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Dr. sc. Branka Jelavić

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Mr. sc. Sandra Antešević

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Sadržaj / Contents

| | |
|---|----|
| PREDGOVOR / FOREWORD | 5 |
| ŽIVOTOPISI PREDAVAČA / PRESENTERS' CURRICULA VITAE | 7 |
| SAŽETCI REFERATA / PAPER ABSTRACTS | 11 |
| 1. Prof. Ing. František Janíček, PhD, Mgr. Miroslava Smitková, PhD, Ing. Juraj Kubica: KOMBINACIJA ENERGETSKIH PROIZVODA U SREDNJOEUROPSKIM ZEMLJAMA SKUPINE V4: POTRAGA ZA STABILNOŠĆU / ENERGY MIX IN CENTRAL EUROPEAN COUNTRIES OF THE V4 GROUP: THE QUEST FOR STABILITY | 13 |
| 2. O. Amerighi, U. Ciorba, G. Giannakidis, M.C. Tommasino: INICIJALNA KATEGORIZACIJA ALATA ZA DUGOROČNU ANALIZU ENERGETSKIH SUSTAVA – PRVI REZULTATI PROJEKTA ATEST / INITIAL CATEGORIZATION OF TOOLS USED FOR THE LONG TERM ENERGY SYSTEM ANALYSIS – FIRST RESULTS FROM THE ATEST PROJECT | 14 |
| 3. Cristine Heinrich: SIGURNOST OPSKRBE ENERGIJOM – POKAZATELJI ZA MJERENJE RANJIVOSTI I RIZIKA (STUDIJA NAČINJENA ZA NJEMAČKI ODBOR SVJETSKOG SAVJETA ZA ENERGIJU) / SECURITY OF ENERGY SUPPLY – INDICATORS FOR MEASURING VULNERABILITY AND RISK (A STUDY ON BEHALF OF THE WORLD ENERGY COUNCIL'S GERMAN MEMBER COMMITTEE) | 15 |
| 4. Igor Tomiš, Peter Koval', František Janíček, Ivan Daruľa: MOGU LI OBNOVLJIVI IZVORI ENERGIJE U SLOVAČKOJ ZADOVOLJITI BUDUĆE ENERGETSKE POTREBE? / CAN RENEWABLE ENERGY SOURCES SATIATE SLOVAKIA'S FUTURE ENERGY NEEDS? | 16 |
| 5. GianCarlo Tosato, Maurizio Gargiulo, George Giannakidis: ENERGETSKI SCENARIJI ZA EUROPU: REZULTATI PANEUROPSKOG MODELA TIMES / ENERGY SCENARIOS FOR EUROPE: RESULTS OF THE PAN EUROPEAN TIMES MODEL | 17 |
| 6. Viktors Zebergs, Ojars Kehris, Juris Savickis, Namejs Zeltins: METODOLOGIJA UPRAVLJANJA DUGOROČNIM RAZVOJEM ENERGETSKE UČINKOVITOSTI / THE METHODOLOGY OF MANAGEMENT FOR LONG TERM ENERGY EFFICIENCY DEVELOPMENT | 18 |
| 7. Prof. dr. sc. Stjepan Car, KONČAR – Institut za elektrotehniku: OBNOVLJIVI IZVORI ENERGIJE – TEHNOLOGIJE I RAZVOJ GOSPODARSTVA / RENEWABLE ENERGY SOURCES – TECHNOLOGIES AND THE DEVELOPMENT OF THE ECONOMY | 19 |

8. Masha Tarle, Sustainable Energy Europe Campaign, Mostra:
KAKO KOMUNICIRATI ODRŽIVU ENERGIJU: KAMPANJA EUROPSKE KOMISIJE
O ODRŽIVOJ ENERGIJI / **COMMUNICATING ON SUSTAINABLE ENERGY: THE SEE
CAMPAIGN OF THE EUROPEAN COMMISSION**.....20
9. Ina Körner, Bioconversion and Emission Control Group (IUE),
Hamburg University of Technology:
CIVILIZACIJSKA BIORAFINERIJA – BUDUĆI PRISTUP DOBIJANJU MATERIJALA I
ENERGIJE IZ ORGANSKOG OTPADA NA REGIONALNOJ RAZINI / **THE CIVILISATION
BIOREFINERY – A FUTURE APPROACH FOR MATERIAL AND ENERGY RECOVERY
FROM REGIONAL ORGANIC WASTE**22
10. Dr.sc. Goran Granić i suradnici, Energetski institut Hrvoje Požar:
KOJE PROCESSE U HRVATSKOM ENERGETSKOM SEKTORU MOŽEMO OČEKIVATI
DO 2050. GODINE? / **WHICH PROCESSES CAN WE EXPECT TO SEE IN THE
CROATIAN ENERGY SECTOR UNTIL 2050?**24

PREDGOVOR

Zašto je već danas važna energetska vizija do 2050. godine? U vremenima recesije, porasta nezaposlenosti, smanjenja gospodarskih aktivnosti i pada osobnog standarda, spominjanje 2050. godine izgleda kao daleka budućnost, gotovo nedohvatljiva.

Koji su argumenti ZA, usprkos činjenici da je predviđanje velikog broja utjecajnih čimbenika vrlo nesigurno (potrošnja, broj stanovnika, gospodarski razvoj, itd). Prvi argument proizlazi iz same činjenice da energetika ima vremenski dugoročnu dimenziju. Istraživanje, priprema, projektiranje, izgradnja i korištenje energetskih objekata vremenski dugo traje i zato traži dugoročne strateške planove. Ako se k tome doda da su procesi tehnološkog razvoja dugi i nepredvidivi u svom konačnom rezultatu, posebno u vremenskoj dimenziji ostvarivanja nove tehnologije i njezine komercijalne iskoristivosti, onda je promatranje strateških vizija u dugim vremenskim horizontima za energetiku nužno. Naravno to je nužan argument za DA, ali ne i dovoljan jer to nisu nove spoznaje. Navedene karakteristike energetike su poznata činjenica i po tome se sadašnje razdoblje ne izdvaja od nekog drugog razdoblja iz prošlosti.

Novi argument ZA su klimatske promjene i potreba radikalne redukcije CO₂ i drugih stakleničkih plinova u odnosu na 1990. ili godinu prema kojoj se mjere potrebne promjene radi očuvanja klime. Radikalno smanjenje emisija (očekivanja su 50%), u očekivanju rasta potrošnje energije, rezultira promjenama u cijelom ciklusu proizvodnje, prijenosa, distribucije i potrošnje energije. Energetika u 2050. godini, sa smanjenim emisijama CO₂ i ostalih stakleničkih plinova, je potpuno različita u strukturi potrošnje kod konačnog kupca energije, a posljedično i u strukturi proizvodnje energije.

Najviše se očekuje od tehnološkog razvoja jer se s postojećim tehnologijama ne mogu ostvariti očekivani rezultati redukcije CO₂ i drugih stakleničkih plinova. Vizija energetike do 2050. godine utjecat će na tehnološki razvoj i ubrzati ona rješenja koja su nužna za ostvarivanje postavljenih ciljeva.

Za planere u pojedinim državama, vizije razvoja energetike do 2050. godine nužne su radi usmjeravanja i podupiranja onih procesa koji mogu dovesti do ostvarivanja postavljenih ciljeva: sigurne i kvalitetne opskrbe energijom i smanjenje emisija CO₂ i drugih stakleničkih plinova. Vizija do 2050. godine treba doprinijeti razumijevanju problema energetskog razvoja, dati argumente za odluke o primjerice nuklearnim elektranama, potaknuti razvoj industrije i usluga prema novim tehnologijama uključujući i obnovljive izvore.



Dr.sc. Goran Granić

FOREWORD


Why the 2050 energy vision is already so important? In the times of recession, of rising unemployment, of sluggish economic activity and the decline of standard of living of individuals, the year 2050 may seem as a very distant future, almost beyond our reach.

What are the arguments PRO long term strategies, despite of the fact that the forecast for so many influential factors (such as consumption, population number, economic growth, etc.) appears to be highly uncertain. The first pro comes from the very fact that the energy industry operates in long timeframes. Research, preparation, designing, construction and exploitation of energy facilities are a long term process and, as such, it requires long-term strategic plans. Moreover, we should bear in mind that the processes of technological development are also extensive and their final outcome is not always predictable, especially in time horizons of realization of a new technology and its commercial usability, then strategic visions referring to long timeframes become crucial. Of course, it is necessary but not sufficient a case for long term strategies, because this is not something we did not know before. The said features of the energy industry are all quite well known, and they don not make difference between the present period and any other period in the past.

The new PRO argument comes from the climate change and the need to dramatically reduce CO₂ and other greenhouse gas emissions compared to 1990 levels or other year which is used as a benchmark for needed changes aimed at climate preservation. Dramatic emission reduction (with expected target of as much as 50%), while expecting an increase in energy consumption, brings about the changes along the whole cycle of production, transmission, distribution, and use of energy. The energy sector in 2050, with reduced CO₂ and other GHG emissions, has a totally different landscape in terms of consumption structure at end-user level and therefore in terms of structure of energy production structure.

The highest expectations refer to technological development because the current technologies are not able to meet the targets of reducing CO₂ and other GHG emissions. The vision of the energy sector until 2050 will influence the development of technology and will accelerate those solutions which are necessary for meeting the targets that are set up.

For plan makers in individual countries, the visions of energy development until 2050 are necessary in order to direct and support the processes which may lead to fulfillment of the objectives: secure and quality energy supply and CO₂ and GHG emission reduction. The vision until 2050 should contribute to understanding of the problems of the energy development, offer arguments for the decisions on, e.g., nuclear power plants, and incite the development of industry and services towards the new technologies, including renewable energy sources.



Goran Granić, PhD

ŽIVOTOPISI PREDAVAČA / PRESENTERS' CURRICULA VITAE

Alexander Zafiriou

Alexander Zafiriou works for the German Member Committee of the World Energy Council in Berlin. He is temporary delegated from his regular employer E.ON AG in Düsseldorf, where he focussed on security of supply and energy mix issues in the Division “Political Affairs and Corporate Communications”. Before joining E.ON he was senior adviser for the German Electricity Association (VDEW) in Berlin. Prior to this he worked as energy research fellow at University of Stuttgart. Alexander started his professional career in 1997 as a project manager in the industry. He is a German and Greek national and holds a university degree in mechanical engineering with specialisation on energy technique from Ruhr-University Bochum.



George Giannakidis

George Giannakidis holds a Mechanical Engineering Degree (1989) from the Aristotle University of Thessaloniki and a PhD (1993) from Imperial College, University of London. Since October 1997 he is a senior consultant in the Centre for Renewable Energy Sources and Saving in Greece, where he has mainly worked on energy analysis and energy policy issues. He is experienced in the use of various computer models for the optimum design of energy systems and the analysis of energy policy instruments. He has participated as a project partner and coordinator in a number of EU funded projects on energy planning and renewable energy sources penetration into the energy system. He has also participated in a number of national projects for the study of the potential of renewable energy sources, cogeneration of heat and power, and energy efficiency.



Dr. Habil. Sc. Ing. Viktors Zebergs

Education: University of Latvia, 1951

Experience:

Institute of Physical Energetics Head of the Laboratory of Energy Economy and Management, 2003 -

Memberships:

Honorary member of Latvian Academy of Science
Honoured President, Latvian Member Committee of WEC

President, Latvian Association of Energy Economics (the Affiliate of the IAEE)
Professor, Riga Technical University: speciality - energy economy
Member of Promotion Council P-12 Riga Technical University
Member of editorial Board of “Latvian Journal of Physics and Technical Sciences”
Member of editorial Board of journal “Energetika” (Lithuania)

Publications: More than 250

Masha Tarle

Masha Tarle holds a Master's degree in European Union Law and Policy from the Universidad Carlos III de Madrid and a BA degree in English Literature from the Universidad Autonoma de Madrid (Spain). Since March 2009 she has been working as Public Relations Manager for the European Commission's Sustainable Energy Europe Campaign, bringing promotional and communication support to Campaign Associates. These are defined as umbrella organisations and key allies of the European Commission, drawn from a wide variety of fields: energy industry, industrial associations, public authorities, networks, societal stakeholders, and media among others. Masha is also responsible for the international representation of the Campaign.



Before this, Masha worked for the former Commissioner for Energy and Transport, Ms Loyola de Palacio, and for organisations such as the International Labour Organisation (ILO) or the Organisation of Latin-American States (OEI). She has also taught Public Speaking at the Menendez Pelayo University in Madrid.

Masha was born in Zagreb, Croatia. Her mother tongue is Croatian. She is fluent in English and Spanish. She can speak and understand both French and German.

Goran Granic, PhD, Docent



Born: 18 April 1950 in Baska Voda, Republic of Croatia

Education:

BSc (Eng.) in 1972, MSc (Eng.) in 1976 and PhD in 1979, Faculty of Electrical Engineering and Computing, University of Zagreb.

Employment:

Energy Institute Hrvoje Požar, Director (1994 – 2000 and 2004 – present),

Government of the Republic of Croatia, Deputy Prime Minister (2000 – 2003),
Croatian Electric Utility Company, General Manager (1990 – 1991),
Union of Croatian Electric Utilities, Member of the Management Board (1987 – 1990),
Institute for the Electric Industry (1973 – 1987 and 1991 – 1994).

Other:

Member of Parliament of the Republic of Croatia since 1992,
Vice-President of Parliament (1995);
More than 160 publications in the field of energy sector planning;
President of the Croatian Energy Society and Member of the other expert organizations;
Associate member and Secretary-General of the HATZ (Croatian Technical Academy).

SAŽETCI REFERATA / PAPER ABSTRACTS

Prof. Ing. František Janíček, PhD, Mgr. Miroslava Smitková, PhD, Ing. Juraj Kubica*

Slovački tehnološki univerzitet u Bratislavi, Fakultet elektrotehnike i informacijske tehnologije, Odjel za elektroinženjering

KOMBINACIJA ENERGETSKIH PROIZVODA U SREDNJOEUROPSKIM ZEMLJAMA SKUPINE V4: POTRAGA ZA STABILNOŠĆU

Sažetak

U radu su istražene promjene u udjelima u potrošnji energetskih proizvoda u zemljama skupine V4: Republika Češka, Mađarska, Poljska i Slovačka. Prikazani su trendovi tijekom protekla dva desetljeća koji su kritički analizirani. Uz to su prikazani i mogući energetski scenariji do 2030. godine te je dana njihova ocjena. Na temelju postojećih scenarija za zemlje V4, ocjenjeni su utjecaji potencijalnih promjena za različite omjere između domaćih i uvoznih fosilnih goriva, nuklearnih izvora i velikih i decentraliziranih obnovljivih izvora. Analiza je obuhvatila promjene u energetskoj intenzivnosti nacionalnih ekonomija, strukturne promjene u potrošnji energije u različitim područjima kao što su industrija i kućanstva, postrožavanje kriterija očuvanja i zaštite okoliša kao i novu evaluaciju ovisnosti o uvozu primarnih izvora energije s mogućim smjerovima budućih trendova u elektroenergetskom sektoru u kontekstu liberalizacije energetskih tržišta.

ENERGY MIX IN CENTRAL EUROPEAN COUNTRIES OF THE V4 GROUP: THE QUEST FOR STABILITY

Abstract

The paper examines the development of the energy mix in the countries of the V4 region (Czech Republic, Hungary, Poland, and Slovakia). Trends over the past two decades are summarised and critically examined but mainly possible energy scenarios by 2030 are presented and assessed. Based on existing scenarios for the V4 countries, the impacts are assessed of potential developments for various ratios between domestic and imported fossil fuels, nuclear sources and large and decentralised RES. The analysis spans the development in energy intensity of the national economies, structural changes in energy consumption in various areas such as the industry and households, tightening of environmental criteria and a reevaluation of the dependency on imports of primary energy sources with an outline of possible future development directions in power engineering in view of the liberalisation of energy markets.

INICIJALNA KATEGORIZACIJA ALATA ZA DUGOROČNU ANALIZU ENERGETSKIH SUSTAVA – PRVI REZULTATI PROJEKTA ATEST

Sažetak

Europska komisija je, u okviru SET-Plana, inicirala planiranje tranzicije europskih energetskih infrastrukturnih mreža i sustava zbog niske potrošnje ugljikovodika u budućnosti. U tom kontekstu je 2009. godine inicirana aktivnost pod nazivom ATESt (Analize planiranja tranzicije i alati sustava energetskog planiranja radi implementacije sustava informiranja o energetskim tehnologijama). Cilje ove aktivnosti i projekta ATESt je pružiti alate koji bi se sastojali od modela, metodologija i postupaka koji su neophodni za potporu procesima donošenja odluka kada se radi o planiranju uporabe nisko-ugljkovih tehnologija i infrastrukture koja bi ih podržavala. U ovom radu je dan pregled postojećih alata, koji mogu odgovoriti potrebama planiranja tranzicije kao i specifičnim potrebama SETPlana. Pregled obuhvaća gotovo 85 modela i alata i djelomice se oslanja na rezultate otvorenog poziva timovima unutar i izvan EU-a koji se bave modeliranjem, a djelomice na izvore iz literature te sadrži opis identifikacije i evaluaciju i karakterizaciju definiranih modela.

INITIAL CATEGORIZATION OF TOOLS USED FOR THE LONG TERM ENERGY SYSTEM ANALYSIS – FIRST RESULTS FROM THE ATEST PROJECT

Abstract

In the framework of the SET-Plan the European Commission has initiated action on planning the transition of European energy infrastructure networks and systems towards a low carbon future. In this framework an FP7 Support Action named ATESt (Analysing Transition Planning and Systemic Energy Planning Tools for the implementation of the Energy Technology Information System) has been launched in 2009. The ATESt project aims to provide a 'toolbox' containing the models, methodologies and procedures required to support the decision making process for planning the deployment of low carbon technologies and their supporting infrastructure. An inventory of the existing tools, that can cover transition planning and the specification requirements of SETPlan, is presented in this paper. The inventory examines almost 85 models and tools and relies partly on the results of an open call to EU and non-EU modelling teams and partly on a review of the literature. It contains a description of the identification and evaluation procedures, and an assessment and characterization of the models identified.

SIGURNOST OPSKRBE ENERGIJOM – POKAZATELJI ZA MJERENJE RANJIVOSTI I RIZIKA

STUDIJA NAČINJENA ZA NJEMAČKI ODBOR SVJETSKOG SAVJETA ZA ENERGIJU

Sažetak

U radu je prikazan način na koji države članice Europske unije u okviru svojih mogućnosti ulažu napore na povećanju energetske učinkovitosti. U svakoj državi članici provode se istraživanja o metodama planiranja i upravljanja koje bi trebale dovesti do boljih rezultata u povećanju energetske učinkovitosti. U Latviji koja uvozi 70 posto ukupnih izvora energije, ušteda svake tone ekvivalentne nafte je od ogromne važnosti. Prilagodba metodologija za ocjenu općih politika predmet je proučavanja u cilju planiranja i upravljanja procesima energetske učinkovitosti. Analizirano je dvanaest metoda upravljanja energetskom učinkovitošću te su dane preporuke za uvođenje nekoliko najaktualnijih metoda.

SECURITY OF ENERGY SUPPLY – INDICATORS FOR MEASURING VULNERABILITY AND RISK

A STUDY ON BEHALF OF THE WORLD ENERGY COUNCIL'S GERMAN MEMBER COMMITTEE

Abstract

In an era of increasing globalization, secure and affordable energy supplies are an essential requirement for economies to work, much less develop and grow in the long term. The present study, Energy security of supply – indicators for measuring vulnerability and risk, develops a broad methodical assessment concept to raise awareness among policymakers and the public regarding the vulnerability of energy supplies to potential energy crises. It explores the different aspects of vulnerability, from the primary energy level to energy infrastructure (storage, networks, power plant parks) to the efficiency and cost of energy consumption for end users. The individual characteristics of the formal concept were quantitatively evaluated for several OECD regions (Germany, UK, Sweden, Poland, Italy, France and the US) using a comprehensive empirical database and reduced to a single indicator for assessing energy supply vulnerability. Part of the database comprises historical observations for the period between 1978 and 2007.

Igor Tomiš*, Peter Kovaľ, František Janíček, Ivan Daruľa

Slovački tehnološki univerzitet u Bratislavi,
Fakultet elektrotehnike i informacijske tehnologije

MOGU LI OBNOVLJIVI IZVORI ENERGIJE U SLOVAČKOJ ZADOVOLJITI BUDUĆE ENERGETSKE POTREBE?

Sažetak

U radu su istražene dugoročne opcije za zamjenu postojeće kombinacije neobnovljivih, konvencionalnih izvora energije s čisto obnovljivim izvorima u Slovačkoj, uz moguće uvođenje nuklearne energije u periodu od narednih 50 godina. Prikazane su ključne potrebe za energijom kućanstava i potrebe u industriji i transportu koje treba zadovoljiti kako bi Slovačka postala neovisna o inozemnim izvorima energije.

CAN RENEWABLE ENERGY SOURCES SATIATE SLOVAKIA'S FUTURE ENERGY NEEDS?

Abstract

The paper examines the options for replacing the current energy mix of non-renewable, conventional energy sources solely with renewable sources in the long term within the context of the Slovak environment, possibly combined with nuclear energy in the 50-year horizon. Vital needs are outlined in household energy consumption and energy consumption for industrial and transportation purposes to fulfil in order for Slovakia to become independent of foreign sources in energy supplies.

ENERGETSKI SCENARIJI ZA EUROPU: REZULTATI PANEUROPSKOG MODELA TIMES

Sažetak

Tijekom proteklih nekoliko godina izveden je određeni broj projekata koji su činili Paneuropski model TIMES koji je predstavljen u ovom radu zajedno s nekim rezultatima. TIMES (akronim za The Integrated MARKAL EFOM System) je alat koji je razvijen i korišten u okviru Programa analize tehnoloških sustava (Energy Technology Systems Analysis Programme) - provedbenog sporazuma Međunarodne agencije za energiju. Korištenjem modela TIMES, a u kontekstu projekta NEEDS koji je financiran sredstvima Šestog okvirnog programa, razvijen je model za skupinu zemalja koja obuhvaća EU-27: Island, Norvešku i Švicarsku. Tu su posebno modelirani energetske sustavi svake od 30 zemalja. Paneuropski model je zatim objedinjen na način da se omogućila razmjena energetske proizvoda između zemalja. Ovaj je model korišten kao polazna točka za razvoj modela RES2020 Pan-European TIMES (PET), kao i modeli u okviru projekta REACCESS i projekata REALISEGRID.

ENERGY SCENARIOS FOR EUROPE: RESULTS OF THE PAN EUROPEAN TIMES MODEL

Abstract

A number of research projects over the last years have produced as an output the Pan-European TIMES model, which is presented in this paper together with some results. TIMES (an acronym for The Integrated MARKAL EFOM System) is one of the tools developed and used by the Energy Technology Systems Analysis Programme an Implementing Agreement of the International Energy Agency. Using TIMES, in the framework of the NEEDS project which was funded by the 6th Framework Programme, a model for EU-27, Iceland Norway and Switzerland was developed. In this model the energy systems of each one of the thirty countries are modelled separately in detail. The Pan European Model was then synthesized by allowing trade of energy commodities among the countries. This model has been used as a starting point for building the RES2020 Pan-European TIMES (PET) model and the models in the REACCESS project and REALISEGRID projects.

Viktors Zebergs, Institute of Physical Energetics, e-mail: zebergs@edi.lv
Ojars Kehris, Economists Association 2010, e-mail: ojars.kehris@ekonomisti.lv
Juris Savickis, Nuclear Energy Competence Centre of LAS, e-mail: itera@itera.lv
Namejs Zeltins*, Institute of Physical Energetics, e-mail: zeltinsh@edi.lv

METODOLOGIJA UPRAVLJANJA DUGOROČNIM RAZVOJEM ENERGETSKE UČINKOVITOSTI

Sažetak

U radu je prikazan način na koji države članice Europske unije u okviru svojih mogućnosti ulažu napore na povećanju energetske učinkovitosti. U svakoj državi članici provode se istraživanja o metodama planiranja i upravljanja koje bi trebale dovesti do boljih rezultata u povećanju energetske učinkovitosti. U Latviji koja uvozi 70 posto ukupnih izvora energije, ušteda svake tone ekvivalentne nafte je od ogromne važnosti. Prilagodba metodologija za ocjenu općih politika predmet je proučavanja u cilju planiranja i upravljanja procesima energetske učinkovitosti. Analizirano je dvanaest metoda upravljanja energetskom učinkovitošću te su dane preporuke za uvođenje nekoliko najaktualnijih metoda.

THE METHODOLOGY OF MANAGEMENT FOR LONG TERM ENERGY EFFICIENCY DEVELOPMENT

Abstract

The paper has shown that the Member States of the European Union (EU) do what they can in order to accelerate the raising of energy efficiency (EE). In each EU Member State investigations are conducted in the planning and management methods with a view to achieve faster and greater EE gains. In Latvia, which imports almost 70% of the total energy resources consumed, saving of each „toe” is of great importance. Adaptation of the general policy assessment methodology is being studied for planning and management of the EE process. 12 EE management methods have been analysed and recommendations worked out for the introduction of several most topical methods.

OBNOVLJIVI IZVORI ENERGIJE – TEHNOLOGIJE I RAZVOJ GOSPODARSTVA

Sažetak

Obnovljivi izvori nadomještaju količinski ograničene fosilne izvore i bitno pridonose smanjenju stakleničkih plinova, a pritom imaju i veliko gospodarsko značenje za razvoj nove industrije i poticanje zapošljavanja. Kako bi se ubrzao postepeni prijelaz s fosilnih na obnovljive izvore, vlade svih zemalja članica EU-a usklađuju svoja zakonodavstva i podzakonske akte kojima se potiču ulaganja u korištenje obnovljivih izvora. Time se stvaraju mogućnosti za nova zapošljavanja, prvenstveno na proizvodnji opreme i postrojenja za korištenje energije vjetra, sunca, malih hidroelektrana, biomase i drugih oblika obnovljivih izvora.

Hrvatska je u posljednjih 10 godina donijela niz zakona i podzakonskih akata koji, također, stimuliraju investitore na korištenje obnovljivih izvora. Izvor subvencija je veća cijena električne energije koju plaćaju svi potrošači. S druge strane, razvoj domaće industrije i stjecanje referenci nužnih za dobivanje poslova su otežani zbog oštre međunarodne konkurencije i stranih izvora financiranja koji često uvjetuju nabavu strane opreme. U takvim uvjetima korištenje obnovljivih izvora ne pridonosi gospodarskom razvoju zemlje niti novom zapošljavanju u Hrvatskoj.

RENEWABLE ENERGY SOURCES – TECHNOLOGIES AND THE DEVELOPMENT OF THE ECONOMY

Abstract

The usage of renewable energy sources is a substitute for usage of fossil fuels, whose quantities are limited, and it represents an essential contribution to the reduction of greenhouse gases; at the same time it has a great economic significance for the development of new industries and creation of new jobs. To speed up gradual transition from fossil to renewable sources, governments of all EU member states harmonise their legislations and subordinate regulations promoting investments in usage of renewable sources and thus creating opportunities for new jobs especially in the production of plants and equipment for utilisation of wind power, solar energy, small hydro power plants, biomass and other kinds of renewable sources.

In the last 10 years Croatia has adopted a number of acts and regulations that also stimulate investors to utilise renewable sources, and the source of such subsidies is a higher price of electricity paid by all the consumers. On the other hand, the development of domestic industry and gaining references necessary for gaining new contracts are very difficult because of stiff international competition and foreign sources of finance, which often require purchase of foreign equipment as a condition for contract award. In such conditions the utilisation of renewable sources does not contribute either to economic development or creating new jobs in Croatia, but in the countries in which such equipment is produced.

KAKO KOMUNICIRATI ODRŽIVU ENERGIJU: KAMPANJA EUROPSKE KOMISIJE O ODRŽIVOJ ENERGIJI

Sažetak

Javne i privatne organizacije širom Europe otkrivaju važnost korištenja komunikacijskih strategija radi mijenjanja stavova i ponašanja potrošača kad je u pitanju potrošnja i očuvanje energije. Postoji jasna potreba za podizanjem svijesti o klimatskim promjenama, kako bi se potaknula javna rasprava i inspirirale inovacije u području energije.

Cilj ovog referata je opisati niz komunikacijskih strategija koje se u ovom trenutku koriste Europi kako bi se prenijele poruke o pitanjima energije. Pokazat ćemo kako različiti protagonisti odlučuju kako će komunicirati s javnosti o pitanjima energije, kome su poruke namijenjene i koje medije koriste kako bi te poruke prenijeli.

Bit će prikazane najbolje prakse u sljedećim područjima:

- Kako uvjeriti građane koji žive u starim stambenim zgradama da poboljšaju energetske učinkovitost zgrada
- Kako da građani u svojoj neposrednoj okolini prihvate infrastrukturu za obnovljivu energiju (npr. vjetroparkove ili solarne parkove)
- Populariziranje čistog transporta među mladima
- Kako postići da energetske intenzivne industrije smanje svoju energetske potrošnju
- Kako u školama podučavati o energetske inovacijama
- Kako privući medije u debatu o energiji
- Kako koristiti društvene medije kada govorimo o energiji (Youtube, Facebook, blogovi, itd.)

COMMUNICATING ON SUSTAINABLE ENERGY: THE SEE CAMPAIGN OF THE EUROPEAN COMMISSION

Abstract

Public and private organisations across Europe are discovering the importance of using communication strategies to change consumers' attitudes and behaviours related to energy use and conservation. There is a clear need to raise awareness on climate change issues, to spark public debate and to inspire energy innovation.

The aim of the conference paper is to describe the variety of communication strategies that are currently used in Europe to communicate on energy issues. We will see how different stakeholders choose to communicate on energy issues, who their target audiences are and what media they use to get their messages across.

The best practises shown will be in the following fields:

- convincing residents in old apartment buildings to improve the energy efficiency of their buildings
- getting citizens to accept new renewable energy infrastructure in their neighbourhoods (i.e. wind and solar parks)
- popularising clean transport amongst teenagers
- getting energy-intense industries to reduce their energy consumption
- teaching energy innovation in schools
- attracting the media to the energy debate
- using social media when talking about energy (Youtube, Facebook, blogs, etc).

CIVILIZACIJSKA BIORAFINERIJA – BUDUĆI PRISTUP DOBIJANJU MATERIJALA I ENERGIJE IZ ORGANSKOG OTPADA NA REGIONALNOJ RAZINI

Sažetak

Buduća oskudica energije i sirovina kao i problemi zaštite klime izazovi su koji imperativno traže rješenja. Kada se radi o efikasnoj upotrebi organskog tekućeg i čvrstog otpada, kojeg stvaraju gradovi, sam grad može postati biorafinerija. Rezultat tog procesa će biti različiti energetske i materijalni proizvodi iskoristivi u samim gradovima ili njihovoj okolici.

Ovisno o karakteru različitih materijala koje gradovi troše, ovi trebaju imati primjenu u biorafinerijama koje bi bile prilagođene različitim vrstama ovih substrata. Biorafinerije, koje će se razlikovati prema substratima koje koriste, mogu u pogledu lokacija biti postavljene na centraliziran ili decentraliziran način u samim gradovima. Štoviše, budući da se otpad iz jednog sustava može koristiti kao input u drugim sustavima, važno je njihovo umrežavanje. U cilju omogućavanja učinkovite valorizacije, bioresursi i vrsta biorafinerije trebaju biti optimalno međusobno kompatibilni. To, također, znači da se već u fazi prikupljanja, moraju uzeti u obzir materijalne karakteristike bioresursa i, ako je potrebno, uvesti nove sustave prikupljanja ili razmotriti tehničke postupke za odvajanje mješavina tih materijala.

Različite regionalne situacije tražit će i potpuno različite kaskade kao rješenja. Iz tog razloga, veoma će važna biti evaluacija alternativnih sustava. Ostala važna pitanja odnose se na to jesu li nove mjere ili postupci pogodni za integraciju u postojeće regionalne strukture, te na logističke aspekte uključujući i pitanje treba li postupke biokonverzije izvoditi na centraliziranim ili decentraliziranim lokacijama.

U Njemačkoj su danas, a tako će biti i u budućnosti, dostupne velike količine biološkog otpada koji se do sada gotovo u potpunosti kompostirao. Potencijali anaerobne fermentacije postaju sve važniji. Aerobna i anaerobna obrada biološkog otpada sve više se kombiniraju dajući rezultate koji su korisni za sve sudionike procesa. Ove će tehnologije predstavljati značajnu komponentu u civilizacijskim biorafinerijama u budućnosti.

THE CIVILISATION BIOREFINERY – A FUTURE APPROACH FOR MATERIAL AND ENERGY RECOVERY FROM REGIONAL ORGANIC WASTE

Abstract

The future shortage of energy and raw materials as well as the problems on climate protection are challenges for which a solution is imperative. For efficient utilizing organic liquid and solid wastes which are generated in a city, a city itself could become a civilisation biorefinery. The output will be various energetic and material products, which can be used in the city or in the surrounding of the city.

Depending on the nature of the various urban input materials, they need to be fed in to biorefineries adapted to the substrate type. The separate substrate-specific biorefineries may be at central or decentralised locations within the city. Moreover, since the residues from one system can be used in others as input, mutual networking is of importance. To facilitate efficient valorification, bioresources and the type of biorefinery need to be optimally matched. That also means that at the collection stage already, the material properties of the bioresource must be taken into account and where appropriate, new collection systems introduced, or consideration should be given to technical processes for separation of mixtures of materials.

Extremely differing cascades will be appropriate for the various regional situations. For this reason, the evaluation of alternative schemes will be seen as very significant. Additional important points are the suitability of new measures or processes for integration into existing regional structures, as well as the logistics aspects, including the question of whether bioconversion processes should be conducted centrally or in decentralised locations.

In Germany, considerable amounts of biowaste are available today and in the future which, until now, were almost entirely composted. The possibilities of anaerobic fermentation are gaining more and more in importance. Aerobic and anaerobic treatments of biowaste are more and more combined within the scope of a win-win situation. These technologies will be important parts of a civilisation biorefinery of the future.

KOJE PROCESSE U HRVATSKOM ENERGETSKOM SEKTORU MOŽEMO OČEKIVATI DO 2050. GODINE?

Sažetak

U članku su analizirani procesi koji se mogu očekivati u hrvatskom energetskom sektoru do 2050. godine u uvjetima značajnih redukcija smanjenja CO₂ i drugih stakleničkih plinova. Prikazani su i osnovni utjecajni čimbenici na potrošnju energije, ograničenja u razvoju energetskog sektora zbog klimatskih promjena i zaštite okoliša, tehnološki razvoj i njegov utjecaj na razvoj energetskog sektora, potencijal raspoloživih resursa i energetske infrastrukture za transport/prijenos energije i uvoza energije, te sigurnost i kvaliteta opskrbe energijom. Ukazano je na velike promjene u energetskom sektoru, nužnost izgradnje nove gospodarske politike koja bi se temeljila na povećanju energetske učinkovitosti, obnovljivim izvorima i tehnologijama koje proizvode električnu energiju s minimalnim emisijama CO₂ i drugih stakleničkih plinova ili doprinose njihovom značajnom smanjenju.

WHICH PROCESSES CAN WE EXPECT TO SEE IN THE CROATIAN ENERGY SECTOR UNTIL 2050?

Abstract

The paper analyzes the processes that can be expected to take place in the Croatian energy sector until 2050 in the conditions of significant reductions of CO₂ and other greenhouses gases emissions. It also shows the main factors influencing energy consumption; limitations in energy sector development deriving from climate changes and environment preservation; technological development and its impact on the energy sector development; potentials of available resources and energy infrastructure for energy transport/transmission and energy import, as well as the security and quality of supply. The paper highlights significant changes in the energy sector, necessity of developing new economic policies which would be based on enhancing energy efficiency and use of low CO₂ and GHG technologies or use of those technologies which contribute to substantial reduction of the emissions.