry out

detailed and often extended analysis, while those who should provide the data evaluate the quality of such research.

Unfortunately, the ample data from the EIA studies are, for various reasons, mostly not entered into publicly available databases, although they are obtained from authorised persons accredited by the state. This often leads to having the analysis of one and the same location paid several times over to the same people for the purposes of different investments.

Monitoring is an instrument not only for controlling predictions and assessments in the process of the EIA, but it becomes an active instrument for correcting and adopting the relevant environmental and nature protection measures. Moreover, the results obtained should contribute to improving the databases. Quality publicly available databases on the environment and the EIA studies are the prerequisite for quality assessment, especially of compliance with the existing or planned projects in the Strategic Environmental Assessment and the scope of the planned project. It should be underlined at this point that the 2007 Environmental Protection Act regulates that the data obtained through monitoring laid down in the EIA procedure are submitted to the Environmental Protection Agency (EPA). So far, at least to our knowledge, no such data were either submitted or entered in the relevant EPA databases.

Appropriate assessment for the Ecological Network

No new challenges for Croatia here. We should make use the fact that, unlike other EU countries, we had the Appropriate Assessment procedure in place for almost 6 years before the accession and we had "practice"; this means that we should make use of the fact that for 6 years we had been implementing Article 6 of the Habitats Directive, only on the National Ecological Network. The procedure will not be fundamentally changed on account of Natura 2000. However, over the years problems have accumulated so they have to be identified and solutions found, i.e. they should be examined and solutions employed by the countries in our vicinity applied. We have learned a lot through the National Ecological Network; let us be smarter with Natura.

What we have to face – and what we have to implement under Natura – is zoning, although not in the sense of management but in the sense of distribution of species within the Natura 2000 area. Croatia Natura 2000 areas are very large; some are very heterogeneous and often contain a number of target species and habitats. These species and habitats are often not distributed across the entire area but only in some of its parts, so this type of zoning (as applied Slovenia and Denmark), provides for faster assessment concentrated on the target species present on the very location of the project.

Nowadays we can assert that some mitigation measures are proposed and laid down without being entirely confident of their effectiveness. Due to this we have to focus on monitoring the set mitigation measures and adjust them according to the results. At the same time, the monitoring programmes have to be focused on the target species which could suffer the most significant impacts from the project.

The compensatory measures are surely the most sensitive issue of the Ecological Network Impact Assessment (ENIA) procedure. And we are least prepared for them. It is no secret that EU countries made an attempt to replace these measures with mitigation measures. I believe that we will also have to resort to this because compensating is something we all want to avoid. Even if we find a substitute area were we could, for example, artificially create a habitat, a series of open issues arise; ownership of the land,

what do physical planning documents envisage at the location, does the spatial plan have to be changed, does someone have to be indemnified for this land… And in order to have it in the first place, in compliance with the Directive and interpretation of the European Court of Justice – the ECJ – we have to be sure that there is no alternative to achieving the project target that would be less harmful than the project itself. Is it really the obligation of the developer or authorised person to prove the nonexistence of the alternative solution or, for example, that the alterative for the new highway is to increase the capacity of the nearby airport?

Ecological Network Impact Assessment of the project is replete with the lack of knowledge and experience, and even understanding of the procedures by all stakeholders. Practitioners (authors of the studies) require and plead to have workshops organised where problematic issues would be discussed and solutions found through joint effort. Although we have understanding for the lack of human resources, we believe that training of stakeholders and ourselves should be one of the main obligations and activities of those who are responsible for the procedure. The new acts reduced the deadlines and the state is promising new investments and speeding up the procedure. It is not sufficient to resolve only administrative barriers. Equally, if not an even larger obstacle is the lack of knowledge and incomprehension of procedures and potential damage that could result from them.

And finally, it has to be emphasised that the fact we are considering the problems is aimed at encouraging the debate and exchange of experiences between all participants. Because of this we are sure that we will leave this Conference satisfied, with new knowledge and aware of the possibilities we have at our disposal.

SEKCIJA 1 / SECTION 1

STRATEŠKA PROCJENA UTJECAJA NA OKOLIŠ / STRATEGIC ENVIRONMENTAL IMPACT ASSESSMENT

The Use and Effectiveness of SEA in Slovenia

Aleš Mlakar

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Abstract

The paper presents a research project, the purpose of which is to obtain an estimate of what Slovenia has achieved so far regarding the implementation of SEA. Criteria system relates to the substantive efficiency and procedural effectiveness of SEA. SEA in some cases exceeds a verification procedure and becomes an optimization activity, which aims to plan modification/change in a way that causes the least impact on the environment. On the other hand, the practice is still associated with misunderstanding of the purpose of SEA, with a number of conflict situations. Results of the project are the recommendations for SEA to be more effective.

Key words: SEA, efficiency, effectiveness, good practice, legal framework

Introduction

The paper presents a research project "The Use and Effectiveness of Strategic Environmental Assessment" (Mlakar et al, 2012) commissioned by the Slovenian Research Agency, Ministry of Environment and Spatial Planning and Ministry of Health and prepared by the University of Ljubljana, Biotechnical Faculty, Department of Landscape Architecture, Jozef Stefan Institute and Aquarius ekološki inženiring d.o.o. The lead authors are Alenka Cof, Branko Kontić, Aleš Mlakar, Bojanka Štern, Lea Trnovšek and Martin Žerdin.

In 1970s Slovenia was one of the leading states (pioneers) in the field of assessment of impacts on environment. Full swing was a result of studies of alternatives and assessment of impacts on the environment concerning several infrastructure projects in late 90-ties. Implementation of SEA Directive (2001) in 2004 in many ways changed the procedures of the preparation of plans, the implementation of which may have a significant impact on the environment, though a comprehensive assessment of actual effectiveness was not yet available. Purpose of the project is to obtain an estimate of what Slovenia has achieved so far regarding the implementation of SEA, how the SEA process has contributed to the goals of environmental protection and what were the efficiency, costs and benefits of its practicing. In addition, a methodology for integration of health impact assessment into formal SEA was developed.

Method

As groundwork for analysis the criteria system of substantive efficiency and procedural effectiveness of SEA was prepared. Proposed criteria were based on theoretical principles of SEA, international obligations, good practices among Member States of the European Union, various recommendations, e.g. OECD and preliminary review of accessible environmental reports (Chaker et al, 2004; Hickie et al, 1998; Lee at al, 1999; Sadler et al, 2010; Schmidt et al, 2010; Smith et al; 2010; Study concerning ..., 2009).

The criteria took into account the characteristics of the various policies, programs and plans. The criteria were used in several methods for analyzing the use and effectiveness of SEA: the opinion poll among representative participants in SEA process; the review of representative environmental reports; and, the series of interviews and workshops with the participants in SEA process.

Project addresses two aspects of strategic assessment - substantive efficiency and procedural effectiveness of SEA. (1) SEA is considered efficient if:

- Information gained within the process of strategic assessment contribute to decision making
- Predictions of impacts are accurate;
- Proposed mitigation measures contribute to achieving the objectives of environmental protection and sustainable development.

(2) SEA is considered effective if the administrative procedure meets the basic premise of strategic assessment:

- Selection of environmentally (the most) acceptable alternative;
- Improvement of assessed policies, programs and plans, especially in terms of the objectives of environmental protection and sustainable development.

The efficiency of SEA is primarily measured at the level of the environmental report author, as well as at the level of environmental report itself. The effectiveness of SEA is primarily measured at the level of the maker of a policy, program or plan and on a policy, program or plan (here and after PPP) itself.

The proposed criteria have essentially a dual character. With (1) the criteria that define the baseline of strategic assessment (input variables), efficiency and effectiveness of SEA are not yet demonstrated. They reveal those circumstances or SEA process, which determine the subsequent substantive efficiency and procedural effectiveness. Analysis of practice using these criteria and developing proposals for improving practice is crucial, because it is possible to increase efficiency and effectiveness only by increasing the quality and understanding the strategic assessment platform. These criteria are related to:

- Participants in the process of strategic assessment (indicators: e.g. attitudes and activity of investors, authors of environmental reports and PPPs, interdisciplinarity);
- Strategic assessment (legal) framework (indicators: e.g. appropriateness and existence of legal framework, scoping efficiency, terms of references);
- The contents of an environmental report (indicators: e.g. suitability of goals, indicators, impact estimations and mitigation measures, transparency of assessment, uncertainties);
- Involvement of participants in the evaluation process (indicators: e.g. way of coordination, level of public participation);

(2) The criteria which define the results or SEA are the criteria based on which it is possible to evaluate the actual efficiency and effectiveness. These criteria include:

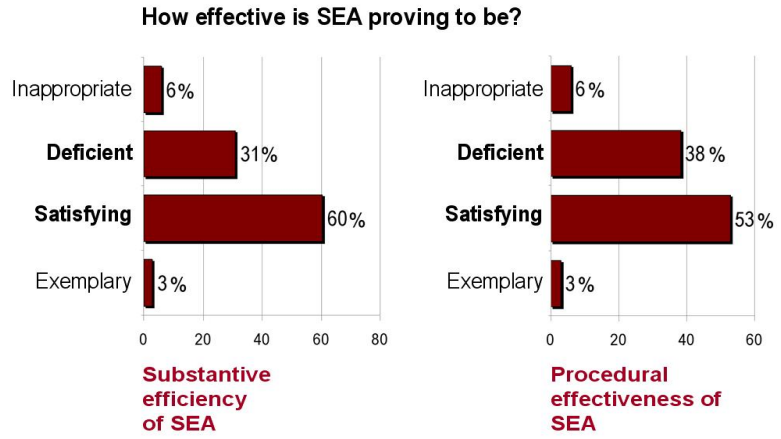
- Alternative solutions (indicators: e.g. characteristics of alternatives, extent of the selection of environmentally most appropriate/ best alternative);
- Appropriateness of environmental report and PPP (indicators: e.g. applicability of results, number of rejected environmental reports, uncertainty management);
- Influence of results of strategic assessment on PPP (indicators: e.g. influence on decision making, extent and character of PPP improvement, level of reconciliation of different interests);
- Time and cost frame of assessment (indicators: e.g preparatory costs, savings within PPP);

For the purpose of making an analysis using indicators, a system of subsidiary questions was formed, which allowed the unique analysis of survey and representative environmental reports. The quality of the starting points of strategic assessment and the degree of efficiency/effectiveness is assessed by four-point scale:

- E: Exemplary;
- S: Satisfactory;
- D: Defective;
- I: Inappropriate.

Results and discussion: Evaluation of practice

Analysis has shown a wide range of variation in practice. SEA in some cases exceeds a verification procedure and becomes an optimization activity, which aims to plan a modification/change in the way that causes the least impact on the environment. On the other hand, the practice is associated with misunderstanding of the purpose of SEA, with a number of conflict situations, including procedural complications resulting in extended time and costs, inability to implement legitimate developmental interests and environmentally appropriate solutions. SEA is based on normative protection with determined mitigation measures, and it very rarely contributes to the design of integrated and innovative solutions. A range of protection measures is mostly limited to respecting the legal regulations and less on consideration of principle of ALARA. However, both substantive efficiency and procedural effectiveness of SEA were found as satisfying to deficient.



Picture 1. Answers to the question: "How effective is SEA proving to be?"

One of the main questions was "What is the difference or impact that SEA introduction has made?" The main findings were:

1. False starting-point:
   - Negligent of the existent good practice, SEA turned out as a verification procedure and not optimization activity;
2. Increased workload, time and cost consumption:
   - Obligation of preparing contents which are time consuming, needless and not strategic, state description orientated assessment, requirement for new data gathering (habitat mapping, archaeological surveys etc.);
   - Significant time consumption.
3. Positive influence on decision making:
   - More frequent rejection of environmentally less acceptable alternatives and harmful solutions;

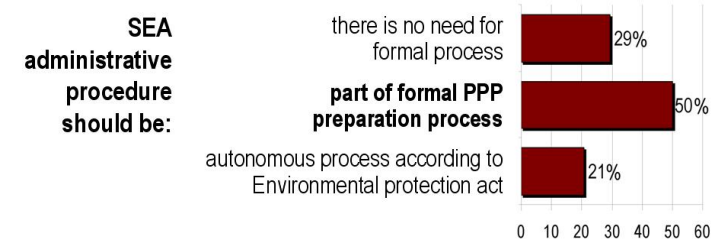
- More orderly and transparent presentation of environmental impacts on decision makers and public;
- Better control over PPP on municipality level.

4. More improvements of PPP:
   - Increased substantive and technical improvements of PPP;
   - Increased mitigation measures that have to be done.

Results and discussion: Recommendations for improving the process of SEA

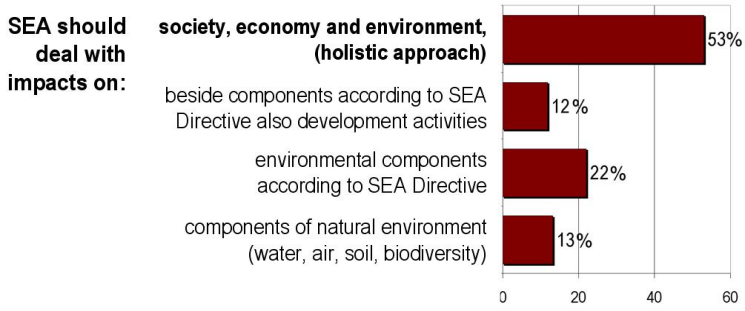
Results of the project are recommendations for SEA to be more effective. Main recommendations are as follows:

1. SEA should deal with real strategic level: with policies and alternatives on hierarchically higher levels.
2. SEA should be a part of PPP preparation process: an optimization activity, which aims to plan modification/change in the way which causes the least impact on the environment, incorporated in the very beginning of PPP preparation.



Picture 2. Answers to the question "SEA administrative procedure should be:"

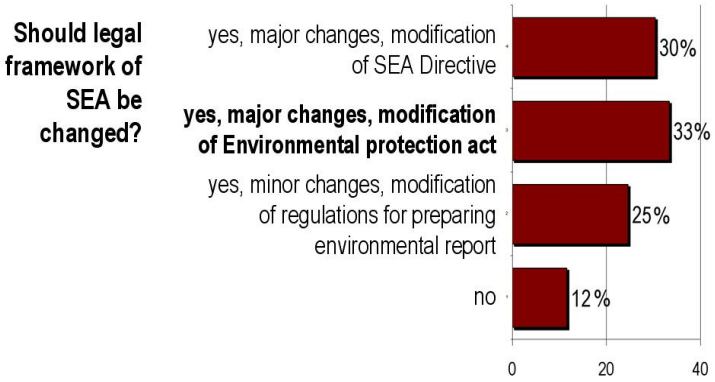
3. SEA should be a comprehensive process, dealing with impacts on society, economy and environment.



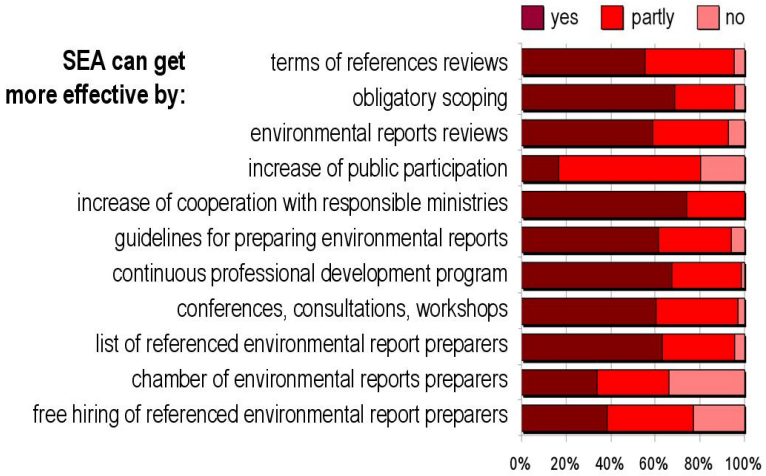
Picture 3. Answers to the question "SEA should deal with impacts on:"

4. Legal framework should be changed, and main suggestion are:
   - Abolition of SEA as autonomous procedure according to Environmental protection act, full integration of strategic assessment in a PPP formal procedure;
   - Separation of EIA and SEA screening process;
   - Obligatory execution of scooping, stakeholder confrontations, confirmations of ToR-s, reviews;
   - Rationalization of reports - comprehensive study of alternatives should be regarded as environmental report;
   - Final decision of PPP environmental acceptability should not be made by singular ministries but by independent competent board.

5. Project approach, education and good practice stimulation and integrity of SEA process stakeholders should be stimulated.



Picture 4. Answers to the question "Should legal framework of SEA be changed?"



Picture 5. Answer to the question "SEA can get more effective by:"

Conclusion

Project "The Use and Effectiveness of Strategic Environmental Assessment" unfortunately shows that SEA in Slovenia is not used in a proper way and consecutively is not sufficiently effective.

Suggested references are aimed at the modification of strategic assessment to optimization task, whose intention is the improvement of policy, program or plan in a manner that will cause as the lowest possible impacts on environment. Prudent identification and assessment of right needs and early and creative search for and selection of comprehensive and at the same time environmentally best possible solutions, is a basis for efficient settling of incremental conflicts of interests in environment and material implementation of bonds of sustainable development.

Suggested optimization/rationalization of procedures and reports means a contribution to abolition of administrative barriers and to a more efficient/quicker placing of development projects, and eventually to larger economic efficiency of investments.

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Strateška procjena utjecaja prostornih planova na okoliš kao instrument zaštite prirode

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Sažetak

Objedinjeni postupak Strateške procjene utjecaja na okoliš i Ocjene prihvatljivosti za ekološku mrežu proveden je za Prostorni plan Primorsko-goranske županije. U procesu izrade plana istraženi su, prema namjeni, udjeli ugrađenih smjernica i mjera zaštite prirode u odnosu na zaprimljene iz ministarstva nadležnog za zaštitu prirode i Državnog zavoda za zaštitu prirode, te proizišlih iz Strateške studije. Istraženi su i načini ugradnje i to analizom kartografskih prikaza i odredbi za provođenje. S obzirom na rezultate te utvrđenu nesistematičnost i nekonzistentnost ugradnje smjernica i mjera u plan zaključeno je da objedinjeni postupak nije pridonio značajnijem poboljšanju u sustavu zaštite prirode.

Ključne riječi: zaštita prirode, dokumenti prostornog uređenja, Strateška procjena, Ocjena prihvatljivosti

Uvod

Biološka raznolikost i zaštićena priroda Republike Hrvatske predstavljaju temeljnu vrijednost i potencijal za daljnji razvitak, te su kao jedan od značajnih resursa prepoznati u sektorskim strateškim dokumentima. One pridonose afirmaciji Hrvatske u europskom i regionalnom okruženju kao zemlje s razvijenom svijesti o značaju očuvanja prirodnog bogatstva koje promišljenim i održivim korištenjem osigurava višestruke razvojne pravce.

Zaštita prirode u Republici Hrvatskoj uređena je Zakonom o zaštiti prirode (ZZP) i podzakonskim propisima. Također, regulirana je i različitim drugim propisima, kao što su Zakon o zaštiti okoliša (ZZO), Zakon o prostornom uređenju i gradnji (ZPUG) te planskim dokumentima (strategije, programi, prostorni planovi i drugi planovi), koji uključuju problematiku zaštite prirode.

Uz prostorno planiranje, postupke procjene utjecaja na okoliš i ostale instrumente zaštite okoliša i prirode, transpozicijom Pravne stečevine Europske unije iz Poglavlja 27 u hrvatski pravni sustav, uvedeni su i dodatni instrumenti. To su Ocjena prihvatljivosti plana, programa i zahvata za ekološku mrežu (Pravilnik o ocjeni prihvatljivosti plana, programa i zahvata za ekološku mrežu), te Strateška procjena utjecaja plana i programa na okoliš (Uredba o strateškoj procjeni utjecaja plana i programa na okoliš). Novi postupci procjene uvedeni su prvenstveno radi osiguravanja održivog korištenja prirodnih resursa već u fazi planiranja određenih radnji u prostoru, te se u skladu s navedenim, pod određenim uvjetima, primjenjuju i pri izradi prostornih planova.

Strateška procjena utjecaja na okoliš (SPUO), bavi se pitanjima zaštite okoliša i razmatra moguće negativne utjecaje na okoliš uključujući i negativne utjecaje na

biološku i krajobraznu raznolikost. Ocjena prihvatljivosti za ekološku mrežu (OPEM) bavi se utjecajima koji mogu imati negativan učinak na ciljeve očuvanja i cjelovitost područja ekološke mreže. Za one planove za koje je potrebno izraditi OPEM, a zahtijevaju i SPUO, provodi se objedinjeni postupak.
U Republici Hrvatskoj do sada je provedeno deset SPUO-a, a objedinjeni postupak proveden je samo za Prostorni plan Primorsko-goranske županije.

Zaštita prirode

Prema Međunarodnom savezu za zaštitu prirode (IUCN) zaštićeni dio prirode je jasno definiran geografski prostor, priznat, primijenjeno i upravljano, pravnim ili drugim učinkovitim sredstvima, kako bi se postiglo dugoročno očuvanje prirode s pripadajućim uslugama ekosustava i kulturnih vrijednosti (Dudley N., 2008.).
Zakonom o zaštiti prirode uređeno je da se zaštita prirode provodi očuvanjem biološke i krajobrazne raznolikosti, te zaštitom prirodnih vrijednosti. Zaštićene prirodne vrijednosti čine zaštićena područja (devet kategorija prostorne zaštite), zaštićene svojte (strogo zaštićene i zaštićene) i zaštićeni minerali, sigovine te fosili. Također propisana je uspostava ekološke mreže kao sustava međusobno povezanih ili prostorno bliskih ekološki značajnih područja, koja uravnoteženom biogeografskom raspoređenošću značajno pridonose očuvanju prirodne ravnoteže i biološke raznolikosti koju čine ekološki značajna područja za Hrvatsku, uključujući i ekološki značajna područja Europske unije Natura 2000 važna za očuvanje ugroženih divljih svojti i stanišnih tipova.
U sustavu zaštite prirode sudjeluju tijela na raznim institucionalnim razinama. Na državnoj razini upravne i stručne poslove zaštite prirode obavlja Ministarstvo zaštite okoliša i prirode (Uprava za zaštitu prirode) (MZOIP), a stručne poslove zaštite prirode Državni zavod za zaštitu prirode (DZZP). Između ostalih poslova, oni su zaduženi za izradu stručnih podloga za nacrte propisa temeljem ZZP-a, pripremanje stručnih podloga za utvrđivanje uvjeta zaštite prirode, te izradu stručnih podloga u svezi izrade OPEM-a. Člankom 70. ZZP određeno je da su mjere zaštite zaštićenih područja sastavni dio dokumenata prostornog uređenja, a odnose se na zabranu ili ograničenje zahvata i aktivnosti u prostoru.

Sustav prostornog uređenja i Strateška procjena utjecaja na okoliš

Prostorno uređenje u Republici Hrvatskoj, uređeno je ZPUG-om i pripadajućim podzakonskim propisima. Člankom 54. ZPUG-a propisano je da se dokumentima prostornog uređenja određuje svrhovita organizacija, korištenje i namjena prostora te mjerila i smjernice za uređenje i zaštitu prostora. Na državnoj razini donose se Strategija i Program prostornog uređenja Republike Hrvatske, te prostorni planovi područja posebnih obilježja za koje je to propisano ZPUG-om. Na područnoj (regionalnoj) razini donose se prostorni planovi županija, odnosno Grada Zagreba te prostorni planovi područja posebnih obilježja, ako je to određeno tim planovima. Na lokalnoj razini donose se prostorni planovi uređenja gradova i općina te provedbeni dokumenti (urbanistički plan uređenja i detaljni plan uređenja).
Hijerarhija sustava prostornog uređenja zahtijeva usklađenost planova, što znači da prostorni planovi užih područja moraju biti usklađeni s prostornim planovima širih područja, a ako to nije slučaj, u provedbi plana poštuju se smjernice prostornog plana šireg područja. Iznimku od pravila te vrste usklađenosti imaju prostorni planovi područja posebnih obilježja, koje donosi Hrvatski sabor, te tako imaju jaču pravnu snagu od planova koja donose tijela jedinica lokalne i regionalne samouprave.

Procedura izrade i donošenja prostornih planova u načelu je prilično slična na svim razinama. Najveća razlika je u obuhvatu i detaljnosti planiranja, te se tako od viših prema nižim planovima smanjuje obuhvat i povećava detaljnost planiranja. Slijedom toga, prostornim planom županije, sukladno ZPUG-u, planiraju se sadržaji od državne i županijske važnosti, te se formiraju smjernice za izradu prostornih planova užih područja čija se izrada i donošenje određuje tim planom. Člankom 60. ZPUG-a propisano je da se dokumentima prostornog uređenja užih područja mogu propisati stroži uvjeti i mjere za provedbu zahvata u prostoru, odnosno viši prostorni standardi od onih propisanih dokumentom šireg područja, ako se time ne mijenja osnovna koncepcija prostornog uređenja utvrđena dokumentom prostornog uređenja šireg područja. Svaki plan na svojoj razini donosi odredbe kojima se uređuju uvjeti za građenje na temelju kojih se izdaje lokacijska dozvola.

Prema M. R. Partidário (1999.) strateška procjena utjecaja na okoliš je sustavan, kontinuirani postupak vrednovanja u najranijoj prikladnoj fazi javno odgovornog donošenja odluka, kvalitete okoliša, posljedica, alternativnih vizija i razvojnih namjera ugrađenih u političke, planske ili programske inicijative, pritom osiguravajući potpunu integraciju bitnih biofizičkih, ekonomskih, društvenih i političkih pitanja.

Strateška procjena utjecaja na okoliš u Republici Hrvatskoj definirana je ZZO-om. SPUO se provodi na temelju Strateške studije, kojom se identificiraju, opisuju i ocjenjuju vjerojatno značajni utjecaji na okoliš, te njihova varijantna rješenja. Strateška procjena utjecaja prostornih planova na okoliš u Republici Hrvatskoj provodi se za prostorni plan županije i Prostorni plan Grada Zagreba.

Kako se navodi u Priručniku Ekonomske komisije Ujedinjenih naroda za Europu za podršku primjene Protokola Espoo konvencije o Strateškoj procjeni utjecaja na okoliš (UNECE, 2012.) u slučaju procjene prostornih planova naglasak u procjeni stavlja se na potencijale resursa i okoliša, te ograničenja tog određenog područja, što zahtijeva posebnu pažnju nad osnovnim uvjetima lokalnog područja, te ekološkim učincima predloženih promjena.

A. Sommer (2005.) u detalje interpretira pojedine članke Direktive 2001/42/EZ i njihovu implementaciju kroz SPUO, te navodi da se, osim same procjene utjecaja na okoliš, kao najbitniji dijelovi izdvajaju određivanje obuhvata procjene, ciljeva zaštite okoliša, varijantnih rješenja i mjera zaštite okoliša.

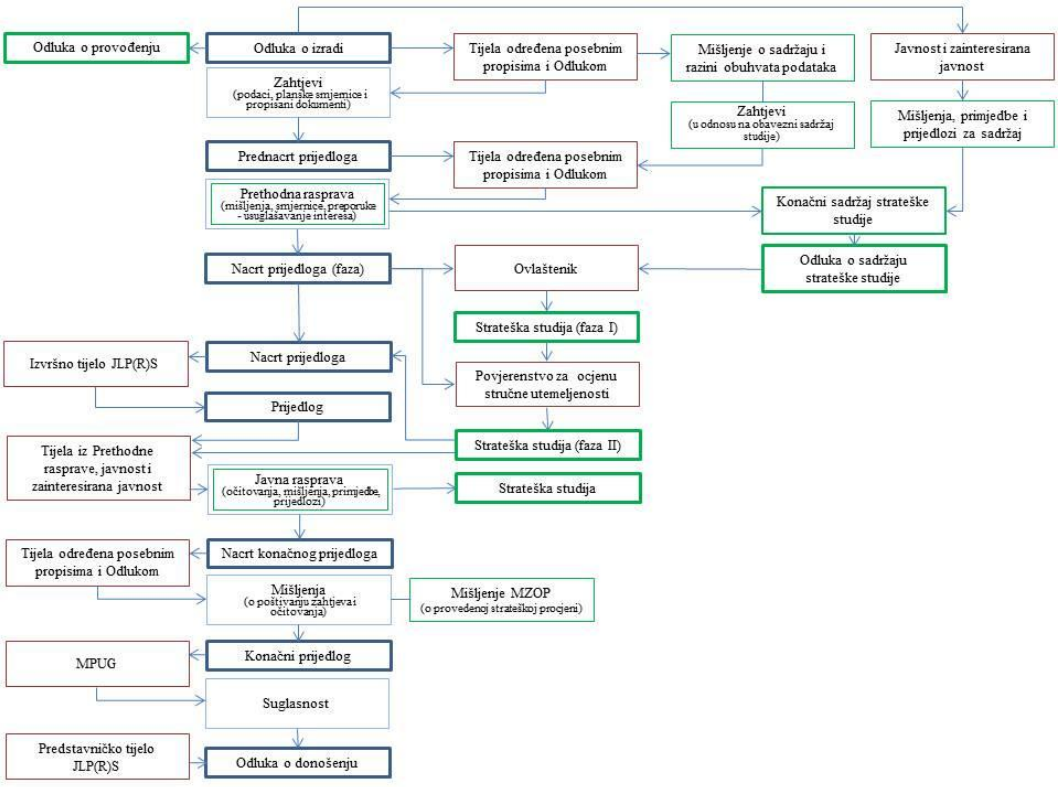
SPUO se provodi kako bi se uskladili ciljevi razvoja, planirani prostornim planom, sa ciljevima zaštite okoliša. U tom smislu, u prvom koraku, važno je dobro odrediti sadržaj i obuhvat Strateške studije, te razinu detaljnosti, koja se razlikuje s obzirom na razine u hijerarhiji planiranja. Naime, detaljnost Strateške studije treba odgovarati specifičnosti i dubini prostornog plana.

Ciljevi zaštite okoliša, koji se definiraju SPUO-om, obuhvaćaju sve one koji teže očuvanju ili poboljšanju stanja okoliša. Pri procjeni prostornih planova bitno je razlučiti one ciljeve zaštite okoliša koji su od tehničke važnosti za njegov obuhvat, tj. one koji mogu igrati ulogu u sadržaju prostornog plana. Ciljeve u SPUO-u treba usredotočiti na rezultate koje je moguće uzimati u obzir prilikom donošenja odluka na određenoj razini, dakle, imajući na umu mogućnosti koje se ostvaruju na toj razini.

Usklađenje ciljeva postiže se identifikacijom i usporedbom raznih varijanti prostornog plana, što je zapravo ključni aspekt SPUO-a, s obzirom na njihove moguće značajne utjecaje na okoliš. Na strateškoj razini, ispitivanje utjecaja prostornih planova i varijanti može se usredotočiti na "relativne" procjene kako bi se utvrdili ozbiljni sukobi, radije nego na ispitivanje apsolutnih parametara, kojima bi se nastojalo utvrditi sve ukupne utjecaje.

Preporučljivo je da se utvrđivanje i razmatranje varijanti započne što ranije u procesu planiranja i to već u fazi utvrđivanja obuhvata. To je iterativan proces, što znači da s jedne strane, izbor varijanti utječe na obuhvat, a s druge strane, rezultati dobiveni

tijekom određivanja obuhvata mogu utjecati na odluku o varijantama. Stoga, u kontekstu određivanja obuhvata trebalo bi govoriti o nacrtima varijanti, dok bi se odabrane varijante uzimale u obzir i razmatrale Strateškom studijom.
Mjere zaštite okoliša formiraju se kao odgovor na identificirane značajne utjecaje na okoliš. Njihova je svrha izbjeći ili smanjiti opseg, vjerojatnost ili učestalost negativnih utjecaja na okoliš. Pozornost treba obratiti na njihovu (ekološku) učinkovitost, prikladnost, kao i ekonomske pokazatelje.
Kad je u pitanju integracija mjera predviđenih za izbjegavanje i umanjivanje negativnih učinaka na okoliš (ili jačanje pozitivnih učinaka), preporuča se da se već u osnovu procjene integriraju one mjere koje su već poznate, što znači da se moraju odraziti u procesu razvijanja varijantnih rješenja, gdje takva rješenja mogu poslužiti kao sredstvo za izbjegavanje ili smanjenje negativnih učinaka na okoliš.
Jednako vrijedi i za prostorne planove, gdje se zakonske odredbe ugrađuju u osnovu procesa planiranja, da bi se stvorile pretpostavke za ostvarenje ciljeva sektorskih strategija, programa i planova. Daljnje smjernice i mjere dobivene i ugrađene u postupku izrade plana moraju biti određene s posebnom pažnjom na razinu detaljnosti predmetnog plana. Kao rezultat, provedbene odredbe moraju biti formulirane na način da uvažavaju često znatne razlike u fizičkim, prirodnim i drugim obilježjima obuhvata nižih planova.
Postupak izrade i donošenja prostornih planova uz usporedno provođenje SPUO-a prikazan je na slici 1. Nadalje, slika prikazuje i tijek prijenosa mjera zaštite okoliša i prirode, te planskih smjernica koje se izdaju u svrhu zaštite okoliša i prirode, spomenutim procesima.



Slika 1. Tijek postupka izrade i donošenja prostornih planova i usporednog provođenja Strateške procjene utjecaja na okoliš.

Materijal i metode

Istraživanje provedbe i ugradnje smjernica i mjera zaštite prirode provedeno je na Prostornom planu Primorsko-goranske županije (PP PGŽ), jedinom u Republici Hrvatskoj za koji je do sada utvrđena obveza provedbe objedinjenog postupka.
Analizirale su se smjernice i mjere koje je dalo ministarstvo nadležno za zaštitu prirode (Ministarstvo) dostavljene u vidu Zahtjeva dobivenih na temelju Odluke o izradi plana, kao i Elaborat „Podaci o vrstama, staništima, zaštićenim i evidentiranim područjima i područjima Ekološke mreže RH mreže s prijedlogom mjera zaštite za potrebe izrade Prostornog plana Primorsko-goranske županije“ (Elaborat DZZP-a) izrađen od DZZP-a, zatim one proizišle iz Strateške studije, te smjernice i mjere dobivene u vidu Mišljenja DZZP-a o poštovanju zahtjeva i očitovanja u I. nacrtu konačnog prijedloga (Mišljenje DZZP-a).
Smjernice i mjere iz navedenih izvora analizirane su i razvrstane u 5 skupina, te se sukladno zakonskoj proceduri istražilo na koji način su ugrađene u prostorni plan:

- Smjernice za planiranje (one koje se ne unose u vidu odredbi)
- Smjernice za provedbene odredbe
- Mjere za daljnje istraživanje (provedbene odredbe za ugradnju u poglavlje Područja i lokaliteti za istraživanje i praćenje pojava i procesa u prostoru)
- Prenošenje zakonskih odredbi
- Ostalo – neadekvatne; ograničavajuće za razinu PP PGŽ

Ugradnja smjernica za planiranje analizirala se usporedbom grafičkih prikaza raznih faza izrade plana korištenjem GIS-a, te analizom Odredbi za provođenje II. nacrta konačnog prijedloga, koje su se koristile i pri analizi ugradnje smjernica za provedbene odredbe i mjera za daljnje istraživanje.
Pri analizi se vodilo računa o tome jesu li smjernice i mjere ugrađene u skladu sa svrhom s kojom su dane. Naime, smjernice za planiranje županijskog plana imaju dvojaku ulogu. Primarna uloga je oblikovanje i raspored zona i infrastrukture, te su se samo tako primijenjene smjernice uzimale u obzir, iako se većina njih ugradila u plan i kao odredba za provođenje za niže planove. Nadalje, zakonske odredbe u stvarnosti bi trebale biti smjernice za planiranje, a ne odredbe za provođenje, te su zbog često krive interpretacije prostornih planera svrstane u zasebnu skupinu. Njihova ugradnja promatrala se i odredbama i planiranjem.
Vrednovalo se po principu ugrađeno/neugrađeno, s tim da ako je smjernica ili mjera djelomično uzeta u obzir, računala se kao ugrađena, no ako je bila neprovjerljiva, računala se kao neugrađena.
Također, imajući na umu vrijeme dostave smjernica i mjera s obzirom na fazu izrade plana, te razvrstaj po pojedinim poglavljima, razmatrao se i opći princip njihove ugradnje.

Rezultati i rasprava

Smjernice i mjere zaprimljene u vidu Zahtjeva dostavilo je Ministarstvu, te u obliku Elaborata DZZP-a. Treba imati na umu da se ovi zahtjevi daju „naslijepo“, tj. samo na osnovi Odluke o izradi, a služe kako bi se izradilo Prednacrt prijedloga, koji će predstaviti koncept razmještaja, uzimajući u obzir zahtjeve svih resora i drugih tijela određenih Odlukom. Tek prethodnom raspravom mogu se dati smjernice koje bi bile definirane na temelju razrađenih prijedloga planskih rješenja. Ministarstvo je uputilo zahtjev za ugradnjom 21 smjernice i mjere, dok je Elaborat DZZP-a uz zakonska polazišta, detaljne opise zaštićene prirode i razloge ugroženosti, uključivao čak 190 smjernica i mjera zaštite, podijeljenih prema skupinama zaštićenih dijelova prirode, te se zbog takvog koncepta između 15 i 20% smjernica i mjera ponavljalo.

U postupku izrade prostornog plana dostavljeno je i Mišljenje DZZP-a kojim se tražilo ukidanje 2 vjetroelektrane zbog detaljnijih saznanja o rasprostranjenosti strogo zaštićenih i ugroženih vrsta. Također su zahtijevali unošenje 34 odredbe od kojih su 32 bile vezane za solarne i vjetroelektrane, a od kojih je većina bila sadržana i u Elaboratu DZZP-a.

Smjernice i mjere dobivene postupkom SPUO-a proizlaze iz Strateške studije. Podloga za izradu Strateške studije bio je Prednacrt prijedloga plana (koncepcija). Koncepcijom nisu predstavljena varijantna rješenja koja su se prema propisima trebala obraditi SPUO-om, te su se u ovom slučaju Strateškom studijom procjenjivali pojedinačni zahvati. Međutim, Prednacrt je dao samo shematski prikaz strateškog usmjerenja. Iz analize proizlazi da su u prikazu nedostajale čitave teme, poput eksploatacije, marikulture, odvodnje otpadnih voda itd., tako da je Strateškom studijom bilo nemoguće u potpunosti utvrditi značajne utjecaje na prirodu na razini detaljnosti analize koja se primijenila. Također, uvidom u dostavljena mišljenja tijela određenih posebnim propisima, o sadržaju i razini obuhvata podataka, koje bi trebalo sadržavati i zahtjeve (podatke, planske smjernice, dokumente) s obzirom na obavezni sadržaj Strateške studije, utvrđeno je da je velika većina njih (uključujući i Ministarstvo) odgovorila samo na pitanje o sadržaju Studije. Izrađivač Strateške studije (Ovlaštenik) u poglavlju "Naznaka bilo kakvih poteškoća", navodi da su tijekom izrade Studije najveće poteškoće predstavljali nedostatak najnovijih podataka o pojedinim sastavnicama okoliša i opterećenjima na okoliš, nedostatak liste svih potencijalnih zahvata koji su planirani PP-om PGŽ, kao i točne lokacije svih pojedinačnih zahvata koji bi mogli značajno utjecati na okoliš.

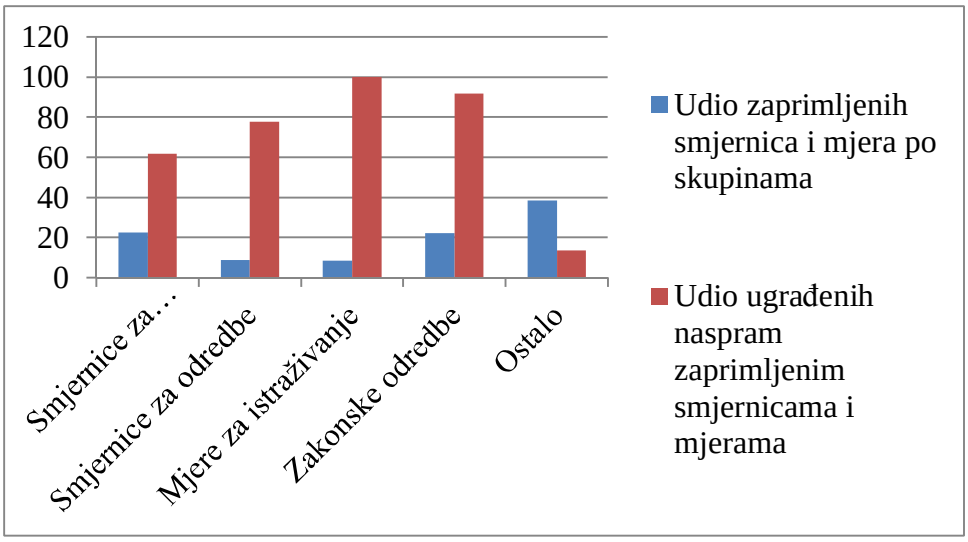
Ovakav pristup ne samo da je umanjio kvalitetu SPUO-a, već je i naknadno zakomplicirao proceduru, budući da je PP PGŽ morao ići na ponovnu javnu raspravu zbog problema koji su trebali biti riješeni upravo Strateškom studijom. Naime, u Obrazloženju odluke o ponovnoj javnoj raspravi stoji da ju je potrebno ponoviti i zato što je Ministarstvo uvjetovalo svoje pozitivno mišljenje na Nacrt Konačnog prijedloga plana izmjenama kapaciteta nekih turističkih zona, ukidanjem nekih turističkih zona i područja za marikulturu, te ukidanjem dviju vjetroelektrana. Nadalje, Prednacrt nije sadržavao ni odredbe za provođenje, a budući da su upravo one osnovni rezultat prostornog plana, bilo je potrebno testirati i njih.

Strateškom studijom utvrđeno je 18 mjera zaštite prirode, odnosno 11 za zaštitu biološke raznolikosti i krajobraza, te 7 za ekološku mrežu. Kompenzacijske mjere nisu određivane.

Praćenje ugradnje smjernica planiranjem, pomoću grafičkih priloga, otežano je zbog više razloga. Prvi od njih je mjerilo 1:100.000, na kojem su zahvati prikazani shematografski. Dok se u planu pojašnjava da smještaj građevinskog područja može biti u radijusu od 1km od simbola, u slučaju linijske infrastrukture nema takve definicije. Zatim, nisu razlučeni postojeći od planiranih zahvata, na kartografskim prikazima različitih faza izrade često nedostaje prikaz čitavih tema, npr. elektroničke komunikacije uopće nisu prikazivane. Problem je i nedovoljne istraženosti zaštićenih dijelova prirode, te tako ne postoje prikazi krajobrazne tipologije ili detaljne rasprostranjenosti ciljanih vrsta unutar područja ekološke mreže da bi se moglo reći da se smjernica u potpunosti poštovala pri izradi plana ili nije. Međutim, pored tih problema, može se vidjeti da se smjernice poštuju u smislu da nema većih zadiranja u zaštićena područja prirode, da se infrastruktura vodi zajedničkim koridorima, iako obuhvaća rubne dijelove nekih područja ekološke mreže i šumskih površina, što opet može biti stvar mjerila. Suprotno od smjernica, može se primijetiti pojačani pritisak na morsku obalu.

Tablica 1. Prikaz zaprimljenih (Z) i ugrađenih (U) smjernica i mjera

Br	Smjernice za planiranje		Smjernice za odredbe		Mjere za istraživanje		Zakonske odredbe		Ostalo	
	Z	U	Z	U	Z	U	Z	U	Z	U
Ministarstvo	4	4	3	3	0	0	10	10	4	3
Elaborat DZZP-a	44	0	13	0	4	0	44	0	75	0
SPUO	3	0	0	0	13	13	1	1	1	0
Mišljenje DZZP-a	6	4	6	4	4	4	1	0	17	0
Ukupno	**57**	**8**	**22**	**7**	**21**	**17**	**56**	**11**	**97**	**3**



Grafikon 1. Prikaz udjela zaprimljenih smjernica i mjera po skupinama i udjela ugrađenih naspram zaprimljenih smjernica i mjera

Iako je najveći broj smjernica i mjera dostavljen u Elaboratu DZZP-a, utvrđeno je da, zbog nepoznatog razloga, ni jedna nije sadržana u prostornom planu, tako da te smjernice i mjere nisu uzimane u obzir prilikom računanja udjela ugrađenih naspram zaprimljenih smjernica i mjera.

Iz navedenog se vidi da se najveći broj zaprimljenih smjernica i mjera odnosio na one koje smo smatrali neodgovarajućim za razinu županijskog plana. Ujedno je to i kategorija koja je najmanje uzimana u obzir pri formiranju odredbi. Najveći broj takvih smjernica došao je iz DZZP-a i Ministarstva.

Nadalje, najzastupljenije su mjere za daljnja istraživanja i to uglavnom dobivene iz objedinjenog postupka SPUO-a. Ova vrsta mjera je u potpunosti ugrađena u Plan jer su one osnova za realizaciju pojedinačnih projekata. Županijski plan u ovom slučaju treba promatrati kao prvu razinu strateškog planiranja prostornim planom, te je razumljivo da on ne može sadržavati podatke i informacije dovoljno detaljne za procjenu utjecaja pojedinačnih zahvata.

Smjernice za planiranje zaprimljene su u jednakim omjerima iz Ministarstva, iz Mišljenja DZZP-a i postupkom SPUO-a, međutim, samo su one iz Ministarstva sve uzete u obzir, vjerojatno jer su dostavljene na početku izrade Plana. Smjernice iz Mišljenja DZZP-a u velikoj mjeri se poklapaju s onima dostavljenima iz Ministarstva, te se može govoriti o repliciranju zahtjeva. Ovdje je očito učinjena pogreška jer Ministarstvo daje smjernice i mjere temeljem pribavljenog mišljenja DZZP-a, što znači da je zahtjev DZZP-u bio bespotreban. Tri smjernice proizišle iz postupka SPUO-a nisu

uzete u obzir prilikom planiranja, te se zbog toga u ovoj analizi nisu razmatrale. Opravdanje može biti mjerilo i shematografski prikaz, međutim, to ponovo ukazuje na neadekvatnost detaljnosti provedenog SPUO-a.
Smjernice koje su se odnosile na prenošenje zakonskih odredbi, čine veliki dio zahtjeva Ministarstva. Uglavnom su ugrađene ili djelomično ugrađene, raznim odredbama i procesom planiranja. Međutim, s obzirom na njihovu općenitost nije moguće determinirati jesu li odredbe formirane na temelju Zahtjeva ili zakona.
Odredbe za provođenje su krajnji i osnovni "proizvod" prostornog plana i formira ih izrađivač u suradnji s nositeljem izrade plana. S obzirom na to, jasno je da je najmanje Zahtjeva (smjernica i mjera) pristiglo u obliku odredbi. Velik dio Zahtjeva pristiglih u vidu zakonskih odredbi i smjernica za planiranje, ugrađen je u obliku odredbi za provođenje.
Temeljem analize ocjenjujemo da smjernice i mjere vezane za zaštitu prirode nisu unesene u Plan sustavno, često se ponavljaju, te ih je problem pronaći. Za zaštitu prirodnih vrijednosti i kulturno-povijesnih cjelina nije propisana niti jedna mjera, već su samo navedena zaštićena područja, što samo po sebi ne predstavlja niti smjernicu niti mjeru. Mjere zaštite prirode dobivene iz Ministarstva ugrađene su u razna poglavlja Plana, dok su one iz Strateške studije dane u jednom poglavlju - Mjere provedbe. Iz toga se može zaključiti da Izrađivač nije razmatrao smisao dobivenih mjera iz čega proizlazi da provedeni objedinjeni postupak SPUO nije ostvario svoju svrhu.

Zaključak

Transpozicijom Pravne stečevine Europske unije iz Poglavlja 27 u hrvatski pravni sustav, stvorene su pretpostavke za unapređenje zaštite okoliša i prirode u postupcima izrade dokumenata prostornog uređenja. Uz do tada postojeće instrumente zaštite – uvjete i mjere zaštite prirode, suglasnosti i mišljenja, uvedena je Strateška procjena utjecaja na okoliš i Ocjena prihvatljivosti za ekološku mrežu. Novi postupci se provode usporedno s izradom prostornog plana uz obvezatnu suradnju nadležnih tijela, izrađivača plana i ovlaštenika. Tijekom postupka konzultira se javnost i zainteresirana javnost.
U svrhu ispitivanja kakav doprinos ima Strateška procjena utjecaja prostornog plana na okoliš na sustav zaštite prirode analizirani su propisi i odgovarajući postupci koji se primjenjuju i provode pri izradi prostornih planova. Analize su provedene na konkretnom primjeru izrade Prostornog plana Primorsko-goranske županije, gdje je po prvi puta u Hrvatskoj primijenjen objedinjeni postupak Strateške procjene utjecaja na okoliš i Ocjene prihvatljivosti za ekološku mrežu.
Istraživanje je obuhvatilo sve dostupne smjernice i mjere zaštite prirode dobivene propisanim postupcima, koje su se za potrebe analize svrstale u 5 skupina (smjernice za planiranje, smjernice za odredbe, mjere za daljnje istraživanje, prenošenje zakonskih odredbi, ostalo – neadekvatne; ograničavajuće za razinu prostornog plana županije), te se sukladno zakonskoj proceduri istražilo na koji način su ugrađene u prostorni plan.
Ukupno su Zahtjevima ministarstva nadležnog za poslove zaštite prirode, Državnog zavoda za zaštitu prirode te objedinjenim postupkom Strateške procjene utjecaj na okoliš zaprimljene 253 smjernice i mjere, međutim, one pristigle kao Zahtjev u obliku Elaborata DZZP-a uopće nisu uzimane u obzir pri izradi plana. Od ostalih 73 smjernice i mjere, 13 ih je uvršteno u kategoriju smjernice za planiranje, 9 kao smjernice za odredbe, 17 u mjere za daljnja istraživanja, 12 u prenošenje zakonskih odredbi i 22 u ostalo – neadekvatne, ograničavajuće za razinu prostornog plana. Udio ugrađenih u zaprimljenim smjernicama i mjerama je 61,6% smjernica za planiranje, 77,7% smjernice za odredbe, 100,0% mjere za daljnje istraživanje, 91,7% prenošenje zakonskih odredbi i 13,6% ostalih. Najveći broj zaprimljenih smjernica i mjera odnosio

se na one koje nisu primjerene za razinu županijskog plana, a ujedno su i najmanje uzimane u obzir pri izradi odredbi za provođenje prostornog plana. Objedinjenim postupkom Strateške procjene utjecaja na okoliš dobivene su smjernice i mjere koje su prostornom planu u najvećoj mjeri ugrađene kao mjere za istraživanje i prenošenje zakonskih odredbi.
Iz dobivenih rezultata, kao i utvrđene nesistematičnosti i nekonzistentnosti u ugrađivanju smjernica i mjera, nedvojbeno se može zaključiti da objedinjeni postupak Strateške procjene utjecaja na okoliš nije ispunio svoju svrhu, tj. da nije pridonio značajnijem poboljšanju u sustavu zaštite prirode. Sve to ukazuje na potrebu daljnjeg jačanja sposobnosti svih sudionika u postupcima izrade prostornog plana, Strateške procjene utjecaja na okoliš i Ocjene prihvatljivosti za ekološku mrežu.

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Strategic environmental assessment of spatial plans as an instrument for nature conservation

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Abstract

The integrated procedure of strategic environmental assessment and appropriate assessment on ecological network was implemented for the Physical plan of Primorsko-goranska County. Through drafting of the plan, shares of incorporated nature protection guidelines and measures have been researched according to their purpose, in relation to those received from the ministry responsible for nature protection, the State Institute for Nature Protection and arising from the Environmental report. The methods of their incorporation were also studied by analysing cartographic representations and implementation provisions. Identified lack of systematic and consistent incorporation shows that the integrated procedure did not contribute to significant improvement within the nature protection system.

Key words: nature protection, physical planning documents, Strategic Environmental Assessment, Appropriate Assessment of impacts on the ecological network

Introduction

Biodiversity and protected nature of the Republic of Croatia represent the fundamental value and potential for development and have been identified as one of the significant resources in the sectoral policy documents. They contribute to the promotion of Croatia in the European and regional environment as a country with developed awareness of the importance of preserving natural resources that by thoughtful and sustainable use provide multiple development directions.
Nature protection in the Republic of Croatia is regulated by the Nature Protection Act (NPA) and the subordinate regulations. It is also regulated through various other regulations, such as the Environmental Protection Act (EPA), the Physical Planning and Building Act (PPBA) and planning documents (strategies, programs, land use plans and other plans), which include nature protection issues.
In addition to physical planning, environmental impact assessment procedures and other nature and environmental protection instruments, by the transposition of the Chapter 27 of the *acquis communautaire* into the Croatian legal system introduced additional instruments. These are the Appropriate Assessment of the impact of plans, programs and projects on the ecological network (Ordinance on the Appropriate Assessment of the Impact of Plans, Programs and Projects on the Ecological Network) and strategic environmental assessment of plans and programs (Regulation on Strategic Environmental Assessment of Plans and Programs). New assessment procedures have been primarily introduced to ensure the sustainable use of natural resources already in

the planning stages of specific interventions in the environment, and that in accordance with the above, under certain conditions, are applied in the preparation of physical plans.
Strategic Environmental Assessment (SEA) deals with environmental issues and considers possible negative environmental impacts, including negative impacts on biological and landscape diversity. Appropriate Assessment of impacts on ecological network (ENIA) deals with the influences that may have adverse effects on the conservation objectives and on the integrity of the ecological network. For those plans that need to carry out ENIA and require SEA, an integrated procedure is to be implemented.
Ten SEAs have so far been completed in the Republic of Croatia, and an integrated procedure was carried out only for the Physical plan of Primorsko-goranska County.

Nature protection

According to the International Union for Conservation of Nature, protected area is clearly defined geographical space, recognized, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values (Dudley N., 2008).
Nature Protection Act regulates that nature protection is achieved through conservation of biological and landscape diversity and protection of natural resources. Protected natural values are protected areas (nine categories of protection), protected species (strictly protected and protected) and protected minerals, speleothems and fossils. It also stipulates the establishment of an ecological network as a system of interconnected or spatially close ecologically important areas that, through their well-balanced geographical distribution, contribute to the preservation of natural balance and biodiversity. Those are ecologically important areas for Croatia, including the ecologically important areas of the European Union Natura 2000, which are important for the conservation of endangered wildlife species and habitat types.
Within the nature protection system there are various institutional bodies participating at different levels. At the national level, the Ministry of Environmental and Nature Protection (Nature Protection Directorate) deals with the administrative and expert tasks of nature protection, while the State Institute for Nature Protection (SINP) deals with the expert tasks of nature protection. Among other tasks, they are responsible for preparing expert bases for draft regulations under the Nature Protection Act, preparing expert basis for determining the nature protection requirements, and expert bases for the purpose of AAIEN. Article 70 of the NPA stipulates that measures for the protected areas are a component of physical planning documents, and they relate to the prohibition or restriction of interventions and activities in the environment.

Physical planning and strategic environmental assessment

Physical planning of the Republic of Croatia is regulated by the PPBA and relevant subordinate regulations. Article 54 of the PPBA stipulates that physical planning documents define purposeful organization, use and allocation of the area, as well as the criteria and guidelines for the regulation and protection of the environment. At the national level, the Physical Planning Strategy and Program of the Republic of Croatia are adopted, as well as physical plans of areas with special features, which are prescribed by the PPBA. At the regional (county) level, physical plans of counties and the City of Zagreb and physical plans of areas with special features, if required by these plans, are adopted. At the local level physical plans of the cities and municipalities, as

well as implementing documents (master plan and detailed development plan) are adopted.

The hierarchy of physical planning requires alignment, which means that spatial plans of narrow areas have to be aligned with plans of wider areas, and if not, the wider area physical plan guidelines will be complied with during implementation, with the exception of physical plans of areas with special features, which are adopted by the Croatian Parliament and thus have a stronger legal force than the plans adopted by local and regional government bodies.

Preparation and adoption procedure of physical plans at all levels is quite similar in principle. The biggest difference is in the scope and level of detail of planning, and thus from higher to lower plans there is a reduction of scope and an increase of level of detail of planning. Consequently, county physical plans, pursuant to the PPBA, plan for the activities of the state and county importance, and create guidelines for the preparation of spatial plans for narrower areas, the development and adoption of which is determined by these plans. Article 60 stipulates that physical planning documents of narrower areas may prescribe stricter requirements and measures for the implementation of interventions in the area, in other words, higher physical standards than those prescribed by the wider physical plan, if it does not change the basic concept of development established by a document of a wider area. Each plan at its level sets out provisions governing the conditions for the construction, which are the basis for issuing a location permit.

According to M. R. Partidário (1999), SEA is a systematic, on-going process for evaluating, at the earliest appropriate stage of publicly accountable decision-making, the environmental quality, and consequences, of alternative visions and development intentions incorporated in policy, planning or program initiatives, ensuring full integration of relevant biophysical, economic, social and political considerations.

SEA in the Republic of Croatia is defined by the Environmental Protection Act. SEA is carried out on the basis of Environmental Report, which identifies, describes and evaluates the likely significant environmental impacts, and their alternative solutions.

SEA of physical plans in the Republic of Croatia is carried out for county physical plans and the Physical Plan of the City of Zagreb.

As stated in the Manual of the United Nations Economic Commission for Europe to Support Application of the UNECE Protocol on Strategic Environmental Assessment (UNECE, 2012), in the case of the assessment of physical plans, emphasis is placed on the evaluation of resources and the potential of the environment, and limitations of a particular area, which requires special focus on the basic conditions of the local area, and the environmental impacts of the proposed changes.

A. Sommer (2005) interprets in detail some articles of the Directive 2001/42/EC and its implementation through SEA, and states that, in addition to the impact assessment on the environment, the most important parts are scoping, determining environmental objectives, alternatives, and environmental protection measures.

SEA is carried out in order to reconcile the development objectives set by physical plans with the environmental objectives. In this regard, as a first step, it is important to determine the content and the scope of the Environmental Report, and the level of detail, which varies according to the level within the hierarchy of planning. Specifically, the level of detail of Environmental Report should be adequate to the specificity and the depth of the physical plan.

Environmental objectives, which are defined by SEA, include all those that aim at preserving or improving environmental conditions. In assessing physical plans,it is essential to distinguish the environmental objectives that are of technical importance for its coverage, i.e., those that could play a role in the content of the physical plan. Targets of SEA should be focused on the results that could be taken into account when making

decisions at a certain level, therefore keeping in mind the opportunities that are to be realized at that level.

Reconciliation of goals is achieved by identifying and comparing different physical plan variants, which is the key aspect of SEA, with regard to their possible significant impacts on the environment. At the strategic level, examination of impacts of physical plans and their variants could focus on "relative" assessments to identify serious conflicts, rather than examination of absolute parameters, which would attempt to determine the overall impact.

It is advisable that identification and consideration of variants should begin as early as possible in the planning process – already in the process of determining the scope. It is an iterative process, which means that on one hand, the selection of variants affects the scope, and on the other hand, the results obtained during scoping may affect the decision on the variants. Therefore, in the context of determining the scope, one should be talking about variant drafts, while selected variants should be taken into account and considered through the Environmental Report.

Environmental protection measures are formed in response to the identified significant environmental impacts. Their purpose is to avoid or reduce the extent, the likelihood or the frequency of adverse environmental impacts. Attention should be paid to their (ecological) effectiveness, appropriateness, and cost-benefit ratio.

When it comes to integration of the measures envisaged to prevent and reduce negative effects on the environment (or strengthen the positive effects), it is recommended to integrate the measures already known in the base of the assessment, which means that they must be reflected in the process of developing alternative solutions, where such solutions can serve as a mean of avoiding or reducing negative environmental impacts.

The same goes for physical plans, where legal provisions are to be built into the base of the planning process, in order to create conditions for realization of the sectoral strategies, plans and programs objectives. Further guidelines and measures, obtained and incorporated in the drafting of the plan, have to be determined with particular attention to the level of detail of the underlying plan. As a result, implementing provisions must be formulated so as to respect the often significant differences in the physical, natural and other characteristics of lower plans scopes.

Drafting and adoption process of physical plans in parallel with the implementation of SEA of the physical plan is shown in Figure 1. Furthermore, figure shows the flow path of environmental and nature protection measures and planning guidelines issued through these processes in order to protect the environment and nature.

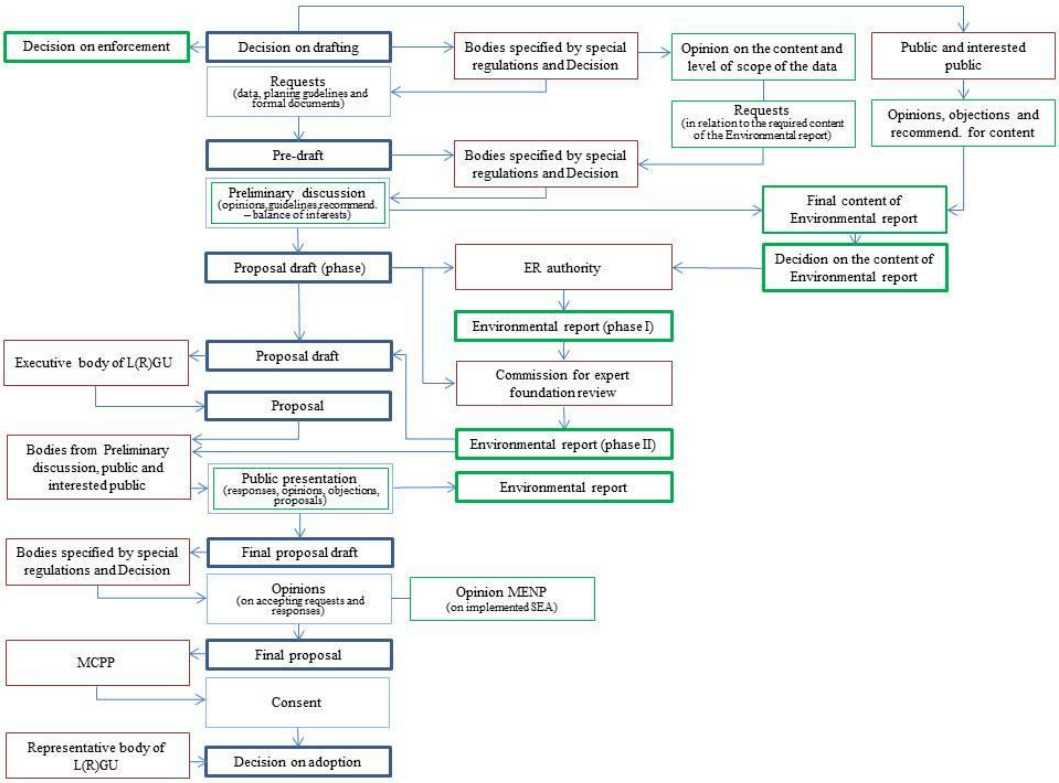

Figure 1. Drafting and adoption process of physical plans in parallel with the implementation of strategic environmental assessment of the physical plan.

Materials and Methods

Research on implementation and integration of the nature protection guidelines and measures is conducted on the Physical Plan of Primorje-Gorski Kotar County (PP PGKC), the only one until now in Croatia for which the obligation to implement the integrated procedure has been established.

The guidelines and measures obtained from the ministry responsible for nature protection (Ministry) received in the form of Requests obtained based on the Decision on Drafting of the Plan, as well as the Elaborate "Data on Species, Habitats, Protected and Registered Areas and Sites of the Ecological Network of the Republic of Croatia with a Proposal of Protection Measures for the Purpose of Drafting the Physical Plan of Primorje-Gorski Kotar County" (SINP's Elaborate) prepared by the SINP, then those arising from the Environmental Report, and the guidelines and measures obtained in a form of the Opinion of the SINP on Compliance with Requests and Responses as Part of the I. Final Proposal Draft of the Plan (SINP's Opinion) were analyzed.

Guidelines and measures from the mentioned sources were analyzed and classified into five groups, and, in accordance with the legal procedure, their incorporation into the physical plan was investigated:

- Planning guidelines (those that are not to be incorporated in the form of provisions)
- Guidelines for provisions
- Measures for further research (implementing provisions to be incorporated in the chapter Areas and sites for research and monitoring of the phenomena and processes in the area)
- Transposition of legal provisions
- Other – inadequate; limiting at the level of the PP PGKC

Integration of planning guidelines was analyzed by comparing the cartographic representations of various stages of the plan drafting, using GIS, and by analysis of the implementation provisions of the II. Final Proposal Draft, which were also used for the analysis of incorporation of guidelines for provisions and measures for further research.
Throughout the analysis it was taken into account whether guidelines and measures were incorporated in accordance with the purpose for which they were given. Specifically, the planning guidelines have a dual role in the context of a county plan. Their primary role is to direct the design and distribution of zones and infrastructure, so that only guidelines applied in that way where taken into account, although most of them were incorporated into the plan as implementation provisions for the narrower plans. Furthermore, in reality, the legal provisions should be planning guidelines, not implementation provisions, so they are, due to often misinterpretations of spatial planners, classified as a separate group. Their incorporation was observed through the provisions, as well as through the planning processes.
Evaluation was carried out on the principle incorporated/not incorporated, considering the guidelines or measures partially taken into account as incorporated, and the ones that where impossible to recognize as not incorporated.
In addition, bearing in mind the time of delivery of guidelines and measures with regard to the phase of the plan draft, and classification under individual chapters, the general principle of their incorporation was also considered.

Results and Discussion

Guidelines and measures received in the form of Requests where submitted by the ministry responsible for nature protection, and in the form of the SINP's Elaborate. It should be noted that these requirements are provided in advance, i.e. on the basis of the Decision on Drafting of the Plan, and serve to prepare the Pre-draft Proposal, which will introduce the concept of distribution, taking into account requirements of all national departments and other bodies designated by the Decision. Only in the Preliminary Discussion the guidelines that were defined on the basis of elaborated proposals of planning solutions could be given. The Ministry has sent a request for incorporation of 21 guidelines and measures, and the SINP's Elaborate, together with the description of legal background, detailed descriptions of protected nature and threat causes, included as many as 190 guidelines and measures, divided by groups of protected natural areas, and, due to such approach, between 15 and 20% of guidelines and measures were repeated.
In the process of county plan drafting the SINP's Opinion was also submitted, which sought the abolition of two wind farms due to more detailed findings on strictly protected and endangered species. They also demanded the incorporation of 34 provisions of which 32 were related to solar and wind power plants, and most of which were already contained in the SINP's Elaborate.
Guidelines and measures obtained through the strategic environmental assessment arise from the Environmental Report. The basis for making the Environmental Report was a Pre-draft Plan (the concept). The concept did not present variant solutions, which should be handled by strategic environmental assessment of a county physical plan, as prescribed by regulations, so in this case the Environmental Report evaluated individual projects. However, the Pre-draft gave only a schematic view of strategic direction. The analysis shows that the entire topics were missing in representations, such as exploitation, aquaculture, waste water treatment, etc., so the Environmental Report was unable to determine the significant effects on the nature at the level of detail of the analysis applied. Furthermore, the insight into the opinions of the bodies specified by special regulations on the content and level of scope of the data, which should include

requirements (data, planning guidance, documents) with respect to the required content of the Environmental Report, showed that the vast majority of them (including the ministry responsible for nature protection) responded only to the question of the content of the Report. The accredited company in a chapter "An indication of any difficulties," indicates that the main difficulties were the lack of recent data on the individual components of the environment and the pressures on the environment, the lack of a list of all potential interventions that are planned by the PP PGKC and the accurate location of individual projects that could significantly affect the environment.

This approach not only diminished the quality of the strategic environmental assessment, but also subsequently complicated the procedure, since the PP PGKC had to undergo a repeated Public Presentation because of the issues that should have been solved by the Environmental Report. Namely, the explanation of the Decision on the Repeated Public Presentation stated that it was necessary to repeat it due to the fact that the ministry responsible for nature protection conditioned its positive opinion on the Final Proposal of the Plan by amendments on the capacity for some touristic zones, abolishing some touristic zones and areas for mariculture, and eliminating two wind farm plants. Furthermore, the Pre-draft did not contain any implementation provisions, and since these are the main result of the spatial plan, it was necessary to test them, too.

The Environmental Report determined 18 nature protection measures, that is – 11 for the biodiversity and landscape protection and 7 for the ecological network. Compensatory measures were not determined.

Observing the incorporation of guidelines through planning using cartographic representations was difficult for several reasons. The first one is the scale of 1:100000, where the interventions are shown schematically. While the plan explains that the location of a building area may be within a radius of one kilometer from the symbols, in the case of a line infrastructure there was no such definition. Then, existing projects are not distinguished from the planned ones, the maps in various stages of the development often lack representations of entire themes, while for example electronic communications where not shown at all. The issue is also insufficient research of protected natural areas, so there are no representations of landscape typology or detailed distribution of the target species within the ecological network in order to be able to say that during the preparation of the plan the guidelines were fully complied with or not. However, despite these problems, it can be seen that the guidelines are respected in the sense that there is no major encroachment into the nature protected areas, that the infrastructure follows joint corridors, although covering the edges of some of the ecological network sites and forests, which could be a matter of a scale. Contrary to the guidelines, increased pressure on the coast could be noted.

Table 1. Representation of received (R) and incorporated (I) guidelines and measures

No	Planning guidelines		Guidelines for provisions		Measures for further research		Legal provisions		Other	
	R	I	R	I	R	I	R	I	R	I
Ministry	4	4	3	3	0	0	10	10	4	3
SINP's Elaborate	44	0	13	0	4	0	44	0	75	0
SEA	3	0	0	0	13	13	1	1	1	0
SINP's Opinion	6	4	6	4	4	4	1	0	17	0
Total	**57**	**8**	**22**	**7**	**21**	**17**	**56**	**11**	**97**	**3**

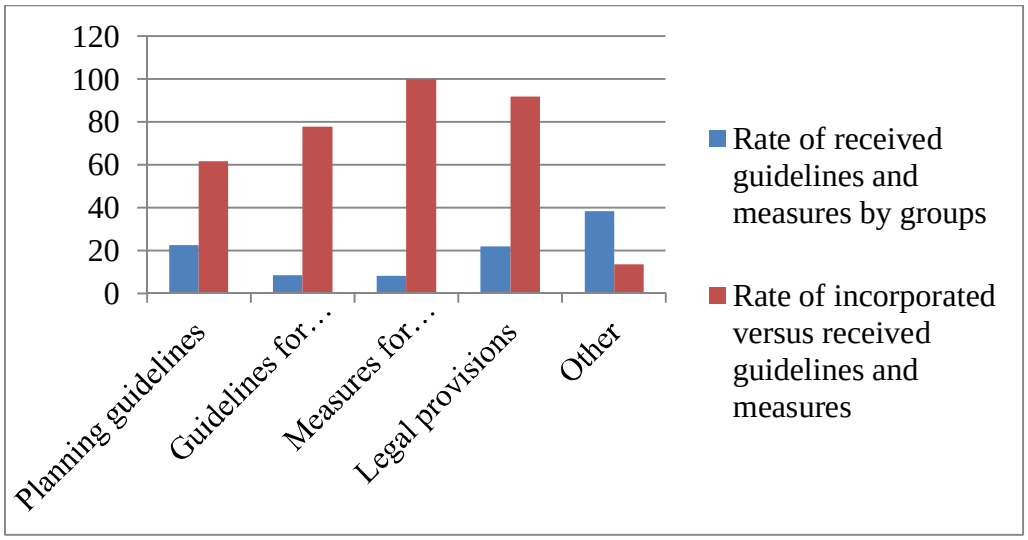

Chart 1. Representation of a share of received guidelines and measures by groups and share of incorporated in received guidelines and measures

Although the largest number of guidelines and measures was delivered through the SINP's Elaborate, it was found that, for unknown reasons, none was contained in the spatial plan, so these guidelines and measures were not taken into account when calculating the share of incorporated in received guidelines and measures.

It can be seen from the above that the largest number of received guidelines and measures was related to those that we considered inadequate for the level of the county plan. This is also the category that was the least taken into account when forming provisions. Most of these guidelines came from the SINP and the Ministry.

Furthermore, the most frequent were the measures for further research, mainly derived from an integrated procedure of strategic environmental assessment. This type of measures was fully incorporated into the Plan, as they are the basis for the implementation of individual projects. County plan in this case should be regarded as the first level of strategic planning by spatial plan, and it is understandable that it could not contain the data and information in sufficient detail to evaluate the impact of individual projects.

Planning guidelines were received in equal proportions by the Ministry, SINP's Opinion and the SEA, but only the ones from the Ministry were all taken into account, probably because they were delivered at the beginning of the plan drafting. Guidelines from the SINP's Opinion greatly coincide with those submitted by the Ministry, so request replications could be considered. An error was obviously made here, because the Ministry issues guidelines and measures based on opinion obtained from the SINP, which means that the request from the SINP was unnecessary. Three guidelines stemming from the SEA were not taken into account in the planning process, and therefore they were not considered in this analysis. Justification for this could be the scale and the schematic representation, however, this again points to the inadequacy of the level of detail of the implemented SEA.

Guidelines referring to the transposition of legal provisions are a large part of the requirements of the Ministry. They were mostly built-in or partially built-in, through various provisions and throughout the planning process. However, due to their generality it was not possible to determine whether the provisions were formed on the basis of the request or the law.

Implementation provisions are the final and main "product" of physical plans and they are formed by plan makers in cooperation with the plan holder. Taking this into account, it is clear that the minimum number of requests (policies and measures) was received in

the form of provisions. Many of the requests received in the form of legal provisions and guidelines for planning were built-in in the form of implementation provisions.
It was evaluated, based on the analysis, that the nature protection guidelines and measures were not systematically incorporated into the plan, they were often repeated, and it was a problem to find them. For the protection of natural values and distinctive historical and cultural entity no measures were prescribed, only protected areas were listed, which by itself does not represent neither guideline, nor measure. Nature protection measures provided by the Ministry have been incorporated into various chapters of the Plan, while those from the Environmental Report were all written in one chapter - Implementing Measures. It can be concluded from this that the plan makers did not consider the meaning of the obtained measures, which means that the implemented integrated procedure of strategic environmental assessment has not achieved its purpose.

Conclusion

Transposing of the Chapter 27 of the *acquis communautaire* into the Croatian legal system created the preconditions for the improvement of environmental and nature protection within the procedures of drafting physical planning documents. In addition to then existing protection instruments - nature protection policies and measures, approvals and opinions, the strategic environmental assessment and appropriate assessment of the impact on the ecological network were introduced. New procedures are carried out in parallel with the development of a physical plan with mandatory cooperation between the authorities, the plan makers and ER authority. During the procedure, the public and the interested public are to be consulted.
In order to examine the contribution of the strategic environmental assessment of the physical plan to the nature protection system, legislation and appropriate procedures that are applied and implemented during the preparation of physical plans were analyzed. Analyses were carried out on a concrete example of the Physical Plan of Primorje-Gorski Kotar County, where the integrated procedure of strategic environmental assessment and appropriate assessment of the impact on the ecological network were applied for the first time in Croatia.
The study included all available guidelines and environmental protection measures obtained through prescribed procedures, which were for the purposes of the analysis classified into 5 groups (planning guidelines, guidelines for provisions, measures for further research, transposition of legal provisions, other - inadequate; limiting at the level of county physical plan), and, in accordance with legal procedure, their incorporation into the physical plan was investigated.
Through the requirements of the ministry responsible for nature protection, the SINP and the integrated procedure of strategic environmental assessment 253 guidelines and measures were received in total, but those received in a form of the Elaborate of the SINP were not taken into an account when drafting the plan. Considering the other 73 guidelines and measures, 13 were included in the category of planning guidelines, 9 in guidelines for provisions, 17 in measures for further research, 12 in transposition of legal provisions and 22 in other – inadequate; limiting at the level of county physical plan. Share of incorporated guidelines and measures in received ones was 61.6% for planning guidelines, 77.7% for guidelines for provisions 100.0% for measures for further research, 91.7% for the transposition of legal provisions and 13.6% for the category other. The largest number of received guidelines and measures was related to the ones that were not appropriate for the level of the county plan, and were also the ones least taken into consideration when making implementation provisions for physical plan. Integrated procedure of the strategic environmental assessment resulted in the

guidelines and measures that were built into the physical plan mostly as measures for further research and as transposition of legal provisions.
From the results obtained, as well as form the determined lack of systematic and consistent incorporation of guidelines and measures into the plan, it was unequivocally concluded that the integrated procedure of strategic environmental assessment has not fulfilled its purpose, i.e. that it did not contribute to significant improvement within the nature protection system. All from the above point to the need of further strengthening of the capacity of all stakeholders within the procedures of spatial planning, strategic environmental assessment and appropriate assessment of the impact on the ecological network.

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Analiza varijantnih rješenja u postupku Strateške procjene utjecaja na okoliš kao sredstvo donošenja prostorno - planskih odluka

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Sažetak

U Republici Hrvatskoj je provođenje strateške procjene utjecaja prostornih planova na okoliš još u začetku, dok u europskim zemalja ta praksa postoji već 20-tak godina. Ovaj rad analizira neke primjere provođenja navedenog postupka u zemljama Europske unije te ih uspoređuje sa jednim od prvih primjera provedbe ovog postupka u Hrvatskoj. Cilj je rada istražiti mogući doprinos strateške procjene utjecaja prostornih planova na okoliš procesu donošenja prostorno planskih odluka, osobito kroz analizu varijantnih rješenja. Došlo se je do zaključka da realno definirana, sveobuhvatno procijenjena te demokratično odabrana varijantna rješenja mogu doprinijeti navedenom procesu.

Ključne riječi: Strateška procjena utjecaja na okoliš, prostorno planiranje, varijantna rješenja

Uvod:

Razvitak i primjena postupka Strateške procjene utjecaja na okoliš (SPUO) u prostornom planiranju u većini zemalja sjeverne i zapadne Europe te sjeverne Amerike započinje prije 20-tak godina, a u nekima od njih u određenom obliku i ranije. Provođenje SPUO temeljem Direktive 2001/42/EC, 2004. godine postaje obvezom za sve države Europske unije. Ovaj postupak se u Europskim zemljama provodi za sve razine prostornih planova, kako za strateške tako i za provedbene. Republika Hrvatska je Direktivu 2001/42/EC, odnosno obvezu provođenja SPUO prenijela u nacionalno zakonodavstvo 2008. godine donošenjem Uredbe o strateškoj procjeni plana i programa na okoliš. U području prostornog planiranja, obveza provođenja SPUO se u Hrvatskoj odnosi na prostorne planove regionalne razine tj. na prostorne planove županija i Prostorni plan Grada Zagreba, dok se za njihove izmjene i/ili dopune obveza određuje provođenjem postupaka Ocjene o potrebi procjene. Punom transpozicijom Direktive 2001/42/EC postupak će se primjenjivati i na lokalnoj razini prostornog planiranja. Iako je proces provođenja SPUO-a općenito, pa tako i u području prostornog planiranja u Hrvatskoj tek u začetku, može se reći da se neki elementi SPUO-a primjenjuju i od ranije. Primjerice, pri izradi strateških prostornih planova, koristile su se sektorske studije koje su često u sebi sadržavale određene okolišne zahtjeve. Nadalje, uključivanje javnosti, kao ključan element procesa SPUO-a je također naglašen dio procesa donošenja prostornih planova.
SPUO i prostorno planiranje su u mnogo čemu slični procesi, koji svaki sa svog motrišta razmatraju ista pitanja među kojima dominiraju; razvojni potencijali prostora, korištenje resursa, prostorna ograničenja, pitanja zaštite prirode i okoliša a sve u cilju

održivog razvoja promatranog područja (jedinice regionalne/lokalne samouprave). Osim toga, oba ova procesa rezultiraju donošenjem odluka koje imaju utjecaj na prostor, a i sam način njihova provođenja je prilično sličan.
U praksi postoji više tipova međudjelovanja ovih dvaju procesa (Therivel, R. i Partidário, M. R. eds, 1996):

- model baziran na procjeni utjecaja na okoliš pojedinačnog zahvata – koristi se isti pristup kao kod ocjene projekta,
- paralelan model – procjena utjecaja na okoliš provodi se paralelno ali neovisno od rada na izradi plana/programa,
- integrirani model – procjena utjecaja na okoliš je blizak ali nezavisan dio postupka izrade planova/programa,
- model gdje je odlučivanje središnja aktivnost – izrada planova/programa određuje proces a SPUO je okvir koji se nadograđuje na proces.

U zemljama u kojima se SPUO prostornih planova provodi već dulje vrijeme uočena je potreba za preispitivanjem i analiziranjem djelotvornosti i učinkovitosti upotrebe instrumenta SPUO u prostornom planiranju, a također se raspravlja o učinkovitom analiziranju varijantnih rješenja. U ovom je radu pretpostavljeno da je jedan od indikatora učinkovitosti SPUO u prostornom planiranju upravo odabir optimalnog varijantnog rješenja, odnosno da je postupak SPUO to uspješniji što su varijantna rješenja kvalitetnije definirana, sveobuhvatnije analizirana, te nakon suda javnosti, argumentirano odabrana.
Da bi se istražilo ovo pitanje analizirani su neki inozemni primjeri provođenja SPUO u prostornom planiranju te je učinjena usporedba sa jednim od prvih provedenih SPUO u Hrvatskoj: Strateškom procjenom utjecaja Prostornog plana Primorsko-goranske županije na okoliš.

Utjecaj Strateške procjene utjecaja na okoliš na donošenje prostorno planskih odluka

Očekivanja od provođenja SPUO u cilju integracije okolišnih pitanja i pitanja održivosti u proces donošenja prostorno planskih odluka su od trenutka kada je ovaj proces uveden bila velika, zacijelo s toga što proces prostornog planiranja sam nije mogao dati sveobuhvatne odgovore o utjecaju ciljeva prostornog plana na okoliš. Sektorske studije koje su ranije korištene kao ulazni podaci za izradu prostornih planova obrađivale su svaka svoje specifično područje (transport, zaštitu kulturne baštine, zaštitu prirode, zbrinjavanje otpada, zaštitu voda) no nedostajala je procjena njihova međusobna utjecaja, njihova kumulativnog utjecaja na okoliš te kombinirano vrednovanje ciljeva. Nadalje, navedene sektorske studije redovito nisu bile izlagane javnosti, pa javnost uz to što se o njima nije mogla izjasniti, nije imala priliku kroz njih niti biti informirana, što bi pridonijelo njenoj kompetentnosti prilikom sudjelovanja u javnoj raspravi. Sve navedeno je definiralo proces prostornog planiranja ne kao proces kroz koji se donose prostorno planske odluke, već postupak koji najčešće unaprijed donesene odluke samo evidentira.
Važno pitanje u analiziranju odnosa SPUO i prostornog planiranja jest kako SPUO može utjecati na donošenje prostorno planskih odluka i na koji način te utjecaje možemo vrednovati i izmjeriti. Kada govorimo o utjecajima možemo razlikovati izravne i neizravne utjecaje koje SPUO ostavlja na prostorni plan za koji je provedena, odnosno na odluke koje iz njega proizlaze. Veći broj stručnih radova se bavi analizom navedenih utjecaja, a rezultati do kojih se je došlo su dvojaki. Po pitanju strateških prostornih planova Runhaar, H. i Driessen,P.P.J. (2007) iznose analizu utjecaja SPUO na prostorne planove donesene u Njemačkoj, Nizozemskoj i Velikoj Britaniji te se je došlo do rezultata da je utjecaj SPUO na te prostorne planove statistički minoran.

Gledajući, pak, prostorne planove lokalne razine rezultat je znatno bolji, odnosno prema Thérivel, R. i Minas, P. (2002) rezultati SPUO-a su doista utjecali na odabir prostorno planskih rješenja u 70% analiziranih primjera. Navedeni utjecaji su klasificirani kao: promjena rješenja, rješenje dodano/izostavljeno ili primijenjen novi pristup odabira rješenja. Glavnina analiziranih primjera se nalazi u prvoj navedenoj kategoriji. Navedena su istraživanja, međutim analizirala samo izravne utjecaje, koji su mjerljivi, no oni neizravni učinci, primjerice informiranje javnosti i donosioca odluka, ili utjecaj na neke kasnije odluke, zapravo spadaju u nemjerljivu kategoriju.
Proces donošenja prostornog plana uz koji ili o kojem se provodi postupak SPUO je složen proces koji traje relativno dugo (prosječno 3 – 5 godina), uključuje velik broj dionika, te ima značajne i dalekosežne posljedice na velik broj ljudi, imovinu i okoliš. To je proces velikih dimenzija, koji je relativno trom, ali je uočljivo da se kroz godine sistem njegova provođenja unapređuje, ponajviše temeljem iskustva brojnih postupaka koji su provedeni prethodno.
O doprinosu SPUO-a donošenju odluka postoje različita mišljenja, osobito po pitanju utjecaja na smanjenje troškova postupka, kojeg mnogi ističu ali je on teško mjerljiv i dokaziv. Doprinosi oko kojih se slaže većina autora su:

- SPUO može biti važna podloga za provođenje procjene utjecaja na okoliš na razini projekta. SPUO nema tendenciju da zamijeni procjenu utjecaja na okoliš pojedinačnih zahvata međutim može doprinijeti smanjenju troškova, vremena i rada na izradi procjene utjecaja na okoliš pojedinačnog zahvata (Therivel, R. i Partidário, M. R. eds, 1996),
- predložena rješenja postaju razumljivijima svima učesnicima u procesu odlučivanja.

Nadalje, pokušalo se je definirati koje su karakteristike ima kvalitetna SPUO, a naglašene su slijedeće (Therivel, R. 2004) : donosiocima odluka pravovremeno pruža opsežnu i jasno prezentiranu informaciju o utjecajima plana na okoliš; pospješuje promjenu stava, pogleda te načina vrednovanja dionika procesa uključujući donositelje odluka; potiče sudjelovanje, suradnju, uključivanje i koncenzus u procesu izrade plana što osigurava legitimitet te potiče mijenjanje uspostavljenih institucionalnih procesa.
Najčešće iznošene karakteristike kvalitetnog SPUO su: sveobuhvatnost, usmjerenost održivosti, fokusiranost na problem, vjerodostojnost, otvorenost prema javnosti i upotrebljivost za daljnje postupke.

Istraživanja o djelotvornosti SPUO u donošenju prostorno-planskih odluka pokazala su i da je SPUO u smislu korištenja vremena i resursa to učinkovitija što je proces SPUO jasnije integriran u proces izrade prostornih planova. Naime, unatoč očitoj potrebi sinergije između procesa donošenja prostornih planova i SPUO, oni se često provode kao dva procesa koja su vođena paralelno ali su zapravo odvojeni. Navedeno dovodi do nekih negativnih učinaka, primjerice, budući se radi o vrlo sličnim zadacima, dupliciraju se napori sudionika u izradi prostornog plana i izrađivača procjene utjecaja na okoliš. Idealno vrijeme za integriranje ovih dvaju procesa je sam početak, odnosno faza prikupljanja podataka o stanju u prostoru, identificiranja problema i pitanja, utvrđivanja glavnih smjernica te definiranja plana rješavanja problema. Dakle vrlo je važno da se njihov odnos uspostavi na početku, odnosno da se SPUO prizna pravo biti čimbenikom u procesu donošenja odluka.

SPUO će biti učinkovitija ako je (Department for Communities and Local Guvernment, UK, 2010):

- prikupljanje podataka usmjereno na prostorne podatke potrebne za identifikaciju i procjenu varijanti;
- procjena usmjerena na dobro osmišljene i jasno artikulirane varijante rješenja;

- opseg procjene prilagođen ciljevima plana;
- rješenja koja nisu vjerojatna su isključena iz procesa procjene;
- procjena bi trebala biti detaljna sukladno potrebama plana.

Kreiranje razboritih varijantnih rješenja

Jedan od glavnih razloga zbog kojih je uočena potreba za strateškom razinom procjene utjecaja na okoliš jest činjenica da kad pojedini zahvat u prostoru dođe do faze projektiranja, odnosno faze kada se provodi procjena njegova utjecaja na okoliš, razmatranje drugih varijanti postaje izlišno (Therivel, R. 2004). Za razliku od procjene utjecaja na okoliš na razini projekta, SPUO uzimajući u obzir vremenski i prostorno dalekosežnije utjecaje može dublje razmotriti različite načine postizanja određenog cilja i prezentirati vjerojatne posljedice odabira pojedinih varijanti. To je jedna od najuočljivijih karakteristika SPUO-a, štoviše SPUO bi se mogla definirati kao „proaktivna procjena varijantnih rješenja“ (Jones, C. (ed) et al. 2005): Noble, 2000). S druge strane praksa često pokazuje nešto sasvim suprotno. SPUO, pa tako i SPUO prostornih planova često procjenjuje utjecaj već unaprijed odabranog rješenja dok su varijantna rješenja u navedenom postupku ili izostavljena ili su navedena kako bi se zadovoljio formalni zahtjev da ona budu definirana. Takva formalna varijantna rješenja često imaju karakteristike koje su suprotnost najpovoljnijeg i/ili rješenja najrealnijeg za provedbu, dakle ona su uočljivo nepovoljna.
U zemljama sa razvijenom praksom provođenja SPUO prostornih planova, u novije vrijeme dolazi do preispitivanja procesa kreiranja realnih alternativnih rješenja, štoviše dolazi i do pozivanja na odgovornost pred pravosudnim tijelima radi neuzimanja u obzir svih mogućnosti rješavanja određenog problema (Smith,S., Fessey,M. i White,A., 2011).
Definiranje varijanata određenog rješenja je krucijalno u procesu SPUO. Izvori iz kojih se mogu dobiti prijedlozi varijantnih rješenja su primjerice (Department for Communities and Local Guvernment, UK, 2010):

- planovi višeg reda i strategije
- prethodna javna rasprava,
- prijedlozi stručnih izrađivača plana,
- procjene utjecaja na okoliš koje su prethodno provedene,
- izvješće scopinga,
- prijedlozi ključnih dionika.

Ono što je važna karakteristika dobrih varijantnih rješenja je da su primjenjiva te da je njihov broj razborit. Direktiva 2001/42/EC (2004) kada propisuje obvezu razmatranja varijantnih rješenja, isključivo govori o „razboritim“ varijantnim rješenjima. I dok se razboritost sadržaja varijantnog rješenja može procijeniti sa stajališta ekonomske isplativosti, sociološke utemeljenosti i ekološke održivosti, mogle bi se definirati dvije razine „razboritosti“ broja varijantnih rješenja (Smith,S., Fessey,M. i White,A., 2011). Prvo je da varijantna rješenja budu postavljena oko razboritog broja ciljeva, a drugo da za svaki cilj bude definiran razuman broj varijantnih rješenja. Premalen broj varijanti ili čak nepostojanje ijednog alternativnog prijedloga ukazuje na činjenicu da problem nije dovoljno dobro analiziran jer nepostojanje alternativa zapravo nije realno. Prevelik broj postavljenih varijanti može otežati proces donošenja odluka na način da se proces izvan očekivanja produlji. Navedena situacija također ukazuje da problem nije dovoljno dobro analiziran jer bi u suprotnom neke od najnepovoljnijih varijanti mogle biti već ranije eliminirane te dat dovoljan prostor kvalitetnijim i realnijim varijantama. Preveliki broj predloženih varijantnih rješenja u fazi javne rasprave može biti podloga za raspršivanje ili skretanje fokusiranosti na ciljeve plana.

Neke analize su pokazale da mogućnost razvoja alternativa uvelike ovisi o kojoj se razini prostornog plana radi, odnosno o njegovu položaju u prostorno-planskoj hijerarhiji. Planovi viših razina mogu suspregnuti razvoj alternativa stavljajući stroga ograničenja na ono što se može razmatrati u planovima nižih razina. Također se je pokazalo da razvoj alternativa ponekad bude onemogućen jer je unaprijed donesena „velika odluka“ od strane izvršne vlasti na nacionalnoj, regionalnoj ili lokalnoj razini(Smith,S., Fessey,M. i White,A., 2011). Na lokalnoj razini je „velikih odluka“ čini se manje nego na ostalim razinama budući je rad sa alternativnim rješenjima na toj razini najizraženiji.

Materijal i metode

Primjeri koji su analizirani odabrani su uzimajući u obzir četiri glavna kriterija:

- dolaze iz zemalja sa razvijenom tradicijom provođenja SPUO u prostornom planiranju (osim primjera 4 koji je, radi usporedbe sa ostalima, uzet iz Hrvatske),
- analiza varijantnih rješenja, često marginalizirana u procesu prostornog planiranja i SPUO-a, u navedenim je primjerima naglašeno prisutna,
- primjeri nisu stariji od 4 godine, zbog pretpostavljenog napretka procesa SPUO,
- zbog određenih geografskih, sociološki ili demografski karakteristika primjeri su usporedivi sa Hrvatskom.

Primjer 1.: Lokalni plan uređenja naselja Collinstown, 2009 – 2015, Irska (2010)

Naselje Collinstown, u središnjoj Irskoj, danas broji oko 700 stanovnika. Fizički je spojeno sa gradićem Leixlip, 17 km udaljenim od centra Dublina. Strategija razvitka regije Dublin 2008-2016 predviđa širenje gradića Leixlip, inače sjedišta tvrtki Guinness, Intel i Hewlett Packard, na područje Collinstowna sa projekcijama rasta broja stanovnika od oko 5,500. Naselje je prometno vrlo dobro povezano sa Dublinom. Glavna intencija ovog prostornog plana jest formiranje glavnog gradskog centra na području Collinstowna. SPUO je vođena paralelno sa izradom nacrta prijedloga prostornog plana.

Definiranje varijantnih rješenja
SPUO je analizirao tri alternativna rješenja:

1. varijanta: Ležeran pristup - ova varijanta bi omogućila raštrkano širenje izgradnje na područje Collinstowna koje će rezultirati brisanjem granica između glavnog gradskog centra, stambenih zona, industrije i skladišta,
2. varijanta: Daljnja izgradnja na području Leixlipa - ova varijanta bi omogućila izgradnju novih zona unutar samog Leixlipa bez širenja na područje Collinstowna. Budući je Leixlip omeđen prometnicama, ova varijanta podrazumijeva povećavanje gustoće izgrađenosti u gradu,
3. varijanta: Strog pristup - ova varijanta bi omogućila izgradnju glavnog gradskog centra na području Collinstowna.

Odabir najpovoljnije varijante
Ocijenjen je utjecaj predloženih varijanti prema 8 SPUO ciljeva: zaštitu 5 sastavnica okoliša, utjecaj na ljude, kulturnu baštinu i krajolik te se je došlo do zaključka da je Varijanta 3. koja predstavlja kombinirani planerski pristup, najpovoljnija opcija i sa okolišne i sa ekonomske točke gledišta. Plansko zoniranje i grupiranje omogućuje adekvatnu infrastrukturnu opremljenost svih zona, pa time i manji pritisak na okoliš, što se osobito odnosi na industrijske zone. Varijanta 1 je ocjenjena najnepovoljnijom i sa okolišne i ekonomske strane, budući bi mogla generirati neadekvatna urbanistička i

projektna rješenja koja će povećati transportne zahtjeve, zahtjeve zbrinjavanja otpada i ostalo. Varijana 2 je povoljnija od varijante 1, no povećana gustoća izgrađenosti u Leixlipu bi intenzivirala transport, nepovoljno utjecala na kvalitetu zraka i ostalo.

Primjer 2: 2. Plan uređenja grada Glasgowa, Škotska, Velika Britanija (2009)

Grad Glasgow, jedna od najvećih morskih luka na svijetu, danas ima oko 600.000 stanovnika, dok njegova konurbacijska regija broji oko 2,8 mil. stanovnika. Škotska vlada zadnjih godina radi na osuvremenjavanju Škotskog sustava prostornog planiranja pa je 2006. donesen novi zakon koji regulira ovo područje a sukladno tome došlo je do potrebe izmjena postojeće planske dokumentacije. Proces izrade SPUO je paralelno vođen sa postupkom izrade nacrta prostornog plana, počevši od donošenja odluke o izradi prostornog plana kada se je istovremeno krenulo sa SPUO screeningom pa do 2009. godine kada je usvojen prostorni plan. Procjena utjecaja na okoliš je utjecala na mnogobrojne izmjene prijedloga prostornog plana, posebice na ciljeve i smjernice razvoja koje se odnose na poboljšanje stanja okoliša u dijelovima grada predviđenim za obnovu i rekonstrukciju.

Definiranje varijantnih rješenja:
SPUO je predložio niz varijantni rješenja koja su definirana na način da su za svako plansko područje suprotstavljene 2 ili 3 varijante. Radi se o slijedećim planskim kategorijama: uvjeti gradnje; način gradnje; stanovanje; industrija i poslovne zone; trgovina i usluge; transport i parkiranje; zaštita okoliša.
Potom je izvršena analiza utjecaja svake od navedenih varijanti na ljude, gospodarstvo, i okoliš.

Primjer 3: Masterplan luke Poole, Velika Britanija (2012)

Poole je turistički grad sa prostranom prirodnom lukom koji se nalazi u pokrajini Dorset u južnoj Engleskoj. Grad broji 138,000 stanovnika, a dio je šireg konurbacijskog područja koji broji 400,000 stanovnika. Luka Poole se nalazi na sjevernoj obali velikog poluzatvorenog zaljeva Poole Harbour, kojeg karakterizira vrlo razvedena obala. Ključni cilj ovog Masterplana je stvaranje uvjeta za održivi razvitak luke odnosno komercijalnu isplativost luke u kojoj se odvija široki spektar aktivnosti. SPUO je provođena paralelno sa izradom nacrta prijedloga prostornog plana.

Definiranje varijantnih rješenja
Nacrt prostornog plana ponudio je 5 rješenja, odnosno 5 različitih zahvata u prostoru koji su predloženi svaki na određenoj lokaciji unutar zaljeva. SPUO je analizirao utjecaj na okoliš predloženih projekata te istražio kumulativni utjecaj 11 kombinacija predloženih projekata (kombinacije se sastoje od 2 ili 3 projekta), čime su formirane varijante planskog rješenja ovog prostornog plana. Predložena su slijedeća rješenja:

- Varijanta 1.: vjetroagregat i vez za brodove sa dubokim gazom, južna varijanta,
- Varijanta 2: isto kao i pod brojem 1., sjeverna varijanta,
- Varijanta 3: produbljivanje postojećih standardnih priveza,
- Varijanta 4: marina sa 950 vezova, vezom za kruzere i popratnim sadržajima, zapadna varijanta,
- Varijanta 5: marina sa istim brojem vezova i popratnim sadržajima, bez veza za kruzere, istočna varijanta.

Analiza varijantnih rješenja

Ispitan je utjecaj 5 predloženih projekta i njihovih 11 kombinacija na 14 SPUO-om definiranih ciljeva: očuvanje, zaštita i unapređenje bioraznolikosti unutar i na prostoru oko luke; smanjenje rizika od akcidenata te smanjenje rizika/povećanje sigurnosti korisnika luke; unapređenje regionalnog gospodarstva uz povećanje mogućnosti zapošljavanja; unapređenje korištenja javnih prostora; zaštita vode; minimiziranje zagađenja tla; unapređenje kvalitete zraka; redukcija ispuštanja stakleničkih plinova; pozitivan utjecaj na kulturnu baštinu; očuvanje krajolika; povećanje prometne propusnosti i sigurnosti na području oko luke; smanjene buke; unapređenje sistema zaštite od poplave i sprečavanja erozije obale i minimiziranje stvaranja otpada. Svi su prijedlozi dobili srednju prosječnu ocjenu: s obzirom na ekonomske ciljeve ocijenjeni su iznad prosječno, podbacili su u odnosu na okolišne ciljeve, dok su s obzirom na sociološke dobili raznolike ocjene. Prijedlog broj 3, te njegove kombinacije sa prijedlozima 5, 1 i 5 te 2 i 5 ukupno su ocjenjeni kao najpovoljniji.

Primjer 4: SPUO Prostornog plana Primorsko-goranske županije (2012)

Predmetna SPUO procjenjuje utjecaj na okoliš 45 zahvata koji su nacrtom prijedloga prostornog plana određeni kao zahvati od važnosti za Republiku Hrvatsku i Primorsko-goransku županiju. Za tri od njih su predložene po dvije varijante rješenja kako slijedi:

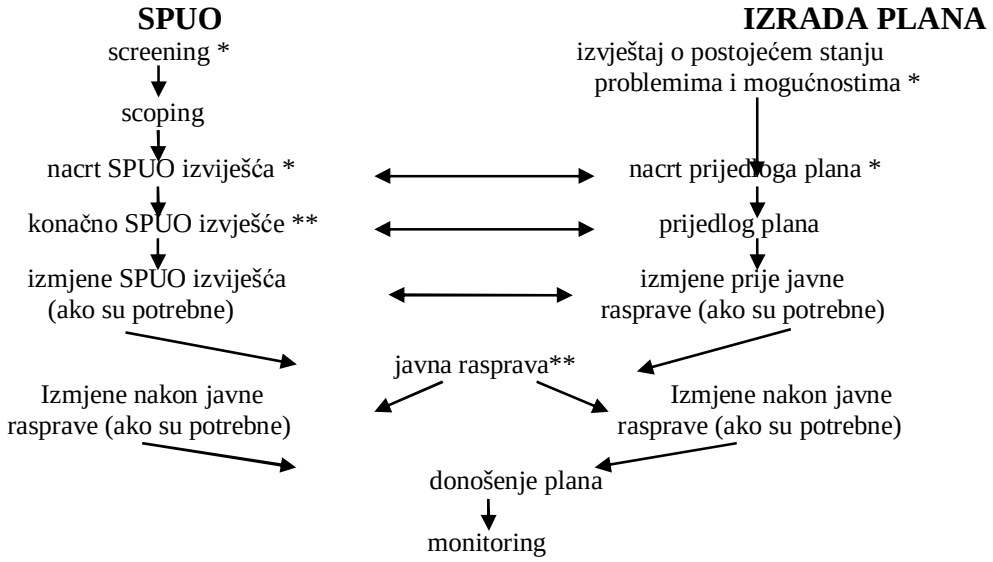
- Autocesta A7: Dionica Permani-Grobničko Polje (Konj): Varijanta 1: sjeverna varijanta / Varijanta 2: južna varijanta,
- Luka za prekrcaj petrolkoksa: Varijanta 1: Bakarski zaljev, SI obala poluotoka Kostrena, kod rta Babno, između postojeće industrijske luke Bakar i industrijske luke Sršćica / Varijanta 2: JZ obala poluotoka Kostrena, rt Škrkovac,
- Kombinirana plinska elektrana: Varijanta 1: na JZ obali poluotoka Kostrena, rt Podurinj (postojeća TE Rijeka) / Varijanta 2: uz lokaciju planiranog terminala ukapljenog plina u Omišlju na Krku.

Analiza varijantnih rješenja:
Utjecaj svakog od zahvata procijenjen je kriterijima vrednovanja za pojedine sastavnice okoliša/opterećenja što je obrađeno ekspertnom (multikriterijalnom) metodom ocjenjivanja te je utvrđeno da su najpovoljnija za okoliš slijedeća varijantna rješenja:

- Autocesta A7: Dionica Permani- Grobničko Polje (Konj) - povoljnija je Varijanta 2, ocijenjena ukupnom ocjenom 15 (umjeren utjecaj) naspram Varijante 1, ocijenjene ukupnom ocjenom 13 (značajan utjecaj),
- Luka za prekrcaj petrolkoksa Bakar – povoljnija je Varijanta 2, ocijenjena ukupnom ocjenom 30 (nije značajan utjecaj) uz potencijalno značajan kumulativni utjecaj naspram Varijante 2, ocijenjene ukupnom ocjenom 28 (nije značajan utjecaj) uz potencijalan kumulativni utjecaj,
- Kombinirana plinska elektrana - povoljnija je Varijanta 1, ocijenjena ukupnom ocjenom 31(nije značajan utjecaj) naspram Varijante 2 ocijenjene ukupnom ocjenom 21 (umjeren utjecaj) uz potencijalno značajan kumulativni utjecaj.

Rezultati i rasprava

Ono što je pozitivno kod Primjera 1. jest činjenica da su sve tri definirane varijante u datim okolnostima prilično realne. Nadalje, iako je odmah uočljivo da je varijanta 3 unaprijed određena kao najpovoljnija varijanta, ipak se može reći da je u SPUO posvećena dovoljna pažnja analizi drugih dviju varijanti kao i da je odabir varijante 3 argumentirano obrazložen. Suprotstavljanje dviju manje vjerojatnih varijanti jednoj vjerojatnijoj može istaknuti kvalitetu odabrane varijante što može dobro ilustrirati problem pri izlaganju prijedloga javnosti.



* - uključuje konzultacije od strane nadležnih tijela, **- uključuje sudjelovanje javnosti

Slika 1. Shema tijeka i međudjelovanja postupaka SPUO-a i donošenja prostornih planova u Velikoj Britaniji (Glasgow City Council, 2009)

Iako je kod Primjera 2. razmatrano više varijantnih rješenja, vrlo je uočljivo da je u većini slučajeva samo jedna od predloženih varijanti prihvatljiva te je unaprijed odabrana, a druga je, kao njena suprotnost postavljena kako bi se zadovoljio formalan zahtjev. Iako se radi o planu uređenja grada, ovaj plan ima izražen strateški karakter.

Primjer 3. je od svih analiziranih primjera najsveobuhvatnije iskoristio SPUO kao alat kojim se dolazi do optimalnog prostorno-planskog rješenja. Uzeti su u obzir realni prijedlozi rješenja kombiniranjem kojih je kreirano nekoliko varijanti i podvarijanti rješenja. Razborit broj predloženih varijanti i podvarijanti otvorio je put lakšem postizanju koncenzusa pri donošenju konačnih odluka. Stječe se dojam da su varijante realno ocijenjene, odnosno da se ne pokušava dati neopravdana prednost niti jednoj od njih. Izviješće o provedenoj SPUO je izrađeno pregledno i jasno te je bilo dobra podloga za informiranje svih sudionika javne rasprave.

Primjer 4 je pionirski u provođenju ovakvog postupka u Hrvatskoj no bez obzira na to, analizu varijantnih rješenja za samo 3 zahvata od njih 45 obuhvaćenih SPUO-om ne možemo nazvati primjernim pristupom. Međutim, pozitivna je činjenica da su varijante realne te da se kod zahvata 2 i 3 doista radi o suštinskim a ne formalnim varijantama. Izviješće o provedenoj SPUO može u određenoj mjeri biti informativno budući je vrednovanje utjecaja na dijelove okoliša pregledno argumentirano.

Zaključak:

U ovom se radu želio istražiti utjecaj SPUO, ponajviše dijela koji se odnosi na analizu varijantnih rješenja na odabir optimalnih prostorno planskih rješenja u postupku izrade prostornih planova. Pretpostavilo se da dugogodišnje iskustvo provođenja navedenih postupaka u zemljama Europske unije može biti dragocjeno u razvoju navedenog sustava u Republici Hrvatskoj. U tom smislu su pronađeni primjeri koji se po nekim karakteristikama mogu povezati sa Hrvatskom.
Provedena je analizirani novijih primjera provođenja SPUO u prostornom planiranju u Velikoj Britaniji i Irskoj, zemljama sa razvijenom tradicijom provođenja navedenih

postupaka te jedan primjer istog postupka iz Hrvatske. Opisana su predložena varijantna rješenja te postupak i kriteriji njihova vrednovanja. Nakon toga je ocijenjeno koliko su varijantna rješenja bila realno definirana, jesu li bila objektivno procijenjena te jesu li i na koji način uzeta u obzir pri konačnom odabiru prostorno-planskog rješenja.
Iz navedenih primjera se može zaključiti da je analiza varijantnih rješenja kao doprinos učinkovitosti SPUO tim veća što je kvalitetnije definiran realan broj varijanti mogućeg rješenja, odnosno što je temeljitije provedeno njihovo vrednovanje. Osim toga se može zaključiti da je utjecaj SPUO na prostorno planiranje u pravilu uočljiviji kod prostornih planova niže razine, odnosno na području koje je manje izgrađeno, dok se kod strateških dokumenata često radi o procjeni već unaprijed odabranih rješenja. Također je vidljivo da je uvjet za djelotvornu SPUO u prostornom planiranju, rano pokretanje postupka SPUO, najbolje na samom početku izrade prostornog plana. Navedeno omogućuje sinergiju ovih dvaju procesa, unošenje rezultata analiza dobivenih kroz postupak SPUO u nacrte prijedloga prostornog plana te pruža mogućnost javnosti da kompetentno sudjeluje u javnoj raspravi.
Propisani postupak izrade i donošenja prostornih planova u Republici Hrvatskoj slično kao i u zemljama Europske unije ne pruža dovoljno prostora za transparentan, demokratičan i argumentirani odabir optimalnih prostorno-planskih rješenja, osobito sa stajališta zaštite okoliša. Iz tog je razloga kao potpora navedenom procesu uvedena SPUO, no praksa je pokazala da djelotvorna upotreba SPUO-a kao instrumenta donošenja prostorno planskih odluka iziskuje promjene u samom procesu prostornog planiranja. Navedeni proces mora prihvatiti ulogu izrađivača i odabiratelja planskog rješenja, tj. da bi bio djelotvoran, mora biti otvoren mogućnosti izmjene, korigiranja, dodavanja ili uklanjanja planskih rješenja tijekom cijelog postupka, od strane svih dionika. Procjena razumnog broja varijantnih rješenja je suština efikasnog SPUO-a pa tako i procesa odabira prostorno-planskih rješenja u postupku izrade i donošenja prostornog plana.

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Analysis of Alternatives in Strategic Environmental Assessment Process as Instrument Used in Physical Planning Decisions

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Abstract

The implementation of Strategic Environmental Assessment of physical planning is still in its inception in the Republic of Croatia, whereas throughout Europe it has been implemented for some 20 years. This paper analyses several cases of its implementation in the EU member states, comparing them with one of the first cases of implementation of this process in Croatia. The specific objective of this paper is to examine the likely effect of Strategic Environmental Assessment of physical plans on the process of reaching physical planning decisions, primarily through alternative solution analysis. A conclusion has been reached that alternative solutions, provided they are defined in real terms, comprehensively assessed and democratically selected, can contribute to the abovementioned process.

Key words: Strategic Environmental Assessment, physical planning, alternatives

Introduction:

The development and the implementation of the Strategic Environmental Assessment (SEA) process in physical planning commenced in the majority of Northern and Western European countries, as well as in North America some 20 years ago and in some countries its early versions were implemented even earlier. The implementation of SEA in conformity with the Directive 2001/42/EC became mandatory for all the EU member states in 2004. The process is implemented in EU member states on all levels of physical planning, both on the strategic and the implementation level. The Republic of Croatia applied the Directive 2001/42/EC in her national legislation in 2008 by the adoption of the Regulation on Strategic Environmental Assessment of Plans and Programmes. The obligation of implementation of SEA in the area of physical planning in Croatia concerns physical planning at the regional level, that is, physical plans of Counties and Physical Plan of the City of Zagreb, while the amendments and/or alterations to the obligations are performed through screening. In compliance with the full transposition of the Directive 2001/42/EC the process will be implemented also on the local level of physical planning. Irrespective of the fact that the implementation of SEA in general, as well as in physical planning is currently only in its inception phase in Croatia, nevertheless, it can be highlighted that several features of SEA had been implemented earlier. For instance, sector studies which were used during the creation of strategic physical plans often encompassed specific environmental requirements. Moreover, the inclusion of the general public, as a principal feature within the SEA process is also a fundamental aspect in creation of physical plans.

SEA and physical planning exhibit substantial similarities, each of them considering identical issues such as: physical development potential, exploitation of resources, issues of nature and environmental protection to enhance the sustainable development of the monitored area (regional/local government). In addition, both processes result in decisions impacting on the environment and the method of their implementation is considerably similar.
In reality, there are several types of interrelation between these two processes (Therivel, R. i Partidário, M. R. eds, 1996):

- environmental impact assessment-based model – same approached used for project's environmental impact assessment,
- parallel model – environmental assessment runs parallel, but independent, to policy-making and planning process,
- integrated model – environmental assessment is part of, and non-distinct from, policy-making and planning,
- decision-centred model – policy-making and planning determine the process, SEA the framework for assessment, SEA is built on the decision process

In the states where SEA in physical planning has been implemented over a longer-term period, the requirement for re-examination and analysis of effectiveness and efficiency of the use of SEA instruments in physical planning has been identified. Furthermore, discussions have been triggered on effective analysis of alternative solutions. This paper assumes that one of the indicators of SEA effectiveness in physical planning is primarily the selection of the most appropriate alternative. Moreover, the definition of alternatives, the comprehensive analysis of alternatives and, following the assessment provided by the general public, their argumentative selection, all have a substantial impact on the success of the SEA process in physical planning.
In order to examine this issue, several foreign examples of implementation of SEA in physical planning have been analysed and a comparison has been made with one of the first SEA processes implemented in Croatia: Strategic Environmental Assessment of the Physical Plan of Primorje - Gorski Kotar County.

The effect of Strategic Environmental Impact Assessment on the decision-making in physical planning

There have been huge expectations arising from SEA implementation to enhance the integration of environmental issues and sustainable development issues within the process of decision-making in physical planning since the commencement of the implementation of the process, primarily due to the fact that the physical planning process in itself could not provide comprehensive answers on environmental impact of physical planning objectives. Sector studies which had previously been used as entry data for the creation of physical plans dealt with specific areas of interest (transportation, cultural heritage protection, nature protection, waste management, water protection), yet an assessment of their correlation was missing, as well as the assessment of their cumulative impact on the environment and the evaluation of combined objectives. Furthermore, the abovementioned sector studies regularly were not presented to the general public and hence they could not provide a feedback, as they had not been informed through the mentioned studies which would in turn have significantly enhanced their competitiveness during the participation in public discussion. Consequently, the physical planning process has not been defined as a process resulting in physical planning decision-making, but rather as a process merely recording the previously made decisions.
An important issue needs to be highlighted concerning the correlation between SEA and physical planning – how SEA can impact on the decision-making in physical planning

and in what way can this impact be evaluated and measured. In addition, the impact of SEA on physical planning for which it has been implemented or on the decisions resulting from it can be direct and indirect. A large number of studies is involved in the analysis of the aforementioned impact and the results achieved have been ambivalent. Concerning strategic physical planning, Runhaar H. and Driessen P.P.J. (2007) presented an analysis of the impact of SEA on physical plans created in Germany, Holland and Great Britain and achieved the results that the impact of SEA on physical plans is statistically minimal. On the other hand, when physical plans on the local level were considered, the results were considerably better or, according to Therivel R. and Minas P. (2002), the results of SEA had significantly affected the selection of physical planning solutions in 70% of the analysed cases. The aforementioned impact was classified as: change of solution, solution added/omitted or a new approach to solution selection has been adopted. Most analysed cases belong to the first category. However, the aforementioned research analysed merely direct and measurable impact, whilst the indirect impact such as providing information to the general public and to the decision-makers or effect on subsequent decisions, belong to the non-measurable category.
The process of creation of a physical plan with the implementation of SEA process is a complex process of relatively long duration (3 to 5 years on average), includes a large number of participants and has significant and long-term consequences for a large number of people, as well as for real estate property and environment. It is a process of large proportions, relatively slow, yet it is evident that the system of its implementation has seen considerable advancement over the years, mainly through comprehensive experience gained through a wide range of previously implemented processes.
Nevertheless, the impact of SEA on decision-making has seen various interpretations, primarily concerning the impact on cost reduction of the entire process, which has been emphasised by many, yet it is hardly measurable and can hardly be proved. Most authors agree on:

- SEA can be an important basis for the evaluation of environmental impacts at the project level. SEA does not have a tendency to replace the Environmental impact assessment individual projects but can contribute to reducing the cost, time and effort in preparing the environmental impact assessment of individual projects (Therivel, R. and partidario, MR eds, 1996),
- suggested solutions become more understandable to all participants in the decision-making process.

Moreover, there have been attempts at defining the high quality SEA features and the following have been pointed out (Therivel, R., 2004): provides decision-makers with robust, clearly presented information about the environmental impacts of their plan at the right time; help to change the values, attitudes and perceptions of stakeholders, including decision-makers; increase participation, collaboration, inclusiveness and consensus in the plan-making process, thus helping to provide legitimacy and help to change established institutional processes.
The most commonly presented features of a high quality SEA are: comprehensiveness, sustainability focus, focus on the problem, credibility, openness to the public and usability for further proceedings.
Research on effectiveness of SEA in physical planning decision-making has revealed SEA in terms of time-effectiveness and the exploitation of resources to be increasingly effective in cases where SEA has been clearly more integrated in the process of creation of physical planning. Irrespective of a requirement for synergy between the processes of creation of physical plans and SEA, they are often implemented as two parallel processes, yet considered separately. Subsequently, there are several negative consequences, as for example, since we are dealing with similar tasks, the efforts of the

participants consequently increase concerning the creation of a physical plan and in the creation of a Strategic Environmental Impact Assessment. The ideal timing for the integration of these two processes is the very beginning or the phase of data collection on environmental conditions, identification of the problem and fundamental issues, defining the principal guidelines, as well as the planning to provide a solution to the problem. Hence, it is of fundamental importance to adopt the appropriate approach and find a correlation at the commencement and it is consequently necessary to consider SEA as crucial in decision-making process. SEA will be more effective if (Department for Communities and Local Guvernment, UK, 2010):

- evidence gathering focused on the spatial information needed to identify and appraise alternatives,
- the appraisal focused on well thought out and clearly articulated alternatives (options),
- the scope of the appraisal – i.e. the issues it addresses – was tailored to the options under consideration,
- issues that are not likely to be significant were excluded from the scope and
- the level of detail of the appraisal was proportionate to the level of detail in the plan.

Creation of reasonable alternatives

One of the principal reasons for the requirement of the environmental impact assessment at a strategic level is the fact that when an individual physical arrangement enters a phase of structural planning or the phase in which its environmental impact assessment is implemented, the consideration of alternative solutions becomes superfluous. As opposed to environmental impact assessment in projects, taking into account more significant effects in terms of time and space, SEA can provide insight into a wide range options for achieving specific objectives and present likely consequences of selection of particular individual solutions. It is one of the most prominent features of SEA. Moreover, SEA can be defined as “proactive assessment of alternative solutions” (Jones C. (ed) et al. 2005): Noble, 2000). On the other hand, the reality reveals entirely different results. SEA and also SEA in physical planning often assesses the impact of a previously selected solution whilst the alternatives in the mentioned process have either been omitted or have been provided merely to comply with the formal requirements. Such formal alternatives often include features which considerably differ from the most adequate solution and/or the solution which has been deemed the most feasible and are hence clearly unacceptable.

The countries where implementation of SEA in physical planning has become common practice have recently seen a reassessment of the process of creation of real alternatives. Moreover, ignoring all the alternatives to a particular problem can even result in legal action.

Defining the alternatives to a particular solution is crucial in SEA process. Sources which can provide proposals of alternatives are for instance (Department for Communities and Local Guvernment, UK, 2010): higher level plans and strategies; public consultation responses; planning body’s own staff; previously completed assessments; scoping report; key stakeholders.

Good alternatives need to be feasible and their number also needs to be reasonable. Directive 2001/42/EC (2004) whilst stating the obligation to consider alternatives, primarily points out “reasonable” alternatives. Whilst the reasonableness of the content of alternatives can be assessed in accordance with cost-efficiency, sociological well-foundedness and environmental sustainability, two levels of “reasonableness” to a number of alternatives can be identified (Smith,S., Fessey,M. i White,A., 2011). Firstly,

alternatives need to be provided for a reasonable number of objectives and secondly, a reasonable number of alternatives needs to be defined for each objective. An insufficient number of alternatives or even the non-existence of alternative solutions illustrates the fact that the issue has not been adequately analysed, since the non-existence of alternatives is not realistic. On the other hand, an excessive number of alternatives can negatively affect the decision-making process by prolonging it substantially and excessively, which also reveals the fact that the problem has not been adequately analysed, as some of the unacceptable alternatives would have previously been eliminated, giving ground to quality and feasible alternatives. An excessive number of proposed alternatives during the phase of public discussion may lead to digressions and turn the focus away from the principal objectives of the plan.
Several analyses have revealed the fact that the potential for the development of alternative solutions is hugely impacted by the level of physical planning and its position in the physical planning hierarchy. Higher level planning may constrain the development of alternatives, putting forward the restrictions as to what can be considered in lower level planning. Furthermore, the development of alternatives is sometimes prevented as a result of a "big decision" reached a priori by the executive entities on the national, regional or on the local level (Smith,S., Fessey,M. i White,A., 2011). Nevertheless, it appears that there are less "big decisions" on the local level as opposed to other levels, as work on alternatives on the local level appears to be the most prominent.

Material and methods

The analysed cases have been selected according to four principal criteria:

- they have been selected from the countries with a developed tradition of SEA implementation in physical planning (with the exception of case number 4, which has been selected from Croatia for the sake of comparison),
- analysis of alternatives, often marginalised during the process of physical planning and SEA permeates the mentioned cases,
- the cases are not older than 4 years, due to the supposed development of the SEA process,
- the cases are comparable with Croatia due to their several geographic, sociological or demographic features.

Case number 1 - SEA of The Collinstown Local Area Plan 2009 – 2015, Ireland (2010)

Collinstown, a village in Central Ireland, currently has around 700 inhabitants. It is physically connected with Leixlip, 17 km away from the centre of Dublin. The strategy of development of the Dublin Region 2008-2016 anticipates the expansion of Leixlip, the headquarters of Guinness, Intel and Hewlett Packard, onto the area of Collinstown with the projections of growth of the number of inhabitants to reach around 5,500. The town has favourable traffic connections with Dublin. The primary intention of this physical plan is the formation of the major town centre in the area of Collinstown. SEA has been implemented simultaneously with the proposed physical planning draft.

Defining alternatives
SEA has analysed three alternatives:

- Option 1: Relaxed Planning - this option would allow for urban expansion and sprawl on Collinstown area, which would result in the loss of distinction between the major town centre, new residential, industry and warehousing,

- Option 2: Additional planning in Leixlip - this option would allow for additional zoning of land in the Leixlip without expansion to Collinstown. Since Leixlip is bounded by roads, this option would result in higher housing densities in the town,
- Option 3: Strict Planning - this option would allow the development of Collinsown as a major town centre.

Selection of the most appropriate alternative
The impact of the proposed alternatives has been assessed in accordance with 8 SEA objectives: protection of 5 environmental features, impact on people, cultural heritage and landscape and a conclusion has been reached that the Option 3, concerning a combined planning approach, is the most appropriate alternative both from environmental and economic aspect. Planned zoning and grouping enables adequate infrastructure for all the zones and hence reduces the environmental impact primarily concerning industrial zones. Option 1 has been rated as the least favourable both from the environmental and the economic aspect, as it may lead to inadequate urban and project solutions which will increase transportation requirements, as well as waste management requirements, to name a few. Option 2 is more favourable than Option 1, yet the increased urban density in Leixlip would intensify transport and adversely affect the air quality and other features.

Case number 2 - SEA of City Plan 2, Glasgow, Scotland, United Kingdom (2009)

Glasgow is one of the largest sea ports in the world and it currently has around 600,000 inhabitants, whilst its conurbation region has around 2.8 million inhabitants. Over the last several years the Scottish government has been intensely focusing on modernisation of the Scottish physical planning system and consequently in 2006 it enacted a new law which regulates this area and which has subsequently led to amendments in the existing physical planning documentation. The SEA process was ongoing simultaneously with the creation of the physical planning draft, commencing with the decision-making concerning the creation of physical planning when SEA screening also commenced and the physical plan was adopted by 2009. The environmental impact assessment significantly affected many alterations of physical planning, primarily the objectives and guidelines concerning the improvement of environmental conditions in parts of the town which were intended for rebuilding and reconstruction.

Defining of alternatives:
SEA proposed a wide range of alternatives in a manner that 2 or 3 alternatives were opposed for each group of planning policies. We are talking about the following planning categories:
development policy principles, design policies, residential policies, industry and business policies, retail and commercial leisure policies, transport and parking policies and environmental policies. Subsequently, an analysis was performed concerning the impact on people, the economy and the environment.

Case number 3 - SEA of Port of Poole Masterplan (2012)

Poole is a tourist resort with a spacious natural harbour in the province of Dorset in Southern England. The town has 138,000 inhabitants and it belongs to a wider conurbation area with 400,000 inhabitants. Poole harbour is located on the northern coast of the huge semi-open bay Poole Harbour with indented coastline. The principal objective of this Master plan is the creation of conditions for sustainable development of

the harbour or the commercial cost-effectiveness of the harbour which enables a vast array of activities. SEA has been implemented simultaneously with the creation of physical planning draft proposal.

Defining of alternatives
Physical planning draft provided 5 solutions or 5 different physical arrangements proposed each on a particular location within the bay. SEA analysed the environmental impact of the proposed projects and investigated the cumulative influence of 11 combinations of the proposed projects (the combinations consist of 2 or 3 projects) which created the alternatives of this physical planning instance. The following solutions have been proposed:

- Option 1: wind farm base and new deep water quay, southern option,
- Option 2: same as Option 1, northern option,
- Option 3: deepening of existing conventional quays,
- Option 4: marine centre, with 950 berths, a cruise ship berth and supporting facilities, western option,
- Option 5: marine centre, with the same number of berths but without a cruise ship berth, eastern option.

Analysis of alternatives
The impact of 5 proposed projects and their 11 combinations has been examined on 14 objectives defined by SEA as follows: to preserve, protect and enhance biodiversity on or in the vicinity of the port; to reduce accidents and reduce risk/improve safety for the users of the harbour; strengthening of the regional economy, including through providing an employment opportunities; to improve the accessibility of community amenities and facilities to local residents; protection of water resources; to minimise the impact on soil; improving local air quality; reduction of greenhouse gas emissions; protection of historical and cultural sites; protection of the landscape; to minimise congestion and improve reliability on the road networks; reduction of noise levels; to enhance the management of flood risk and coastal erosion; to minimise waste generation. All the proposals were assessed with an average score: considering economic objectives they ranked above the average, they were below average concerning environmental objectives, whereas in relation to sociological objectives and requirements they were assessed with various marks. The Option 3, its combinations with Options 5, 1 and 5 and 2 and 5 have been assessed as the most favourable.

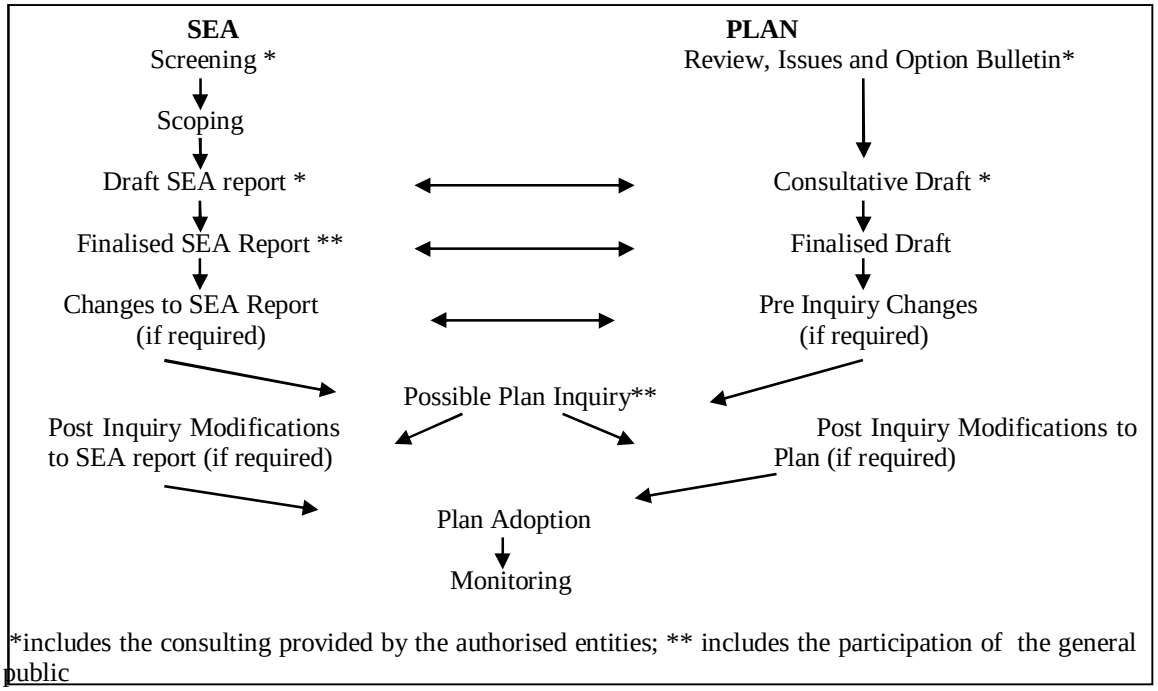
Case number 4: Physical plan in Primorje - Gorski Kotar County, Croatia (2012)
Case SEA assesses environmental impact of 45 physical arrangements which have been assessed by the physical planning draft proposal as physical arrangements of significant importance for the Republic of Croatia and Primorje – Gorski Kotar County. Two alternatives have been proposed for three physical arrangements as follows:

- Motorway A7 – section Permani-Grobničko Polje (Konj): Option 1: northern alternative/ Option 2: southern alternative,
- Port for reloading of petroleum coke: Option 1: the Bay of Bakar, North-East coast of Kostrena peninsula, near cape Babno, between the existing Bakar industrial port and Sršćica industrial port / Option 2: South- Western coast of Kostrena peninsula, cape Škrkovac,
- Combined gas power plant: Option 1: on the South- Western coast of Kostrena peninsula, cape Podurinj (the existing Rijeka thermal power-plant) / Option 2: near the location of the planned liquefied gas terminal in Omišalj on the island of Krk.

Analysis of alternatives:
The impact of each physical arrangement has been assessed in accordance with the evaluation criteria for individual environmental features/ burdens which have been analysed with expert (multi-criteria) evaluation method and the following alternatives have been selected and assessed as the most environmentally friendly:

- Motorway A7 – section Permani-Grobničko Polje (Konj): Option 2 has been assessed as more favourable and recived a total score of 15 (moderate impact) in relation to Option 1, evaluated with a total score of 13 (significant impact),
- Port for reloading of petroleum coke: Option 1 has been assessed as more favourable and received a total score of 30 (not significant impact) with potentially significant cumulative impact in relation to Option 2, evaluated with a total score of 28 (not significant impact) with potential cumulative impact (moderate impact) (significant impact),
- Combined gas power plant: Option 1 has been assessed as more favourable and received a total score of 31 (not significant impact) in relation to Option 2 evaluated with a total score of 21 (moderate impact) with potential significant cumulative impact.

Results and discussion



Picture 1 Schematic diagram of the typical process and inter-correlation of SEA processes and enactment of physical plans in Great Britain (Glasgow City Council, 2009).

The fact that all the three defined alternatives under the specified circumstances are considerably realistic and feasible are a positive aspect in Case number 1. Moreover, irrespective of the fact that it is clear that the alternative number 3 has been defined a priori as the most favourable alternative, still it appears that SEA has been sufficiently focused on the analysis of the other two alternatives, as well as that the selection of the alternative number 3 has been argumentatively explained. Comparing two less probable alternatives with a more probable one can highlight the quality of the selected

alternative which can adequately illustrate the problem whilst presenting the proposal to the general public.
Irrespective of the fact that in Case number 2 several alternatives have been considered, it is obvious that in most cases only one of the proposed alternatives is acceptable and has been selected a priori, whilst the second alternative, to oppose it, has been presented merely in compliance with formal requirements. Although we are dealing with the plan of the reconstruction of town, this plan has explicitly strategic features.
Of all the analysed cases, Case number 3 has used SEA in the most comprehensive manner as a tool to achieve optimum physical planning solutions. Realistic proposals of solutions have been considered and the combination of these solutions resulted in the creation of several alternatives and sub-variants. A reasonable number of the proposed alternatives and sub-variants has facilitated the reaching of a consensus during the final decision-making. It appears that alternatives have been realistically and impartially assessed. The report on the implemented SEA process has been written clearly and lucidly and provided comprehensive information for all the participants in the public discussion.
Case 4 is a pioneer example in the implementation of this process in Croatia, yet irrespective of that fact, the analysis of alternatives for only 3 physical arrangements out of 45 where SEA was implemented cannot be viewed as an exemplary approach. However, it has to be highlighted that the alternatives are realistic and that in physical arrangements number 2 and 3 we are really dealing with the fundamental rather than merely formal alternatives. The report on the implementation of SEA can be considered as informative to a certain extent since the assessment of environmental impact has been clearly argumented.

Conclusion

This paper strived to examine the impact of SEA, primarily the aspect concerning the analysis of alternative solutions and their impact on the selection of optimum physical planning solutions during the process of the creation of physical planning. It has been presupposed that comprehensive experience in the implementation of the aforementioned processes in the EU member states can be valuable in the development of the aforementioned system in the Republic of Croatia. Consequently, cases have been illustrated which can be linked and related with Croatia due to several of their features.
The analysis of recently implemented SEA in physical planning in Great Britain and Ireland has been performed, as those are countries with a long-term tradition of implementation of the aforementioned processes. In addition, one case of the same process has been provided from Croatia. The proposed alternatives have been described, as well as the criterion and the process of their evaluation. Subsequently, it has been assessed to what extent alternatives have been realistically defined, whether they were impartially assessed and whether and in what manner they were considered during the final selection of physical planning solution.
A conclusion has been reached that analysis of alternatives increasingly contributes to SEA effectiveness with respect to quality definition of the realistic number of variants of the possible solutions, or in cases of more comprehensive assessment performed. In addition, it can be concluded that the impact of SEA on physical planning is more apparent in lower level physical planning or in insufficiently urbanized areas, whereas in case of strategic documentation it has been concluded that assessment of a priori selected solutions is common. It is also clear that a requirement for effective SEA in physical planning, early commencement of implementation of SEA, is fundamental at the very beginning of the creation of physical planning. The aforementioned enables the synergy of these two processes, entry of analyses results obtained through SEA in

physical planning draft proposals and enables the competitive participation of the general public in public discussion.
The prescribed process of creation and enactment of physical planning in the Republic of Croatia, as well as in EU member states does not provide sufficient room for a transparent, democratic and argumentative selection of optimum physical planning solutions, primarily from the aspect of environmental protection. Consequently, SEA has been implemented to provide support to the mentioned process, yet in reality it appears that effective implementation of SEA as a tool for physical planning decision-making requires alterations within the physical planning process. The aforementioned process needs to accept and recognize the role of the person in charge of creation and selection of the planning solution, or in other words, in order for it to be effective, it has to be open to alterations, corrections, adding or omitting of planning solutions throughout the entire process by all the participants. The assessment of a reasonable number of alternative solutions is crucial for effective SEA and for the process of selection of physical planning solutions throughout the creation and enactment of physical planning.

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Teorija održivog prostornog planiranja i Strateška procjena utjecaja na okoliš

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Sažetak
U promoviranju održivog razvoja gradova, općina i regija, izražena je potreba za prostornim planiranjem koje objedinjuje prostorne, ekonomske i društvene aspekte, ali i aspekte okoliša i podržava inegralni pristup. Prostorni plan prerasta iz instrumenta korištenja prostora u instrument upravljanja odnosno razvoja prostora i zaštite okoliša.
U radu se uspoređuje prostorno planiranje sa Strateškom procjenom utjecaja na okoliš i daju se osnovna obilježja održivog razvoja. Zalaže se za nove paradigme u prostornom i okolinskom planiranju i davanje važnosti ekonomskom, društvenom i prostornom razvoj, ali i razvoju okoliša.
Uključivanje utjecaja na okoliš u procesu planiranja korištenjem Procjene utjecaja na okoliš i Strateške procjene okoliša podrazumijeva unošenje nove filozofije održivog razvoja u sistem vrijednosti društva. Objedinjeno prostorno planiranje i planiranje okoliša može osigurati novu kvalitetu u objema vrstama planiranja, ali i kvalitetniji razvoj područja koja takve postupke primjenjuju.

Ključne riječi: prostorno planiranje, Strateška procjene utjecaja na okoliš, održivi razvoj

Uvod

Prostor je bitan resurs za razvoj društva i jedno od najznačajnijih obilježja državnosti, a okoliš je jedna od dimenzija prostora koja u pojedinim područjima limitira razvoj. Organi uprave iz oblasti prostornog plairanja i okoliša u većini država Evrope su na nivoima od lokalnog do državnog, jer se radi o javnom interesu.
Za život i razvoj čovjeka neophodno je da se čovjek prilagodi prostoru, odnosno okolišu. Razumijevanje prostora podrazumijeva poznavanje okolišnih indikatora koji determinišu prostor. Studije utjecaja na okoliš obezbjeđuju indikatore koji pokazuju kako određena namjena i organizacija prostora utječe na okoliš. "Stoga je prostorno i okolinsko planiranje naučni pristup za razumijevanje prostora i okoline i na taj način obezbjeđenje i prilagođavanje čovjeka i njegovih aktivnosti prostoru, odnosno okolini."[1]
Strategijska procjena okoliša - (Strategic Environmental Assessment – SEA) je postupak koji otkriva već u namjerama i ciljevima određene negativne utjecaje na okoliš, te nastoji spriječiti te negativne utjecaje u sklopu određenih planova, politika i programa prije negoli se donese odluka o njima.

Općenito o prostornom planiranju

Prostor je ograničen resurs, bitan za razvoj društva. Šire shvaćeno prostor je, sve što ima tri dimenzije, a u prostornom i urbanom planiranju, shvaćen u najširem smislu, znači okruženje u kome čovjek djeluje. Potrebe za planiranjem i uređenjem prostora u kojem se živi javljaju se s pojavom ljudskih zajednica. Cilj prostorno – planerske i urbanističke djelatnosti je postići optimalni raspored ljudi, dobara i djelatnosti na teritoriji

promatranja. Resursi na kojima zasnivamo život na planeti su ograničeni, često neobnovljivi, pa prostorno-planerska i urbanistička djelatnost ima zadaću da koristi i iskoristi prostor tako da što uzmemo od njega i vratimo za buduće generacije. Konflikti u prostoru se stvaraju usljed pojave više različitih korisnika zainteresiranih za iste resurse. Kako se ne bi trajno uništili prostorni resursi i okoliš, kako za život danas, tako i za buduće generacije, potrebno je vršiti kontrolu u korištenju prostora, permanentnim praćenjem putem prostornih planova i strategija razvoja uzimajući u obzir korištenje prostora, iskorištavanje resursa, razvoj tehnike i tehnologije, demografsku eksploziju, potrebe za hranom i vodom, nekontroliranu urbanizaciju, klimatske promjene i sl. Prostor se neprestano mijenja ljudskim djelovanjem radi čega moramo u planove unijeti i četvrtu plansku dimenziju vrijeme koje ove planove posebno karakterizira kao stalno promjenljive. Stoga je najjača karakteristika prostornog i urbanog planiranja, permanentnost planiranja - nikada dovršenog.

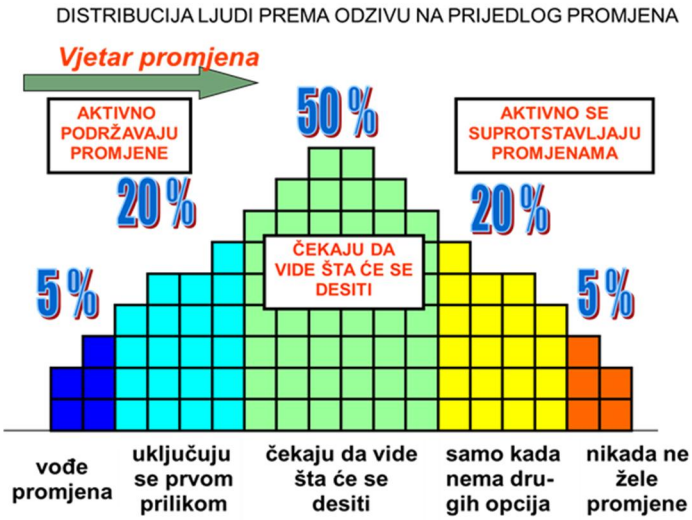
Zakonodavstvo BiH vezano za prostorno planiranje i strategijsku procjenu okoliša

Prostorni planovi se prema zakonskoj regulativi u Bosni i Hercegovini dijele u dvije skupine: prostorni planovi i urbanistički planovi. Prostorni planovi se odnose na prostorne cjeline definirane određenim kriterijima za prostor: političke, prirodne i ekonomsko-privredne granice. Političko uređenje uvjetuje hijerarhiju prostornih planova u ovisnosti od načina organizacije prostora. (Prostorni planovi entiteta, u Federaciji prostorni planovi kantona/županija, prostorni planovi općina, prostorni planovi posebnih područja uvjetovani resursima i načinom korištenja, razvojnim mogućnostima i dr.). Proces planiranja je permanentan, planovi nižeg reda uzimaju inpute iz planova višeg reda, ali i svojom detaljnošću utječu na planove višeg reda.
Urbanističko planiranje se odnosi na urbane prostore (gradove, naselja). Prema zakonodavstvu u Bosni i Hercegovini urbanistički planovi se obavezno donose za centre kantona/županija u Federaciji BiH i za općinske centre u Republici Srpskoj, za ostala naselja po potrebi. Urbana područja se tretiraju sa aktuelnom urbanom zonom i gravitirajućom – utjecajnom zonom za potencijalni razvoj. Gravitirajuće područje ovisi o veličini grada, te su parametri i kriteriji koji ga određuju vrlo različiti.
Osnovne karakteristike prostornih i urbanih planova su prisustvo četvrte dimenzije prostorne cjeline. Planovi su permanentno promjenjivi i obnovljivi, a često i nepredvidivi. Odrednice planova višeg reda su šire i podložnije promjenama, pa se plan radi na duži vremenski period, a elementi su teže primjenjivi. Stoga je potrebno stalno praćenje plana, što je metodologijom planerske struke i predviđeno. Planovi nižeg reda su konkretniji, rade se za kraći vremenski period, ali imaju i veći procenat ostvarenja.
Strategijska procjena okoliša je sistematski proces vrednovanja okolišnih posljedica predloženih planova, programa ili strategija kako bi se još u ranoj fazi donošenja odluka uz ekonomska i društvena uključila i okolišna razmatranja. Organi nadležni za izradu dokumenata prostornog uredenja i organi nadležni za izradu planova, programa i strategija iz oblasti: poljoprivrede, ribarstva, šumarstva, energije, rudarstva i industrije, transporta, upravljanja otpadom, upravljanja vodama i čiji sadržaji mogu imati negativan utjecaj na okoliš dužni su izraditi Strategijsku procjenu okoliša. Prilokom izrade Strategijske procjene okoliša uzimaju se u obzir komponente okoliša, kvalitet okoliša i utjecaj na ljudsko zdravlje. Strategijska procjena okoliša izrađuje se i kod donošenja ekonomskih propisa koji mogu imati utjecaj na okoliš (propisi o carinama porezima, obavezama, itd.)
Strategijska procjena okoliša sadrži: procjenu okolišnog stanja; identifikaciju razvojnih ciljeva određivanjem prioriteta sa stanovišta okoliša/održivog razvoja; razmatranje razvojnih alternativa za ciljeve i prioritete realizacije; izradu prijedloga okolišne procjene; određivanje okolišnih indikatora za praćenje utjecaja na okoliš i promjene

stanja okoliša; integraciju planiranih mjera u završni dokument planova, programa i strategija.
Nacrt dokumenata prostornog uređnja strategija, planova ili programa iz federalne nadležnosti dostavljaju se federalnim ministarstvima nadležnim za oblast okoliša i zdravlja.
Strategijsku procjenu okoliša iz federalne nadležnosti donosi Vlada FBiH. Strategijsku procjenu okoliša iz kantonalne nadležnosti donosi vlada kantona. (Zakon o zaštiti okoliša, F BiH)

Veza prostorno planiranje i Strateške procjene utjecaja na okoliš

Prostor na Zemlji je ograničen, broj ljudi raste, a time i njihove potrebe i zahtjevi. Različitost potreba i zahtjeva rezultira konfliktom u prostoru. Konflikt može imati više dimenzija: lično - društveno, nacionalno – lokalno, kratkoročno – dugoročno. Nesuglasice između lokalnih i regionalnih interesa i NIMBY efekat, sve su učestalije i potrebno ih je riješiti još unutar procesa planiranja.
NIMBY efekat (Not in My Back Yard – Ne u mom dvorištu) naziv je za efekt otpora stanovništva prema novim zahvatima u prostoru. Svijest da je nešto potrebno postoji, ali se zbog nedostatka informacija ljudi boje i odbijaju da to bude u njihovom dvorištu. Prva informacija o zahtjevu za korištenje prostora mora biti pravovremena (ne smije uraniti ni kasniti), optimalnog obima (ne smije biti preopširna ni prekratka). U protivnom ostavlja prostor za neželjene komentare "stručnjaka", zabrinutih građana i drugih. Proces se mora voditi tako da ne nastanu dvije struje, jedna ZA, druga PROTIV. Proces treba voditi objektivno sa ciljem da se zajednički dođe do zaključka, bez pristrasnosti i navijanja, ni ZA, ni PROTIV. Oni koji bi objektivno mogli pomoći da se dođe do zaključka, ukoliko nisu konzultirani, veoma često postaju protivnici. Oni kojima nije bilo nuđeno da rade na planiranju, takođe mogu postati protivnici. Otpor stanovništva prema zahvatu u prostoru je stvar poznata u cijelom svijetu. Razvijene zemlje imaju razvijen menadžment usaglašavanja konflikta.
Na osnovu prethodno rečenog nameće se zaključak da je u proces potrebno uključiti: (1) ekologe i ekologiste (poznavanje ekoloških uslova i okolinskih ograničenja), (2) stručnjake za razvoj područja (prostorni planeri, ekomnomisti), (3) stručnjake za razvoj privredne grane /izgradnju objekta (građevinci, energetičari, tehnolozi, saobraćajni inženjeri), (4) građani (različitih interesa i pristupa).
Suština je u uspostavi partnerstva između: vlasti, građana i struke. Strategijska procjena okoliša pomaže upravo u izbjegavanju prostornih i među-sektorskih konflikata.
Područje planiranja znatno se izmijenilo u posljednjih 30-ak godina. Danas je planiranje privlačno zanimanje koje uključuje brojne interdisciplinarne vještine, poput poznavanja društvenih i prirodnih nauka, političkih prognoza, urbanog dizajna, sposobnosti pregovaranja i sl. Nastaju novi pristupi planiranju kao odgovor na rastuću složenost naslijeđenih problema, nesporazuma, ograničenih budžeta i pokreta za deregulaciju i zaštitu prava vlasništva. Oni teže djelotvornijem i javno prihvatljivijem odlučivanju u upravljanju okolišem.
Prostor je dio društveno-ekonomskog razvoja pa ga je potrebno promatrati kao dio razvojnih procesa. Svaki razvojni proces ima uspone i padove pa se i u prostornoj organizaciji pojavljuju određena ograničenja zbog nedostatka prostora, zbog izrazitog zaostajanja u razvoju pojedinih funkcija, kao i zbog utjecaja na okoliš. Prostorno planiranje se mijenjalo u skladu s društveno-ekonomskim promjenama, a osnovna mu je funkcija bila kontrola korištenja zemljišta. Brze društvene promjene dovode do promjena u okolišu, infrastrukturi, ekonomskome životu, zakonodavstvu i stambenoj politici.



Slika 1. Odziv ljudi na prijedlog promjena - [4] Izvor Knežević A. Predavanja na postdiplomskom studiju Lokalan okolinska infrastruktura

Održivi razvoja gradova, općina, regija i šire, podrazumijeva potrebu za prostornim planiranjem koje objedinjuje prostorne, ekonomske i društvene aspekte, te aspekte okoliša i podržava integralni pristup. S regionalnoga stajališta, tri su bitna pitanja koja se rješavaju planom: sistem naselja, infrastruktura i okoliš. Prostorni plan prerasta iz instrumenta korištenja prostora u instrument upravljanja odnosno razvoja prostora i zaštite okoliša.
Osnovna načela Strategijske procjene su:

a) načelo održivog razvoja, koje podrazumijeva:
   1. očuvanje prirodnog blaga na način da stepen potrošnje obnovljivih materijala, vodnih i energetskih resursa ne prevazilazi okvire u kojima prirodni sistemi mogu to nadomjestiti i da stepen potrošnje neobnovljivih resursa ne prevazilazi okvir prema kojem se održivi obnovljivi resursizamjenjuju,
   2. da stepen polutanata koji se emitiraju ne prevazilazi kapacitet zraka, vode i tla, te da apsorbuje i izvrši preradu polutanata i
   3. stalno očuvanje biološkog diverziteta, ljudskog zdravlja, te kvalitet zraka, vode i tla prema standardima koji su uvijek dovoljni za život i blagostanjeljudi, biljnog i životinjskog svijeta,
b) načelo integralnosti, koje se zasniva na uključivanju uslova zaštite okoliša, odnosno očuvanja i održivog korištenja biološke raznovrsnosti u odgovarujuće sektorske i međusektorske programe i planove,
c) načelo predostrožnosti, koje podrazumijeva da se korištenje okoliša organizuje i vrši na način da se spriječi zagađivanje okoliša i šteta po okoliš, te da rezultira najnižim mogućim stepenom opterećenja i iskorištavanja okoliša,
d) načelo saradnje i podjele odgovornosti, koje podrazumijeva uključivanje u procjenu utjecaja planova i programa i zajedničko djelovanje svih subjekata u cilju zaštite okoliša, a u okviru svoje nadležnosti i odgovornosti,
e) načelo javnosti – u cilju informisanja javnosti o određenim planovima i programima i o njihovom mogućem utjecaju na okoliš, javnost mora, prije donošenja bilo kakve odluke, kao i poslije usvajanja planova i programa, imati pristup informacijama koje se odnose na te planove i programe.

Strategijska procjena okoliša osigurava procjenu utjecaja na okoliš na višoj, strateškoj razini odlučivanja, te je potrebno integrisati aspekte okoliša u sve procese planiranja, što zahtijeva promjenu u postupcima i procesima planiranja. Održivi razvoj je postizanje

kompatibilnosti: (1) društva, (2) ekonomije, (3) prirode / okoline i (4) institucionalnog uređenja. Ne postoje jedinstveni kriteriji održivog razvoja. Planiranje održivog razvoja traži holistički pristup.

Strategijska procjena okoliša je postupak kojim se unaprijed utječe na smanjenje negativnih utjecaja na okoliš, ali se koristi u vrijeme izrade koncepcija i strateških alternativa, pa ga s toga stajališta možemo smatrati i postupkom planiranja. To je postupak upravljanja razvojem i okolišem. Analiza utjecaja na okoliš se radi u vrijeme planiranja koje nem veliku preciznost te ona mora biti jasna i sistematična.

"Strategijska procjena okoliša je sustavni proces vrednovanja i procjene posljedica na okoliš za predložene politike, planove ili programe, tako da se o tim posljedicama raspravlja u najranijim fazama postupka odlučivanja, zajedno s ekonomskim i socijalnim aspektima. Politika se definira kao generalni pravac akcije koji neko upravno tijelo provodi i koje usmjerava postupak donošenja odluka. Program je koherentni i organizirani plan rada i/ili vremenski plan aktivnosti koji sadrži obveze, prijedloge, instrumente i/ili aktivnosti pomoću kojih se provodi određena politika. I konačno, plan je k budućnosti usmjerena strategija ili projekt koji često sadrži usklađene prioritete, opcije i mjere za realizaciju politike. Planovi, programi i politike mogu biti administrativni (u smislu razina upravljanja), sektorski i/ili prostorni." [5]

Strategijska procjena okoliša omogućava da se širi politički kontekst ispita sa stajališta utjecaja na okoliš. Utjecaji pojedinih razvojnih projekata na nižem nivou ispituju se kroz Procjenu utjecaja na okoliš.

Zaključak

Suština je u neophodnosti integrisanja prostornog i okolišnog planiranja u jedinstven sistem, odnosno nužnost definisanja nove paradigme prostornog i okolišnog planiranja kao jedinstvenog procesa.

Strategijska procjena okoliša je tehnika koja se uvodi u praksu planiranja i donošenja odluka, odnosno unošenje nove filozofije održivog razvoja u sistem vrijednosti društva. "Strateška procjena utjecaja na okoliš, ako je sustavno provedena, postaje prvoredni, dugoročni instrument zaštite prostora."[2] Kod sistematske primjene Strateška procjena okoliša pomaže da se pređe od tradicionalnog planiranje u planiranje koje se temelji na održivosti. Objedinjeno prostorno planiranje i planiranje okoliša može osigurati novu kvalitetu u objema vrstama planiranja, ali i kvalitetniji razvoj područja koja takve postupke primjenjuju.

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The theory of sustainable spatial planning and Strategic Environmental Assessment

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Abstract

In promoting the sustainable development of cities, municipalities and regions, there is a need for spatial planning that integrates the physical, economical and social aspect, and aspects of the environment and it supports integral approach. Spatial plan grows from the tool for space usage into a management tool or development tool of space and environmental protection.
The paper compares the spatial planning with Strategic Environmental Assessment and gives the basic features of sustainable development. It advocates for new paradigmes in spatial and environmental planning and it gives appreciation to the economic, social and physical and environmental development.
Including environment impacts in the planning process using an Environmental Impact Assessment and Strategic Environmental Assessment involves the introduction of the new philosophy of sustainable development in the system of social values. Unified spatial and environmental planning can provide a new level of quality in both types of planning, as well as more qualitative development of areas which are applying such procedures.

Keywords: spatial planning, strategic environmental impact assessment, sustainable development

Introduction

Space is an essential resource for the development of the society and one of the most important characteristics of statehood, and the environment is one of the dimensions of space, which in some areas limit development. Administrative bodies in spatial planning and the environment in most countries of Europe are at levels from the local to the state, because it is a public interest.
For life and human development, it is necessary to adjust man to the space or the environment. Understanding space implies the understanding of environmental indicators that define the space. Environmental impact studies provide indicators that show how specific purpose and space organization affects the environment. "Therefore, spatial and environmental planning is scientific approach for space and environment understanding, thus providing and adapting human activities to the space and the environment."[1]
Strategic Environmental Assessment - SEA is a procedure that reveals, in its aims and objectives, a certain negative impacts on the environment, and try to prevent the negative impacts of the specific plans, policies and programs before a decision is made.

General information about the spatial planning

Space is limited resource, essential to the development of society. The space is everything that has three dimensions, and at spatial and urban planning, understood in the broadest sense, means an environment in which man operates. The need for planning and development of the space appears with development of human communities. The aim of spatial - planning and urban planning activities is to achieve optimal distribution of people, goods and activities on the territory of observation. Resources on which the life on the planet is based are limited, often non-renewable, and spatial planning and urban activity has task to use and exploit the space in the manner to take it and turn it back for the next generations. Conflicts in space are formed due to appearance of different users interested in the same resources. In order not to permanently destroy the physical resources and the environment, both for life today and for future generations, it is necessary to control the use of space, permanent monitoring through spatial planning and development strategies, taking into account the use of space, use of resources, the development of techniques and technology, demographic explosion, the need for food and water, uncontrolled urbanization, climate change, etc. The space is constantly changed by human activities therefore we have to introduce in the plans fourth dimension (planning) time that these plans specifically characterizes as constantly changing. The strongest characteristic of spatial and urban planning is permanence of planning - never completed.

Legislation of Bosnia and Herzegovina related to planning and strategic environmental assessment

Spatial plans according to the legislation in Bosnia and Herzegovina are divided into two groups: spatial plans and urban planning. Spatial plans are related to spatial units defined by specific spatial criteria to: political, natural and socio-economic boundaries. Political system determines a hierarchy of spatial plans, depending on the way the organization of space. (Spatial plans of entities, in the Federation spatial plans of Cantons, municipal spatial plans, specific areas spatial plans influenced by resources and way of use, development opportunities, etc.). The planning process is permanent, plans at lower levels taking inputs from the plans from a higher level, they also affects on the plans at a higher level by its details.
Urban planning refers to the urban areas (cities, settlements). According to legislation in Bosnia and Herzegovina, urban planning's are made for the cantons centres in the Federation of B&H and the municipal centres in the Republic Srpska, for other settlements where appropriate. Urban areas are current urban area and gravitating - influential zone, for potential development. Gravitating area depends on the size of the city, so the parameters and criteria that determine it are very different.
Basic characteristics of spatial and urban plans are presence of fourth dimension of spatial unit. Plans are constantly changing and renewable, and often unpredictable. Determinants of plans at higher levels are broader and more susceptible to change, therefore the plan is made for longer period of time and the elements are difficult to apply. Therefore, it is necessary constant monitoring of the plan, what is provided by methodology and planning profession. Lower level plans are more concrete, made for a shorter period of time, but they have a higher percentage of accomplishment.
Strategic Environmental Assessment is a systematic process for evaluation of the environmental consequences of proposed plans, programs and strategies in order to provide, in early stage of making decisions, to include except economic and social and environmental considerations. Authorities responsible for the development of spatial planning and the authorities responsible for the development of plans, programs and

strategies in the field of agriculture, fisheries, forestry, energy, mining and industry, transport, waste management, water management and the content of which may have a negative impact on the environment have to develop a strategic environmental assessment. When creating a Strategic Environmental Assessment it needs to account environmental components, environmental quality, and impact on human health. Strategic environmental assessment is made in making economic regulations that may have an impact on the environment (regulations on tariffs, duties, etc.)
Strategic Environmental Assessment include: assessment of environmental conditions; identify development goals by determining priorities in terms of environmental / sustainable development, consideration of development alternatives for the realization of the goals and priorities, drafting environmental assessments; determination of environmental indicators for monitoring the impact on the environment and environmental change; integration of planned measures in the final document of the plans, programs and strategies.
Draft of spatial document of strategies, plans or programs from the federal jurisdiction is shipped federal ministry responsible for environment and health.
Strategic Environmental Assessment of federal jurisdiction brings the Government of FBiH. Strategic Environmental Assessment of the cantonal authority brings the government of the canton. (Environmental Protection Act, F BiH)

Connection between spatial planning and Strategic Environmental Assessment

Space on Earth is limited, the number of people is increasing, and thus their needs and requirements. Diversity of needs and demands is resulting with conflict. Conflict can have multiple dimensions: personal - social, national - local, short-term - long term. Disagreements between the local and regional interests and NIMBY effect have become increasingly frequent and must be resolved even in planning process.
Effect NIMBY (Not In My Back Yard) is the name for the effect of the resistance of the population to new projects in the area. Awareness that something must exist, but due to lack of information people are afraid and refuse to be in their backyard.The first information on the application for use of the space must be ready on time (not earlier or later) in optimal volume (not too large or too short). Otherwise, there is space for unwanted comments of "experts", concerned citizens and others. The process must be taken so as not to occur two streams, one FOR, and the other AGAINST. The process should take an objective with a view to jointly come to a conclusion, without bias and cheering, either FOR or AGAINST it. Those who would objectively help you to come to the conclusion, if they are not consulted, often become adversaries. Those who are not being offered to do the planning also can become opponents. The resistance of the population for operation in space is a thing known worldwide. Developed countries have build up management of conflict harmonization.
Based on the afore mentiones it can be concluded that the process should involve: (1) ecologists and environmentalists (knowledge of environmental conditions and environmental constraints), (2) experts in the area development (spatial planners, economists), (3) experts for development of economic branches / construction of the building (builders, energy experts, technologists, traffic engineers), (4) citizens (of different interests and approaches).
The essence is to establish a partnership between: government, citizens and professionals. Strategic Environmental Assessment helps just to avoid spatial and inter-sectoral conflicts.
Planning is significantly changed in the last 30 years. Today, planning is an attractive profession that includes a number of interdisciplinary skills, such as knowledge of the social and natural sciences, political forecast, urban design, negotiation skills, etc. New

approaches to planning are developed as response to increasing complexity of the problem, protracted disputes, limited budgets, and the movement for deregulation and protection of property rights. It tends to more effective and publicly acceptable decision-making in environmental management.
The area is part of the socio-economic development and must be seen as a part of the development process. Each development process has its ups and downs, so in the spatial organization appear certain limitations due to lack of space, due to a pronounced lag in the development of certain functions, as well as the environmental impact. Spatial planning has changed in accordance with the socio-economic changes, and its basic function is the control of land use. Rapid social changes lead to changes in the environment, infrastructure, higher economic life, law and housing policy.

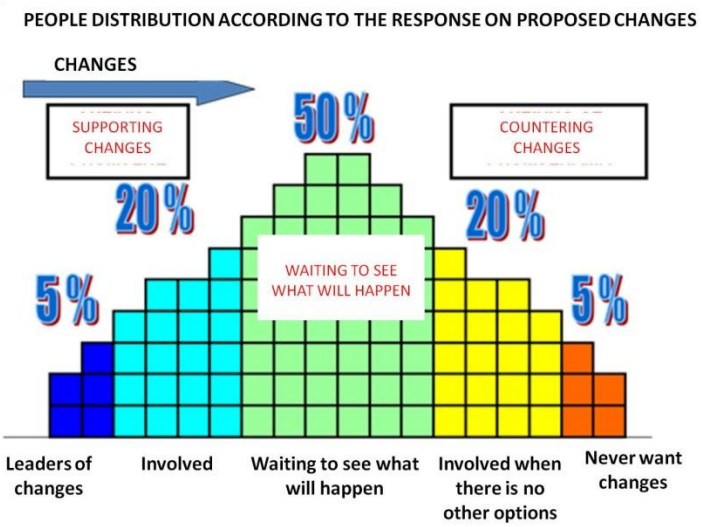

Figure 1. The response of the people on the proposed changes - [4] Source Knezevic A. Lectures on postgraduate study local environmental infrastructure

Sustainable development of cities, municipalities, regions and beyond, implies the need for spatial planning that combines spatial, economic and social aspects, and aspects of the environment and supports an integrated approach. From a regional perspective, there are three important issues that can be solved with a plan: system of settlements, infrastructure and the environment. Spatial plan grew from instrument of space usage to instrument of space management and space development and environmental protection.
Basic Principles of Strategic Assessment are:

a) the principle of sustainable development, which includes:
   1. preservation of natural treasures in a way that the level of consumption of renewables, water and energy resources is not beyond the limits of what the natural systems can not be replaced and that the level of consumption of non-renewable resources is not beyond the scope under which sustainable renewable resources are replaced,
   2. level of pollutants that are emitted is not beyond the capacity of air, water and soil, as well as to absorb and make the processing of pollutants and
   3. permanent conservation of biological diversity, human health, and the quality of air, water and soil according to standards that are always sufficient for life and well-being of people, flora and fauna,
b) the principle of integrity, which is based on the integration requirements of environmental protection or conservation and sustainable use of biodiversity in adequate sectoral and cross-sectoral programs and plans,
c) the precautionary principle, which implies that the use of the environment is organized and carried out to prevent environmental pollution and damage to the

environment, and that results in the lowest possible level of load and exploitation of the environment,

d) principle of cooperation and shared responsibility, which includes involvement in impact assessment of plans and programs and joint activities of all entities in order to protect the environment, within its powers and responsibilities,
e) the principle of the public - in order to inform the public of certain plans and programs and their possible impact on the environment, the public must, before making any decision, and after the adoption of plans and programs, have access to information relating to the plans and programs.

Strategic Environmental Assessment provides an environmental impact assessment on the higher, strategic decision-making, and it is needed to integrate environmental aspects into all planning processes, which requires a change in procedures and planning processes. Sustainability is achieving compatibility of: (1) society, (2) economics, (3) nature / environment, and (4) the institutional configuration. There are no uniform criteria for sustainable development. Planning for sustainable development requires a holistic approach.

Strategic Environmental Assessment is the process by which pretends to decrease the negative impact on the environment, but it is used at the time of conception and strategic alternatives, and from that point of view it can be considered during the planning process. It is a process of managing the development and the environment. Environmental impact analysis is done at the time of planning that dumb high accuracy, and it must be clear and systematic.

Strategic Environmental Assessment is a systematic process of evaluation and assessment of the environmental consequences of proposed policies, plans or programs, so that the consequences are discussed in the earliest stages of the decision-making process, along with the economic and social aspects. Policy is defined as a general course of action for a governing body that conducts and directs the decision-making process. Program is coherent and organized work plan and / or schedule of activities that includes commitments, proposals, instruments and / or activities which are carried out by a specific policy. Finally, the plan is a future-oriented strategy or project which often contains aligned priorities, options and measures for the realization of the policy. Plans, programs and policies can be administrative (in terms of management), sectoral and / or space. "[5]

Strategic Environmental Assessment allows that broader political context is annalised from the standpoint of environmental impact. The influence of individual development projects on the lower level are tested through the Environmental Impact Assessment.

Conclusion

The essence is in the necessity of integrating spatial and environmental planning in a single system, or the necessity of defining new paradigms of spatial and environmental planning as a single process.

Strategic Environmental Assessment is a technique that was introduced in the planning and decision-making, or the introduction of a new philosophy of sustainable development in the system of the society. "Strategic Environmental Assessment, if systematically implemented, becomes first-order, long-term instrument of space protection." [2] The systematic application of Strategic Environmental Assessment helps to exceed the traditional planning in planning based on sustainability. Unified spatial and environmental planning can provide new level of quality in both types of planning, as well as more qualitative development of areas which are applying such procedures.

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Environmental Noise Directive and its role in SEA procedures

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Abstract

Croatia made major progress in transposing the Environmental Noise Directive 2002/49/EC (END) in national legislation (Noise Protection Act, NPA) but very little progress was made regarding the implementation of main END requirements in respect to the development of Noise Maps and Action Plans. The implementation of main articles and annexes of the END is primarily focused on a long-term prevention from the environmental noise caused by big infrastructural investments, such as highways, railways, airports, cities, etc., by influencing primarily the development of Spatial plans. Therefore, the END is the most critical part of the Strategic Environmental Assessment (SEA) as prerequisite of any national or regional Spatial planning procedures, or for major investment projects such as the highways, railways, airports, and development of cities. The END is relatively young directive, and therefore, represents a major challenge for most of the EU member states, particularly in respect to the production of 3D noise maps and adoption of sectoral action plans. Although the 3D noise maps and action plans represent very strong instrument in preparing SEA, it is very rarely used because of lack of knowledge in dealing with this specific environmental health risks. This article will focus on the recently adopted National Environmental Noise Protection Strategy (2012), which is prepared with the assistance of EU IPA funded project (EuropeAid/129403/D/SER/HR), and will elaborate about its implementation and possible role in upgrading the SEA procedures, particularly related to the preparation of Operational Programme Competition and Cohesion 2014-2020 (OPCC).

Key words: Environmental Noise Directive, Environmental Noise Survey, Environmental Noise Strategy, Environmental Noise Action Plan, Strategic Impact Assessment, Operational Programme 2014-2020

Introduction

One of the most sophisticated regulatory areas of the Acquis is the environment noise protection Directive 2002/49/EC, which is dealing with the assessment and management of environmental noise. The Environmental Noise Directive (END) is, also, one of the youngest EU legislation, which is expected to be fully implemented by 2020.
The main purpose of END is to assess the existing situation regarding the noise pollution, and to provide standardize system for preventing the future noise pollution that may be caused by the future investment developments, such as the railway and road constructions, airports and urban settlements. Therefore, this Directive is providing basic information for any Strategic Environment Impact Assessment, and in particular for major investments under the Operational Programmes 2014-2020 (OP). The END main goals could be summarized in the following mandatory obligations of the EU member states:

1. To establish all competent bodies for strategic noise maps, action plans and data collection.
2. To establish the noise limit values in force or planned and related explanations.
3. To develop strategic noise maps related data (as listed in annex VI) for major roads, railways, airports and agglomerations concerned for:
   - agglomerations ≥ 100,000 and < 250,000 inhabitants
   - overall major roads ≥ 3 million and < 6 million vehicles/year
   - overall major railways ≥ 30,000 and < 60,000 trains/year
   - for major civil airports ≥ 50,000 movements/year
4. to develop Action plans related data (as listed in annex VI) for major roads, railways, airports and agglomerations concerned and criteria used in drawing up action plans for:
   - agglomerations ≥ 100,000 and < 250,000 inhabitants
   - overall major roads ≥ 3 million and < 6 million vehicles/year
   - overall major railways ≥ 30,000 and < 60,000 trains/year
   - for major civil airports ≥ 50,000 movements/year

The END establishes that the Member States should create noise maps, inform the public and prepare action plans for parts of their territories in participatory way. The noise maps should present the number of people and noise sensitive buildings exposed to certain values of noise, expressed in the harmonized noise indicators for day-evening-night period L_{den} or night time L_{night}. It is expected that through the use of harmonized methods and indicators a deeper insight will be gained into the population exposure to the noise. The END, however, does not set any limit values, and it is left to the member states following the "subsidiary principles".
Since the basic EU policy is that no economic development should take place on the EU territory on the expense of environment degradation, particularly if the investments are supported by the EU funds, the full implementation of END is one of the preconditions for application on EU funds. For example, the Structural Funds, which are available for the major investment projects, such as the highways, railways, bridges, airports and other big development projects, could be used only after the EC consent on national OPs, which are based on the appropriate SEA. In preparing the SEA the application of strategic noise maps and action plans are instrumental.
On 29 August 2013, the Croatian Government made decision that the Ministry of Regional Development and EU Funds (MRDEUF) is responsible for preparing OPs for the European Union financial period 2014-2020. The adopted OPs are precondition for the availability of the European Union funds. MRDEUF, as the coordinator of the programming process, is also, responsible for developing the SEA for the OPs.
It is expected that this paper will contribute to the awareness raising regarding the importance of full development and implementation of the END in Croatia as essential prerequisite for incorporating appropriate environmental noise protection measures in the SEA and the OPs.

Material and methods

In order to assist Croatia in achieving its ambitions to transpose fully the END into national legislation, and in particular to build up the institutional and expert capacities for its effective implementation of END, the project was carried out with the support of the European Union under the framework of project Technical Assistance for the Development of National Environmental Noise Strategy for Republic of Croatia. Under this project the following three main products were produced:

- The Review document of the END implementation in Croatia, which was prepared based on the survey carried out in Croatia, based on the Questionnaire prepared according to the EU Review process.
- The "National Environmental Noise Protection Strategy", presenting one of the main products of the project, which was prepared on the basis of comprehensive analysis of the environmental noise protection situation in the Republic of Croatia.
- The Action plan to implement the strategy, as well as several Guiding documents that should assist in practical implementation of the National strategy and action plan.

In the scope of this paper, the material and methods applied for preparing the assessment of the END implementation in Croatia, and conceptual framework for development of integrated environmental noise protection strategy.

The method applied for Review of the END implementation in Croatia was based on the guidelines and questionnaire used by the European Commission in review of the END implementation by the Member States. According to the Article 11 of the END, the European Commission launched in March 2011 the review of the implementation of the END, with the following key project objectives: (1) to review the implementation of key provisions of END by the 27 Member States; (2) to develop proposals for the amendment of END, as appropriate, and (3) to develop an Action Plan outlining further implementation strategies and Community action on environmental noise, as appropriate.

The method for preparing the integrated strategy for the noise protection was based on the WHO and EU Environmental Health Action Plan (EHAPE, WHO 1994), which was adopted at the Second Environmental Health Conference in Helsinki in 1994. This approach is focused on improving the main instruments for actions (such as the legislation, institutional setup, education, public participation, monitoring system, etc), rather than to be concerned with particular disease caused by an environmental factor.

Subsequently, the identified problems in the performed survey have been interpreted in relation to the objectives and practical measures that should be carried out as the priorities in National Environment Noise Protection Strategy (NENPS 2012). In order to provide a practical tool for Government actions the National Environmental Noise Prevention Action Plan (NENPAP 2012) was prepared as well. The approved Strategy and Action plan by the main beneficiary were submitted in 2012 to the Government for formal adoption.

Concerning the approach and methods that should be applied in preparing the SEA are described in the Environmental Protection Act (EPA) and the Regulation on strategic environmental assessment of plans and programs on the environment[9].

Results and discussion

The results of performed survey are of particular importance for Croatia, because it represents an independent assessment of international experts that are very familiar with the END situation in the EU, and not the "national assessor", who is most often a member of administration, and who has no freedom or international experience to make objective opinion. The following are the most important conclusions regarding the most pertinent problems in implementing the END in Croatia.

According to the performed survey, the main problems in implementing the END in Croatia are not different from those experienced by other EU Member States, such as a lack of knowledge on noise mapping and action plans among different competent authorities at the central and local level, the insufficient number of properly qualified noise mapping professionals, lack of proper collaboration between different sectors

regarding the environmental noise protection, as well as inappropriate use of the environmental noise maps and actions plans in preparing SEA and OPs.

However, performed survey showed that Croatia is in average much behind other EU member states in implementing the END, and that implementation of this Directive achieved so far very little progress. Although the Directive itself was transposed into the Croatian legislation, under the NPA, its Ordinances are not fully adhering to the END mandates and guidelines, and are dealing at the same time with other aspects of noise protection, such as the community noise and working environment noise, such as the Ordinance on maximum allowed noise levels in working and leaving environment, Ordinance on requirements regarding the premises, equipment and personnel of legal persons performing expert tasks of noise protection, Ordinance on expert examination in the field of noise protection, Ordinance on activities which require noise protection measures and Ordinance on noise protection measures from open space sources.

Also, in contrast to majority of other EU Member States, the main responsibility for the environmental noise protection (according to the END mandates) is with the Ministry of health (MoH), and not with the ministry in charge of the environment protection. Administrative and inspectional supervision over the implementation of the noise protection legislation is the responsibility of the Directorate of Sanitary Inspection (DSI) within the MoH. However, the noise protection got until now very low priority in the MoH, and as a consequence, no single environmental noise mapping specialist exist in the ministry, although the ministry is responsible for implementing the NPA, and in this capacity for implementing the END in Croatia.

Survey indicated that due to the lack of an appropriate institutional infrastructure responsible for the END implementation, the prepared strategic noise maps and action plans (Ordinance on the method of preparation and content of noise maps and action plans), so far have been developed for the minority of noise sources, as required by END and national legislation, and not at the expected quality level according to the latest END guidelines and manuals. For such situation, partially is responsible lack of appropriate accreditation system for the noise mapping experts/companies, as a part of the existing licensing system.

However, the most important problem is that due to the lack of inter-sectoral cooperation, the Ministry of Environment and Nature Protection (MENP) is not properly involved in the END implementation. As a consequence, the environmental noise protection did not find its place in the strategic documents of the MENP, nor in the prepared SEA for OP Environment 2007-2013. It must be emphasized that the main purpose of strategic noise maps and action plans according to the END requirement is to provide appropriate ground for the Strategic Environmental Impact Assessment, as a basis for preparing the Action plans and key elements of the OPs.

This problem is becoming particularly important in the light of new Government decision of 29 August 2013, making the MRDEUF responsible for preparing the OPs 2014-2020, as well as for the development of SEA.

The preparation of the OP follows the basic EU legislation which governs the mainstream operation of the EU Structural Instruments (ERDF, ESF and Cohesion Fund) for the current period, such as the General Regulation No 1083/2006, the ERDF Regulation No 1080/2006, the ESF Regulation No 1081/2006, the Cohesion Fund Regulation No 1084/2006, and the Commission Implementing regulation No 1828/2006.

At his stage, the OPCC 2014-2020 has 10 main topic objectives. As it is presented in the Table 1 below the environmental noise protection is introduced in 2 out of the 10 selected Thematic Objectives.

Table 1 The Operational Programme Competition and Cohesion 2014-2020 and noise protection

Main Thematic Objective	**Selected investment priority**
(6) Preserving and protecting the environment and promoting resource efficiency	***6.5. Taking action to improve the urban environment, to revitalise cities, regenerate and decontaminate brownfield sites (including conversion areas), reduce air pollution and promote noise-reduction measures*** Sustainable urban development and urban reconstruction are identified as reform measure in the Croatian Economic programme. The measures relate inter alia with more efficient management of resources (physical space) and improvement of environmental conditions within urban areas renovation and re-use of the abandoned sites and city areas.
(7) Promoting sustainable transport and removing bottlenecks in key network infrastructures	***7.4. Developing and rehabilitating comprehensive, high quality and interoperable railway systems, and promoting noise-reduction measures*** The EC Position Paper recommends ESI funds to concentrate on the development of a balanced transport network, with a priority to be given to the railway sector. Also, the 2013 Economic Programme of Croatia stipulates railway infrastructure development, with the aim of creating a single interoperable railway system and the improvement of the railway transport, as one of the reform measures. The main characteristic of the existing railway infrastructure are reduced operational capabilities which resulted in a reduction of average commercial speed on the network and low competitiveness of rail transport. Investments in rail are vital for enabling a modal shift to rail, taking into account plans of neighbouring countries, as more environmentally friendly mean of transport.

This text indicates clearly the importance of the END, and in particular the NENPS in connecting and integrating the noise protection with different sectors within the selected investment priorities that have been identified as the most important for financing from the EU funds.

Considering that the development of OP started very late by the Government decision of 29 August 2013, and that the responsibility for preparing SEA for development of OP 2014-2020 is given to the MRDEUF, there are many concerns expressed by the professional community that the SEA would not be properly prepared due to the shortage of time and lack of the necessary experience in MRDEUF. Additional problem is that the MRDEUF is primarily driven by the priorities of economic objectives and not the environment protection, such as the MENP. Therefore, all of the mentioned problems are creating doubts whether the OPCC 2014-2020 would properly address the environmental noise protection.

Although the NENPS 2012 and the NENPAP 2012 were prepared and submitted to the MoH for the formal Government adoption, it has not been adopted as the Government policy document until today.

Conclusion

Considering importance of the Environment Noise Protection Strategy for preparing SEA and OP 2014-2020, the time is ripe now for the Government to formally adopt this important policy document. However, because the overall situation changed in many ways from 2011, particularly following the full EU membership of Croatia, it is necessary to revise the NENPS 2012 in order to reflect the changes that occurred in Europe as well as in Croatia. Considering that Croatia is in the very important process of development of OP 2014-2020, based on which the EU Structural funds could be used, the meaning and purpose of this Strategy is completely different from the time when it was originally prepared in 2012. This new Strategy must address other sectors priorities related to the environmental noise protection, as indicated above in Table 1, and therefore, the process of preparation of this strategic document must be transparent, inter-sectoral and fully participative exercise.

The most important strategic decision in preparing the new Strategy is the question whether the MoH should be in future responsible for the Environmental Noise Protection, or whether this responsibility should be transferred to the more "natural" government administration, such as the MENP. This critical question was already addressed in NENPS 2012. Considering that the next EU budgetary period 2014-2020 just started, it is a right time for Government to make such critical decision.

According to the NENPS 2012, any administration, whether the MoH or MENP, must upgrade the knowledge and expertise in the environmental noise, and must employ the necessary experts knowledgeable in the END mapping and action planning. It is essential prerequisite for any progress in this important environment protection area.

Also, as it was stressed already in NENPS 2012, the new Strategy should indicate major actions that should be carried out to improve the related END legislation, and to take care of the improving the overall noise mapping expert level, by introducing the accreditation system as a part of the licensing process.

Finally, considering that the economic and financing aspects are of special importance, an important issue to be taken up by the new Strategy, are the costs related to the obligations placed over the Governmental central authorities, local authorities and cities, and operators of major roads, railways and airports, necessary to fulfill the requirements of the END. However, considering that the major investments in the mentioned areas will be strongly subsidized from the available EU funds, these aspects of Strategy should be prepared by high level experts familiar with the Structural and Cohesion funding. It is supported by the financial indicators that according to estimates made in 2004, the social cost of traffic, rail and road noise across the EU is estimated to € 40 billion a year, of which 90% is related to passenger cars and goods vehicles. This is about 0.4% of total EU GDP11 including health care costs. According to the 2011 Commission's White Paper on Transport, the noise-related external costs of transport would increase to roughly 20 billion € by 2050 unless further action was taken. More recent studies have suggested a range of environmental noise related costs between EUR 13 and 38 billion per annum due to medical costs, lost workdays, reduction in house prices and reduced land use potential (EC, COM(2011) 321).

Therefore, this new Strategy could be of major importance for implementation of OPCC 2014-2020, as a prerequisite for obtaining the EU Structural and Cohesion funds for identified priority projects. For example, in order to get an appropriate feeling for the investment levels, some information can be used from the Italian experience, where extensive plans of anti-noise recovery actions started on new and existing railways (beginning on year 2000) and roads (beginning on year 2004), following the requirements of the Italian Framework Law on Environmental Noise and the budget for

noise protection measures on 16.000 km of railways is 6,8 billion €, while on 5.000 km of highways it is 2,2 billion €.

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Comparison and Differences Regarding Strategic Environmental Impact Assessment Conducted for Physical Plans and Operational Programmes

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Abstract

Strategic environmental impact assessment (hereinafter SEA) is applied to a physical plan or programme delivered on a state or regional level. Although the content is legally prescribed, the assessment varies significantly regarding a physical plan when compared to an operational programme. Starting from the very structure of an operational programme and a physical plan, the differences are as follow:

- programme description is much less detailed when compared to a physical plan,
- range of a programme is defined for Croatia as a whole, generally not stating specific areas opposed to a physical plan which is applied for the area of a county,
- the description of specific activities is provided on an abstract level within a programme, while it is clearly defined within a physical plan,
- spatial description within a programme is quite broad, while in a physical plan it is described in details with a very precise elaboration of sensitiveness, zones etc

All stated differences are the reason why strategic impact assessment procedures must be approached in a different manner and by using different drafting methodology. In case of an operational programme, the approach will be less determined and more abstract (depending on type and sort of an operational programme), while a physical plan strategic assessment can and has to be conducted in a way to respect all environmental and spatial features. The key element on which the subsequent prescribing of measures (guidelines) depends will be the correct choice of indicators of state of the environment and its changes.

Key words: programme, physical plan, methodology, access, environmental indicators

Introduction

The Environmental Protection Act (OG 110/07) defines SEA as a procedure conducted for the purpose of determining possible significant impacts on the environment which can emerge as a result of the implementation of a plan or programme. SEA creates the basis for the promotion of sustainable development by incorporating the environmental protection requirements into the plans and programmes for specific areas. This assures that relevant decisions on approval of a plan or programme are reached on the basis of knowing all significant impacts that the implementation of a plan or programme could have on the environment, at the same time providing the investors with framework guidelines for their course of action and possibility of including important environmental elements in the decision making process.

SEA provides the possibility of considering a greater number of options than usually provided within an environmental impact assessment (hereinafter EIA) at the project level, aids the decision makers in reducing the costs and missed opportunities regarding limited options at the project level and also lessens the risks of bad political decisions and time and money expenditures involved therein. SEA deals with cumulative impacts, impacts that spread over multiple sectors, impacts at a regional level and indirect impacts. SEA has the possibility to deal with issues which are usually skipped at the project level. Thus, SEA can help in avoiding conflicts (geographical, multisectorial). [1]

The main principles of an efficient SEA can be summarized as follows:

- SEA should consider all suggested plans/programmes which may significantly influence the environment.
- SEA should be based on an initiative and steered by the proponent of a plan/programme.
- SEA should be integrated into the key phases of preparation of a plan/programme. The procedure should start as soon as possible with the aim of objectives assessment, i.e. it should estimate to which extent does a plan/program comply with the generally accepted environmental protection objectives while at the same time fulfilling the requirements of a plan/programme. SEA should provide guidelines for all the key phases of development of a plan/programme.
- SEA should focus on the right questions at the right time in the preparation process of a policy/plan/programme.
- SEA should use acceptable and economically viable methods and techniques of analysis. It should collect data in the amount and precision needed to achieve a sound decision.
- SEA should assess the environmental consequences of a reasonable number of alternatives of an initiative, acknowledging that the scope of assessment shall vary in accordance with the decision-making level. Practical and environmentally most acceptable solution shall be suggested.
- SEA should strive for the early inclusion of all key stakeholders. It should apply suitable counselling techniques which are simple to use and applicable to specific target groups.

Main benefits from SEA are the following:

- Strengthening of an EIA at the project level,
- Dealing with cumulative impacts and impacts of high magnitude,
- Achieving of the environmentally circumspect and sustainable development.

An SEA either for a physical plan or for an operational programme must not be conducted in more details or utilizes more means than necessary for achieving its purpose. Quantitative and qualitative data should be collected from the existing sources as much as possible. In case of unavailability of certain data, it is essential to provide comments which should suffice to justify the conclusions on state of the art brought on the basis of available data wherever possible.

Strategic study, prepared at the end of a SEA procedure recognizes, assesses and evaluates possible significant impacts of the implementation of a plan or programme on the environment, including all acceptable alternatives. SEA also suggests environmental protection measures with the purpose of preventing and mitigating possible adverse effects as well as the monitoring programme of environmental impacts the implementation of a plan or programme might have. [1]

Legal Framework

The Environmental Protection Act (OG 110/07) stipulates mandatory SEA procedure for the following:

- plan and programme, including their amendments and/or supplements, which are delivered at the state and regional level in the fields of: agriculture, forestry, fishery, energy, industry, mining, traffic, telecommunications, tourism, waste management and water management;
- physical plan of a county and the City of Zagreb physical plan, including their amendments and/or supplements.

Regulation on Strategic Environmental Assessment of Plans and Programmes (OG 64/08) regulates the procedural aspects of the implementation of SEA of plans and programmes which may significantly influence the environment and for which mandatory SEA is stipulated by the Law, including the drafting of the environmental impact study, obligatory content of opinions and other acts in that procedure, terms, obligatory content of the Report on the modalities of integrating the environmental protection provisions raised by the SEA within the plan or programme, modality of monitoring the state of the environment during the implementation of a plan or programme and procedure for verifying that environmental protection measures raised by a plan or programme were taken into account.

The Regulation also defines procedural aspects of the screening process for SEA for amendments and/or supplements to a plan, i.e. programme, and also the manner of individual inquiries and criteria for determining possible significant environmental impacts of a plan/programme.

It is evident that there are differences in types of plans and programmes for which SEA is mandatory. Numerous stakeholders assuming various roles shall be included in the SEA procedure and a variety of environmental impact assessment methods shall be applied. The difference in approaches in drafting the SEA for an operational programme in comparison to the SEA for a physical plan shall be the focus of this work.

Regarding the fact that SEA is a relative novelty in Croatia and does not have such a long tradition like EIA, only several SEAs have been conducted in the Republic of Croatia in the passed five years, mostly for operational programmes: Operational Programme for Environmental Protection and Energetics,, Operational Programme for Regional Competitiveness, Operational Programme for Traffic and only one for a physical plan: the Primorsko-goranska County Physical Plan.

SEA procedures for several more operational programmes are pending (for instance, River Basin Management Plan). Most of the remaining operational programmes at the level of ministries as well as adoption/revision of most of the counties' physical plans are pending, therefore it is to be expected that in the following period (the next 2 - 3 years) the number of conducted SEA procedures shall increase significantly.

For the above stated reasons, this work shall focus primarily on comparison of the executed SEA procedures for the Primorsko-goranska County Physical Plan and the SEAs of the above mentioned operational programmes.

Description of the SEA for the Physical Plan

County's Physical Plan is the basic and obligatory document which sets directions for spatial development and organization of a county. The Plan also encompasses the development and spatial organization in the frameworks of the state, but also the wider regional area. The Plan directs social and economic development of the County with the aim of sustainable utilization of natural resources and spatial protection. On the basis of the County's development potentials assessment while maintaining its specificities regarding spatial protection and quality of the environment, the Plan should also define purpose and spatial development conditions as well as the conditions for realization of envisaged interventions in space.

The impact of each part of the Physical Plan ("interventions") is assessed in accordance with the assessment criteria defined for each environmental component and processed using the expert assessment method. The acquired marks were scrutinized using the adapted "Delphi" method in regard to a variety of different experiences, attitudes and knowledge of each of the members of the team. The indicators pose representatives values of the impact the Physical Plan might have on the environment. The criteria used when selecting the indicators are related to their importance from the view of adverse impacts on the environment, and the typology of indicators used was based on the European Environmental Agency's typology based on the DPSIR system. [4]

The DPSIR system comprises of:

- (D - Driving forces) - basic driving mechanisms of adverse impacts,
- (P - Pressures) - consequences of acting of the driving forces,
- (S - State) - current state of the environment,
- (I - Impact) - consequences of impacts,
- (R - Response) - measures and instruments which state/society plan and implement with the aim of improving conditions in some specific area.

The typology stated above was adjusted to the envisaged plan in a way that Driving forces are presented by projects (interventions) which will cause certain changes in the environment, Pressures symbolize concrete activities which will be conducted on a respective area, State presents the current state of the environment while the Impacts (including potential cumulative impacts) specify parts of the environment on which the stated activities shall cause changes.

Naturally, more detailed alternative solutions of specific projects will be possible to define and also justify during the final defining of the intervention (location and sizes). SEA shall present all possible impacts and suggest mitigation measures of possible adverse effects set on a higher level than those that shall subsequently be addressed for each specific intervention in the EIA procedures.

Description of SEA for an Operational Programme

Usually, a state level operational programme is structured in a way that it's divided into priority axes. Each priority axis has further sub-divisions in regard to issues connected to the Strategy of the priority axis' framework, general and specific objectives, end users/target groups and the indicative list of operations.
As opposed to the SEA for a physical plan which is determined by space (county, a town) with a clear delimitation of the "interventions", SEA for an operational

programme sometimes applies to the whole state territory without a clear delimitation of areas and sometimes with a very scarce description (explanation) of what needs to be achieved by the operational programme. Therefore, the SEA is of a more theoretical nature and is much more undetermined than the SEA for a physical plan. Therefore, the methodology for conducting the SEA for an operational programme greatly differs from the methodology for conducting the SEA for a physical plan. [6]

Usually, it is the practice to perform a suitable analysis of baseline trends for each specific environmental component on the basis of planned operations, i.e. things that need to be achieved. [3] On the basis of these baseline trends projection, an appropriate Suggestion for Monitoring the State of the Environment with the implementation plan and selection of suitable state/quality of the environment indicators is drafted for the purpose of monitoring of future trends regarding the state of the art for each of the environmental components as well as the environmental load. [4] When conducting this task, one has to be extremely careful regarding the data used for this purpose since poor input data result with poor final results.

More detailed comparison of similarities and differences regarding the SEA for a physical plan and the SEA for an operational programme is provided in chapter D.

Comparison of similarities and differences between SEAs for a physical plan and an operational programme

Table 1. Comparison of similarities and differences between SEAs for a physical plan and an operational programme

SEA	Physical plan	Operational programme
Description of plan/programme	More or less detailed description of planned interventions in space, objectives	Indicative list of operations/activities
Timeframe	In the early phase of strategic planning	In the early phase of strategic planning
Focus	On the implementation of the plan and consequences of future decisions at the local level	On the implementation of the plan and consequences of future decisions at the local level
Recognized and assessed areas	Assessment of impacts on biodiversity, fauna, flora, soil, water, air, climate factors, material assets, cultural heritage architectural and archaeological heritage inclusive, landscape, population, human health and interactions among all these.	Assessment of impacts on biodiversity, fauna, flora, soil, water, air, climate factors, material assets, cultural heritage architectural and archaeological heritage inclusive, landscape, population, human health and interactions among all these.
Assessment	More qualitative, but also quantitative.	More qualitative, only partially quantitative.
Environmental changes	Character, range, geographical location or spatial unit, frequency and duration, reversibility, possibility of occurrence	Character, frequency and duration, reversibility, possibility of occurrence
Scale: range of the	Narrower, specified for the area	Wider (territory of the state or

activities assessed	of a county	some part of it)
Impacts assessed	Cumulative - spatial and indirect impacts	Cumulative – inter-sectorial and indirect impacts
Methodology of assessment (recognition methods and environmental assessment methods)	Impacts matrices, questionnaires, interviews and commissions, control lists, spatial analysis maps, network diagrams	Impacts matrices, questionnaires, interviews and commissions, control lists, network diagrams
Indicators	Indicators stated in Sustainable Development Strategy of the Republic of Croatia, i.e. in the National List of Indicators	Indicators stated in Sustainable Development Strategy of the Republic of Croatia, i.e. in the National List of Indicators
Level of details and scrutiny of the analysis (absence or insufficiency of data)	More detailed assessment, narrower overview provided, less uncertainties, lesser insecurity	Less detailed assessment, broader overview provided, more uncertainties, greater insecurity
Key sources of information	Report on state of the environment of a county, single report on specific environmental components, strategies and programmes for environmental protection of a county, visions, and judgements.	Report on State of the Environment of the Republic of Croatia
Data on the existent state of environment	Statistical overview of an area, description of the physical environment, location and type of protected areas and species	Types or schemes of development
Data representation	In form of maps	In form of charts
Variant solutions	Account for a narrower scope of variant solutions, mainly: spatial and socio-economic.	Accounts for a wider scope of variant solutions: spatial, political, legal, fiscal and socio-economic.
Type of variant solutions	Mostly another location in space	Choice of the type of activity
Evaluation criterion	Environmental protection objectives often comprised within the environmental protection legal documents mainly at the county level.	Environmental protection objectives often comprised within the environmental protection legal documents mainly at the state level.
Appropriate assessment	Basically always conducted	Depends on the type of an operational programme and not always conducted.
Inclusion of public [5]	Greater public interest due to longer tradition of physical plans drafting and higher level of awareness on environmental protection issues on the area of a	Public interest often weak due to lower level of environmental protection awareness regarding the difficulties in transferring more general issues to the

	county. Quite often there is an express of interest based on local conditions which are often a result of the "NIMBY" attitude.	broader public.

Conclusion

SEA is a systematic procedure for assessment of potential environmental impacts of proposed plans and programmes which starts at an early phase of their drafting, while major alternative solutions are still subject to discussion. SEA is a tool used to aid the higher level decision makers and therefore it has to be applied with resilience in the planning and decision making process.

By comparing the SEAs for physical plans and operational programmes accordingly, it was concluded that following differences exist between the two types of SEAs:

- Description of a physical plan contains mainly more or less detailed description of planned activities in space, while the description of an operational programme refers to the indicative list of operations/activities that need to be achieved through its implementation.
- The assessment is more of a quantitative nature for the physical plan SEA than for an operational programme.
- Changes in the environment regarding physical plans refer more to a geographical location or spatial dimension compared to operational programmes.
- Range of certain activities is more specified for the area of a county in case of a physical plan while for an operational programme it is (mainly) the entire state area, or some part of it.
- The impacts regarding operational programme include inter-sectorial impacts.
- Level of details and scrutiny of the analysis are more thorough and provide more precise overview of the situation in SEAs for physical plans.
- Key sources of information are regarding the state of the environment of a county and state respectively.
- Data on the environmental state of the art sometimes refer to types or development patterns regarding operational programmes, while with physical plans they refer to statistical overview, locations and types of protected areas.
- In physical plan SEAs, the data are mostly interpreted by maps, while in the operational programmes SEAs they are mostly interpreted by charts.
- Range of variant solutions is narrower in physical plans compared to operational programmes
- Public participation is more pronounced during the preparation of physical plans in comparison to operational programmes. [5]

With the increased number of SEAs, skills and expertise used in the preparation of the same shall also increase. In future, these skills and expertise will be more focused on the wider environmental protection context, thus enhancing the quality of conducted SEA procedures accordingly.

During the preparation of SEAs there is a great need for consultations with numerous institutions which dispose with an abundance of relevant data needed for conducting a quality assessment for the purpose of acquiring as most accurate an image on state of the environment of an area as possible, which is especially important for the determination of state of the environment and setting of the appropriate indicators which

will be monitored in the future. This issue is highly relevant regardless to the fact whether these institutions are directly included in the SEA process or not, because this approach assures their more proactive role in the process.

It would be of great aid for the SEA drafting process if a set of guidelines for the drafting of SEAs were published. The purpose of those guidelines would be to encompass all the issues that were raised so far, in accordance with the already prepared guidelines for specific interventions which are subject to EIAs.

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Operational Programme Environment 2014-2020 and role of Strategic Environmental Assessment

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Abstract

From 1 July 2013, Croatia is the 28th EU Member State, and therefore, is eligible for using the Cohesion Funds (CF) and European Regional Development Funds (ERDF) for co-financing the Operational Programme Environment 2007-2013 (OPE) and Operational Programme Competition and Cohesion 2014-2020 (OPCC). These two operational programmes are prerequisites for absorbing the EU funds allocated for the environmental sector covering a rolling seven-year period 2014-2020. The OPE 2007-2013 was approved by the European Commission, but the OPCC 2014-2020 is still in the early process of preparation. The new OPCC 2014-2020 should be based on the EU Common Strategic Framework (CSF) for 2014-2020, and the proposed thematic objectives, including those of relevance to the environment and nature protection. Strategic Environmental Assessment (SEA) of this OPCC is the responsibility of the Ministry of Regional Development and EU Funds (MRDEUF), and the SEA procedure should be conducted in line with the provision of the Environmental Protection Act (EPA), Regulation on strategic environmental assessment of plans and programmes (RSEAPP) and Regulation on information and participation of the public and public concerned in environmental matters, which are aligned with Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment. Since the time for completing the OP 2014-2020 is extremely short, it indicates urgency on preparing SEA as prerequisite for adopting the OPCC 2014-2020 by EU, in order to be in position to use the Cohesion Fund. The purpose of this paper is to discuss the development of Croatian Operational Programmes 2014-2020 in respect to the selected thematic objectives and investment priorities for the new 7 years period, and in particular the procedural and methodological issues regarding SEA for the OP, and the appropriate environmental protection priorities.

Key words: SEA for Operational Programme 2014-2020

Introduction

Following the ratification of Accession Treaty by all EU Member States, and formal accession of Croatia to European Union, Croatia becomes from 1 July 2013 eligible for utilizing the EU Structural Funds and Cohesion Fund. With the full membership, the annual EU funding allocations to Croatia will rise to over ten times their level under IPA funding. For many other countries that recently joined the EU, the effective utilisation of the Structural Funds and Cohesion Fund has been an extremely challenging task, particularly during the first years of accession.

The adoption of OP represents a basic prerequisite for absorbing the EU funds allocated for the implementation of the EU Cohesion Policy in Croatia, including the environment

sector. Primarily, the OP shall be closely linked to the aims and priorities of the National Strategic Reference Framework (NSRF) which is the basic reference document for the programming of the EU funds in the area of cohesion and regional policies. The OP contributes to the achievement of the overall objective of the NSRF "to accelerate economic growth and foster employment, with the prospect to achieve real convergence". Moreover, implementation of the OP shall contribute to three strategic objectives of the NSRF, including the Thematic Priority 2 of the NSRF: Improvement of environmental infrastructure and quality of related services.

SEA procedure for OPE 2017-2013 was conducted in line with the provision of the EPA, RSEAPP, Ordinance on the committee for strategic assessment and Regulation on information and participation of the public and public concerned in environmental matters, which are aligned with Directive 2001/42/EC.

However, the accession negotiation were closed in mid-2011 and accession date was set for 01 July 2013, thus limiting allocation in this first generation of structural fund for Croatia to 6-month period (1st July 2013 to 31st December 2013), the Croatian government decided in consultation with the European Commission that for this short programming period OP Environment, the scope should be narrowed solely the sectors of waste and water management, i.e. priorities for which funding has commenced in the pre-accession IPA programme framework.

Therefore, this OPE 2007-2013 did not cover many other important environmental protection areas, as it was a case in all other EU Member States during the 7 years period of 2007-2013, giving impression that only waste and water management are the priority issues in the environment protection. The OP Environment 2007-2013 will be operational up to 2015. Priority axes of the OPE 2007-2013 were defined in the following 3 priority areas:

Priority Axis 1: Developing waste management infrastructure for establishing an integrated waste management in Croatia aims at development of integrated waste management system through investments in waste infrastructure, construction and/or reconstruction of the facilities and elimination of the uncontrolled waste disposal of highly polluted by waste and existing incompliant municipal waste landfills.

Priority Axis 2: Protecting Croatia's water resources through improved water supplies and integrated wastewater management systems aims at achieving and maintaining sustainable management of water resources through investments in water supply systems, increase in network connection, reduction of losses and increase of the reliability and efficiency of the water supply system.

Priority Axis 3: Technical Assistance is to provide backing for sound management and implementation of the OP along with strengthening administrative capacity of the structures involved in the management and implementation of OPE.

All EU Member States are now in the process of development of OP for the next seven years budget 2014-2020, including the environmental priorities. The preparation of the OP follows the basic EU legislation which governs the mainstream operation of the EU Structural Instruments (ERDF, ESF and Cohesion Fund) for the current period, such as the General Regulation No 1083/2006, the ERDF Regulation No 1080/2006, the ESF Regulation No 1081/2006, the Cohesion Fund Regulation No 1084/2006, and the Commission Implementing regulation No 1828/2006.

For Cohesion Policy in 2014-2020, the linkage with the Europe 2020 Strategy translates into the 11 guiding 'Thematic Objectives' set out in the Common Strategic Framework (CSF) for 2014-2020. The Figure 1 below shows the 11 main Thematic Objectives of the Common Strategic Network for 2014-2020.

1. Research & innovation
2. Information and communication technologies (ICT)
3. Competitiveness of Small and Medium-sized Enterprises (SMEs)
4. Shift towards a low-carbon economy
5. Climate change adaptation & risk prevention and management
6. Environmental protection & resource efficiency
7. Sustainable transport & removing bottlenecks in key network infrastructures
8. Employment & supporting labour mobility
9. Social inclusion & combating poverty
10. Education, skills & lifelong learning
11. Institutional capacity building & efficient public administrations

Figure 1. The 11 Thematic Objectives of Cohesion Policy 2014-2020

Each of these Thematic Objectives breaks down into a series of 'Investment Priorities' for each of the relevant Fund. For ERDF, ESF and Cohesion Fund, these Investment Priorities are set out in the draft Fund-specific Regulations, such as Art 5 of draft ERDF Regulation 2014-2020, Art 3 of draft ESF Regulation 2014-2020 and Art 3 draft Cohesion Fund Regulation 2014-2020.

At the end of January 2013, the European Commission presented its Position Paper on Croatia for 2014-2020. The paper emphasises the continued need for environment-related investment in Croatia – in particular for, but not restricted to, the full implementation of the environment *acquis* in line with the agreed transition periods. For any future Environment OP in Croatia, the key focus is likely to be on the Thematic Objectives 5 - *Climate change adaptation & risk prevention and management*, and Thematic Objective 6 - *Environmental protection & resource efficiency*. There can also be debates about whether elements of Thematic Objective 4 - *Shift towards a low-carbon economy* should be part of a future Environment OP, or of other complementary OPs.

On 29 August 2013 the Croatian Government on its 111 session made decision that the MRDEUF is responsible for the organization and coordination of preparation of the OPs for the European Union financial period of 2014-2020, and that only the following three OPs will be developed:

1. Operational Programme in the field of competitiveness and cohesion;
2. Operational Programme in the field of efficient human resources;
3. Operational Programme in the field of technical assistance

Also, by the same Government Decision, the MRDEUF is responsible for development of the SEA for each of the mentioned OPs in accordance with the EPA and the Regulation on strategic environmental assessment of plans and programs on the environment.

The purpose of this paper is to discuss the development of Croatian OP 2014-2020 in respect to the selected thematic objectives and investment priorities for the new 7 years

period, and in particular the procedural and methodological issues regarding SEA for the OP, and the appropriate environmental protection priorities.

Basic approach and methodology in preparing SEA for OP 2014-2020

The SEA Directive is a framework law which establishes a minimum common procedural framework for certain plans and programmes (P/Ps). The purpose of the SEA Directive is to ensure that environmental impacts of certain plans and programmes are identified and assessed during their preparation and before their adoption.
According to the SEA Directive an environmental assessment must be carried out for all national, regional and local plans and programmes:

a) Which are prepared for agriculture, forestry, fisheries, energy, industry, transport, waste management, water management, telecommunications, tourism, town and country planning or land use and which set the framework for future development consent of projects listed in Annexes I and II to the EIA Directive 85/337/EEC; or
b) Which, in view of the likely effect on sites, have been determined to require an assessment pursuant to Article 6 or 7 of Directive 92/43/EEC (Habitat Directive).

The assessment should be carried out during the preparation of a plan or a programme and before its adoption or submission to the legislative procedure. It is very important to point out that the plan or programme should be finalized, before its adoption or submission to the legislative procedure, by taking into account the Environmental Assessment Report, opinions of Environmental authorities and public, and results of trans-boundary consultations, when appropriate.

The Guides on Implementation of Directive 2001/42 of the Assessment of the effects of certain plans and programmes on the environment was prepared by the Commission with the aim to help Member States to implement the SEA Directive such as to meet its requirements and gain the benefits expected from it. The Guides also enabled the Member States to understand better the purpose and operation of the Directive.

The legislative base for introducing the SEA into decision-making system of Croatia is the EPA, which defines the framework to carry out the strategic environmental assessment procedure, plans and programmes for which the procedure is mandatory and those which are subject to the prior evaluation procedure on the need for strategic assessment as well as plans and programmes not subject to strategic assessment. Furthermore, it defines the bodies competent for carrying out the procedure, participation of the Ministry of Environmental and Nature Protection (MENP) and other bodies competent for particular environmental issues, the obligation of preparing the strategic impact report, prescribes certain procedural details at national and regional (county) levels, outlines the obligations of public participation, the need to carry out the procedure in case of impact on nature and the procedure in case of transboundary effects of implementing a plan or programme.

The RSEAPP prescribes, in details, the manner of carrying out the strategic assessment procedure, including the approach to which the plan or programme must integrate the environmental protection requirements established in the strategic assessment.

SEA should be carried out during the preparation a plan or programme before their adoption or submission to the legislative procedures. The activities on the SEA are parallel to those on the development of P/P, as shown in the following Figure 2.

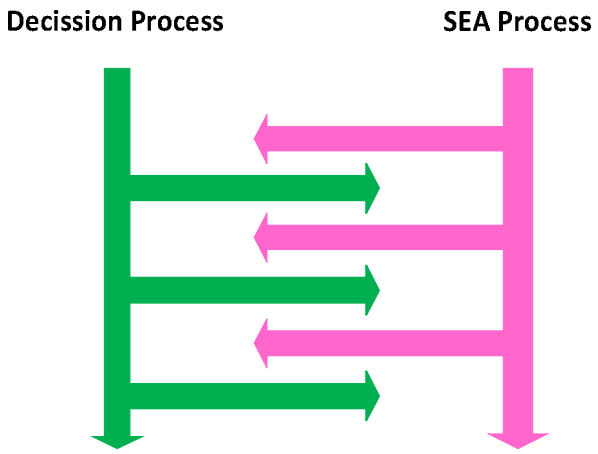

Figure 2 Parallel and distinct processes

This approach provides an appropriate framework for analysis and priority setting regarding the harmony between economic development and environment and nature protection. General public and concerned public should be involved in the SEA Procedure from its beginning. The public should be informed on the initiation of the SEA procedure and on its accomplishment. Furthermore, the public may actively participate in screening procedure, definition of the content of an Assessment Report, commenting and giving proposal to the Strategic Environmental Assessment Report and the draft P/P.

In order that any of the national OPs would be approved by the European Commission, it is essential to prepare the SEA for particular OP. The prepared SEA shall be strongly linked to the , which will be, also, strongly linked to other national strategic documents, such as the Waste Management Strategy, Water Management Strategy, Nature Protections Strategy, Marine Protection Strategy, etc., but as well as the overall National Strategic Reference Framework (NSRF). All of the mentioned strategies were developed, adopted and endorsed by the European Commission by 2012.

Results and discussion

By decision of the Government of 29 August 2013, the MRDEUF, as the coordinator of the programming process, initiated the process of preparing the OP in the field of competitiveness and cohesion, and in the field of efficient human resources, for the period 2014-2020. Also, by the same Government decision, the MRDEUF launched preparation of the Strategic Environmental Assessment for each of the mentioned OPs.

These two decisions came as a surprise to the professional community in the field of environment impact assessment and strategic impact assessment, because in contrast to other countries and the previous OP, this time Croatia (1) will not have for the period of 2014-2020 the expected Operational Programme Environment, and (2) the responsibility for preparing SEA for OP is not organized and/or supervised by the ministry responsible for environment and nature protection. Although the Government decision is recalling that the SEA will be developed in accordance with the EPA and the Regulation on strategic environmental assessment of plans and programs on the environment, the question is whether the two essential principles of European approach

in environment and nature protection will be preserved, such as the independence and the professional competence.

The European experiences are showing that the economic and developmental pressures are usually prevailing over the environment and nature protection, particularly during the recession times, and therefore, there is a fear by the professional community that the necessary independence in preparing SEA will not be preserved.

The question of competence of government administrations in preparing SEA was identified in the EU performed surveys as one of the major problems in Europe. If the ministry responsible for the nature and environment protection is not leader in preparing SEA, but the MRDEUF, the question of competence and neutrality is even more pronounced.

The future will certainly show whether the expressed concerns by the professional community at the First Regional Conference on Environmental Impact Assessment in Zadar (18-21 September 2013) was justified or not, particularly because the administration from MRDEUF responsible for preparing SEA was not present at this most important event in the Region that was dealing with the professional and procedural aspects of SEA.

Until now, the draft Operational Programme for Competition and Cohesion has been prepared with the following selected 10 Thematic Objectives (TO):

(1) Strengthening research, technological development and innovation
(2) Enhancing access to, and use and quality of ICT
(3) Enhancing the competitiveness of small and medium-sized enterprises
(4) Supporting the shift towards a low-carbon economy in all sectors
(5) Promoting climate change adaptation, risk prevention and management
(6) Preserving and protecting the environment and promoting resource efficiency
(7) Promoting sustainable transport and removing bottlenecks in key network infrastructures
(9) Promoting social inclusion, combating poverty and any discrimination
(10) Investing in education, training and vocational training for skills and lifelong learning by developing education and training infrastructure

Although the initial decision indicates that the SEA will be prepared for all 10 Thematic Objectives, the main emphasis concerning the environment and nature strategic assessment will be most probably focused on the thematic objectives 4, 5 and 6, under so called Environmental protection Objectives. As the Figure 3. below is showing, under each of the Topic Objective the number of the selected investment priorities are at this stage identified.

The analysis of selected priorities indicates that beside waste and water sectors, which are the priorities of OPE 2007-2013, the OPCC 2014-2020 expanded the selected priorities on other environmental protection areas such as the nature protection, air protection, soil protection, climate change adaptation, environmental noise protection, energy efficiency and renewable energy use and risk prevention. These areas are applicable under thematic objectives No 4), 5) and 6) established in proposed Regulation on CSF Funds (article 9 of the Proposal for a Regulation COM (2011) 615 final/2).

Selected thematic objective	**Selected investment priority**
(4) Supporting the shift towards a low-carbon economy in all sectors	4.1. Promoting the production and distribution of energy derived from renewable sources
	4.2. Promoting energy efficiency and renewable energy use in enterprises;
	4.3. Supporting energy efficiency, smart energy management and renewable energy use in public infrastructures, including in public buildings, and in the housing sector
	4.4. Developing and implementing smart distribution systems at low and medium voltage levels;
	4.5. Promoting low-carbon strategies for all types of territories, in particular for urban areas, including the promotion of sustainable multi-modal urban mobility and mitigation relevant adaptation measures
(5) Promoting climate change adaptation, risk prevention and management	5.1. supporting investment for adaptation to climate change, including eco-system based approaches
	5.2. Promoting investment to address specific risks, ensuring disaster resilience and developing disaster management systems;
(6) Preserving and protecting the environment and promoting resource efficiency	6.1. Investing in the waste sector to meet the requirements of the Union's environmental acquis and to address needs, identified by Member States, for investment that goes beyond those requirements
	6.2. Investing in the water sector to meet the requirements of the Union's environmental acquis and to address needs, identified by Member States, for investment that goes beyond those requirements
	6.3. Conserving, protecting, promoting and developing natural and cultural heritage
	6.4. Protecting and restoring biodiversity and soil and promoting ecosystem services, including through NATURA 2000, and green infrastructure
	6.5. Taking action to improve the urban environment, to revitalise cities, regenerate and decontaminate brownfield sites (including conversion areas), reduce air pollution and promote noise-reduction measures

Figure 3. Environment protection topic objectives and main selected priorities

Therefore, it could be concluded that most of the important areas that were omitted in the OPE 2007-2013 are now covered by the new OPCC 2014-2020. However, one very important area is still missing in this new OP and it is marine environment protection. According to the Marine Strategy Framework Directive (MSFD), which is defining the frame for EU actions in the area of the policy of marine environment, all Member States must take necessary measures to achieve and maintain the appropriate state of marine environment as a latest by 2020. Croatia transposed the MSFD in the form of Regulation on establishing the framework for actions of Republic Croatia on marine environment protection. This Regulation defines the basic requirements and measures for developing, upgrading, implementing and monitoring of Strategy for marine environment protection. The Marine Strategy covers the marine waters under the legal jurisdiction of Republic of Croatia, and should adopt many outstanding documents and legislation. Among other things it requires that, for all inland and coastal waters, "good

status" must be achieved by 2015 and defines how to achieve that by establishing measures for protection of the aquatic environment.

With the new plans for major development of exploration of undersea carbohydrates, sea transport and ports, very intensive development of tourism, and plans for major upgrading of the fisheries industry, it is clear that the marine environment of the Adriatic Sea will be under enormous pressure in the next 7 years. Therefore, non-existence of single word or action on the marine protection in the draft Operational Programme is a major omission, particularly because Croatia is already late in fulfilling the Water Framework Directive (WFD) obligations.

Based on the early experiences of SEA preparation for development of the OPCC 2014-2020, the following main problems could be identified in implementing the SEA Directive in Croatia:

- Both, on national and county level, still considerable unfamiliarity with obligations of indivisible role of SEA in preparation of P/P proposals, which in some cases results in attempts to evade the legal obligations.
- Insufficient communication between experts, authority involved in preparation of the SEA and institutions preparing the OP.
- Insufficient communication between competent authorities liable to conduct SEA and authorized persons preparing the strategic studies and plans/programs, with common bad communication within the competent authority (in case two or more sectors are involved in the preparation of the plan/programme, i.e. the implementation of the SEA procedure).
- Insufficient number of joint meetings between authorized persons preparing the P/P and expert committee for implementation of SEA, resulting in separate procedures of preparation and assessment of P/P, which leads to the unavoidable hard core EIA model when the issues of relevance to the environment and nature protection are evaluated after the OP was already prepared
- On both levels, insufficiently and inadequately trained (uneducated) human resources resulting in bad management of the SEA procedures and inadequate solving of problems encountered in work with SEA committee
- „Late and insufficient inclusion of public into the procedure – public debate as a rule is initiated upon the completion of the committee's work, i.e. the positive opinion on the P/P proposal is already issued. In such a way, the objections of the public are not considered by both the experts in environmental protection and the experts preparing the P/P, only by the latter that are in charge of issuing the final decision to be proposed to the authority which adopts the P/P.
- Inadequately developed plan and program background documents used as a basis for the strategic study.

Conclusions and recommendations

According to the present situation, the main problems in implementing the SEA Directive in Croatia are not different from those experienced by other EU accession countries. A lack of knowledge on SEA procedures among different competent authorities is also a problem. The everyday practice shows that the Republic of Croatia has no sufficient number of SEA specialists to be used according to the legal requirements. Therefore, fast implementation of the legal requirement of EPA, for establishing the formal body for education and licensing system of EIA and SEA experts may significantly improve the situation in Croatia.

Additional problem is that environment protection and function of the MENP has no necessary independence from all other economic development government sectors. The drastic example is that the SEA for development of OP 2014-2020 is responsibility of the MRDEUF, which is primarily driven by the economic development objectives, and not by the MENP. Also, as concluded already, Croatian administration is lacking the knowledge of preparing SEA in general, and therefore, the professional competence of the MRDEUF for developing the SEA is even more questionable. Therefore, it is recommended that the responsibility for preparing SEA is transferred from MRDEUF to the MENP, which is possible according to the existing legislation in Croatia. Also, the basic SEA principles and objectives of permanent and close collaboration between the OP preparation team and the SEA experts should be enforced in the actual practice. Otherwise the SEA would become only a formal assessment, and not a critical instrument in search for common solutions for effective environmental and nature protection.

It is concluded that the Government decision to include beside waste and water sectors (priorities of OPE 2007-2013), in the new OPCC 2014-2020 other environmental protection areas such as the nature protection, air protection, soil protection, climate change adaptation, environmental noise protection, energy efficiency and renewable energy use and risk prevention, is certainly very god decision. However, not including the marine protection in the OPCC 2014-2020 is considered to be a major omission. Particularly if we have in mind the Government new plans for major development of exploration of undersea carbohydrates, development of sea transport and ports, very intensive development of tourism, and plans for major upgrading of the fisheries industry, which will make enormous pressure on the marine environment of the Adriatic Sea in the next 7 years. Therefore, it is strongly recommended that the protection of marine environment is introduced as one of the investment priorities. This action should be, also, linked to the efforts for implementing the MSFD in the form of Regulation on establishing the framework for actions of Republic Croatia on marine environment protection.

Finally, lessons learned in preparing SEA for OPCC 2014-2020 will most likely show further shortcomings of the current legislation and implementation of the SEA regulation in Croatia. The recommendations should be aimed toward improvement of the existing legislative framework, the upgrading of the enforcement system, as well as upgrading the education and training of expert in the authorized consulting firms, and other parties of Primary and Secondary target groups or other government administration. This experience should be used in preparing the amendments to the Laws on Physical Planning and the Construction, but as well the EPA should take into account these experiences.

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Research of environmental indicators in the strategic assessment of the environmental impact of the energy plan and program

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Abstract

Strategic environmental assessment is the process at an early stage of development strategies, plans, programs or legislation assesses their impact on the environment and nature.
Environmental indicators are an effective tool for monitoring changes and achieving the objectives of sector policies and strategies.

Environmental indicators are used to quantify the effects of each plan or program.
By applying the latest scientific research in the establishment of decision making by selecting environmental indicators can improve the decision making in the strategic environmental assessment.

In this paper we investigate environmental indicators that are related to the energy sector, which can be used in a strategic environmental assessment of the impact of the energy sector.
Also, the paper will be shown the appropriate criteria for the selection of environmental indicators for use in the strategic assessment of the environmental impact of the energy curriculum.

Energy related environmental indicators will be classified using the Drive-Pressure-Impact-State-Response (DPSIR) model which is useful tool for selection of environmental indicators.
In addition, to complement the key indicators it will be investigated and so far not described environmental indicators, which describe the environmental impacts of specific energy source.

Keywords: environmental indicators1, strategic environmental assessment2, energy plan or programme3, DPSIR model4

Introduction

Strategic Environmental Assessment is a procedure used in the early stages of development strategies, plans, programs or legislation assesses their impact on the environment and nature. [1]
The procedure is regulated by the Directive 2001/42/EC and the Espoo Convention, the Protocol on Strategic Environmental Assessment to the UNECE Convention on Environmental Impact Assessment in a Transboundary Context from 1991 (Espoo Convention), and transposed into Croatian legislation with the Environmental

Protection Act [2] and the Regulation on strategic environmental assessment of plans and programs on the environment. [3]
In conformity with the Directive, the obligation to implement the strategic assessment is prescribed only for plans and programs.
Public participation is regulated by the ratification of the Aarhus Convention.

Energy Development Strategy is a basic document that sets the energy policy and planning of energy development. By the Croatian Energy Development Strategy is regulated the obligation to adopt the plan and program of implementation of the Energy Development Strategy of the Republic of Croatia. Before the Croatian Government adopts these key development documents, they shall be subject to the strategic environmental assessment.

Environmental indicators that are the subject of this research serve as a criterion for assessing the significance of impacts on the environment and the health of the proposed variants of these strategic documents. Environmental indicators are an effective tool for tracking changes and achievements of sectoral policies and strategies. Environmental indicators are used to quantify the effects each plan or program has on the environment.

In general, the indicators are defined as a measure of, mainly quantitative, that can be used for simplified presentation and justifying complex phenomena including trends and progress of an activity over time. [9]

Energy is an economic sector that has a significant, if not the greatest environmental impact. Production of energy in any form, and the procedures that come with it - the extraction of raw materials, transportation of raw materials, energy use activities that load the environment primarily with emissions of air pollutants.

On the other hand, energy is required for almost any human activity. It provides us with a standard of living that we are used to - comfort, mobility and performance of economic activities and is a prerequisite for the development of society as a whole.
Reconciliaton of these two requirements - the hunger for power and the effective environmental protection can be balanced by selection of energy sources and environmental protection-based strategic energy sector documents. Selecting a certain type of energy facility and a certain type of fuel can significantly affect the level of emissions, e.g. CO_2 emission of natural gas combustion is about 40% lower per unit of energy than the combustion of coal. [5]
Although SO_2 and CO_2 are most frequently mentioned emissions with negative impacts resulting from the combustion of fossil fuels, every energy facility has an addition impact on the environment.

Thus, the construction and operation of hydropower plants may change the groundwater level and the micro-climate which is changing the ecosystem around the affected area. From the environmental point of view, it is important to consider the possible accidents in the overall cycle of production, transport, production and use of energy, which can cause major pollution of all segments - air, water, sea, and land. [5]

Energy Strategy and program of Implementation of the Strategy sets out the three main objectives: security of supply, competitiveness and sustainability of the energy system of energy development including special care to preserve the environment. [4]

In this paper, the emphasis will be on protection of the environment and the impact of energy, i.e. energy sector in the Republic of Croatia.

Selection of environmental indicators

The European Environment Agency (EEA) has developed for the energy sector a set of 5 key indicators, 3 of which are according to the DPSIR (Driving forces - Pressures - States - Impacts – Responses) model classified as driving force, and two as response. [9] Indicators related to the energy sector are:

- Final consumption of energy; D
- Total energy intensity; D
- Total energy consumption; D
- Consumption of energy from renewable energy sources; R
- Electricity from renewable energy sources. R

Furthermore, by examining the official website of the Croatian Environment Agency (AZO), it has been found that the Agency has according to DPSIR model identified the following indicators for energy sector [5]

- Final energy consumption by sectors Driving force
- Total energy intensity Driving force
- Total energy consumption by fuel Driving force
- Consumption of renewable energy Response
- Renewable electricity Response

This paper considers the following main criteria for the selection of indicators are: accessibility and availability of data and the importance of indicators for the policy of the energy sector, for which reason the indicators are presented according to the said criteria, and are based on the indicators established by the Croatian Environment Agency (AZO).

DPSIR (Driving forces - Pressures - States - Impacts - Responses) model

DPSIR (Driving forces - Pressures - States - Impacts - Responses) model is an integrated model that is used for the analysis and study of the environment, which was developed by the European Environment Agency (EEA).
DPSIR model is based on the existing model of the Organization for Economic Cooperation and Development (OECD), which is the basis for the analysis of interrelated factors that affect the environment.
Components of the DPSIR model are: driving forces (D), pressures (P), state (S), impacts (I) and responses (R) to the current state of the environment. Components of the model enable the analysis and synthesis of causal relations between anthropological and environmental activities and their consequences and possible responses to a changing environment.

- **Driving forces (D):** represent the needs of the society and the economy. These are the changes in social, economic and institutional system, which directly and indirectly cause pressures on the state of the environment. The European Environment Agency defines the driving forces as social, demographic and economic development of society and the corresponding changes in lifestyle, patterns, overall levels of consumption and production. Proposed classification of four non-hierarchical, but interactive levels driving forces affecting the structure and relationships between the social, economic, political and environmental systems. Under this approach, the primary driving force of the socio-economic

activities directly related to the pressure (e.g., industry and tourism) on the economic level management.

Secondary driving forces have been established at the political level (e.g. waste management policies, laws). Long term and the spatial spreading sphere of influence, there is a level of tertiary driving forces (e.g., media, consumer habits). Finally, the base of the driving forces include fundamental trends (e.g. demographic or cultural) that have long influenced social decisions (e.g., climate change, population). [10]

Examples of the driving forces in the energy sector are prices and energy consumption by sector and fuel type.

- **Pressures (P)**: Pressures are anthropogenic factors that induce changes in the environment. Although there are different definitions of pressure from the European Environment Agency, pressures are defined as the development of emission, the physical and biological resources, use of resources and the use of land by human activities.

  Since the driving forces leading to human activities, such as transport or energy production, i.e. the result of the fulfillment of human needs.

  These human activities are carried out "pressures" on the environment as a result of the process of production or consumption, which can be divided into three main types:

  1) excessive use of natural resources;
  2) changes in land use;
  3) emissions (chemicals, waste, radiation, noise) into the air, water and soil. [10]

- **State (S):** State can only refer to the natural system, or both, and the natural and socio-economic system. Condition may be related to a wide range of features, from the qualitative and quantitative characteristics of the ecosystem, the quality and quantity of resources, living conditions for the people, exposure influences pressures on people to even greater socio-economic issues. [10]

  States arising from environmental pressures that can change the state of the quality of the different components of the environment such as air, water, soil, etc. Therefore, the state of the environment combination of physical, chemical and biological conditions.

  The combination of the current situation and existing pressures explain the influence.

- **Impacts (I):** The impact are the changes in the functions of the environment that affect the social, economic and environmental dimensions, which are caused by changes in the status of the system. Impacts could include changes in the functions of the environment, such as access to resources, air and water quality, soil fertility, health and social cohesion. These impacts triggered responses. [10]

  Change in physical, chemical and biological conditions of the environment determines the quality of ecosystems and human well-being in terms of human health.

– **Response (R):** Responses are policy measures which are directly or indirectly triggered by the perception of impacts and seek to prevent, remove, compensate for or reduce their consequences. Responses may come from different social levels, such as groups of individuals, government and non-government sectors. These responses can be affected by movements in the driving forces, pressures, states and impacts. [10]

Driving forces

In the final energy consumption by sector in Croatia, largest share is held by the transport sector and households and industry. In the present period in Figure 1 it is clear that since 2008 the slight decrease in final energy consumption in the sectors of industry, transport and households can be attributed to the economic crisis (industry) and a continuous increase in energy prices (domestic and transport).

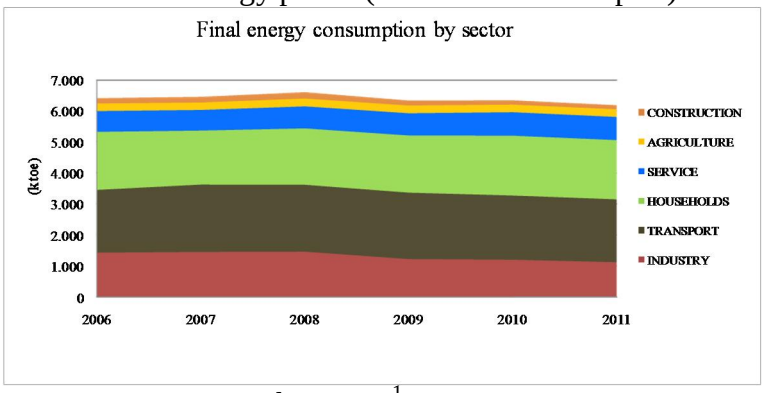

Figure 1 Final energy consumption by sector[1]

Figure 1 shows the final energy consumption by sector in Croatia, with a significant decline in consumption after 2008 in all sectors.

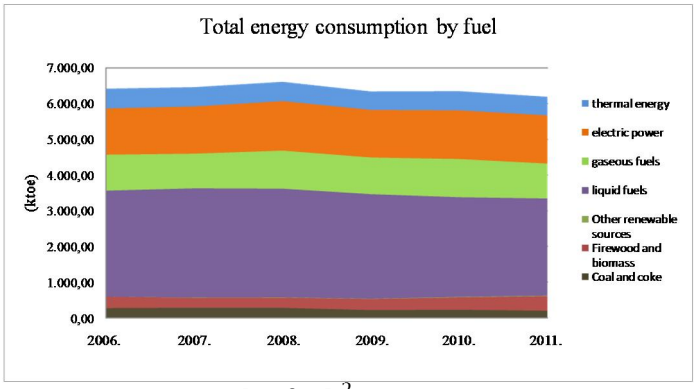

Figure 2 Total energy consumption by fuel [2]

As shown in Figure 2 for the period 2006 to 2011 a reduction in total energy consumption by type of energy in Croatia is evident, the cause of the decline is due the economic crisis which is evident from the picture because the drop in consumption is present since 2008.

Energy intensity measures the energy consumption in the economy and its energy efficiency. It is the relationship between gross domestic energy consumption and gross domestic product (GDP).

[1]Energija u Hrvatskoj 2011, Godišnji energetski pregled, Ministarstvo gospodarstva. Dostupno na: http://www.eihp.hr/hrvatski/projekti/EUH_od_45/EUH11web.pdf [11. travnja 2013.]
[2]Energija u Hrvatskoj 2011, Godišnji energetski pregled, Ministarstvo gospodarstva. Dostupno na: http://www.eihp.hr/hrvatski/projekti/EUH_od_45/EUH11web.pdf [11. travnja 2013.]

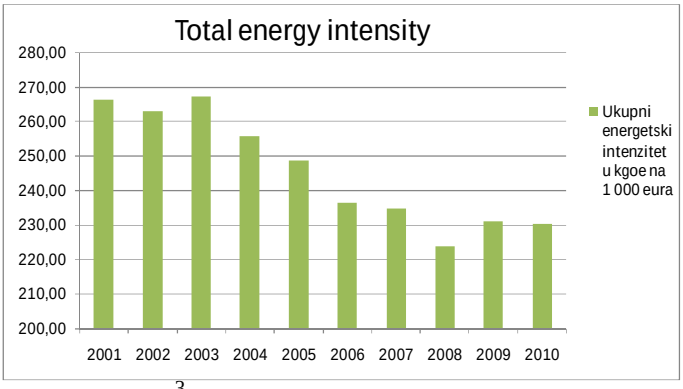

Figure 3 Total energy intensity[3]

Figure 3 shows that in the period 2001 - 2010 in Croatia there was a improve in overall energy intensity, which means that it takes to consume less energy to produce one unit of GDP.

Pressures

For the energy sector are certainly the most important SO_2, NO_X, CO_2 emissions.
The SO_2 and NO_X gases except potentially harmful effects on health, are known as the "acid" gases because their remote transport occurring acidic ingredients that are deposited from the atmosphere as wet (acid rain) and dry deposition. [6]
In addition to acidification, gas NO_x contributes to the eutrophication and the formation of tropospheric ozone.

The CO_2 gas is a greenhouse gas and therefore the most important anthropogenic cause of global warming, due to the availability of data in Fig. 4 are presented only data on CO_2 emissions in Croatia. [7]

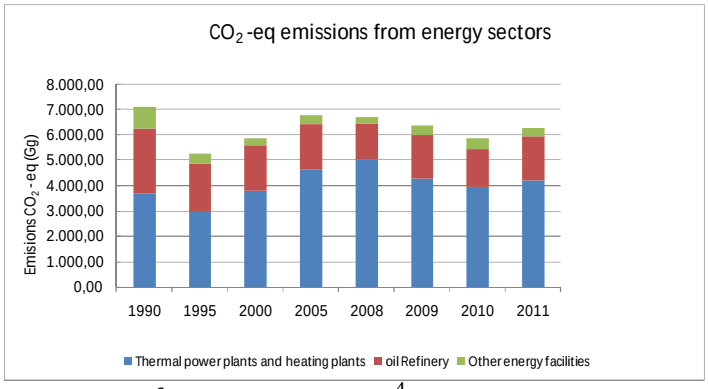

Figure 4 CO_2 -eq emissions from energy sector[4]

The CO_2 emissions from the energy sector in Croatia are shown in Figure 4 in which unified all energy sub-sectors of the thermal power plants and heating plants, oil refineries, to other energy facilities.
From Figure 4 it is clear that in the period 1990 - 2011 decline in total CO_2 emissions is mainly due to the economic downturn in recent years. The CO_2 emissions in the 2011 were 5% lower than those in the 2010, and by 10% compared to the emissions of CO_2 in 1990.

[3]Energy intensity of the economy - annual data.Dostupno na: http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nrg_ind_332a&lang=en [14. travnja 2013.]
[4]EKONERG – Energy and Environmental Protection Institute (2012), National inventory report 2013, Croatian greenhouse gas inventory for the period 1990 – 2011, april 2013, Croatian Environment Agency

Accordingly, in Table 1 states applicable to the energy sector to the DPSIR model climate change and air quality, and the impacts are applicable to the energy sector are biodiversity and human health.

Response

The share of renewable energy sources (RES) in total electricity production

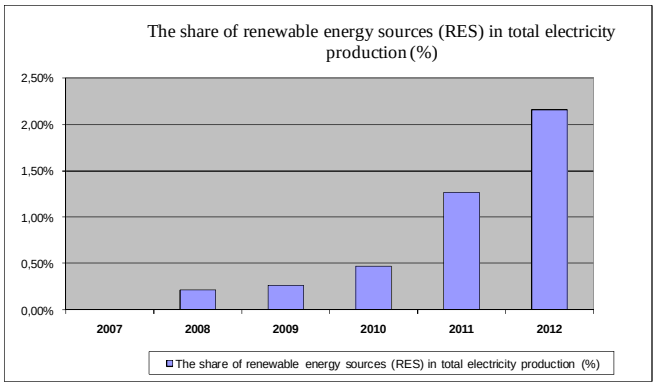

Figure 5 The share of renewable energy sources (RES) in total electricity production*[5]

Figure 5 shows the increase in the share of electricity from renewable energy sources in the Republic of Croatia, the share of renewable energy in the total electricity production in 2012 was 2.1%.

Table 1 Overview of Selected environmental indicators according to the DPSIR model

Indicator	**The key political issue**	**DPSIR**	**Evaluation (+,-, 0)**
Final energy consumption by sector	Are we spending less energy by sector	D	+
Total energy consumption by fuel	Are we spending fuels that are less harmful to the environment	D	+
Total energy intensity	Is the power consumption separate from economic growth	D	+
The share of renewable energy sources (RES) in total electricity production	Are we switching to the use of renewable energy	R	+
The share of renewable energy in total electricity consumption	Are we switching to the RES in order to satisfy our electricity needs	R	
CO_2 -eq emissions from energy sector	Are there a reduction of pollutant emissions from the energy sector, e.g., replacement of fuel coal and fuel oil (heavy fuel oil) with gas in power plants	P	0

* It refers to renewable energy sources whose production is incentivized in the total electricity consumption

[5]Hrvatska energetska regulatorna agencija, Izvješće o radu Hrvatske energetske regulatorne agencije za 2012. godinu

Air quality		S	
Climate change		S	
Biodiversity		I	
Human health		I	

Conclusion

In this paper, an attempt was made by Drive-Pressure-State-Impact-Response model to research and define environmental indicators related to the energy sector.
The criterion for selecting individual environmental indicators were the accessibility and availability of data and the importance of indicators for the policy of the energy sector.
Energy Strategy and Program Implementation Strategy sets out the three main objectives: security of supply, competitiveness and sustainability of the energy system of energy development including special care to environmental protection.
In this paper, the emphasis is placed on the environment by making energy plans and programs, so they used environmental indicators established by the Environmental Protection Agency for the energy sector.
In this paper has been found that the Drive-Pressure-State-Impact-Response model is a useful tool for selecting environmental indicators related to the energy sector, which can be used in a strategic environmental impact assessment of the energy plan and program.
According to Drive-Pressure-State-Impact-Response model, the Environmental Protection Agency has identified environmental indicators related to the energy sector, namely: the total energy consumption by sector, total energy consumption by fuel, overall energy intensity, the share of renewable energy in total electricity production and the share of renewable energy in total energy consumption.
In this paper, I added an indicator of the environmental pressures on the environment, such as emissions of pollutants (CO2) from the energy sector, and a reduction in CO2 emissions compared to emissions in 1990.
It was also found that the selected environmental indicators for the energy sector indicate a gradual improvement of the overall energy intensity and reduce total energy consumption by type of energy as well as the total energy consumption by sector.
This reduction should be taken with a reserve since it shows the impact of the economic crisis on the reduction of energy consumption and a decline in industrial production, rather than the results of political regulations which affect the improvement of these indicators of the environment related to the energy sector.
In further research is necessary to research environmental indicators also to the share of renewable energy in total energy consumption as well as environmental indicators of states and impacts.

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Strategic environmental impact assessment of the physical planning documents using the example of the Spatial plan of the Primorsko-goranska County

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Abstract

The aim of this paper is to present the strategic environmental impact assessment of the new Spatial plan of the Primorsko-goranska County. The paper describes the process of making the assessment, the participants in the project, the participation of the general public as well as the specially appointed bodies. The main assessment of the acceptability of the plan for ecological network and the questions of environmental protection integrated in the Spatial plan are specially presented. Considering that this is the first strategic environmental impact assessment of a spatial plan in Croatia, it is suggested that the experience of the Primorsko-goranska County can serve as an example for other similar procedures.

Keywords: environmental protection, physical planning, instruments of environmental protection, strategic environmental impact assessment, Primorsko-goranska County

Introduction

The current Spatial plan of the Primorsko-goranska County was made between 1994 and 1998 and adopted in 2000. It was based on many specialist scientific evaluations. Very important among them are the ones from the environmental protection and historical and cultural heritage protection areas, since they enabled the modern approach to spatial planning, in which the optimal use of space is based on the reception possibilities of the environment. The plan was changed and updated three times: in 2005, to harmonise with the Act on organization and protection of the protected coastal area (Narodne novine 128/04), in 2009, in order to define the routes of state roads of the high level of service and in 2011 to determine the criteria for the construction of telecommunication systems.

In the meantime, a range of new acts that influence the decisions and provisions of the plan, such as the acts on ports and port areas, acts on energy sources and environmental protection, acts on the use of water and agricultural land was adopted. Besides, there were changes in the social, especially demographic and economic development of Croatia, which greatly influenced the Primorsko-goranska County. Therefore, it was decided that instead of changing and updating the existing Spatial plan, a new plan should be made.

According to the current Environmental protection act (Narodne novine 110/07), it is necessary to make the strategic environmental impact assessment when creating the physical planning documents on the state and county level (SEIA). Since this is a

relatively new instrument of environmental protection, applied in practice in a county spatial plan for the first time in Croatia, the authors think that it is important to present in this paper the experience of the Primorsko-goranska County as an example for similar future procedures.

Assessment of environmental impacts of strategies, programs and plans – strategic environmental impact assessment

Strategic assessment of environmental impacts of plans and programs is a procedure in which more important environmental impacts that can occur when applying a plan or a program are assessed. SEIA is a base for sustainable development, inserting the conditions of environmental protection into plans and programs of a specific area. It makes sure that the important decisions are made with the knowledge of the possible environmental impact of the plans and programs and it gives the decision makers guidelines, enabling them to include the important elements of environmental protection into their decisions.

Strategic assessment of environmental impacts of plans and programs is a relatively new instrument of environmental protection in our country. Its introduction into the Croatian legal system was induced by the positive experience of the application of this procedure worldwide, and especially in Europe.[6] The Ministry of Environmental and Nature Protection or any ministry whose plan's environmental impact is assessed is responsible for the application for the SEIA on national level. On county level, it is the governing body responsible for the environmental protection in cooperation with the county department responsible for the plan or program assessed. SEIA is applied in the making of the plan or program draft, before the process of adoption. The public is informed and allowed to contribute at every stage of the procedure. [7] If the strategic assessment also includes the nature acceptability assessment, that procedure is included in the SEIA.

The legal base for the appliance of the SEIA is the Environmental Protection Act[8], the Act on Strategic Assessment of Environmental Impacts of Plans and Programs (Narodne novine 64/08) and the Act on informing and Cooperation of the Public and Interested Public in the Issues of Environmental Protection (Narodne novine 64/08).

[6]In 2002, the Ministry of Environmental and Nature Protection started the process of introducing the strategic environmental impact assessment. In 2003, Primorsko-goranska County Institute for physical planning organized a panel discussion *The importance of strategic environmental impact assessment in the management of space and development.* In the course of alignment of Croatian legislation with the acquis communautaire, the Environmental Assessment of Development Strategies (SEA) project was conducted in 2006 and 2007, financed by the EU funds in the CARDS program. In 2006 and 2007, the Ministry of Environmental and Nature Protection organized several workshops with representatives of all Counties. Three publications were also issued: *Smjernice o strateškoj procjeni utjecaja na okoliš, Strateška procjena održivosti i utjecaja na okoliš pokrajinskog prometnog i prijevoznog plana (PPPP) Limburg* i *Strateška procjena utjecaja na okoliš strukturnog plana općine Wieringermeer*. Source: Vahtar-Jurković, 2011: 168

[7]The public is informed about the beginning of the SEIA procedure, about defining the contents of the SEIA, about public discussion (date of public discussion and presentation, place and manner of contributing to public discussion, as well as the results of the application of the SEIA – the SEIA report. Source: Regulation on the informing and involvment of the public and interested public in the environmental protection issues, article 5

[8] Chapter VI.2. the definition and aims of the SEIA; obligation of application; exceptions (defense, civil defense, finance and budget plans and programs); jurisdiction; mode of application and financing the application of the SEIA. Source: Environmental Protection Act, articles 55-68

The SEIA procedure includes the following steps:

- decision to start the SEIA
- defining the contents of the strategic study
- the making of the strategic study
- the assessment of completeness and expertness of the strategic study
- opinion of the committee
- opinion of the body and/or persons appointed by special acts and bodies of regional or local government
- optional – results of international consultations, if a plan or program has impact across the border
- informing the public and their cooperation
- if it is a SEIA procedure on county level – the opinion of the Ministry of Environmental and Nature Protection and the competent ministry for the plan or program area
- report after the adoption of the plan or program.

The SEIA procedure begins with the minister's decision, if it is a plan or program on state level, or the decision of the head of the main body responsible for the program, or the head of the county, on county level. [9] The base for the procedure is a strategic study examined by the Professional advisory committee appointed by the head of the body responsible for the application of the SEIA. [10] The committee assesses the results of the strategic study and gives its opinion. The SEIA procedure ends with the report of the body responsible for the application of the SEIA[11], informing the public, bodies and/or persons appointed by special acts and optionally countries involved in international consultations. After the adoption of the plan or program, the body responsible for its application is required to make a program of monitoring the state of the environment in relation to the application of the plan or program. [12]

The sources of the SEIA procedure financing are: government budget and other legal sources for a plan or program on state level, county budget and other legal sources for a plan or program on county level.

[9]The decision defines: general course of the procedure, name of body responsible for the application of SEIA, name of plan or program for which the SEIA is conducted, reasons for application, aims and starting points, opinion on the necessity of the main nature impact assessment and the order of the actions that need to be taken in the process of the SEIA. Source: Regulation on the strategic environmental impact of plans and programmes, article 4

[10]According to the Ordinance on the strategic assessment comittee, structure and number of members of the committee is defined according to the scope and characteristics of the plan and program for which the strategic assessment is conducted. The members must be reputable scientists and professionals, representatives of lokal and regional government, representatives of state administrative bodies, representatives of public institutions and representatives of the Ministry of Environmental and Nature Protection. The list of potential candidates is compiled by the Minister of environmental and nature protection and it is available on the Ministry of Environmental and Nature Protection website. http://www.mzoip.hr/. Source: Regulation on the strategic environmental impact of plans and programmes article 13.

[11]The report contains: the mode in which the questions of environmental protection are integrated into the plan or program, results of the procedure, measures for environmental protection, modes of monitoring the application of measures for environmental protection, modes of monitoring significant environmental impacts of the plan or program. Source: Regulation on the strategic environmental impact of plans and programmes, article 19

[12]Program contains: description of aims of the plan or program, indicators for monitoring the state of the environment, modes of checking the application of environmental protection measures, procedure in case of unexpected negative impact and required funds for the application of the program. Source: Regulation on the strategic environmental impact of plans and programmes, article 20

According to the available information, there has been no SEIA procedures of spatial plans in the Republic of Croatia so far.

The course of the procedure of the strategic environmental impact assessment of the new Spatial plan of the Primorsko-goranska County with a special reference to the application of the main assessment of the acceptability of the plan for ecological network

The decision to start the procedure of the strategic environmental impact assessment of the Spatial plan of the Primorsko-goranska County was made by the County prefect Zlatko Komadina on 28 March 2011 and it was published on the Primorsko-goranska County webpage. In this way, the public was duly informed.

According to the Nature Protection Act, the opinion of the competent ministry for the protection of nature was required to determine whether it was necessary, during the application of the procedure of the strategic environmental impact assessment, to conduct the main assessment of the ecological network impact, the aim of which is to prove or deny the impact on the ecological network and suggest alternative solutions, as well.

After that, on 1 April 2011, the County Administrative Department for Civil Engineering and Environmental Protection published the information on the application of the procedure of determining the contents of the strategic environmental impact assessment of the Spatial plan of the Primorsko-goranska County[13], in which they called for cooperation in determining the contents of the study. They invited the government and county bodies and institutions from the area of water, sea, forest, land, agricultural land, fire and nature protection, health, economic development, as well as cities, municipalities and general public. It is necessary to point out that the mandatory content of the strategic study is defined in the Act on Strategic Environmental Impact Assessment of the Plan and Program, in Appendix I. [14] Parallel with the previous discussion on Preliminary draft of the Spatial plan of the Primorsko-goranska County, on 8 September 2011, there was also a discussion on the contents of the strategic study in order to harmonize the received opinions and define the content of the Study.
In the meantime, the County Institute for Physical Planning together with the Administrative Department for Civil Engineering and Environmental Protection completed the procedure for choosing the author of the strategic study. [15]
On 12 April 2012, the head of the Administrative Department for Civil Engineering and Environmental Protection appointed the Professional advisory committee for the strategic environmental impact assessment of the Spatial plan of the Primorsko-goranska County. The Committee held three meetings and on 6 July 2012 concluded that the strategic study was professional and comprehensive. Their conclusion gives an

[13]The complete document is available on the Primorsko-goranska County website: http://www.pgz.hr/Zupanijski_ustroj/Upravna_tijela/Upravni_odjel_za_graditeljstvo_i_zastitu_okolisa/Strateska_procjena_utjecaja_prostornog_plana_PGZ_na_okolis

[14]The Study must contain a short overview of contents and aims of the plan or program, environmental characteristics of the area; aims of environmental protection, reasons for chosing the suggested variants, measures for monitoring significant environmental impacts of the plan or program and a summary of the study. Source: Regulation on the strategic environmental impact of plans and programmes, article 6.

[15]Strategic study can be conducted by a legal person registered and authorized for conducting professional work in the area of environmental protection by the competent ministry. A list of such legal persons can be found on the Ministry of Environmental and Nature Protection website http://www.mzoip.hr/. In the process of public procurement for the strategic environmental impact assesment of the Spatial plan of the Primorsko-goranska County , the DVOKUT ECRO from Zagreb was chosen.

overview of the most important spatial interventions outlined in the Plan, an overview of their impact on particular parts of the environment and measures for protecting the environment in relation to those interventions, i.e. the application of the Plan.

On 9 July 2012, the Administrative Department for Civil Engineering and Environmental Protection issued a decision to conduct a public hearing on the issue of the strategic study and Spatial plan. It lasted from 21 July to 18 September and there were three public presentations: in Rijeka on 4 September, in Krk on 5 September and in Delnice on 6 September. [16]

After the analysis of the questions, objections and suggestions from the public hearing and the making of the Final draft of the Spatial plan and the final draft of the strategic study, the Final draft of the plan was delivered to all the bodies and institutions which cooperated from the beginning in the process of making the Plan and the strategic study, and gave their opinions according to specific regulations.

During the course of the strategic environmental impact assessment of the new Spatial plan of the Primorsko-goranska County, the main assessment of the acceptability of the plan for ecological network was also conducted. Since the extent of the ecological network on the dry land in Primorsko-goranska County is great and covers almost 88% of the territory, special attention in the process of making the Spatial plan and the strategic study was given to the optimal distribution of planned interventions in relation to the ecological network. In the process of making the Plan, the demands of the ecological network were taken into account in the early phase. This is confirmed by the opinions of the Ministry of Environmental and Nature Protection and the Ministry of Construction and Physical Planning, given in the application of the process of main assessment of the acceptability of the plan for ecological network.

At the request of the Primorsko-goranska County, on 21 December 2012 the Ministry of Environmental and Nature Protection delivered the opinion that the Spatial plan of the Primorsko-goranska County would not have significant impact on the aims of protection and integrity of the ecological network with the application of the following mitigation measures:

- locations of the wind farms Zebar and Kavranica should be removed from the Final draft of the Plan since they are situated near the documented active nests of the endangered species golden eagle. Besides, the Zebar location is also significant for its flowers, and Kavranica location is in the area with the documented bat colonies.
- Locations for the planned cages for fish farming: Kaldonta bay, Zaplot – Veliki bok bay and locations near the islands of Plavnik, Prvić, Grgur and Goli should be moved. It is suggested that shellfish could be produced there instead (except in the area of the special nature reserve Prvić and Grgurov kanal).
- Analyse the impact of the tourist zones on the ecological network, especially on the island of Cres, near the ornithological reserves Fojiška-Podpredošćica and Mali Bok-Koromačna and uninhabited islands Grgur and Goli, where some of the existing buildings could be used for the reception of visitors during the day

Considering these recommendations, the Primorsko-goranska County Institute for Physical Planning made the Final draft of the Spatial plan and the Administrative Department for Civil Engineering and Environmental Protection requested the opinion

[16]Three public presentations were organized because the Primorsko-goranska County is comprised of three subregions: Primorje, Gorski kotar and the islands.

of the Ministry of Environmental and Nature Protection on the Final draft of the Spatial plan and the strategic study. The Ministry, after receiving the opinion of the Ministry of Construction and Physical Planning, issued a positive opinion of the applied strategic environmental impact assessment on 12 February 2013.

It is necessary to point out that the Final draft of the Spatial plan of the Primorsko-goranska County has not been adopted yet since it still does not have the required approval of the Ministry of Construction and Physical Planning confirming that it was made in accordance with the Strategy of the Physical Planning of the Republic of Croatia. This is because the new Strategy has been sent to the Parliament and after its adoption the last obstacle for the approval of the Plan will probably be removed and it will be sent to the County Assembly for adoption.

The procedure of the strategic environmental impact assessment ends with the report on the applied strategic environmental impact assessment which will be published on the Primorsko-goranska County website. The Spatial plan will be sent to the County Assembly for adoption, together with the report on the applied strategic assessment. In the first following meeting, the County Assembly will adopt a program of monitoring the state of the environment in relation to the application of the County Spatial plan.

Everything described so far shows that the procedures of making the spatial plan and its strategic environmental impact assessment should be conducted simultaneously. The stages of public hearings on the concept of the plan and contents of the strategic study as well as the final draft of the plan and the strategic study should be conducted at the same time.

The ways in which the questions of environmental protection are integrated in the Spatial plan of the Primorsko-goranska County

The way in which the questions of environmental protection are integrated in the Spatial plan of the Primorsko-goranska County is defined by the strategic environmental impact assessment.

The bases for the analysis of the state of the environment in the Primorsko-goranska County were the current documents on the environmental protection: the Report on the state of the environment in the Primorsko-goranska County, the Strategy of environmental protection in the Primorsko-goranska County, the Plan for the waste management in the Primorsko-goranska County, the Plan for the protection and improvement of the quality of the air in the Primorsko-goranska County, the Report on the state of nature in the Primorsko-goranska County, the Program of the protection of nature in the Primorsko-goranska County, the studies of environmental impact of particular interventions as well as many other studies and reports on the quality of air, water, sea etc. A comprehensive analysis showed that the biggest current environmental problems are the pollution of air, protection of drinking water, surface water and ground water, the problem of the protection of the sea from the pollution from the shore and the sea (caused by the marine traffic and port activity), the problem of the protection of the forest, agricultural land and land planned for development, the problem of the synergic impact of the interventions on nature (flora and fauna), habitats and ecological network, the problem of the synergic impact of the interventions on forests and wildlife, the changes in the landscape and acquisition of space, the potential negative impact on the cultural and historical heritage, the problem of waste management, the problem of noise

pollution, light pollution and the problem of the protection from the potential accidents (ecological accidents, fires, floods, earthquakes, etc.)

The most important interventions in space planned by the new County Spatial plan which could have impact on the mentioned environmental problems are: business zones, sports centres, golf courses, roads, railways, sea ports, airports, manufacturing plants, power stations (combined natural gas fired plant, hydro electric power station, power lines, wind farms and solar power plants), gas pipeline and oil pipeline. The impact of every intervention has been assessed according to the assessment criteria for particular elements of the environment and evaluated according to the expert method of assessment by applying the adjusted *Delphi* method. In the course of the evaluation of the possible environmental impacts, the European Environment Agency's typology of indicators based on the DPSIR framework was used. It consists of:

- D- Driving forces – interventions that cause changes in the environment
- P- Pressures – consequences of the activity of the driving mechanisms
- S- State – current state of the environment
- I- Impact – parts of the environment which will be affected by the pressures
- R- Response – measures and instruments planned and carried out by the society/state in order to improve the situation in a specific area

The interventions which could have the greatest impact on the aims of protection and integrity of the ecological network were also defined: golf courses, highways, hydroelectric power plant reservoir Kukuljanovo, wind farms and solar power plants.

The strategic study also includes appropriate measures for the protection of particular elements of the environment, as well as the measures for monitoring the state of the environment which include the monitoring of the air, water, land, sea, biodiversity, forests, wildlife, agriculture, traffic, energetics, cultural heritage, waste and noise.

Conclusion

Strategic environmental impact assessment is a relatively new instrument of environmental protection in the Republic of Croatia. This paper presents the bases for this procedure and its appliance on the example of the new Spatial plan of the Primorsko-goranska County. The strategic study analyses different variants of the Plan in relation to their environmental impact. The impact on environment and ecological network is demonstrated for the most acceptable variant of the plan. Measures for environmental protection and the program of environmental monitoring with the plan of its application are also suggested.

The strategic environmental impact assessment of the new Spatial plan of the Primorsko-goranska County is the first strategic assessment of a spatial plan in the Republic of Croatia. So far, most procedures have been finished successfully, thanks to the cooperation of the County bodies responsible for physical planning and environmental protection, ministries and other administrative bodies and institutions, local authorities, businessmen, non-governmental organizations and general public. Therefore, the authors of this paper think that the experience of the Primorsko-goranska County can serve as an example for the application of similar procedures.

Literature

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[8] Environmental Protection Act (Narodne novine 110/07)
[9] Nature Protection Act (Narodne novine 70/05, 139/08, 57/11)

Strateška procjena utjecaja na okoliš Plana upravljanja vodnim područjima

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Sažetak

Plan upravljanja vodnim područjima obuhvaća dva vodna područja na području Republike Hrvatske: vodno područje rijeke Dunav i jadransko vodno područje. Cilj koji se planira postići Planom je očuvanje dobrog stanja voda u svrhu zaštite života i zdravlja ljudi, te zaštite vodnih ekosustava. Strateškom procjenom utjecaja na okoliš, kao instrumentom zaštite okoliša, procjenjuju se utjecaji plana i programa na okoliš, temeljem Zakona o zaštiti okoliša (NN, broj 110/07) i Uredbe o strateškoj procjeni utjecaja plana i programa na okoliš (NN, broj 64/08). U postupku strateške procjene određuju se odgovarajuće mjere zaštite okoliša i program praćenja stanja okoliša.
U ovom radu predstavljen je postupak određivanja sadržaja strateške studije, te je uspoređen sa sadržajem koji je propisan Direktivom 2001/42/EZ. Provedena je analiza metoda koje su korištene za procjenu utjecaja plana na okoliš. Također, prikazan je postupak ocjene strateške studije i analizirane su mjere zaštite okoliša i program praćenja koji se predlažu kako bi se značajni utjecaji provedbe plana sveli na prihvatljivu razinu.
Na temelju provedenih analiza i usporedbi predložene su odgovarajuće preporuke i smjernice za postupke strateške procjene utjecaja na okoliš za dokumente iz područja gospodarenja vodama.

Ključne riječi: strateška procjena utjecaja na okoliš, plan, strateška studija, mjere zaštite okoliša

Uvod

Jedan od najvažnijih dokumenata upravljanja vodama je Plan upravljanja vodnim područjima koji predstavlja temeljni planski dokument za provedbu integralnog upravljanja vodama u Republici Hrvatskoj. Dokument se sastoji od osnovnog dijela te od tri dodatka. Dodatak I se odnosi na Analizu značajki vodnog područja rijeke Dunav, Dodatak II na Analizu značajki Jadranskog vodnog područja, a Dodatak III na cjelovito izvješće o informiranju i konzultiranju javnosti u postupku donošenja Plana. Prateći dijelovi Plana su registri vodnih tijela s njihovim značajkama i registri zaštićenih područja. Osim značajki vodnih područja Planom su određeni i ciljevi zaštite voda i vodnog okoliša te program mjera za postizanje planiranog stanja voda. Osobito se to odnosi na mjere smanjenja onečišćenja iz točkastih i raspršenih izvora, mjere zaštite vodnih tijela iz kojih se zahvaća ili se planira zahvaćati voda za piće te mjere održivog korištenja voda. Zaštićenim područjima osim područja namijenjenih za zahvaćanje vode za piće smatraju se i područja voda pogodnih za život i rast školjkaša i život slatkovodnih riba, vode za kupanje i rekreaciju, područja voda ranjiva na nitrate, osjetljiva područja i područja voda koja su staništa biljnih i životinjskih vrsta za koje je

voda bitan element njihove zaštite. Za ta područja su Planom određene posebne mjere zaštite voda. Navedeni Plan donosi se za razdoblje do 2015. godine.

Strateškom procjenom utjecaja na okoliš procjenjuju se utjecaji plana i programa na okoliš temeljem Zakona o zaštiti okoliša (NN, br. 110/07) i odgovarajućih provedbenih propisa. Postupak se uvodi prvi put u hrvatsko zakonodavstvo Zakonom o zaštiti okoliša i Uredbom strateškoj procjeni utjecaja plana i programa na okoliš (NN, br. 64/08).

Strateška procjena utjecaja na okoliš (SPUO) je postupak kojim se procjenjuju vjerojatno značajniji utjecaji na okoliš koji mogu nastati provedbom razvojnih planova ili programa, čime se stvara osnova za promicanje održivog razvitka. Time se omogućava da se mjerodavne odluke o prihvaćanju planova i programa donose uz poznavanje mogućih značajnijih utjecaja koje bi oni svojom provedbom mogli imati na okoliš.

U svijetu se postupak SPUO primjenjuje posljednjih desetak godina, a zemlje članice EU su ga, u skladu s odredbama Direktive 2001/42/EZ od 27. lipnja 2001. o procjeni učinaka određenih planova i programa (SEA Direktiva), obvezne primjenjivati od 2004. godine.

Osnovni cilj SEA Direktive je osiguranje visokog stupnja zaštite okoliša kroz planove i programe tijekom njihove pripreme odnosno prije usvajanja. Javnost i tijela nadležna za zaštitu okoliša sudjeluju u postupku strateške procjene svojim mišljenjima, primjedbama i prijedlozima. Izvješće o okolišu (eng. *Environmental Report*) čini osnovu postupka i njegova izrada je obvezna. Sastavni dio navedenog izvješća čini sadržaj i osnovni ciljevi planova i programa, odnos s drugim relevantnim dokumentima, okolišne značajke područja na koje provedba planova i programa može imati utjecaj, na biološku raznolikost, stanovništvo, zdravlje ljudi, faunu, floru, tlo, vodu, zrak, klimu i dr. Usprkos tome da se u Republici Hrvatskoj dugi niz godina provodi postupak procjene utjecaja pojedinog zahvata na okoliš nedostajao je instrument zaštite okoliša na višoj razni planiranja. Postupak strateške procjene obuhvaća pitanja kumulativnih utjecaja pojedinih zahvata što nije bio slučaj odnosno metodološki nije bilo provedivo u okviru postupka procjene utjecaja pojedinog zahvata na okoliš.

Sam postupak strateške procjene provodi se za planove i programe iz područja poljoprivrede, šumarstva, ribarstva, energetike, industrije, rudarstva, prometa, telekomunikacija, turizma, gospodarenja otpadom i gospodarenja vodama te za dokumente prostornog uređenja. Uzimajući u obzir da se postupak provodi u ranoj fazi izrade plana i programa, pitanja zaštite okoliša i prirode integriraju se u njegov sadržaj. Dakle, predlažu se planovi i programi, odnosno njihove varijante, koje su najprihvatljivije s aspekta zaštite okoliša i prirode. Za izmjene i dopune planova i programa, za koje je obvezna strateška procjena, provodi se ocjena o potrebi postupka (eng. *screening*).

Na državnoj razini stratešku procjenu provode ministarstva nadležna za područje za koje se donosi plan ili program, a na županijskoj razini upravno tijelo koje obavlja poslove zaštite okoliša.

Strateška studija je stručna podloga kojom se određuju, opisuju i procjenjuju mogući značajni utjecaji na okoliš koje može uzrokovati provedba plana ili programa. Nacrt prijedloga plana ili programa i stratešku studiju ocjenjuje stručno povjerenstvo, tijela nadležna za pojedine sastavnice okoliša (npr. vode, more, priroda, zrak i dr.), te javnost.

Prije pokretanja postupka donošenja plana ili programa obvezno se uzimaju u obzir rezultati strateške procjene, mišljenja tijela i javnosti. Postupak završava izvješćem nadležnog tijela o provedenom postupku strateške procjene kojeg priprema nadležno tijelo.

Nakon provedene strateške procjene predlažu se odgovarajuće mjere zaštite okoliša i program praćenja stanja okoliša.

Materijali i metode

Cilj ovog rada je predstavljanje postupka strateške procjene za Plan upravljanja vodnim područjem, te analiza i usporedba propisnih postupaka u zakonodavstvu Republike Hrvatske s odredbama SEA Direktive. Temeljem provedene analize, odnosno koristeći metodu sinteze generalizirani su osnovni dijelovi postupka i ključni sudionici. Na temelju provedenih analiza i usporedbi predlažu se odgovarajuće preporuke i smjernice za daljnje postupke strateške procjene utjecaja na okoliš.

Rezultati i rasprava

Određivanje sadržaja strateške studije

Strateška studija je stručna podloga na temelju koje se provodi postupak strateške procjene. U posebnom postupku određuje se sadržaj strateške studije (eng. *scoping)*.
Postupak određivanja sadržaja strateške studije proveden je sukladno propisanim odredbama. Ministarstvo regionalnog razvoja, šumarstva i vodnoga gospodarstva (sada Ministarstvo poljoprivrede), kao tijelo nadležno za provedbu postupka, pribavilo je mišljenja tijela nadležnih za pojedine sastavnice okoliša, te jedinica regionalne samouprave o sadržaju i razini obuhvata podataka koji se moraju obraditi u strateškoj studiji. Obvezni sadržaj poglavlja strateške studije, između ostalog, sadrži i glavnu ocjenu prihvatljivosti plana ili programa za ekološku mrežu prema Prilogu II. Pravilnika o ocjeni prihvatljivosti plana, programa i zahvata za ekološku mrežu (NN, br. 118/09). Za potrebe informiranja i sudjelovanja javnosti objavljena je informacija o postupku određivanja sadržaja strateške studije na internetskim stranicama nadležnog tijela. Rezultat postupka je konačno utvrđen sadržaj strateške studije koji u osnovnom sadrži sljedeća poglavlja:

- prikaz sadržaja i glavnih ciljeva Plana,
- odnos Plana prema drugim planovima, programima i strategijama,
- pregled postojećeg stanja okoliša (za sve okolišne sastavnice) i stanja bez Plana,
- određivanje okolišnih značajki na koje Plan može značajno utjecati,
- određivanje okolišnih problema (za značajne okolišne sastavnice) važnih za Plan,
- pregled vanjske odrednice od utjecaja na Plan (međunarodne obveze),
- prikaz vjerojatno značajnih utjecaja Plana na okoliš,
- prikaz razloga izbora odabranog rješenja Plana,
- prikaz mjera zaštite okoliša kod provedbe Plana,
- prikaz mjera praćenja (Dvokut Ecro, 2012).

Strateška studija za Plan upravljanja vodnim područjima
Postupak procjene utjecaja na okoliš provodi se za pojedinačni zahvat dok se strateška procjena provodi za planove i programe. Iako oba postupka podrazumijevaju procjenu značajnih utjecaja na okoliš, kao i predlaganje odgovarajućih mjera zaštite okoliša i programa praćenja stanja okoliša, bitne razlike odnose se na razinu, detaljnost procjene i metodološki pristup.
Strateška procjena provodi se na višoj razini planiranja. Varijantna rješenja u postupku strateške procjene su obvezna dok ih u procjeni zahvata nije moguće odgovarajuće analizirati jer je sam zahvat već donekle određen. Također, pitanje kumulativnih utjecaja nije moguće analizirati postupkom procjene pojedinog zahvata već isključivo postupkom strateške procjene plana ili programa.
Izrada strateške studije jednim dijelom je bila prilagođena kratkom upravljačkom razdoblju za koje se priprema dokument. Izrada strateške studije započela je nakon što je pripremljen Nacrt prijedloga Plana, ali tijekom provedbe postupka provedbe strateške

procjene provodilo se usklađivanje dokumenata. Ocjena utjecaja provedbe prijedloga Plana obrađena je strateškom studijom i temeljila se na načelu ekspertne procjene. Strateškom studijom predložene su mjere zaštite okoliša koje su navedene u Tablici 1.

Tablica 1. Prikaz mjera sprječavanja utjecaja na okoliš (Dvokut Ecro, 2012)

Tema/ sastavnica okoliša	**Strateški/opći ciljevi**	**Konkretni ciljevi**
Biološka raznolikost	Spriječiti narušavanje biološke raznolikosti	- dovršiti planove upravljanja zaštićenim područjima i provoditi mjere zaštite voda propisane tim planovima - definirati uvjete i uskladiti ih sa sektorskim planovima očuvanja staništa i vrsta u odgovarajućim zaštićenim područjima
Stanovništvo	Doprinijeti održivom razvoju	- naći rješenja za uključivanje u sustav javne vodoopskrbe postojećih sustava koji koriste vodu u količini većoj od 10 m^3/dan - izgraditi preostale planirane sustave javne vodoopskrbe i proširiti obuhvat postojećih
Zdravlje	Smanjiti rizike za ljudsko zdravlje	- staviti pod aktivnu zaštitu (sanacija) sva izvorišta vode za piće kapaciteta većeg od 10 l/s - na svim zonama sanitarne zaštite započeti s primjenom pasivnih mjera zaštite - staviti pod sustav registriranja i izvješćivanja o stanju zaštite za sva javna kupališta - uspostaviti planove nižeg reda mjera prevencije utjecaja incidentnih onečišćenja
Tlo	Izbjeći oštećenje funkcije i kakvoće tla	- uspostaviti sustav namjenskog korištenja naknada za zaštitu voda za proizvode koji se koriste u poljoprivredi za poticanje dobre polj. prakse - organizirati pripremu primjene dobre polj. prakse u smislu zamjene umjetnih sa stajskim gnojivima - korištenje obrađenog mulja s uređaja za pročišćavanje u poljoprivredi organizirati kontrolirano i selektivno - uvesti sustavno praćenje kakvoće polj. tala - operacionalizirati sustav kontrole štetnih kemikalija koje se koriste u biljnoj proizvodnji
Vode i more	Spriječiti narušavanje stanja vodnih tijela u odnosu na količinu i kakvoću	- ograničiti izdavanje novih prava na korištenje voda ovisno o količinama zahvaćene vode i o uvjetima i načinu njihovog korištenja - uvesti kontrolu i sprječavati onečišćenja industrijskim otpadnim vodama - uvesti cjeloviti nadzor u prometu opasnim tvarima - uspostaviti organiziranu prevenciju incidentnih onečišćenja

Tema/ sastavnica okoliša	Strateški/opći ciljevi	Konkretni ciljevi
Materijalna dobra	Poboljšati infrastrukturu radi zaštite zdravlja i ekološkog stanja	- uskladiti strategiju gospodarenja otpadom i akcijske planove

Cjelovitost i stručnu utemeljenost strateške studije u odnosu na njen utvrđeni sadržaj i prijedlog Plana ocjenjivalo je Povjerenstvo kojeg je imenovalo nadležno tijelo. Postupak strateške procjene pripremljen je za provedbu nakon što je izrađena strateška studija. Povjerenstvo je nakon postupka ocjene strateške studije donijelo mišljenje kojim se predlažu mjere zaštite okoliša i program praćenja stanja okoliša.
Ključne primjedbe Ministarstva zaštite okoliša i prirode čiji član je sudjelovao u radu Povjerenstva, u bitnom, su se odnosile na prekogranični postupak. Temeljem Zakona o zaštiti okoliša i Uredbe o strateškoj procjeni utjecaja plana i programa na okoliš ocjenjeno je da bi provedba Plana mogla značajno utjecati na okoliš i zdravlje ljudi susjednih država (Slovenija, Mađarska, Bosna i Hercegovina, Srbija, Crna Gora, Italija), te je s tim u vezi predloženo da se Ministarstvu zaštite okoliša i prirode dostavi cjelokupna dokumentacija radi daljnjeg postupka. Također, primjedbe su se odnosile i na odnos Plana prema drugim planovima i programima.
Važno je istaknuti da prijedlogom Plana nisu posebno analizirana varijantna rješenja s obrazloženjem da su većina projekata koji su njime predloženi planirani dokumentima prostornog uređenja, uz napomenu da je izrada strateške studije bila prilagođena kratkom upravljačkom razdoblju.
Sukladno odredbama Protokola o strateškoj procjeni okoliša uz Konvenciju o procjeni utjecaja na okoliš preko državnih granica („Narodne novine“ – MU, broj 7/09), Zakona o zaštiti okoliša i Uredbe o strateškoj procjeni utjecaja plana i programa na okoliš, Ministarstvo zaštite okoliša i prirode dostavilo je nadležnim tijelima susjednih država informaciju o provedbi postupka strateške procjene, te ih je pozvalo da se očituju o namjeri sudjelovanja u prekograničnom postupku, a sve u cilju utvrđivanja mogućeg značajnog prekograničnog utjecaja provedbe Plana. Prekogranični postupak odnosno tehničke konzultacije provedene su u skladu s propisanim odredbama.
Koordinacija zajedničkog prekograničnog postupka bila je otežana zbog razlike u postupcima pojedinih susjednih država.

Integracija pitanja zaštite okoliša u Plan upravljanja vodnim područjima

Plan upravljanja vodnim područjima usklađen je s ključnim provedbenim dokumentima iz područja zaštite okoliša i upravljanja vodama. Za oba vodna područja prijedloga Plana izrađeni su karakterizacijski izvještaji u kojima se provela analiza značajki vodnih područja, pregled utjecaja ljudskih aktivnosti na stanje voda, te ekonomska analiza korištenja voda. Na temelju toga provedeno je izdvajanje vodnih tijela kao osnovnih cjelina za koje se određuju ciljevi i mjere za upravljanje vodama. Karakterizacijom voda obuhvaćene su rijeke sa slivnom površinom iznad 10 km^2, jezera s površinom vodnog lica iznad 0,5 km^2, prijelazne i priobalne vode mora, te vodonosnici iz kojih je moguće zahvatiti u prosjeku više od 10 m^3 na dan ili opskrbiti više od 50 ljudi, odnosno koji u značajnoj mjeri utječu na neki površinski ekosustav. Prilikom karakterizacije voda uzeta su u obzir zaštićena područja uspostavljena prema odredbama Zakona o vodama (NN, br. 153/09, 63/11, 130/11, 56/13) u svrhu posebne zaštite površinskih, uključujući i

prijelazne, priobalne i vode teritorijalnog mora te podzemnih voda i jedinstvenih i vrijednih ekosustava koji ovise o vodama.
Program mjera odnosno prijedlog aktivnosti koje je potrebno provesti do kraja 2015. godine, obuhvaća osnovne mjere, dodatne mjere i dopunske mjere, te objedinjuje obveze iz brojnih okolišnih direktiva Europske unije. Prema prijedlogu Plana osnovne mjere su:

- povrat troškova vodnih usluga i poticanje učinkovitog korištenja voda
- zaštita voda za piće
- kontrola zahvaćanja voda
- kontrola i smanjivanje onečišćenja voda iz točkastih izvora
- kontrola i smanjivanje onečišćenja voda iz raspršenih izvora
- kontrola i smanjenje hidromorfološkog opterećenja voda
- kontrola direktnog ispuštanja u podzemne vode
- kontrola i smanjenje kemijskog onečišćenja voda
- prevencija i smanjenje utjecaja incidentnih onečišćenja
- provedba procjene utjecaja na okoliš
- dodatne mjere vezane uz zaštićena područja

Dopunske mjere uključuju smanjenje hidromorfoloških opterećenja zbog mjera za zaštitu od poplava, te zaštitu morskog okoliša.
Najznačajnije mjere izgradnje, obnove i sanacije koje su predviđene za provedbu do kraja 2015. godine su sljedeće:

- kontrola zahvaćanja voda za piće (osnovna mjera): mjere zaštite vode za piće u sektoru javne vodoopskrbe kroz provedbu aktivnih mjera zaštite (sanacijskih mjera) na zonama zaštite vodocrpilišta većih od 10 l/s koja opskrbljuju >5.000 stanovnika te kroz provedbu proširenja postojećih sustava, pri čemu su nadležne jedinice lokalne i regionalne samouprave,
- kontrola zahvaćanja voda (osnovna mjera): smanjenje zahvaćanja količina vode po potrebi kroz uvođenje tehnologija za racionalnu potrošnju vode i smanjivanje gubitaka na sustavima javne vodoopskrbe, pri čemu su ove mjere u nadležnosti korisnika voda,
- kontrola i smanjivanje onečišćenja iz točkastih izvora uključivo mjere smanjivanja onečišćenja prioritetnim tvarima (osnovna mjera): smanjivanje onečišćenja u otpadnim vodama izgradnjom sustava odvodnje i uređaja za pročišćavanje komunalnih i industrijskih otpadnih voda, sve u nadležnosti korisnika voda.

Zaključak

Postupak strateške procjene za prijedlog Plana proveden je u skladu s odredbama SEA Direktive čije odredbe su prenesene u zakonodavstvo Republike Hrvatske. Usprkos tome da je postupak strateške procjene u Republici Hrvatskoj u začetku, možemo zaključiti da je Ministarstvo regionalnog razvoja, šumarstva i vodnoga gospodarstva, kao nadležno tijelo, provelo i koordiniralo postupak izrazito stručno i kvalitetno.
Određivanje sadržaja strateške studije ključni je dio postupka u kojem se prepoznaju najvažnija pitanja koja je potrebno obraditi u dokumentaciji s ciljem utvrđivanja značajnih utjecaja koji se mogu očekivati provedbom plana ili programa. Kako je navedeno u ovom radu, u postupku određivanja sadržaja sudjelovala su tijela nadležna za pojedine sastavnice okoliša, jedinice regionalne samouprave te javnost. Važno je naglasiti da javnost sudjeluje u postupku određivanja sadržaja strateške studije što nije propisano odredbama SEA Direktive odnosno u zakonodavstvu RH postupak je u tom dijelu unaprijeđen. Ocijenjeno je da javnost treba sudjelovati i u postupku određivanja sadržaja kako bi se u najranijoj fazi raspravila određena pitanja bitna za postupak

strateške procjene. Uključivanje javnosti u ranoj fazi postupka doprinosi kvaliteti izrade strateške studije kao i cijelog postupka strateške procjene.
Odredbama SEA Direktive propisano je da države članice trebaju osigurati izradu strateške studije, kao i ocjenu njene kvalitete putem tijela nadležnih za zaštitu okoliša. Iako kvalitetu strateške studije u zakonodavstvu Republike Hrvatske provode tijela nadležna za pojedine sastavnice okoliša, propisan je i instrument Povjerenstva, kao nezavisnog stručnog tijela, prema modelu preuzetom iz postupka procjene utjecaja na okoliš. Ovakav pristup potrebno je svakako zadržati, te ga unaprjeđivati kako bi se osigurala što kvalitetnija izrada strateške studije i učinkovitost cijelog postupka.
Kao što je navedeno u ovom radu, strateška procjena provodi se na višoj razini planiranja i uključuje varijantna rješenja koja u procjeni pojedinačnog zahvata nije moguće analizirati na odgovarajući način. Važno je istaknuti da u ovom postupku strateške procjene nisu posebno analizirana varijantna rješenja s obrazloženjem da je većina projekata koji su predloženi Planom planirani dokumentima prostornog uređenja, uz napomenu da je izrada strateške studije bila prilagođena kratkom upravljačkom razdoblju samog Plana.
Za sljedeće programsko razdoblje preporuča se analiza varijantnih rješenja kako bi se u što ranijoj fazi provela njihova ocjena u odnosu na pojedine sastavnice okoliša, te predložila ona koja je najprihvatljivija za okoliš uz primjeru mjera zaštite okoliša i programa praćenja.
U odnosu na analizu provedenog postupka prekogranične strateške procjene, utvrđena je djelomična neusklađenost propisanih postupaka u pojedinim susjednim državama, te bi za daljnje postupke trebalo svakako osigurati njihovo ujednačavanje putem bilateralnih ugovora.
Također, prema postojećoj regulativi susjedne države se informiraju o provođenju postupka tijekom rada Povjerenstva, prije upućivanja dokumentacije na javnu raspravu. Preporuča se izmjena regulative na način da se susjedne države informiraju u što ranijoj fazi (npr. određivanje sadržaja strateške studije) s ciljem što kvalitetnije i stručnije provedbe postupka prekogranične strateške procjene.

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The use of Strategic Environmental Assessment in Transport Masterplanning

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Abstract

In recent years Witteveen+Bos was involved in the development of Transport Masterplans for Serbia (nationwide) and Latvia (regional plan for Riga and Pieriga). In both cases it was decided that a Strategic Environmental Assessment (SEA) in line with EU and national regulations should be carried out. It appeared not straightforward to perform a SEA for Transport Masterplans, as a SEA is more on the evaluation of fully fledged alternatives, whereas in Transport Masterplans a bundle of individual projects is considered, some of which is already decided upon. Furthermore, national regulations do acknowledge the use of SEA, but tend to follow the procedures for Environmental Impact Assessments (EIAs), which are in general more strict as they are related to environmental permitting.

An approach was made that could be adapted for both Master Plans. The key element of this was to include the cost of environmental impacts into the Cost Benefit Analysis for the Master Plan. Furthermore, project fiches were made to facilitate the further environmental evaluation of the individual transport development projects, to be performed in the EIA stage of the projects. During workshops with stakeholders it was concluded that this approach was well-accepted as being fit for purpose.

Key words: Strategic Environmental Assessment, Infrastructure, Transport Masterplanning, Traffic Impacts

Introduction

The development of infrastructure can have severe environmental impacts (e.g. construction of new roads). Furthermore, different alternatives will have different environmental impacts, both on a local and on a global scale. Including environmental issues in the decision making is an important step towards sustainable development of infrastructure.

Within the framework of environmental assessments, the preparation of a Strategic Environmental Assessment (SEA) is considered to be an appropriate instrument in the MP Planning phase. In the SEA not necessarily all environmental aspects have to be analysed in detail. Only those aspects that have different effects on the environment regarded to the proposed plan and the alternative plans are relevant. The scoping of the themes for the SEA is related to the scale of the Masterplan: The themes relevant to the choices to be made on the scale of the Masterplan have to be dealt with in the SEA. In a later stage, a more detailed assessment of environmental impacts and alternatives for individual projects from the Masterplan (e.g. the development of a specific highway)

will take place within the framework of the Environmental Impact Assessment (EIA) for that project (see Picture 1).

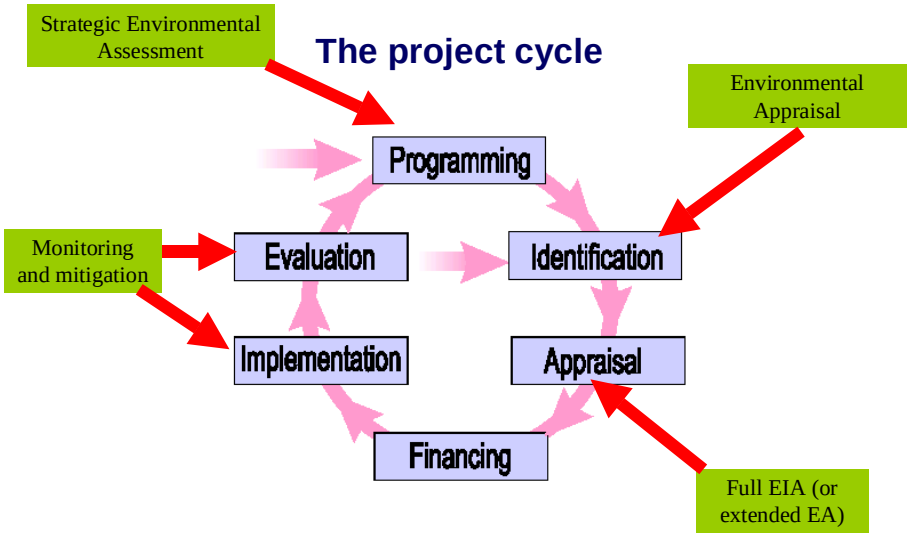

Figure 1 Typical environmental activities in the lifecycle of projects

The SEA should provide the competent authority with sufficient information at a strategic level to assess the implications of the projects with regard to the environment, which can be integrated in the considerations to be be made for the development of the final Transport Masterplan.

The SEA refers to the Transport Masterplan of a region or country, which is the basic strategic development document. It defines the basic decisions and goals of spatial development, achievement of a more rational space organisation and management, by the harmonisation of its use with the potentials and limitations of the available natural and man-made values, and with the needs of long-term social and economic development. The Transport Masterplan defines the plan principles and criteria of environmental protection, as the basis of the utilisation and protection of natural and man-made resources.

Outlines of the General Masterplan for Transport in Serbia

The General Master Plan for Transport in Serbia (GMTS) intends to contribute to expanded, improved and safer transport networks in Serbia, which will attract new investments to the poorer regions, improve the quality of regional life, promote trade and contribute to the improvement of relations with neighbouring countries [ref. 1]. The GMTS focuses on various modalities:

- Rail: 20 projects on rehabilitation of Corridor X lines to design speed, upgrading Corridor X lines, Doubling Corridor X lines, rehabilitation of regional lines, new lines, ERMTS
- Roads: 13 preliminary road development projects and rehabilitation and reconstruction of main and regional network
- Inland Water Transport: 63 developments projects for the Danube river, Sava river, Tisa river and the DTD canals
- Aviation: 16 projects for developments at airports in Belgrade and Niš
- Intermodality: development of an intermodal port in the Belgrade area

For each modality, all potential development projects within the framework of the GMTS are developed. Some examples are given in Picture 2.

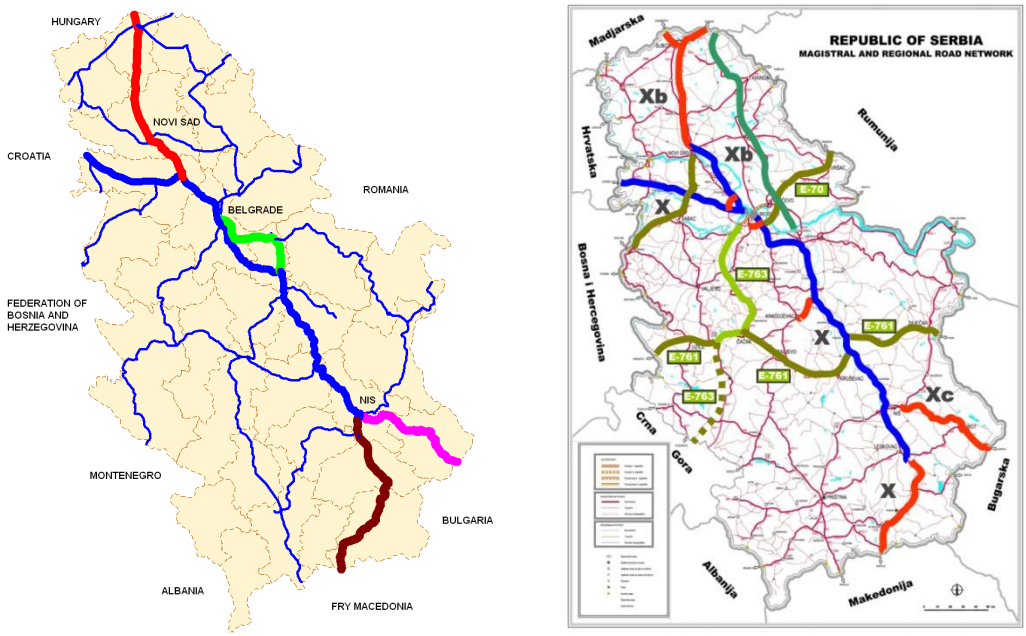

Figure 2 Doubling of Corridor X rail lines (left) and Road preliminary development projects (Right)

Outlines of the Riga and Pieriga Mobility Plan (Latvia)

The Riga and Pieriga Mobility Plan (RPMP) is meant to create an overall framework in which all existing and new plans for construction and improvement of the traffic and transport system in Riga and Pieriga (Latvia) are evaluated and prioritised [ref. 2]. Professional expertise and ideas of the consultant team were combined with existing plans and information in the development. The plan provides solutions for the traffic and transport problems which the Ministry of Transport of Latvia is facing, contributing to spatial, ecological, economical, social and institutional optimization.

Three realistic variants have been distinguished based on the main road and street hierarchy. In Variant A and Variant B the road and street system is complemented with a new river crossing to the north of Vansu Bridge. Analysis has shown that there is a very large demand for such a connection and that such a connection is necessary to be able to reduce the amount of traffic in the Riga city centre. Also, it is regarded as imperative for making a new step in improving the transport system, since possibilities for further optimisation of the existing network are limited without a new crossing.

Variant A foresees a sparser main network, with clear hierarchy and high capacities and speeds. Variant B foresees a denser main network, with more possible routes, but less capacity per route. Variant C does not include any new river crossing. This variant focuses on better use of the Southern bridge and improvements with traffic management on the main routes in the road and street hierarchy. The main differences between the variants lays in the division between road developments and public transport. An example is given in Picture 3.

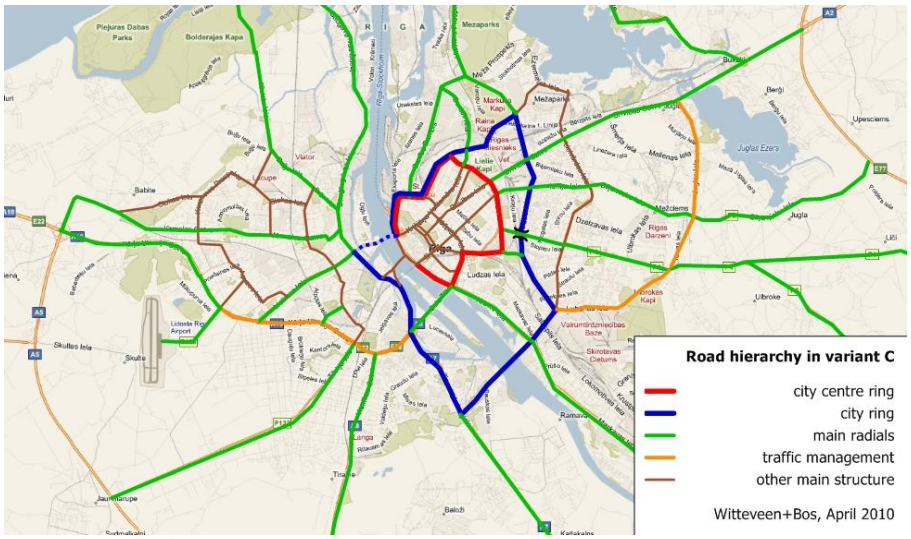

Figure 3 Road hierarchy in variant C

SEA Scoping for Transport Masterplans

Both projects started with Scoping sessions as first step in the SEA studies. It was concluded that only project developments related to roads, trains and Public Transport might have significant impacts. As an exemple, the overview for the project in Latvia is given in table 1. The situation in Serbia is very similar to this.

Table 1. Potential impacts on the environment from the Latvian Transport Masterplan

aspect	impact	road	railway	PT
air/climate	pollution	√√	0	√
	noise	√√	√	√
	temperature changing	√√	0	0
landscape aesthetic	location of the infrastructure	√√	√	√
	vegetation changing	√√/+	0	0
	terrain changing	√√	0	0
soil	pollution	√√	√	√
	polluted deposition	√√	√	√
	compression/sealing	√√	0	0
water	pollution	√	0	0
	losing water bodies	√	√	√
	changing the content of atmospheric water	√	0	0
flora and fauna	loss and damage species	√√/+	0	0
	pollution pressure	√√	√	√
	ecological corridor interruption	√√	√	√
	occupied habitat	√√	√	√
biotope and biodiversity	vanishing	√√/+	√	√
	damaging	√√/+	0	0
agriculture	decreasing potential	√√	√	√
forestry		√√	√	√
water management		√√	0	0
recreation and tourism		√√/+	0	0

aspect	impact	road	railway	PT
landscape and nature protection		√√	√	√

√√/√: substantial negative impact; √: negative impact; 0: negligible impact; +: Positive impact

Strategy for the SEA

For the Masterplans within the framework of this abstract, it should be realised that the methodology for the SEA needed to be customised for the specific circumstances:

- In Serbia there were no alternatives to be evaluated against each other. For each transport mode (roads, trains, Public Transport, intermodal projects), a longlist of projects was developed, some of them already approved or under construction.
- In Latvia there were three variants, with a focus on different aspects of the transport system. Yet, here also a longlist of projects was developed, with quite some projects that would be constructed in all variants.

The strategy that was developed for the SEA was to include the costs for environmental issues into the Cost Benefit Analysis for the Masterplanning. By allocating budget for environmental investments related to the infrastructure development, it can be assured that the environment will be probably addressed. The exact (amount of) measures strongly depend on the (more) detailed design of the individual projects, which will take place in a later stage, when also the EIA procedures are carried out. It should be emphasised that the purpose of the EIA procedures should be to identify full alternatives (including the environmentally friendliest option) per project.

Furthermore, for each project development with a significant environmental impact, project fiches were prepared containing relevant environmental information. These function as starting point for the detailed development of the envisaged projects (including EIA studies), and the need for mitigation (besides mitigation measures that are mandatory).

Strategy to include air pollution into the CBA Model

Air pollution can be considered as the main responsible of environment damage due to transport activities. Various research programmes funded by EU allow elaborating both unit values and emissions for the following set of air pollutants:

- CO2 Carbon Dioxide (greenhouse gas)
- CO Carbon Monoxide
- NOx Nitrogen Oxides (sum of NO and of NO2)
- SOx Sulphur Oxides
- CH4 Methane
- VOC Volatile Organic Compounds
- PM Particulate Matter (PM2.5/ PM10)

The unit values (EUR/Ton) of all these pollutants are derived from EU research programmes HEATCO (2006), ExternE (External Costs of Transport in ExternE, 2005), CAFE CBA (2005), VOLY, TREMOVE (2006) and summarised in IMPACT 1 [ref. 3]. Unit values have been elaborated considering the impacts on health (morbidity and mortality), crops and materials are estimated by applying the exposure-response relationships. These functions relate an increase in pollutant concentration level (exposure) to an anticipated damage or negative effect (response) on a particular

receptor, meaning anything which is affected adversely or positively by an increase in air pollution [ref. 4].

The Handbook reports the estimated values for 27 EU countries for NO_x, SO_x, VOC and $PM_{2.5}/PM_{10}$ per ton of exhaust. Two average values have been elaborated weighting the country values with both population and Gross Domestic Product (GDP). A final average is then calculated averaging the above two averages. All values are in Euro on price level 2000.

The values of pollutants causing global warming have been calculated using the methodology illustrated in the handbook:
- for CO_2 the estimates of this value [ref. 3] increase from 25 to 55 $Euro_{2000}$/ton
- the CH_4 and CO emissions are transformed in CO_2 equivalent greenhouse gas emissions, using the suggested GWP (Global Warming Potential), which was 23 in 2007 for CH_4 and 5 for CO [ref. 3]

Similar approaches were developed for other environmental issues with a significant impact.

Project fiches

For each project development with a significant environmental impact, project fiches were prepared containing relevant environmental information that can be used for the further development of the project. An example for a road project in Serbia is given in Table 2.

Table 2. Project fiche road project Serbia

Project name	**E-75 Kelebijka - E-75 (motorway)**	
Sector	**Roads**	
Screening		**Motivation**
Annex I or II?	Annex I	- construction of motorways and express roads - construction of a new road of four or more lanes, or realignment and/or widening of an existing road of two lanes or less so as to provide four or more lanes, where such new road, or realigned and/or widened section of road would be 10 km or more in a continuous length
Environmental impacts		**Motivation**
Flora	negative	- Loss of species, specially endemics and relicts - Habitat degradation - Ecological corridors disturbance
Fauna	negative	- Loss of species, specially endemics and relicts - Decreasing of fauna migration - Devastation of underground and ground habitat - Ecological corridors disturbance
Air pollution and climate change	positive/negative	- Emissions of pollutants and greenhouse gases - By rerouting traffic, air quality in some (urban) areas will improve

Project name	**E-75 Kelebijka - E-75 (motorway)**	
Sector	**Roads**	
Noise pollution	negative/positive	- Increase of noise levels nearby the new road - By rerouting traffic, noise situation in some (urban) areas will improve
Water pollution	negative	- Pollution of underground and surface watercourses
Soil pollution	negative	- Degradation of quality of arable land - Erosion and contamination - Soil sealing
Waste production	negative	- Disposal of construction earth and rubble - Recovery and recycling of metals from scrapped vehicles and disposal of non-recoverable materials
Incident risk	negative	- Risks caused by transport of dangerous goods or hazardous waste
Influence on nearby		- Motivation
urban areas	YES	- According to Corina land cover
Ramsar sites	NO	
Natura 2000 sites	YES	- According to Corina land cover
national parks	NO	
nature parks	NO	
cultural heritage	NO	

Comparison of alternatives RPMP

Although both projects did not discern fully developed alternatives, for the RPMP (Latvia) three tentative variants were developed. The financial consequences of the environmental impacts were compared with each other, based on the input developed for the CBA Model. The results are given in table 3.

Table 3. Comparison of project variants Latvia

parameter	**Variant A**	**Variant B**	**Variant C**	**Unit**
CO_2	- 4,381	-1,758	-918	ton/year
CO	-136	-74	-57	ton/year
NO_x	-24	-7	0	ton/year
SO_2	-2	-1	0	ton/year
Volatile Organic Hydrocarbons (including benzene)	-28	-15	-11	ton/year
PM	-5	-2	-1	ton/year
costs/benefits for air pollution #	0.3	0.3	0.3	MEuro
costs/benefits for noise pollution #	- 0.4	-0.4	0.0	MEuro
costs/benefits for climate change #	0.1	0.0	-0.2	MEuro

 # negative figures are costs, positive figures benefits

The results of this analysis served as input for the multi criteria analysis that was developed for the selection of the preferred variant.

Evaluation

Transport Masterplans cover many individual projects, each with a different level of environmental impact. In the studied projects, the largest (negative) impacts are expected to come from the development of new roads. These can be flagged as annex I of the EIA Directive as well as national regulations, which means that a full EIA is needed. The impacts of rail or other Public Transport projects will in general be much less than those of road projects. These are either annex II (hence it should be decided at national level if an EIA is needed or not) or not subject to an EIA procedure according to the EIA Directive.

In planning and design of infrastructure and in the elaboration of the EIA reports for the individual projects, the following should be taken into account:

- The main approach in the design of transport infrastructure should be based on the legal regulations in the country and the EU, addressing nature and environment protection
- The concrete protection and prevention measures should be applied during the plan realisation
- Road layout should be adapted to topographical conditions, taking into account the border edges, margins, i.e. the delineation in the landscape, in order to preserve the landscape character
- New infrastructure should avoid to a maximum degree protected areas, areas of outstanding importance for biodiversity conservation, ecological important habitats and rare fragile ecosystems

The works must be executed in line with local, national and international regulations, focussing on minimising the environmental impacts of the activities. If not covered already in the scope of work, as many mitigation measures should be taken into account as reasonably feasible, in order to achieve an approach as close as possible to the environmentally friendliest alternative.

A budget reservation should be made for measures that are not deemed necessary beforehand, but might become required during constructions or operation to avoid exceedance of threshold values. Conclusions on the latter should be made on the results of proper environmental monitoring activities.

Conclusions

There is no straightforward solution for the execution of the SEA studies for Transport Masterplanning, if there are no fully fledged alternatives to be compared. Nonetheless it is important that environmental considerations are sufficiently implemented in the decision making.

Authors have developed a strategy that was used in two more or less similar projects. The core activity was to determine the costs that are related to the environmental impacts and to incorporate these in the Cost Benefit Analysis of the project, thus making them part of the financial evaluation of the feasibility of the project.

Furthermore, an analysis is made of the key elements per individual project. This information serves as basis for the Environmental Impact Assessments for these projects, in which alternatives per individual project should be further detailed and analysed.

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Strategic Environmental Assessment for institutional decision making: a case-study from the Walloon Region, Belgium

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Abstract

Although the environmental impact assessment of projects at a local level is now rooted in the practices by most countries worldwide, the evaluation of the global impact and potential alternatives of a whole program is yet to be adopted as common practice. European experience has notably confirmed that the contribution of SEAs has improved the organization and structure of the whole planning practice. Hereinafter, is presented a good case study in this matter : the SEA conducted for the Walloon program, namely the "Seine-Scheldt inland waterways and connections in the Walloon region" in Belgium.

Key words: Strategic environmental assessment, institutional programs, multi-criteria analysis

Introduction

The constantly growing interest in developing inland waterways as an alternative to road transportation for economic and environmental reasons often leads to institutional programs defining a coherent strategy for a whole territory. These programs are then implemented through local projects, which contribute together to the overall strategic objective.

Although the assessment of the environmental impact of projects at a local level is now rooted in the practices by most countries worldwide, the evaluation of the global impact and potential alternatives of a whole program is yet to be adopted as common practice. Following that need, the European Union requires, through the European Directive 2001/42/EC, also called 'Strategic Environmental Assessment' (SEA) – Directive', that specific public programs undergo an assessment of their effect on the environment prior to their adoption.

Theoretically, the SEA entails the integration of environmental considerations in planning and programming procedures and decisions. It is in fact an "up-stream" process that allows identifying optimal options at an early planning stage when modifications can still be considered and integrated. Moreover, as an iterative process the SEA allows a progressive amendment of concerned programs. The SEA can as such be considered as a decision support tool to increase the global awareness of all involved parties.

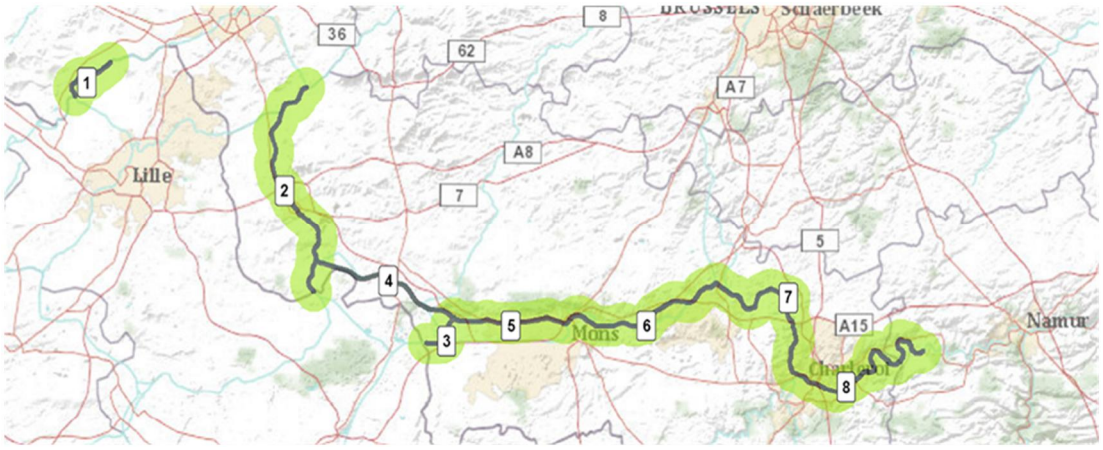
European experience has notably confirmed that the contribution of SEAs has improved the organization and structure of the whole planning practice through 1) transparency and improved communication, 2) global impact and costs control, and 3) improved compliance.

The consultation phase has increased the transparency of planning procedures, which in turn have increased their efficiency by easing the collaboration between involved parties and authorities. SEAs have up front demonstrated the worthlessness of some expensive theoretical mitigation measures that could then be avoided. The SEA contribution has been demonstrated to improve compliance with the requirements of the specific environmental policy concerned.

Seine-Scheldt inland waterways and connections in the Walloon region

Initial Program

The SEA conducted in 2011-2012 for the Walloon program, called "Seine-Scheldt inland waterways and connections in the Walloon region" in Belgium, is a good case study. This program is part of the European Seine-Scheldt global project, which will provide a large capacity transport axis between the Parisian region, the Seine estuary, Northern France, Belgium and the Netherlands. It will connect a high density of activities, areas and maritime ports.
This Walloon program itself, is defined as the participation of the Walloon region in the development of European inland waterway transport. It identifies the works to be undertaken by the Walloon region on its territory. Three main axes are concerned: the Lys River, the Upper Scheldt and the eastern axis of the Seine-Scheldt, also known as the "Walloon backbone".
The Lys River axis is the one directly concerned by the main European North-South navigation axis. The size selected for the waterway is Class Vb of the ECMT classification. In this case, it concerns convoys of two barges (1x2), of maximum 185 meters x 11.40 meters x 3.50 meters draught, corresponding to a load of 4,400 to 4,500 tons for an air draft of 5.25 m under bridges.



1. The Lys River
2. The Upper –Scheldt River
3. The Pommeroeul-Condé Channel
4. The Nimy-Blaton-Péronnes Channel (1)
5. The Nimy-Blaton-Péronnes Channel (2)
6. The Center Channel
7. The Charleroi-Bruxelles Channel
8. The Sambre River

Figure 1. Governmental program: initial intervention axis

Furthermore, the program also foresees (1) to greatly improve the Walloon network connection to the North-South large capacity transport axis, (2) to strengthen trans-European inland waterway network, (3) to increase the market potential of the new corridor by extending its reach to all quarry and industrial areas of Wallonia.
In this context, the Walloon Region has undertaken to improve the Upper Scheldt axis and the "backbone Walloon" eastern axis. The later being composed of the Nimy-

Blaton-Peronnes channel, the Center channel, the Charleroi-Brussels channel and the Sambre River, with the Pommeroeul-Condé channel (free of sediments) as the main access point of the eastern network.
The goal is to bring all of these connections to a Va class of the ECMT classification. In this case, given the accepted drags, it allows self-propelled ships or convoys of maximum 110 meters long x 11.40 meters wide, with an authorized strength of 2.50 m air draft. Given a clearance under bridges of 5.25 m, it corresponds to about 2,000 tons of cargo. These types of houseboats are usually referred to as "Great Rhenish".

Alternative solutions

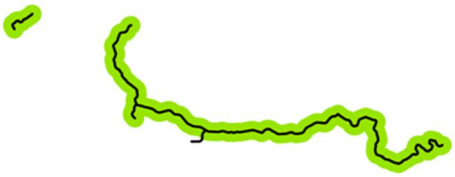
Different strategic alternatives to the program were defined by the Walloon authorities under the Strategic Environmental Assessment (SEA). The latter allowing for evaluation and comparison in order to inform on the best option.
Among the various defined alternatives, some of them were excluded because they were technically and/or financially unsuitable. It was admitted that any alternative that would involve a fundamental changes in a large number of structures (locks, bridges, banks, etc.), or the construction of a new waterway of significant length, was considered to be unfeasible.
The alternatives to the program relate to macroscopic changes in the program, on either (1) changing assumptions of the program (eg, the non-realization of a section upstream or downstream of the project outside of the study area), or either (2) changing the objectives of the program (eg, implementation of a program that allow a higher size of the inland waterways than originally planned).

Alternative zero

No works or modifications

Alternative 1

All works previously mentioned achieved, except the restoration of the Pommeroeul – Conde Channel



Alternative 2

All works previously mentioned achieved, except for the works planned for the Haut – Escaut waterway.

Alternative 3

All works previously mentioned achieved, except for the modifications planned in Comines

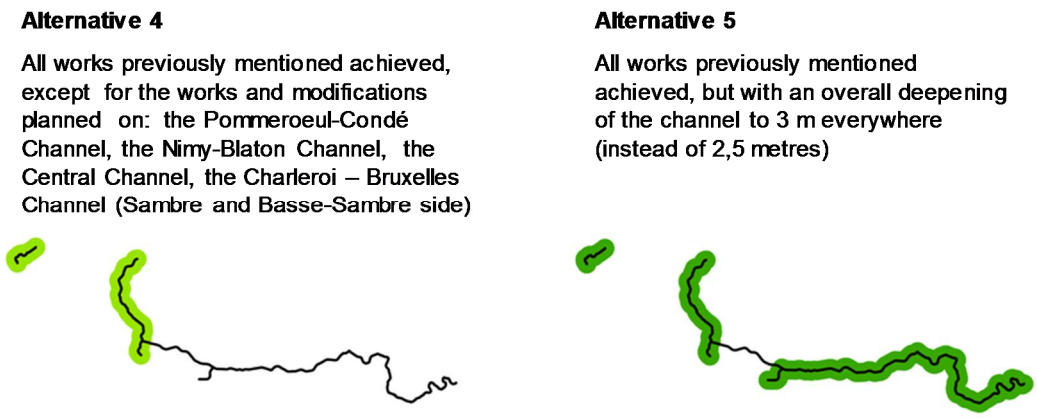


Figure 2. Selected alternative solutions

Analytical Procedure

Assessment at a global stage

The SEA allowed for the identification of five realistic alternatives to the original program (Figure 2). These alternatives were elaborated and assessed, together with the main program, for all relevant environmental aspects. In order to evaluate the environmental effects related to the implementation of the program or its alternatives, the considered territory has been divided into eight sections (Figure 1). For each section, an impact assessment, considering clearly defined site-specific evaluation criteria, was conducted. It resulted in a matrix that was used as a basis for a multi-criteria analysis providing a tool for decision support.
The main criteria used for the MCA were related to relevant environmental aspects such as Soil and Ground water, Surface waters, Fauna and Flora, Landscape, Heritage, Transport and Mobility, Noise and Vibrations, Air quality, Energy and Human health. For each of these environmental aspects a set of relevant sub-criteria was defined.
For each environmental field, an objective assessment was made at a macroscopic and/or at the defined sections scale. The macroscopic scale corresponds to the overall vision of the program whilst the scale of the sections focuses on the specific analysis of a smaller territory.

Assessment unit definition and value determination

For each considered field, evaluation units were specified as much as possible. In some cases, indeed in the context of the study of a strategic and global program, the accuracy of the data, or available data, does not provide an easy quantification. In any case, the determination of the assessment unit must meet the following requirements: cover the whole range of the possible data and be based on objective choices.
The assessment result of each criterion can lead to a quantitative value, or not. In case of a qualitative criterion (that can't lead to a precise quantified value either because the subject does not allow it, or because the available data do not provide a quantified value), the impact of the implementation of alternative solutions, or of the initial program, is evaluated on the basis of a five level classification (common to all the criteria). The latter ranges values of between -2 and +2.
Values are attributed to qualitative observation obtained (-2 being the most negative impact to the environment, +2 being the most positive impact on the environment). The

0 value is assigned to criterion for which the difference between the baseline situation and the projected situation is zero (ie, the environmental impact is the same).

1st segment	Lys	Mobility							
		1. Variation in road usage	2	-1	0	2	-1	2	2
		2. Use of alternative routes	2	-1	2	0	-1	2	0
		3. Use of alternate transport modes	2	-2	2	2	-2	2	2

Figure 3. Section of the quantitative and qualitative matrix scores as a result of the evaluations

Multicriteria analysis (MCA)

To facilitate interpretation of the assessment of potential impacts associated with the implementation of the program and its alternatives at the macroscopic scale, a multi-criteria analysis was performed (AMC). To do this, a special software was used in AMC (D-Sight, developed by laboratories CODE-SMG, ULB), applying the reasoning PROMETHEE-GAIA.
The principle of AMC is to compare several alternatives, based on different evaluation criteria. In this case, the evaluation criteria should be maximized or (in the case of positive impacts) or minimized (in the case of negative impacts on the environment and / or negative impacts associated with costs implementation of the program and its alternatives).
Generally, there is no alternative that optimizes simultaneously all evaluation criteria. Therefore, the MCA will identify, taking into account all evaluation predefined criteria or the alternatives that present an overall positive impact. In addition, the MCA will also evaluate which alternative will be less likely to be affected by changes in the evaluation criteria.
To allow comparison between different criteria, an estimation of the weight of each criterion relative to the other is first realized, a sensitivity analysis is then performed. Two scenarios were considered in this MCA:

Analysis A: weighting designed to give greater weight to the fields of Mobility, Air quality and Energy, which are characterized as having a "global" range. These are therefore more "strategic"; the other environmental fields, with a more "local" range, keep an equal weight between them.

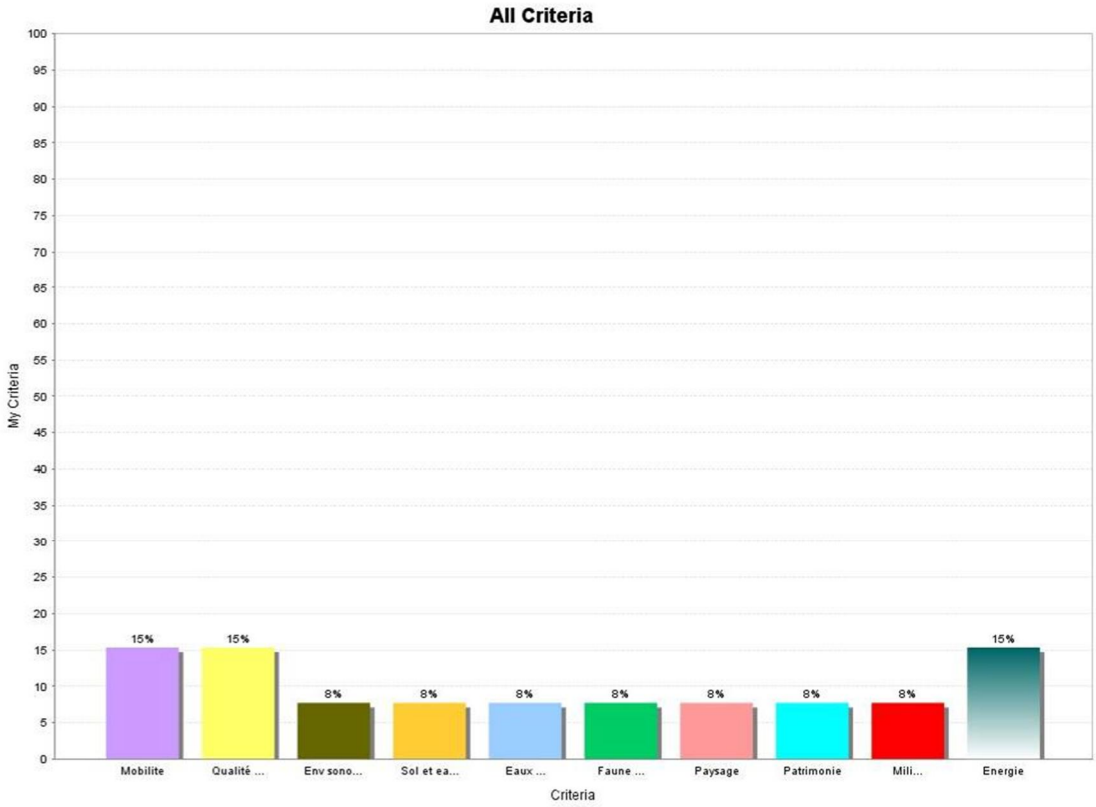


Figure 4. Adopted weighting for the analysis A

Analysis B: an equal weighting across all considered disciplines of the environment.

Results

In addition to the results from the multi-criteria analyzes for each section of the considered waterways network, the results of the MCA produced for the entire study area (an overall evaluation) have proved to be an interesting idea that allows a comprehensive understanding of the different solutions. However, it should be interpreted with caution because of the large scale of the program territory (more than 100 km).

The D-Sight charts presented below provide a comprehensive representation of the global evaluation outputs. They allow to easily view the overall results between the different selected solutions.

The results presented in Figure 5 reflect the different considered weighting (analysis A and analysis B). It is also important to note that these charts (global output and analyzes on a variety of different weights) provide an interpretation of the results, ie the expected trends.

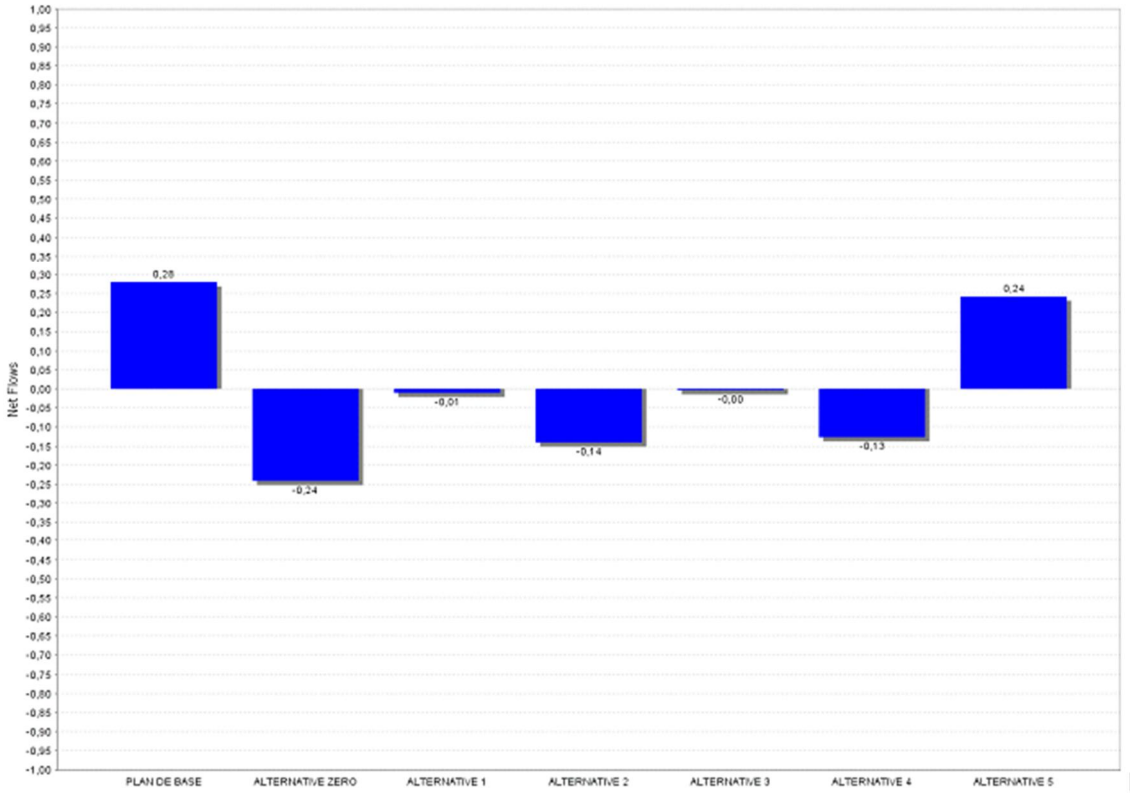
The evaluation showed that for equal weighting between criteria (analysis B), both the initial program and the alternative 5 remain ahead of other studied alternative solutions. Nonetheless it also shows differences in scores between the various solutions are less pronounced, therefore providing a decision support and comparison less marked. Therefore, the analysis showed that giving a greater weight to the disciplines with a more "global" range (analysis A) offer a better tool for decision and correspond more to the actual situation and objectives that the program is designed to achieve.

The weighting which gives a greater score to the criteria with a more "global" and strategic scope (analysis A) shows that amongst all the studied solutions, the alternative 0 (ie the non-realization of the program) would be the worst option (the most negative

overall solution). The implementation of the program or any program alternative is therefore justified.

It also shows that two of the proposed solutions have a positive score: the basic alternative (the initial program) and the alternative 5 (the improved program, allowing a 3 m deep drag, vs 2,5 m).

The two solutions have very similar overall scores, with a small advantage for the implementation of the improved version of the program. A choice between these two solutions should then be based on arguments related to other areas, such as the technical and financial feasibility. Again, we have to keep in mind that this multi-criteria analysis considers mainly broad environmental aspects. The socio-economic objectives that the program are designed to reach are therefore not, or nearly not, taken into consideration in that kind of study.



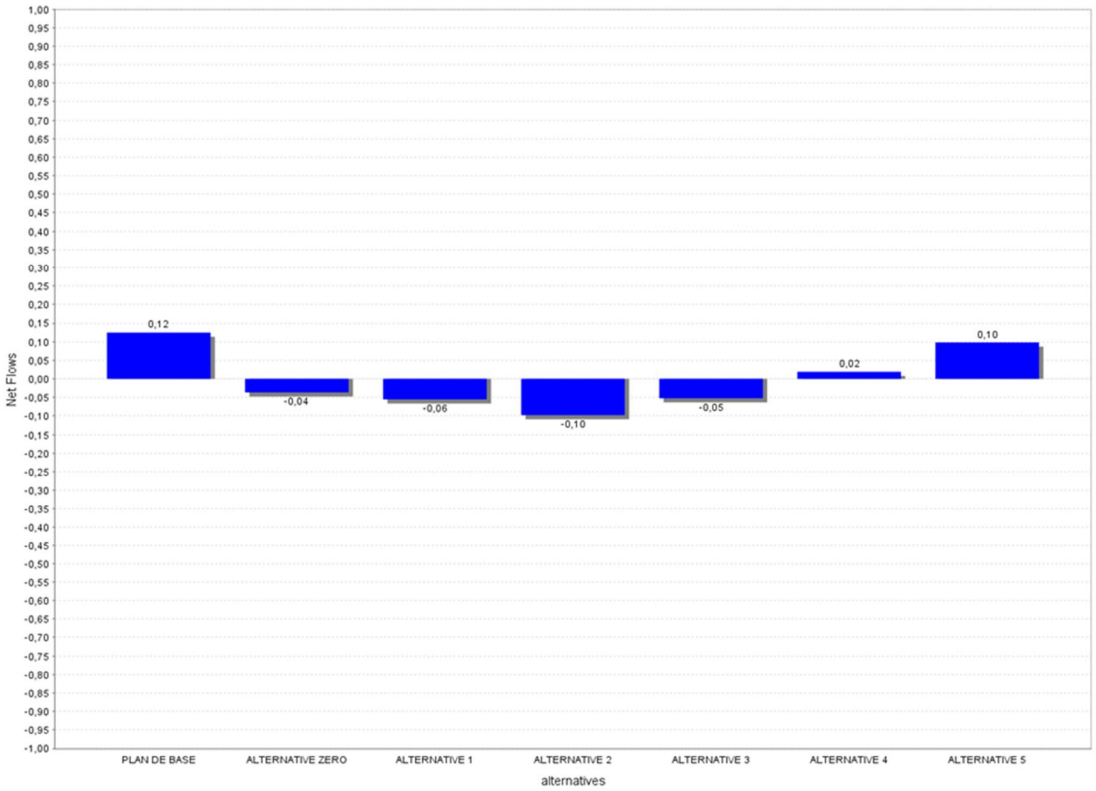


Figure 5. Overall outputs of the MCA – D-Sight software

Conclusion

The SEA therefore (1) proved the need to implement the originally defined program, (2) identified another very valuable alternative further developing the program through greater economic benefits, (3) identified black points and sensibilities of the program and its territory, at an early stage of the procedure, and (4) identified and described the mitigating measures to be taken as a priority.
In the specific context of the Walloon program, the SEA proved to be a major advantage for environmental protection and decision making. Occurring at an early stage of the planning procedure, the SEA allowed to disseminate its conclusions into the next steps of environmental protection (e.g. EIAs), and promoted support and acceptance by all actors of the territory.

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Strategic Environmental Transboundary Assessment between Slovenia and Croatia of Slovenian National Plans for Hydropower Use in Brezice and Mokrice on Lower Sava

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Abstract

On the basis of the SEA Protocol and the SEA Directive, the transboundary procedure for two National Spatial Plans for hydropower plants, in Brežice and Mokrice, was finalised between Slovenia and Croatia and then assessed according to the best practice recommendation. The process was managed via points of contact/focal points for the purpose of the Espoo Convention.
The article presents the two processes as positive experiences in the region. First, the notification with information on the proposed plan and possible transboundary effects, the nature of the decision, and the indication of time for response were sent and responses received in the proposed timeframe. The SEA report was presented for comments. Two environmental commissions were established and consulted on the following: the state of the environment, sediment, cumulative effects, erosion and underground water, possible alternatives, including a no-action alternative, and possible measures to mitigate significant adverse transboundary impacts. In the case of Mokrice, an appropriate assessment in line with Article 6(3) of the Habitat Directive was prepared. Both parties agreed on public participation on both sides of the border in an adequate timeframe. At the end of the process, the mitigation measures for reducing impacts were agreed and included in the final decision.
The article shows the importance of agreement on each stage in the transboundary SEA process to fully implement the provisions of European and international law.

Key words: Strategic Environmental Assessment, Espoo Convention, transboundary impact, transboundary consultations, Protocol on SEA

Introduction and legal framework

On the basis of the Protocol on Strategic Environmental Assessment to the Convention on Environmental Impact Assessment in a Transboundary Context and the European SEA Directive, the following two transboundary strategic environmental assessment (SEA) procedures were conducted between Slovenia and Croatia:
a.) Transboundary SEA for the Brežice National Spatial Plan and
b.) Transboundary SEA for the Mokrice National Spatial Plan.

In the process of SEA in a transboundary context, both parties – Slovenia and Croatia – agreed in advance to work together taking into account all elements of the SEA protocol in a transparent way and also to use three practical guidelines: the Guidance on

Notification According to the Espoo Convention [1], the Guidance on the Practical Application of the Espoo Convention [2],and the Guidance on Public Participation under the Espoo Convention [3]. SEA is systematic process of analysing the environmental effects of plans and programmes, which present the formal procedure based on environmental impact assessment, as exemplified by the European SEA Directive (Directive 2001/42/EC) [4], which entered into force in July 2004 across the European Union

In the UNECE region, the Protocol on Strategic Environmental Assessment to the Convention on Environmental Impact Assessment in a Transboundary Context (the SEA Protocol), done in Kiev in 2003, presents a legislative framework for implementing SEA for plans and programmes with the possibility for policies [5]. In 2008 the SEA Protocol was ratified by the European Union, so it now also represents the European legislation on transboundary impact assessment. Today, the SEA Protocol has been ratified by 25 Parties and also Slovenia, as Party of Origin, and Croatia, as Affected Party, are both Parties to the SEA Protocol. At the time of implementation of the two processes, Slovenia, as the Party of Origin, was an EU member state and Croatia, as the Affected Party, was in the accession process; the latter became an EU Member State in 2013, just before the final decision for the national spatial plan for Mokrice was reached.

The state of the environment and other related issues

Slovenia and Croatia were still republics in the former Yugoslavia when the policy for a hydropower plant chain on the Sava River was adopted 40 years ago as part of the National Energy Strategy. The northern part of the chain was built, but for economic reasons, activities for hydropower plants in the downstream part of the Sava have not yet started. The already build hydropower plants and the Nuclear Power Plant (NPP) in Krško, which was built and is shared by Slovenia and Croatia, with its cooling water reservoir from the Sava, caused morphological changes and change of the sediment downstream in the river. In addition the obligation for Slovenia according to the European energy environmental aims came into force and Slovenian has to reach its obligation for 25% of renewable energy sources.

Figure 1 Illustrative location map for national plans for hydropower use in Brežice, 13 km from the border between Slovenia and Croatia, and Mokrice, ca. 0.5 km from the border, and existing hydropower chain on the Sava River

In 1991 Slovenia and Croatia become independent states and there was as yet no obligation for a transboundary procedure. The Convention on Environmental Impact assessment in a Transboundary Context (the Espoo Convention) [5] was adopted in Espoo in 1991 and entered into force in 1997. By 1996 Croatia and by 1998 Slovenia

became Parties to the Espoo Convention with an obligation to consult on environmental issues with the aim of protecting the environment in transboundary contexts.
In parallel, in 2011 Slovenia prepared its Water Management Plan according to the Water Framework Directive and finalised transboundary procedure with Croatia and Croatia started with the preparation of its Water Management Plan in 2012 and finalised the transboundary procedure with Slovenia. In the consultation for the Water Management Plan, a consensus on exemption according to the Art.4.7 of water framework [7] directive was also reached.

Methods

The method of work was:

a.) implementation of two SEA transboundary procedures, first for the national plan for Brežice and then for the national plan for Mokrice: a one-by-one approach starting the new one only after ending the first, while taking into account the cumulative effects of the chain in both procedures;
b.) a step-by-step approach: notification, environmental report preparation, consultation with environment authorities, transboundary consultation, public participation, mitigation measures, final decision in a transparent way;
c.) agreement on each step and preparation of a clear conclusion of each step;
d.) consulting on all environmental aims with an emphasis on the state of the water bodies, including underground water and water supply, nature conservation and flood protection.

Screening

In the SEA Protocol, Annex I includes a list of activities that automatically require the application of the Protocol if significant impacts may extend across a border. According to the fact that energy activities are planned in the two national spatial plans on the transboundary Sava River, the transboundary SEA thus applied. Annex I of the SEA Protocol, referring to paragraph 2 of Article 4, defines large dams and reservoirs. In the national plan there is a planned dam and reservoir on the Sava, which flows to Croatia: thus there is possibility for transboundary effects and transboudary effects could not be excluded.

Institutional arrangement

There was no relevant bilateral agreement between the countries, but points of contact and focal points for the purposes of the Espoo Convention and its SEA Protocol were designated with their tasks and responsibilities. The cases show that the procedures could be managed successfully via focal points. The SEA Protocol specifies the formal steps and points of contact but has no provisions on the informal contacts and negotiations that occur in border areas between authorities at different levels and which also very important to support the process. A formal contact has been carried out to meet the legal requirements of the SEA Protocol. The cooperation shows that it is important to trigger informal negotiation throughout the process and especially at the starting, consultation and final stages.
To manage the process, working groups – called "*delovna skupina*" in Slovenia and "*povjerenstvo*" in Croatia – were organised on both sides of the border and cooperated during the whole process until the final decision. Experience in the two cases shows that the negotiations which were conducted between points of contact and responsible authorities within both countries as well as between authorities and NGO and public on

both sides of the borders were essential for the conclusion of the procedure on the base of existing legislation [11,12,13,14,15].

Financial aspects

The application of transboudary SEA had certain financial implications. Financial aspects were agreed in advance. The cases show that agreement on costs is an important aspect of the procedure the procedure, while complication could produce a much longer period and uncertainty on both sides.

Costs of translation of the SEA report, presentation of documentation, an additional expert consultation, and the public hearing and participation were covered by Slovenia; costs of publication of the public hearing in the Croatian press and organisation of the public hearing and participation were covered by Croatia.

Time schedule

It was in the interest of both parties involved in the transboundary SEA that time schedules were specified as early as possible. The focal points discussed the possible timeframe according to the legislation in both countries, the legislative timeframe for the stages of the procedure, and opportunities to combine steps and prepared the time plan to avoid or minimise possible delays by planning the time schedule at early stage. The agreed time schedule was also presented to the public. As a time-saving measure, public participation on both sides of the border was organised almost in parallel; this could be recommended as a good practice.

Clear agreement on schedule was important in sending the formal notification (30 days), in responding to the notification (30 days), in public consultation and participation (30 days), on technical consultation (60 days), in the final opinion on the draft decision (90 days) and on informing of the final decision (30 days).

Notification

Slovenia, as the Party of Origin considered that the implementation of the plan was likely to have significant transboundary environmental effects. Also Croatia had already requested in the transboundary process for Krško that there was a need to be included into the process as early as possible, before the adoption of the plans. Slovenia sent notification in line with recommendations under the Espoo Convention and SEA Protocol. The notification was sent before the public in Slovenia was informed of the national SEA process and thus at an early stage. This was very important, because the competent national authorities for the environment needed time for cooperation during the process.

In spite of this fact, the notification, as the formal and mandatory start of the procedure for the application of the Convention, had to be sent. The notification was passed from Slovenia to Croatia, and also to the official points of contact. Pre-notification contacts, which are highly recommended to give both parties time to prepare for the coming procedure, were also drawn up. The importance of the official notification lies in the formality it gives to the procedure.

The transboundary procedure started with notifications: first for the SEA of the National Spatial Plan for Brežice in January 2011 and, after concluding this procedure with a final decision, the notification for the SEA for the National Spatial Plan Mokrice in July 2012.

The notification contained all documents and data according to Article 10 of the SEA Protocol:

a.) the draft plan and environmental report including information on its possible transboudary environmental, including health effects;
b.) information regarding the decision-making procedure, including a reasonable time schedule for the transmission of comments.

Croatia responded in the proposed time of one month and sent the confirmation to cooperate in the transboundary SEA procedure supported with reasons such as care for underground water sources in Zagreb and Samobor, possible effects on the morphology of the river, nature conservation, flood protection and possible risks with the dam. A reasonable time schedule for transmission of comments was redefined and agreed between the focal points in advance, i.e. before the technical consultation.

Translation of documents and interpreting at hearings

Studies have shown that even minor difficulties in understanding language may cause difficulties in the participation of the public and authorities. Slovenia and Croatia have practice in EIA transboundary procedures and in the past used the Slovenian and Croatian languages for documentation and translated only a non-technical summary. The languages were mutually understandable to past generations, but this seems not to be the case for the younger generation any more. To be practical and not cause additional financial costs, there was a working agreement between the countries to translate the non-technical abstract and transboundary chapter. Slovenia thus prepared the translation and an active presentation in Croatian. In spite of this, there were a few complaints about language, so planning for translation for the next national plan for the Mokrice SEA was improved and additional costs for translation of the full SEA report planned in Slovenia. In addition, Slovenia sent the presentation to Croatia in the Croatian language to be presented on the webpage. For the first hearing, both parties agreed on interpreting – to be organised by Croatia – to ensure quality, this to be paid for by Slovenia, the Party of Origin, but at the time of the hearings the presentations of Slovenian experts in the Croatian language deemed satisfactory and additional translation was not needed.

Preparation of the environmental report and its quality

The quality of the environmental report is essential for the quality of the process, while countries should agree on the state of the environment in the border area, evaluation and mitigation measures. If evaluation is weak, there is uncertainty in the mitigation measures proposed.

In the case of both plans, environmental reports were prepared and alternatives evaluated according to Slovenian law, which prescribes precise items of an environmental report. Environmental reports identify, describe and evaluate the likely significant environmental and health effects of implementing a plan and its reasonable alternatives. The report contained information taking into account the current knowledge and methods of assessment, the contents and the level of details of the plans and its stage in the decision-making process, the great interest of the public in energy-related plans and the information needs for decisions.

According to the SEA Protocol, each party shall ensure that environmental reports are of sufficient quality to meet the requirements. Slovenia also has specific provisions in its legislation: in the Environmental Act and the Decree on Environmental Reports. For the environmental report for the National Spatial Plan for Brežice, there were two quality-checking controls by the Ministry of the Environment, the Environment Agency, the Institute for Nature Conservation, the Ministry of Health and the Ministry of Culture, before the written confirmation of the quality on the basis of the Environmental Act; in the National Spatial Plan for Mokrice there were even three. According to the provisions of the Environmental Act and related decree, only an environmental report confirmed by the competent authorities could be send to the affected party and to the public.

Public participation

According to the provision on public participation, both parties were responsible and cooperation of both teams was essential. Thus at the very beginning of the process, the competent national authorities met and defined the common aim: to developed good practice in both transboundary SEA procedures and to cooperate such as to give an adequate and reasonable timeframe for public participation and to ensure effective consultation.
The SEA Protocol requires that the public of the affected party must be given the opportunity to participate in the SEA process. This entails the right to be informed and the right to express views. In practice, the focal points agreed to have two public hearings in Zagreb, for the Brežice SEA and the Mokrice SEA, in parallel to the public hearings for the Slovenian public in Slovenia. Each public hearing was announced in the Croatian press and webpage and the deadline for sending comments or questions was 30 days for each SEA procedure. The authority to which the Croatian public sent comments and questions was the Croatian ministry responsible for the environment and the authority to which the Slovenian public sent comments and questions was the Slovenian ministry responsible for spatial planning.

Both countries organised early, timely and effective opportunities for public participation on both sides of the border. A draft plan and environmental report were also published on the webpage. Relevant non-governmental organisation and interested public expressed their opinions on the plans and environmental reports. The possibility of an adequate timeframe for public consultation was given on both sides of the border.
Croatian focal point sent the comments and Slovenian focal point organised an expert group to answer all comments and representation, translate the answers and send them back to Croatia to inform the public there on the answers.

The NGO observations differed: from a proposal to re-nature the Sava without energy use, to the observation on nature conservation questions with an emphases on the Natura 2000 European ecological network on the Croatian side of the river, which was still under development on the time of the public consultation for Brežice and in the last stage of development at the time of the public consultation for Mokrice.

According to a new fact which arose in the middle of the procedure for Mokrice and according to the fact that the national plan for Mokrice was near to the border, the countries agreed that there was a need to prepare appropriate assessment according to Article 6(3) of the Habitat Directive[8.]. The competent Croatian authorities prepared the data and Slovenia prepared the appropriate assessment and sent it in addition to the already prepared environment report. The assessment was prepared according to the

Slovenian rules on appropriate assessment which are in line with the Habitat Directive and related recommendation and approved also by the competent Croatian authority for nature conservation.

Consultation with environmental and health authorities

Slovenia and Croatia accepted the legislation which defines the authorities to be consulted by virtue of their specific environmental and health responsibilities and which are likely to be concerned by environmental effects of the implementation of the plans. Within the process, each of the responsible environmental authorities consulted mentioned authorities and has to reach consensus and common understanding of measures needed for reducing transboundary effects.

Consultation on the national plan for Brežice, in which two alternatives were evaluated, showed that the narrow alternative was better for the environment, but in addition all flood-protected areas have to be preserved to reduce the impact to Croatia. In addition, a flood-protection model was prepared; Croatian experts were invited at a very early stage of its preparation and the model and its conclusion were also presented to the public and at the technical consultation.

Consultation on the national plan for Mokrice showed at a very early stage that from the three alternatives only the alternative with project measures only on the Slovenian side was acceptable to Croatia, so this alternative was proposed for further evaluation.

Transboundary consultation

After the SEA report was accepted by the Ministry for Agriculture and the Environment of the Republic of Slovenia, as the competent authority, it was presented to the Ministry of Environment and Nature Protection of the Republic of Croatia for comment.
Environmental commissions were established on both sides. These are composed for all transboundary procedures on the Sava River, with the following members: environmental experts, environmental authorities, planning authorities and energy authorities.
The above were consulted on the following:

a.) the state of the environment;
b.) possible alternatives, including a no-action alternative;
c.) evaluation methods;
d.) cumulative effects;
e.) possible effects and mitigation measures for the following: sediment, erosion, water protection, nature conservation and flood protection.

The additional data were presented by Croatia during the consultation according to the Natura 2000 European ecological network in Croatia, and on this basis Slovenia prepared the appropriate assessment according to the Habitat Directive and sent it in addition to the agreement.
Both parties agreed on the basis of the environmental report, that in the river there will be geomorphologic changes and differences in some indicators according to the water framework directive and that exemption according the Article 4.7 of the water directive [6.] and the provision of the Slovenian Water Act will be needed.

At the very end of the process, precise technical consultation on mitigation measures proposed in the environmental report was also held: Slovenia proposed a list of possible mitigation measures to reduce the impact and Croatia gave an opinion on them. Among

the proposed mitigation measures for improvement of the morphology downstream was stabilisation of the river, which was not accepted by Croatia and was therefore excluded. Only agreed measures were proposed for final approval to the Ministry of Infrastructure and Energy and further to the Slovenian Government for acceptance of Decree on the National Spatial Plan for Hydropower Brežice and of the Decree on National Spatial plan for Hydropower Mokrice.

On 25 March 2013 the final agreement for the SEA and National Plan of Mokrice was accepted. In addition, Croatia proposed to work further on a transboundary EIA, which is already in progress.

Results and discussion

Analyses of both procedures show that both have all elements from the SEA Protocol and have taken into account the practical advice from relevant parts of the guidances [1,2,3] which are all very useful in practical implementation. The analysis shows that the methods used: well-managed process and technical agreements via focal points, establishment of working groups and consultation only on relevant environmental issues is essential for process management to conduct the procedure properly and transparently. The approach of conducting the assessment of the second plan only after completing the first procedure is recommended: while the substance may differ, there is a need for cumulative effects of the existing plans to be taken into account. Both transboundary cases shows that there would be difficulties if the quality of the SEA report was not assured, so we recommend the highest standards in methods and the development of methods for transboundary assessment within the river basin.
The practical approach of both parties, with agreement on public hearings and their organisation on both side of the border with representatives of local communities and NGOs, and the adequate timeframe for comments were important aspects of both transboundary processes.At the end of the processes, mitigation measures for reducing the impact were discussed, agreed on and included in the final Slovenian decision and the final decision send to Croatia. An agreement was also reached to continue with the EIA transboundary procedure according to the Espoo Convention and the EIA Directive. The article shows how the general agreement at each stage of the transboundary environmental assessment is important to fully implement the provisions of the SEA Protocol and SEA Directive, including in relation to the Water Framework and Habitat Directive.

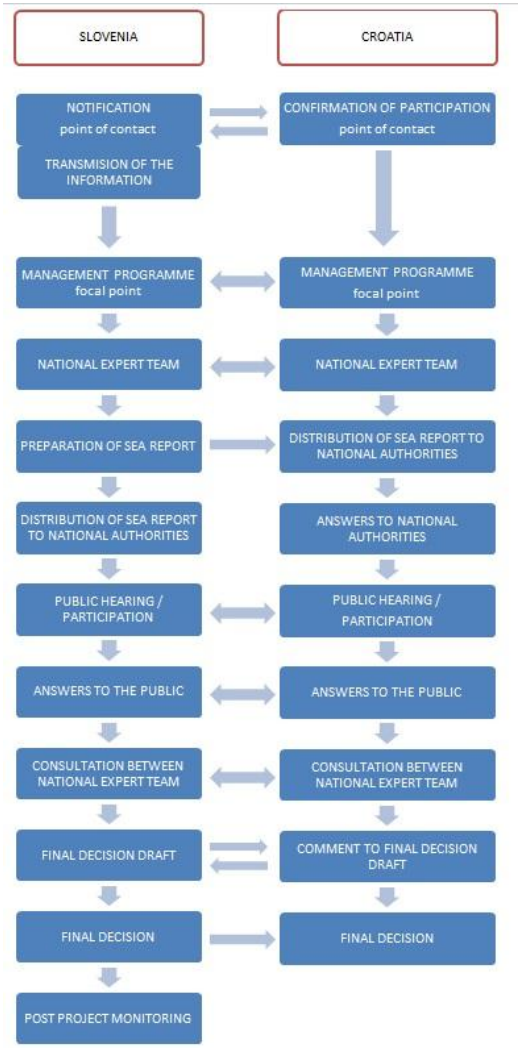

Figure 2 Flow-chart for the transboundary strategic environmental procedure of Slovenian National Plans for Hydropower Use on the Lower Sava in Brežice and Mokrice

Conclusion and recommendation

On the base on results on two transboundary SEA procedures, we conclude that practical advices from three guidance under the Espoo Convention are helpful in implementation of SEA protocol in transboundary context. The methods used was positive and on its base the following recommendation are proposed:

- start with notification as early as possible,
- give the attention to the relevant environmental issues,
- give the same attention to the organisation of the procedure and technical details, like translation, timeframe, public consultation and agree on them on advance with the certain level of flexibility;
- prepare public hearing with presentations and organise active public participation with public hearing in parallel in both sides of the border;
- start with technical consultation before or at the time of public participation and end them in agreement of mitigation measures, before the final decision is taken,
- include all agreed environmental mitigation measures into the final decision.

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Biorazgradivi otpad – glavni parametar u vrednovanju sustava mehaničko-biološke obrade miješanog komunalnog otpada

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Sažetak

U Pristupnom sporazumu Republike Hrvatske Europskoj Uniji, a kao posljedica odgovarajućih EU direktiva o otpadu pojavljuje se, između ostaloga, i zahtjev o postupnom smanjenju odlaganja biorazgradivog otpada te bi se konačno 2020. godine odlaganje biorazgradivog otpada trebalo svesti na maksimalno 35 posto od količine koja je proizvedena u 1997. godini.

U provođenju tog vrlo eksplicitnog kriterija postoji, međutim, niz potencijalnih pitanja. Jedna od tema je sama definicija pojma „biorazgradivi otpad“ u čemu postoje različite interpretacije u pojedinim državama, a u Hrvatskoj još nemamo preciznu definiciju. Drugo pitanje odnosi se na izračun biorazgradive komponente u ostatnom otpadu koji odlazi na odlagalište otpada, a koji je prethodno prošao obradu u nekom tipu MBO postrojenja pa se po strukturi i sastavu znatno razlikuje od referentnog otpada koji nije prošao nikakav oblik obrade.

U članku se daje pregled relevantne regulative i prakse, prijedlog definicije biorazgradivog otpada, načina procjene biorazgradive komponente u ostatnom dijelu otpada koji odlazi na odlagalište otpada. Dat će se prikaz na konkretnom primjeru jedne hrvatske županije uz pretpostavku obrade otpada na MBO postrojenju te uz pretpostavku ispunjenja zahtjeva o primarnom odvajanju otpada prema Okvirnoj direktivi o otpadu.

Članak će pomoći u sagledavanju problema povezanog s odlaganjem biorazgradivog otpada u projektiranju sustava za gospodarenje otpadom te također u izradi strateških procjena utjecaja na okoliš planova i programa gospodarenja otpadom.

Ključne riječi: biorazgradivi otpad, kriteriji odlaganja otpada, MBO postrojenja

Uvod

Glavni uvjet iz regulative EU u vezi sa zbrinjavanjem komunalnog otpada je ***ograničenje odlaganja biorazgradivog otpada*** (čl. 5 Smjernice o odlaganju otpada[17]). Prema tom dokumentu, a u skladu s Pristupnim sporazumom Republike Hrvatske (Croatia Accession Treaty) i novim Zakonom o održivom gospodarenju otpadom (NN 94/13, u nastavku: ZOGO), količina biorazgradivog komunalnog otpada koja se odlaže na odlagališta otpada mora se:

- do kraja 2013. smanjiti na iznos od najviše 75 posto od količine koja je proizvedena u 1997. god.

[17] Council Directive 1999/31/EC on the landfill of waste (u nastavku: Landfill direktiva)

- do kraja 2016. smanjiti na iznos od najviše 50 posto od količine koja je proizvedena u 1997. god.
- do kraja 2020. smanjiti na iznos od najviše 35 posto od količine koja je proizvedena u 1997. god.

Smanjenjem količine odloženog biorazgradivog otpada postižu se sljedeći osnovni ciljevi gospodarenja otpadom:

a) smanjenje odlaganja biorazgradivog otpada na odlagališta otpada dovodi do smanjenja emisije stakleničkih plinova metana i ugljikova dioksida koji su označeni kao glavni čimbenici u potencijalnom globalnom zatopljenju,
b) stimuliranje materijalnog i energetskog iskorištavanja biorazgradivih tvari u komunalnom otpadu i razvoj tehnoloških rješenja koja to omogućuju,
c) smanjenje lokalnog utjecaja na vode i zrak zbog smanjenja emisije plinova i smanjenja stvaranja procjednih voda.

Definicija biorazgradivog otpada

S obzirom na vrlo eksplicitan zahtjev iz Landfill direktive u vezi s biorazgradivim komunalnim otpadom nužno je jasno opisati taj pojam. Što je to „biorazgradivi otpad“? Kako se određuje?

Spomenuta smjernica ga definira kao «otpad koji je podesan za aerobnu ili anaerobnu razgradnju, kao što je hrana i vrtni otpad, papir i karton».

Definicija je neprecizna i može se različito tumačiti. Ostavljena je mogućnost da se pored hrane i vrtnog otpada te papira i kartona u biorazgradivi otpad uključe i druge sastavnice komunalnog otpada (npr. drvo, tekstil, koža i kosti i sl.).

U Okvirnoj smjernici o otpadu[18] (u nastavku: Framework direktiva) uvodi se pojam biootpada. To je biorazgradivi otpad iz vrtova i parkova, hrana i kuhinjski otpad iz kućanstava, restorana, ugostiteljskih i maloprodajnih objekata i slični otpad iz proizvodnje prehrambenih proizvoda.

Iako su slično definirani, navedeni pojmovi odnose se na različite vrste otpada. Biootpad nastaje primarnim izdvajanjem na mjestu nastanka, a definicija biorazgradivog otpada odnosi se na ukupno stvoreni komunalni otpad – izdvojeni na mjestu nastanka i preostali miješani otpad. Biootpad je dakle samo dio biorazgradivog komunalnog otpada.

Naš novi Zakon o održivom gospodarenju otpadom pokušava razjasniti situaciju uvođenjem i trećeg pojma s prefiksom „bio“. Osim pojma „biootpad“ koji je definiran jednako kao u Framework direktivi još su dva slična pojma:

»biološki razgradivi otpad« je otpad koji se može razgraditi biološkim aerobnim ili anaerobnim postupkom;

»biorazgradivi komunalni otpad« je otpad nastao u kućanstvu i otpad koji je po prirodi i sastavu sličan otpadu iz kućanstva, osim proizvodnog otpada i otpada iz poljoprivrede, šumarstva, a koji u svom sastavu sadrži biološki razgradiv otpad.

Budući da je u ZOGO-u »komunalni otpad« definiran kao otpad nastao u kućanstvu i otpad koji je po prirodi i sastavu sličan otpadu iz kućanstva, osim proizvodnog otpada i otpada iz poljoprivrede i šumarstva gornja definicija biorazgradivog otpada mogla bi se jednostavnije napisati:

»biorazgradivi komunalni otpad« je dio komunalnog otpada koji u svom sastavu sadrži biološki razgradiv otpad dakle otpad koji se može razgraditi biološkim aerobnim ili anaerobnim postupkom.

[18] Directive 2008/98/EC of the European Parliament and of the Council on waste and repealing certain Directives (OJ L 312, 22.11.2008)

Na taj način se formulacija iz našega zakona vraća na definiciju iz Landfill direktive sa svim pitanjima koja iz te definicije proizlaze. Spada li tu samo „hrana i vrtni otpad, papir i karton“ ili i drugi sastojci komunalnog otpada koje sadrže biološki razgradiv otpad kao drvo, tekstil, kosti i koža i sl.
Osim toga, nisu sva hrana i vrtni otpad ni sav papir i karton biorazgradivi čak i da zanemarimo činjenicu da znatan dio u hrani i vrtnom otpadu predstavlja voda koja se nikako ne može tretirati kao biorazgradiva tvar.
Dakle, može se zaključiti da Landfill direktiva i ZOGO ostavljaju u tom smislu dovoljno prostora da se u sklopu podzakonskih dokumenata precizno definira pojam biorazgradivog otpada i, što je još važnije, način njegova određivanja kako u masi miješanog komunalnog otpada tako i u onom dijelu otpada koji se odlaže na odlagalištima otpada.
U nedostatku takve precizne definicije u praksi se pojavljuju razni pristupi.
Kako se u strukturi otpada ne definira sastavnica „hrana“ obično se pod tim smatra tzv. kuhinjski otpad, a definicija po Direktivi onda uključuje kao biorazgradivu komponentu kuhinjski, vrtni i sličan biootpad te papir i karton.
U sklopu projekta LIFE 04 TCY/CRO000028 [1] prihvaćena je definicija biorazgradivog otpada koja pored kućnog i biootpada te papira i kartona uključuje i dio drugih sastavnica okoliša – po 50 posto tekstila, drva, kože i kostiju te ostalog.
U Planu gospodarenja otpadom Republike Hrvatske (PGO) u biorazgradive sastavnice komunalnog otpada svrstava se, pored kuhinjskog i vrtnog otpada te papira i kartona još i ukupna količina tekstila, drva te kože i kostiju.
Ako se tri spomenuta kriterija primijene na sastav otpada iz PGO-a dobiju se relativno velike razlike u rezultatima (*Tab. 1*).
Očigledno je kako ovakva kvalifikacija, bez obzira na kriterij, ima barem jedan bitan nedostatak, a radi se o sadržaju vode (vlage) u pojedinoj biorazgradivoj sastavnici otpada. Tako na primjer, sadržaj vlage u kuhinjskom otpadu može iznositi i do 70 posto pa nije korektno da se ta vlaga tretira u masi biorazgradivog otpada.

Tablica 1: Postotak biorazgradivog otpada prema raznim kriterijima

			Prema Direktivi		**Prema LIFE 04 TCY/CRO 000028**		**Prema PGO RH**	
Sastav otpada		**%**	**biorazgr.**	**ukupno**	**biorazgr.**	**ukupno**	**biorazgr.**	**ukupno**
1	kuhinjski i vrtni otpad	42	100	42	100	42	100	42
2	papir i karton	20	100	20	100	20	100	20
3	plastika	12	0	0	0	0	0	0
4	tekstil	8	0	0	50	4	100	8
5	guma	1	0	0	0	0	0	0
6	koža i kosti	3	0	0	50	1,5	100	3
7	drvo	1	0	0	50	0,5	100	1
8	staklo	7	0	0	0	0	0	0
9	metal	4	0	0	0	0	0	0
10	ostalo	2	0	0	50	1	0	0
	Ukupno, %	**100**		**62**		**69**		**74**

Dodatnu otežavajuću okolnost prema Landfill direktivi predstavlja činjenica da se ta smjernica ne odnosi na svježi stvoreni otpad nego na dio (ostatak) otpada koji se nakon obrade mora odložiti na odlagalište otpada. Budući da se prema Framework direktivi, a također i prema našemu zakonu ne smije odlagati neobrađeni komunalni otpad dio koji će u konačnosti završiti na odlagalištu otpada bit će po sastavu bitno različit od svježeg otpada.
Ako se radi o termičkoj obradi otpada zadatak je jednostavan jer je praktično sav ostatak za odlaganje u obliku koji ne sadrži biorazgradive komponente.
Međutim, ako se radi o nekoj od tehnologija mehaničko-biološke obrade (MBO) tada će i u ostatku za odlaganje zaostati određeni dio biorazgradive komponente, međutim u tom otpadu nije moguće utvrditi količinu hrane i vrtnog otpada pa čak ni papira i kartona te tako odrediti njegovu biorazgradivu komponentu.
Za to je potrebno primijeniti druge načine i u pojedinim zemljama postoji nekoliko metoda da se to napravi. Nužno je da se i u Hrvatskoj propiše odgovarajuća metoda s pomoću koje će biti moguće utvrđivati biorazgradivu komponentu u otpadu koji se odlaže na odlagalištima otpada. Inače, Landfill direktivu i naš Zakon o otpadu neće biti moguće primijeniti na kvalitetan način.

Određivanje biorazgradivog otpada u proizvedenom komunalnom otpadu u referentnoj 1997. godini

Drugi problem u primjeni Landfill direktive odnosi se na određivanje količine biorazgradivog otpada u referentnoj godini.
Na temelju te smjernice u Pristupnom sporazumu te konačno i u ZOGO-u sadašnja količina otpada koja dolazi na obradu u RCGO i njegov sastav nisu parametar u dokazivanju potrebne kvalitete otpada koji se odlaže nego je osnova za analizu proizvedeni komunalni otpad u 1997. godini.
U Hrvatskoj ne postoje službeni podaci o količinama i sastavu proizvedenog komunalnog otpada u 1997. Kako bi se ispravno primijenio naš zakon nužno je u nekom podzakonskom dokumentu utvrditi tu polaznu količinu proizvedenog komunalnog otpada i njegov sastav. S obzirom na županijski koncept u ZOGO-u potrebno je polazne vrijednosti utvrditi za sve županije i Grad Zagreb.
Izgleda da bi najkvalitetnija podloga za određivanje količine proizvedenog biorazgradivog otpada u 1997. mogli biti rezultati projekta CRO/98/G31, [2] . U tom dokumentu postoje podaci o količinama otpada odloženog na komunalna službena odlagališta po županijama u razdoblju 1990-1998 (u *Tab. 2* daju se podaci za 1997. godinu) pri čemu su uključeni podaci ostalih pojedinačnih istraživanja o količinama komunalnog otpada. Dakle, u 1997. godini je na službena odlagališta u Hrvatskoj odloženo 755.800 tona otpada. Kako bi se dobila procjena količine **proizvedenog** komunalnog otpada na taj podatak treba još dodati i količinu otpada koja se odlagala na neslužbena odlagališta te otpad koji nije organizirano prikupljan i koji je završio na tzv. divljim odlagalištima te oduzeti količinu proizvodnog otpada koja se odlagala na odlagališta otpada skupa s komunalnim otpadom.

Tablica 2: Količina odloženog otpada na službenim odlagalištima RH 1997.(tisuća tona)

Županija		tisuća tona
I.	Zagrebačka	42,0
II.	Krapinsko-zagorska	12,1
III.	Sisačko moslavačka	28,3
IV.	Karlovačka	21,3

V. Varaždinska	15,9
VI. Koprivničko-križevačka	10,3
VII. Bjelovarsko-bilogorska	21,2
VIII. Primorsko-goranska	74,3
IX. Ličko-senjska	9,4
X. Virovitičko-podravska	8,0
XI. Požeško-slavonska	9,2
XII. Brodsko-posavska	13,2
XIII. Zadarska	27,4
XIV. Osječko-baranjska	39,2
XV. Šibensko-kninska	17,1
XVI. Vukovarsko-srijemska	19,4
XVII.Splitsko-dalmatinska	77,8
XVIII. Istarska	51,8
XIX. Dubrovačko-neretvanska	22,4
XX. Međimurska	12,1
XXI. Grad Zagreb	215,4
UKUPNO	**755,8**

Takva sustavna analiza po svim hrvatskim županijama nije napravljena. Ako se pretpostavi da količina neskupljenog komunalnog otpada te otpada koji je završio na neslužbenim i divljim odlagalištima umanjeno za dio odloženog tehnološkog otpada iznosi dodatnih 30 posto na količinu iz *Tab. 2* može se pretpostaviti da je u 1997. u Hrvatskoj proizvedeno oko 1.000.000 tona komunalnog otpada[19].
Međutim, određivanjem količine biorazgradivog otpada na prikazani način ne daje kvalitetnu mogućnost da se ispune postavljeni zahtjevi u vezi sa smanjenjem odložene količine biorazgradivog otpada. Naime, dio otpada koji nakon prolaska kroz MBO postrojenje odlazi na odlagalište ne može se klasificirati po istim sastavnicama kao svježi, miješani komunalni otpad.
Mnogo bi bolje bilo ako bi se biorazgradivi otpad definirao prema sadržaju biorazgradivog organskog ugljika, a ne prema vrsti otpada jer bi tako bilo mnogo lakše odrediti biorazgradivi potencijal dijela otpada koji se odlaže na odlagalište nakon obrade u MBO postrojenju.
U tom smislu je vrlo prikladna formula prema [3] po kojoj je biorazgradivi dio otpada izražen kao DOC (*Degradable Organic Carbon*) i definiran sljedećim izrazom:

$$DOC = 0,4A + 0,17B + 0,15C + 0,3D$$

gdje je A-udio u otpadu papira, kartona i tekstila, B-udio vrtnog i sličnog otpada, C-udio otpada od pripreme hrane i D- udio drva i poljoprivrednog otpada. Ako se pretpostavi podjednaka količina vrtnog i kuhinjskog otpada formula se može svesti na sljedeći oblik:

$$DOC = 0,4A + 0,16(B+C) + 0,3D$$

Ako se ova formula primijeni na otpad proizveden u 1997. godini i pretpostavi njegova struktura prema *Tab. 1* slijedi A=28%, B+C = 42%, D=1% i dobije se DOC = 18,2% od ukupne količine otpada, odnosno ukupna godišnja količina biorazgradivog ugljika u proizvedenom komunalnom otpadu u Republici Hrvatskoj iznosila je u 1997. godini

DOC (1997) = 182.000 t/g

[19] U PGO-u je prema analizi IPZ Uniprojekta pretpostavljena količina od 1.015.000 tona u 1997.

Odatle slijede kriteriji za odlaganje prema zahtjevima ZOGO-a:
DOC-75% = 136.500 t/g (do kraja 2013.)
DOC-50% = 91.000 t/g (do kraja 2016.)
DOC-35% = 63.700 t/g (do kraja 2020.)
Dakle, za kompletno ispunjenje postavljenih zahtjeva ne bi se smjelo na odlagališta u Hrvatskoj nakon 2020. godine odlagati više od 63.700 tona biorazgradivog ugljika godišnje.

Određivanje biorazgradivog ugljika u otpadu koji se nakon obrade u MBO postrojenju odlaže na odlagalištu otpada

U PGO-u je u 2015. procijenjena proizvodnja komunalnog otpada od 1.953.000 tona[20]. Pritom je stopa porasta u razdoblju 2010/2005 procijenjena oko 3,5% godišnje, a u razdoblju 2015/2010 oko 2,5% godišnje. Ako se pretpostavi daljnji porast proizvodnje komunalnog otpada do 2020. po stopi pod 1,5% godišnje dobije se u 2020. količina proizvedenog komunalnog otpada od oko 2.100.000 t/g. U toj količini otpada, uz pretpostavku da se ne mijenja struktura proizvedenog otpada nalazilo bi se 382.620 t/g biorazgradivog ugljika (*Tab. 3*).

Tablica 3: Stvorena količina komunalnog otpada

			Stvoreni otpad, 2020	
Sastav otpada		**%**	**Masa, tona**	**DOC, tona**
1	kuhinjski i vrtni otpad	42	882.000	141.120
2	papir i karton	20	420.000	168.000
3	plastika	12	252.000	0
4	tekstil	8	168.000	67.200
5	guma	1	21.000	0
6	koža i kosti	3	63.000	0
7	drvo	1	21.000	6.300
8	staklo	7	147.000	0
9	metal	4	84.000	0
10	ostalo	2	42.000	0
	Ukupno, %	**100**	**2.100.000**	**382.620**

Prema ZOGO-u, a u skladu s Framework direktivom obaveza je sljedećih godina realizirati vrlo visoki stupanj odvajanja pojedinih sastavnica otpada što bi se realiziralo ili primarnim odvajanjem na mjestu nastanka otpada ili naknadnim razvrstavanjem npr. u MBO postrojenjima tako da se u 2020. postigne postotak odvajanja od 50 posto papira i kartona, plastike, stakla i metala. Od dijelova otpada koji sadrže biorazgradivu tvar obaveza uključuje papir i karton. Ovdje se pretpostavlja da će se u 2020. primarnim odvajanjem odvojiti 38 posto papira i kartona[21] dakle 134.400 t/g, a ostatak do 50 posto će se odvojiti u sklopu MBO postrojenja.
Nadalje u spomenutoj regulativi podupire se i primarno odvajanje biootpada do razine tehničke izvedivosti te ekonomske i ekološke opravdanosti. Ovdje je pretpostavljeno da će se u 2020. odvojiti 11 posto biootpada kao dijela kuhinjskog i vrtnog otpada, dakle 97.000 t/g.

[20] Preciznije analize iz posljednjih godina (kada se mnogo veći dio komunalnog otpada važe prije odlaganja)
pokazuju da su količine iz PGO-a vjerojatno precijenjene.
[21] Pretpostavke za potrebe ovog rada temelje se na analizama napravljenim u [4]

Osim navedenog biorazgradivog otpada primarnim odvajanjem realno je moguće u 2020. odvojiti i 30 posto plastike (75.600 t/g) i 40 posto stakla (58.800 t/g). Odvajanje metala na mjestu nastanka nije pretpostavljeno, osim u sklopu skupljanja glomaznog otpada. Metali će se odvajati u MBO postrojenju.
Uz te pretpostavke bi se količina otpada koji odlazi na daljnju obradu smanjila sa 2.100.000 t/g na 1.734.200 t/g, a količina biorazgradivog ugljika za 69.280 t/g, dakle sa 382.620 t/g na 313.340 t/g, *Tab. 4*.

Tablica 4: Količina otpada na ulazu u centre gospodarenja otpadom

			Ulaz u CGO, 2020	
Sastav otpada		**%**	**Masa, tona**	**DOC, tona**
1	kuhinjski i vrtni otpad	45,3	785.000	125.600
2	papir i karton	16,5	285.600	114.240
3	plastika	10,2	176.400	0
4	tekstil	9,7	168.000	67.200
5	guma	1,2	21.000	0
6	koža i kosti	3,6	63.000	0
7	drvo	1,2	21.000	6.300
8	staklo	5,1	88.200	0
9	metal	4,8	84.000	0
10	ostalo	2,4	42.000	0
	Ukupno, %	**100**	**1.734.200**	**313.340**

Pretpostavimo, nadalje, da se cjelokupni otpad obrađuje u nekom MBO postrojenjima u kojima se u mehaničkom dijelu dodatno izdvaja određena količina papira i kartona te također dio lagane frakcije kao gorivo iz otpada (GIO) koja u sebi također sadrži dijelove biološki razgradivog otpada, a nakon toga se pretpostavlja aerobna biološka obrada s proizvodnjom biostabilata koji se u cjelosti odlaže na odlagališta otpada.
Tehnološka shema MBO postrojenja može znatno varirati čak unutar iste tehnološke koncepcije, a za potrebe ovog teksta pretpostavlja se odvajanje korisnih sastavnica otpada u MBO postrojenju kao u *Tab. 5*.

Tablica 5: Bilanca odvojenog dijela otpada u mehaničkom dijelu MBO postrojenja

		%	Ukupno, t	DOC, t
OTPAD NA ULAZU U MBO POSTROJENJA			**1.734.200**	**313.340**
Odvajanje korisnih sastavnica otpada u MBO postrojenju	odvajanje papira i kartona	25	71.400	28.560
	odvajanje plastike	40	70.560	-
	odvajanje metala	80	67.200	-
	odvajanje stakla	30	26.460	-
UKUPNO ODVOJENO			**235.620**	**28.560**
Odvajanje s gorivom iz otpada (GIO)	papir i karton	40	114.240	45.696
	plastika	40	70.560	-
	tekstil	60	100.800	40.320
	koža i kosti	40	25.200	-
	guma	40	8.400	-
	drvo	60	12.600	3.780
	kuhinjski i vrtni otpad	5	39.250	6.280
UKUPNO GIO			**371.050**	**96.076**

ODLAZI NA BIOLOŠKU OBRADU			**1.127.530**	**188.704**
Struktura otpada koji odlazi na biološku obradu	kuhinjski i vrtni otpad		745.750	119.320
	papir i karton		99.960	39.984
	plastika		35.280	-
	tekstil		67.200	26.880
	guma		12.600	-
	koža i kosti		37.800	-
	drvo		8.400	2.520
	staklo		61.740	-
	metal		16.800	-
	ostalo		42.000	-

U MBO postrojenjima predviđa se odvajanje 235.620 t/g korisnih materijala za recikliranje, te 371.050 t/g GIO. Gorivo iz otpada je vrlo visoke kvalitete, ogrjevne vrijednosti od oko 22,5 MJ/kg.
Efikasnost biološke obrade ovisi o mnogim detaljima (sastavu otpada, trajanju biološke obrade, kvaliteti postupka itd.). Uz uobičajeno vrijeme obrade od 8 tjedana može se pretpostaviti stupanj biostabilizacije biorazgradive komponente otpada prema [5]:

- za kućni, vrtni i biootpad efikasnost biostabilizacije 80 posto
- za papir, karton i tekstil 50 posto
- za drvo 40 posto.

Uz takve pretpostavke dobije se količina biorazgradivog ugljika koja odlazi na odlagalište otpada kao u *Tab. 6*, odnosno 58.808 t/g što predstavlja 32,3 posto od količine koja se nalazila u komunalnom otpadu proizvedenom u 1997. Time je zahtjev iz Landfill direktive odnosno ZOGO-a ispunjen, ali s vrlo malom rezervom.

Tablica 6: Bilanca otpada koji odlazi na odlagalište otpada

	DOC na ulazu u biološku obradu	Eliminacija DOC-a u biološkoj obradi	DOC koji odlazi na odlagalište otpada
kuhinjski i vrtni otpad	119.320	95.456	23.864
papir i karton	39.984	19.992	19.992
tekstil	26.880	13.440	13.440
drvo	2.520	1.008	1.512
UKUPNO	**188.704**	**129.896**	**58.808**

Konačno, u Tab. 7 dana je ukupna bilanca komunalnog otpada RH u 2020. na temelju pretpostavki iz teksta. Dakle, količina otpada nakon obrade koja odlazi na odlagalište otpada iznosi 34,5% od ukupne količine proizvedenog otpada ali sadrži svega 15,4% biorazgradivog ugljika u odnosu na početnu količinu. Od ukupne količine proizvedenog komunalnog otpada 28,6% odnosno 601.420 t/g predstavljao bi reciklabilni dio, a 17,7% odnosno 371.050 t/g predstavljao bi vrlo kvalitetni GIO.

Tablica 7: Ukupna bilanca otpada u RH (2020.)

	Uk. otpad, t/g	**%**	**DOC (t/g)**	**%**
Proizvedeni komunalni otpad	2.100.000	100,0	382.620	100,0
Otpad odvojen primarnom selekcijom (za reciklažu)	365.800	17,4	69.280	18,1
Otpad koji dolazi u MBO postrojenje	1.734.200	82,6	313.340	81,9
Otpad odvojen u mehaničkom dijelu MBO postrojenja (za reciklažu)	235.620	11,2	28.560	7,5
Otpad odvojen za GIO	371.050	17,7	96.076	25,1
Otpad koji odlazi na biološku obradu	1.127.530	53,7	188.704	49,3
Gubitak mase u biološkoj obradi (H_2O, CO_2 i sl.)	399.146	19,0	129.896	33,9
Ostatak koji odlazi na odlagalište otpada	728.384	34,7	58.808	15,4

Zaključak

Prema Zakonu o održivom gospodarenju otpadom, a na temelju Pristupnog sporazuma Republike Hrvatske Europskoj Uniji i Direktive o odlaganju otpada u Hrvatskoj se do 2020. postupno treba smanjiti odlaganje biorazgradivog otpada u odnosu na baznu 1997. godinu.
Definicija biorazgradivog otpada prema navedenim dokumentima nije sasvim precizna i ostavlja mogućnost dorade u regulativi pojedine zemlje članice EU što u nas još nije napravljeno. Osim toga, budući da je u Hrvatskoj obrada komunalnog otpada planirana uglavnom s pomoću MBO tehnoloških rješenja otpad, odnosno ostatak nakon obrade otpada koji se odlaže na odlagalište otpada, nije moguće analizirati po istim sastavnicama kao svježi otpad.
Stoga se u članku predlaže praćenje biorazgradive komponente komunalnog otpada s pomoću ključnog parametra a to je biorazgradivi organski ugljik.
Napravljena je i simulacija bilance biorazgradivog ugljika u komunalnom otpadu Republike Hrvatske uz pretpostavku da se realizira sustav izdvajanja reciklabilnih sastojaka otpada prema zakonu, da se sav komunalni otpad obrađuje u MBO postrojenjima s aerobnom biološkom obradom te da se biostabilizirani ostatak u cjelosti odlaže na odlagalištima otpada.
Rezultati pokazuju da je moguće u Hrvatskoj ispuniti tražene uvjete, međutim za ispunjenje osnovnih pretpostavki u traženom roku trebat će intenzivirati postojeće aktivnosti i upotpuniti važeću regulativu s odgovarajućim podzakonskim dokumentima.

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