



HUSZPO

HRVATSKA UDRUGA STRUČNJAKA ZAŠTITE PRIRODE I OKOLIŠA

PRVA REGIONALNA KONFERENCIJA O PROCJENI UTJECAJA NA OKOLIŠ
FIRST REGIONAL CONFERENCE ON ENVIRONMENTAL IMPACT ASSESSMENT
Zadar, Croatia • rujan/september 18-21, 2013.

Tomislav STRAHOVNIK, Nenad MIKULIĆ

RESEARCH OF ENVIRONMENTAL INDICATORS IN THE
STRATEGIC ASSESSMENT OF THE ENVIRONMENTAL IMPACT OF
THE ENERGY PLAN AND PROGRAM

ISTRAŽIVANJE INDIKATORA OKOLIŠA U STRATEŠKOJ PROCJENI UTJECAJA NA
OKOLIŠ ENERGETSKOG PLANA I PROGRAMA

Tomislav Strahovnik, B. Sc. Mining • Croatian Energy Regulatory Agency,
Ulica Grada Vukovara 14, 10 000 Zagreb, Croatia • (tstrahovnik@hera.hr)

Nenad Mikulić, Ph.D. • EKO INVEST d.o.o., Draškovićeve 50, 10 000 Zagreb

RESEARCH OF ENVIRONMENTAL INDICATORS IN THE STRATEGIC ASSESSMENT OF THE ENVIRONMENTAL IMPACT OF THE ENERGY PLAN AND PROGRAM
ISTRAŽIVANJE INDIKATORA OKOLIŠA U STRATEŠKOJ PROCJENI UTJECAJA NA OKOLIŠ ENERGETSKOG PLANA I PROGRAMA

Environmental indicators in Strategic Environmental Assessment

Indikatori okoliša u Strateškoj procjeni utjecaja na okoliš

- 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;
- The aim of this paper is to:

1. 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;
2. Represent certain criteria for the selection of environmental indicators;
3. Using the Drive-Pressure-Impact-State-Response (DPSIR) model Energy related environmental indicators will be classified.

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

- Indikatori okoliša su učinkovit alat za praćenje promjena te ostvarenje ciljeva sektorskih politika ili strategija;

- Pomoću indikatora okoliša kvantificiraju se utjecaji pojedinog plana ili programa na okoliš;

- Cilj ovog rada je:

1. Istražiti indikatore okoliša koji su povezani s energetske sektorom, a koji se mogu koristiti u strateškoj procjeni utjecaja na okoliš energetske plana i programa;
2. Prikazati odgovarajuće kriterije za odabir indikatora okoliša;
3. Indikatore okoliša za SPUO energetske plana i programa odrediti primjenom DPSIR sustava.

U ovom radu naglasak će biti na zaštiti okoliša i utjecaju energetike tj. energetske sektora na okoliš u Republici Hrvatskoj.

DPSIR MODEL

DPSIR 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). Components of DPSIR model are: driving forces (D), pressures (P), state (S), Impacts (I) and responses (R) to the current state of the environment. Component model enables the analysis and synthesis of causal relations between anthropological and environmental activities and their consequences and possible responses to a changing environment.

Indicators related to the energy sector are:

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

DPSIR (engl. Driving forces - Pressures - States - Impacts - Responses) model je integralni model koji se koristi za analizu i proučavanje stanja okoliša, koji je osmislila Europska agencija za zaštitu okoliša (EEA).

Komponente DPSIR modela su: pokretačke sile (D), pritisci (P), stanje (S), učinci (I) i odgovori (R) na trenutno stanje okoliša. Komponente modela omogućavaju analizu i sintezu uzročnih odnosa između antropoloških aktivnosti i okoliša te njihovih posljedica i mogućih odgovora na promjene okoliša.

Indikatori koji se odnose na energetske sektor su:

Neposredna potrošnja energije po sektorima	Pokretačka sila
Ukupni energetske intenzitet	Pokretačka sila
Ukupna potrošnja energije po energentima	Pokretačka sila
Potrošnja obnovljive energije	Odgovor
Obnovljiva električna energija	Odgovor

Methodology and Results

Metodologija i rezultati

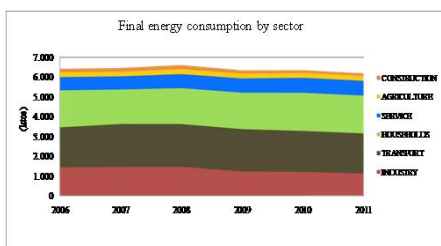


FIGURE 1. Final energy consumption by sector
SLIKA 1. Neposredna potrošnja energije po sektorima

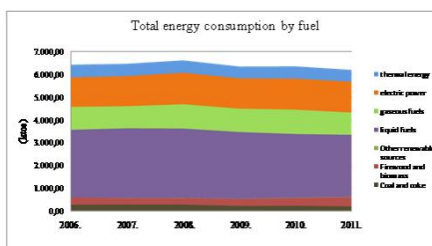


FIGURE 2. Total energy consumption by fuel
SLIKA 2. Ukupna potrošnja energije po energentima

Methodology and Results

Metodologija i rezultati

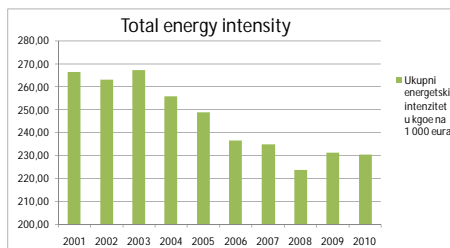


FIGURE 3. Total energy intensity
SLIKA 3. Ukupni energetska intenzitet

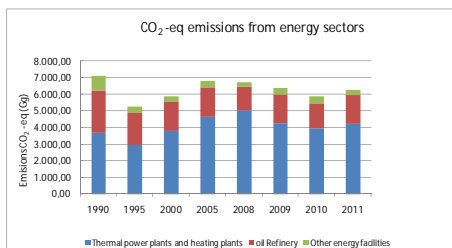


FIGURE 4. CO₂-eq emissions from energy sector
SLIKA 4. Emisije CO₂ iz energetska sektora

Methodology and Results

Metodologija i rezultati

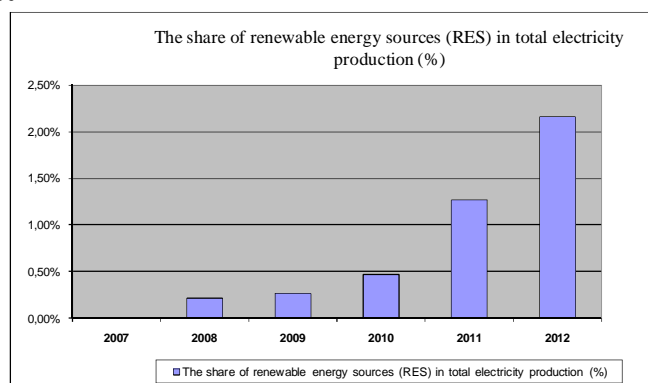


FIGURE 5. The share of renewable energy sources (RES) in total electricity production
SLIKA 5. Udio OIE u ukupnoj proizvodnji električne energije

Methodology and Results

Metodologija i rezultati

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
Air quality		S	
Climate change		S	
Biodiversity		I	
Human health		I	

TABLE 1. Overview of Selected environmental indicators according to the DPSIR model
Tablica 1. Prikaz odabranih indikatora okoliša prema DPSIR modelu

Results, discussion and conclusions

Rezultati, diskusija i zaključci

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.

Drive-Pressure-State-Impact-Response model koristan alat za odabir indikatora okoliša povezanih s energetskektorom, a koji se mogu koristiti u strateškoj procjeni utjecaja na okoliš energetskeg plana i programa.

In this paper, I added an indicator of the environmental pressures on the environment, such as emissions of pollutants (CO₂) from the energy sector, with 5 indicators which was selected by Croatian Environmental Protection Agency.

U radu sam prikazao 5 indikatora koje je odredila Agencija za zaštitu okoliša te sam pridodao još i indikator okoliša emisije onečišćujućih tvari u zrak (CO₂) iz energetskeg sektora.

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.

Odabrani indikatori okoliša za energetskektor ukazuju na postupno poboljšanje ukupnog energetskeg intenziteta te smanjenje ukupne potrošnje energije po vrstama energenata kao i ukupne potrošnje po sektorima.

THANK YOU!!

HVALA!!

