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## Introduction

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**Biographical notes:** J. Michna is a Professor in the Silesian School of Management in Katowice (Poland), where he lectures on ‘risk management’, and cooperates with the European Management Akademie in Düsseldorf (Germany). He has worked for more than 25 years in the industry, and later in the Polish Academy of Science as the Head of division for basic energy conservation problems. At the same time he has been an Advisor to the UNIDO and Polish Government on energy conservation policy. Since 1980 he has organised cooperation on these issues with the USA, the UK and Germany as well as with all the CEE countries. He is also the Founder and Chairman of The International Centre on Energy and Environment Policy for CEE countries.

R. Ney is a Rector of the Silesian High School of Management in Katowice (Poland), where he participated in scientific research undertaken by the ICEEP. He is also a member of the Polish Academy of Science, where he was a long-standing Scientific Secretary and currently chairs the committee on energy issues. Since 1980 he has collaborated with foreign institutions and experts on efficient energy policy. He is an author of more than 250 scientific publications on regional geology, mineral resources and energy policy.

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Ever since 1960s the countries of Central and Eastern Europe (CEE) have been a notable source of research, practical applications and methodical approaches on valuation of energy conservation parameters and couplings dispersions.

Especially in Poland, where hard coal production has been an important part of economy and provided majority of the export income, while at the same time forcing sweeping limitations on energy carriers, essential support was provided to energy conservation activities, as well as towards a decrease in electricity consumption and gas streams values dispersions.

One of the results was notable publications on methodical approaches useful in optimal energy consumption systems in different industrial technologies.

The intensity of research in this field rose even more after the so-called energy crisis in 1973.

Furthermore, Poland established a relevant state institution for energy economy, and inside it – a department for energy conservation, as a research and development centre in the field.

An important objective of this institution was to prepare a national scientific programme on ‘complex problems of energy generation’, where research on energy conservation in the economy has been given high priority.

The Polish Academy of Science (PAN) and the aforementioned state institution (GIGE) have jointly created a special unit on basic energy and fuel using problems (PAN/GIGE). Its objective was first and foremost a preparation of concept of national energy conservation policy as well as a specific, multidimensional programme of research for the entire Polish economy inside the wider, already-mentioned national scientific programme.

At the same time the unit in question has established an appropriate foreign cooperation network, especially with similar research institutions from other CEE countries: such as the former German Democratic Republic (Academy of Science, High School of Zittau, Metallurgical Academy in Freiberg), the Soviet Union (VNIKTEP and Academy of Science in Moscow, Energy Institute in Irkutsk), former Czechoslovakia (VUP and Academy of Science in Prague), Hungary (Energy Institute and Energy Control Institution in Budapest), Romania (ICEMENERG and Energy Institute in Bucharest) and Bulgaria (Academy of Science and Promyslennoia Energetyka in Sophia), as well as with relevant institutions outside the region, e.g., in the USA (MIT), the UK (British Energy Economy Institute), Federal Republic of Germany (Nuclear Research Centre in Jülich and Technical University of Munich), and Austria (IIASA in Laxenburg) and last but not least with the WEC (Committee for Energy Consumption in London) and the UN (Economic Commission in Europe – Geneva).

On the basis of its research the PAN/GIGE unit has been offered by the UNIDO a possibility to provide the focus point on ‘energy conservation policy’ of the European UNDP/UNIDO project on ‘energy conservation in industry’.

An appropriate research program prepared by the unit in question, acting in consultation with competent institutions participating in the project as well as in cooperation with scientific institutions from developed countries, has been undertaken. It included research on dispersion reasons of relevant parameters and couplings, describing energy conservation policy activities, and possibilities to decrease its implications.

After the first part of research was completed, UNIDO in Vienna and the PAN/GIGE unit in Katowice (in its journal) have published a report presenting a thought-through methodical approach on efficient energy conservation policy.

As the research results have not always fully corresponded with aims and interests of the influential energy aggregation and distribution lobby, the Polish Academy of Science – GIGE agreement on creation of the joint unit has been cancelled, and as a result the entire unit was taken over by the Academy (1987).

This organisational change has given the research in question a higher degree of liberty and support for development of themes connected to management of uncertainties and risk.

Therefore, after the return of Poland to democratic government, the research results have been used to advise it on preparation of a bill on energy conservation in the economy and of a national energy policy rationalisation project.

During the completion of the second part of the UNDP/UNIDO project Polish economy has begun (1989) its transition from central planning to market economy principles, which had also to be taken into account due to its influence on the discussed issues.

All this influence was accompanied by the emerging essential and specific transition period uncertainties and risk, making the experience of Polish and other CEE economies in the last two decades even more interesting.

The most important question in this respect may be formulated thus: How to select methods useful in organisation of efficient cooperation with government institutions, enterprises, municipal institutions and scientific institutions in developed countries?

Unfortunately, from the very beginning of these cooperation processes, a wide range of behaviours of the aforementioned organisations, as well as of people representing them could have been observed.

Essential factor contributing to this was the very low level of knowledge of the conditions in CEE countries and – by extension – of the existing additional and unprecedented sources of uncertainties that had emerged in these conditions.

Another important problem was the focus of these organisations and their representatives on achieving their own profit, combined with little or no concern whatsoever of more networked, long-term gains for themselves and their client institutions in CEE countries.

All these additional impediments to efficient transition period problem-solving were present in the field of energy and environment conservation activities, influencing the research provided within the scope of the UNDP/UNIDO project.

Therefore, during the European conference ‘Energy in Europe: The East-West Dimension’ in Berlin, not only particular reports by some CEE countries, but also a more synergetic one, based on the contents of the UNIDO project, with synthetic conclusions for all CEE countries, was presented and published in a special issue (Vol. 11) of the IAEE (1991).

The methodical approaches set out there have also been used for further research of PAN/GIGE, especially within the framework of experience exchange with the US National Academy of Science institutions, with British Energy Economy Institute on efficient energy conservation policy in CEE countries, as well as in contacts with experts participating in the UNDP/UNIDO project.

The essential results of this cooperation process are as follows:

- two American-Polish workshops on efficient energy consumption
- cooperation with Pennsylvania Energy Office (organisation of an American-Polish school for young scientist on energy efficiency)
- cooperation with the American National Association of State Energy Officials as well as some joint ventures.

Two further workshops with experts from British Energy Institute and Energy Efficiency Office as well as appropriate joint ventures have also taken place as a result of permanent cooperation established with the aforementioned Institute.

All the research in question has brought an effect in the form of publications for scientific journals in the USA, UK and Poland.

Intensive cooperation and experience exchange process with the German ‘Europa Management Academy’ in Düsseldorf, ‘Energy Policy Department’ of German Ministry of the Economy as well as with seminars on ‘Energy Economy in CEE countries’, organised by the ‘High School of Zittau’, has also emerged.

Energy conservation policy problems in transition countries have also been presented during a seminar in the University of Berkeley (1993), in the *International Journal on Global Energy Issues* (1994), during the international workshop ‘Energy–University–Environment’ in Bordeaux (1995), a seminar of the

American-Polish School for Young Scientists in Washington (1996), and a Polish-American conference organised in Poland on energy efficiency (1997).

The importance of specific implications of the so-called post-transition problems, search of efficient cooperation with enterprises in developed countries, as well as of introduction of sustainable development trends and economic delinquency issues have also gradually emerged.

Due to the fact that all these activities have brought to attention new sources of uncertainty, and not only within the discussed scope, the research subsequently provided on energy and environment conservation has been consistently undertaken with the use of complex system methods.

The actuality of this research has been confirmed through extension of cooperation to all countries that have regained their independence after disintegration of the Soviet Union and Czechoslovakia (Estonia, Latvia, Lithuania, Ukraine, Belarus, Czech Republic and Slovakia).

Specificity of post-transition problems in these countries has been evaluated through the 'Ecological energy concept for Baltic-Sea countries in transition' project (1996–1998; Estonia, Latvia, Lithuania and Poland).

Proposal of Europa Management Akademie (EMA) to organise a virtual Centre on Energy and Environmental Policy (ICEEP), aimed principally for the CEE region, proposed at that time, has met with support of experts from the countries in question.

The centre has therefore been officially established during a seminar in Warsaw, organised for deliberation on final results of the aforementioned Baltic Sea countries project.

ICEEP has been founded by appropriate experts from all 12 CEE countries, who have already cooperated in the past on the research described above, as well as two experts from countries evaluated to be the most important from CEE perspective in the field: the USA and Germany.

The initial subject of ICEEP research has been 'Mathematic modelling of energy conservation processes' (PRUE 1999, Zabrze), with special emphasis put on identification of energy carriers stream time functions and partial criteria used (i.e., these helpful in the more complex decision-making processes of energy conservation), valuation of energy conservation potential (by taking into account essential post-transition implications and their probable effects).

The next step into the research was establishing improvement of the situation in the CEE countries – as measured against their initial positions – on their way to accession to the EU, especially in reduction of uncertainty sources, ascertaining the value of this improvement in relation to other sources of risk and to the relevant experiences of other CEE countries as well as the relevant use of the latter (PRUE Zabrze 2000-1).

Thus achieved results have shown an advisability – or even necessity – of a more-than-expected complexity of approach towards current and future energy economy problems in CEE countries.

Firstly, methodical impediments noticeable at the beginning of transition period, such as too direct an application of methods used in developed countries, have been identified.

Next the research focused on implications arising from both the new market economy problems as well as from still existing post-transition problems. This has been achieved through valuation (by each CEE country expert) of established partial criteria for complex decision-making processes (in a five degree scale).

Additionally, dispersions of parameters used as partial magnitudes in the field of research have been evaluated in a similar way.

This research has come to a conclusion showing, that the lowest dispersions have had offered purchase prices, than dispersions of parameters used as partial magnitude.

Results of this research have also brought to attention the essential dispersions of relative parameters importance, as on expected effects from provided energy conservation policy in each CEE country (PRUE, Zabrze 2001/1; *IJ Global Energy Issues*, London, 2001, Vol. 16).

Therefore the ICEEP has undertaken research on 'Cooperation of Central and East European countries and developed countries on energy and environment conservation' (*IJ Global Energy Issues*, London, 2003, Vol. 19).

This research has shown very essential influences from common existing uncertainties of relevant parameters, coupling even opinions of competent experts and weaker initial position of CEE enterprises in the arising competition and in results in the efforts to achieve compromised profits (for both sides) from specific innovation.

In consequence, research has begun on 'Institutional support for energy and environmental policy in Central and Eastern European countries' for evaluation of efficiency increase in governmental, municipal and entrepreneurial support in the field (*IJ Risk Assessment & Management*, London, 2003, Vol. 4).

Special emphasis has been put on the analyses of institutions responsible for energy or environmental policy in general and for energy and environment conservation policy in particular.

The main conclusion was that the most useful and compatible with the post-transformation conditions modern management methods are the 'change management', 'risk management' and 'chaos management'.

In addition, the most advisable of evaluated methods are those focused on complex, strategic, ecological and cybernetic thinking.

Therefore the essential increase in the methods useful for appropriate decision-making in the field has been suggested, pointing particularly at the modelling of systems (processes) methods and connected sensitivity analyses on choices of most essential parameters and couplings (internal as well as external from the surrounding environment), by taking into account not only its deterministic, but also probabilistic and fuzzy character.

Basing on these conclusions, the ICEEP has begun its further research from 2003 onwards, with studies on 'risk management' in developed countries and in the CEE.

Firstly, the 'Development of risk analyses on energy and environment conservation' has been undertaken and completed, the results of are presented in articles by experts from some (eight) CEE countries as well as in synthetic form (for the entire CEE region) in a following part of this publication.

Due to the essential importance of strategic forecasts, the subsequent ICEEP research has referred to 'Strategic forecast on energy and environment conservation in CEE countries'.

A synthesis of its results is presented in a following part of this publication.

The next research theme of ICEEP was 'Main risk sources identification in energy and environment conservation' in CEE countries, particularly in reference to the implications of post-transition conditions.

A synthesis of the results is presented in a following part of this publication.

It has been noted, that in relation to great a number of risk sources, necessity exists to possess a relative valuation of it values, and for this reason as well as for the sake of continuation of research undertaken on risk management, the theme 'Risk valuation methods in energy and environment conservation' has been chosen.

A synthesis of the results is presented in a following part of this publication.

Due to the fact that each analysed risk valuation method has been used in a different intensity, the following research theme for ICEEP activities has been chosen to be 'Risk valuation methods used in energy and environment conservation'.

As in the earlier cases, a synthesis of the results is presented in a following part of this publication.

In every country an essential part of risk sources results from the existing economy delinquency, and therefore as the next ICEEP research theme 'Efficient possibilities to decrease economy delinquency'.

A synthesis of the results is presented in a following part of this publication.

The latest ICEEP research theme is the 'Future ICEEP research on risk management' (in energy and environment conservation activities), the results of which are presented in a following part of this publication.

The entire aforementioned research of ICEEP has been possible to undertake in no small measure owing to the interest taken by specific persons in equally specific and mostly new methodical approaches to energy conservation.

Therefore we owe the ICEEP members much gratitude for their great activity, even though this has been mainly achieved in their honorary capacity.

Another decisive factor has been the assistance provided for completion of the research described, which has been coming from many relevant institutions and persons.

Therefore special thanks belong to the former members of the Polish Academy of Science leadership: Prof. Ciszewski, Prof. Witold Gutkowski and the former Chief of Polish Main Energy Economy Inspection (GIGE) – Mr. Jerzy Wójcicki, who have created the independent division for basic research on rational fuel and energy consumption.

It is special to emphasise the innovation in science programs of this division, (as essential aim) the uncertain problems on energy conservation policy and to search: how to handle with dispersions of relevant parameters and couplings describing the appropriate energy conservation processes behaviour.

We owe special thanks to Prof. Jerzy Filipowicz the Manager of Polish Government program PR.8, who have contributed to the creation, as a most important directing line of this program, the research into the energy conservation activities.

Special thanks belong also to the former Head of department in the Polish Ministry of Economy Mr. Franciszek Krawczyński, who consistently supported the research in question as well as actively participated in a part of it.

After transition of government systems in CEE countries, the most essential support came from the Institute of Environmental Engineering of the Polish Academy of Science. The special thanks are also therefore owed to the Director of this Institute at the time, Prof. Jan Kapała, who secured the necessary economic resources for the research, as well as personally participated in the completion and presentation of the results achieved.

Later, he became one of the ICEEP founders and has actively participated in and supported the ICEEP research in its initial phase.

Great part in organisation of the ICEEP has been played by the Chairman of the 'Europa Management Akademie' in Düsseldorf, Dr. Detlef Frommann, who was the first

to come with the idea and has remained personally involved till today in providing essential assistance for completion of the research as well as in personally participating in it for the most part.

Great appreciation, which he has been shown as a result of these activities, can be noted in the fact, that ever since the ICEEP has been founded, he remains the elected Chairman of its Advisory Council.

The research results achieved have shown the utmost relevance of experience from the USA, the UK and Germany.

This is directly linked to the fact the aforementioned unit organised appropriate cooperation with MIT, NAS (USA), British Energy Economy Institute, High School of Zittau (former East Germany) and Technical University of Munich (former West Germany).

Gratitude is also owed to the efficient foreign research participants, such as Dr. Bednarz (still participating today), Prof. Wood of the MIT (who passed away in the previous decade), Prof. Stelson of the NAS, Prof. Carter of the BEEI (who passed away in 1996), Prof. Riesner of the High School in Zittau and Prof. Schneider of the TUM.

Last but not the least, the Latvian Academy of Science, and especially its Chairman and one of the ICEEP founders Prof. Yuri Ekmanis own a grateful mention.

This is also owned to Prof. Namejs Zeltins, whose responsibility and active participation in the ICEEP research have caused his repetitive election as its vice-chairman.

In 2003–2006 the ICEEP has been strenuously assisted by the City of Ruda Śląska in Poland (where the aforementioned Polish Academy of Science unit has resided), with a particular role played by the Mayor, Mr. A. Stania.

Also our friend, Dr. Jerzy Siemianowicz, has provided relevant deliberation points on risk management problems and has actively participated in the ICEEP research, for which he needs to be thanked.

At the end of our tether we wish to stress the positive position taken by the Chief Editor of *IJ Global Energy Issues* Dr. M.A. Dorgham, who from the very beginning of transition in the CEE countries has shown his keen interest in energy conservation problems arising there.

To all the ICEEP members, as well as to all persons supporting its activities, we wish to extend our gratitude for their great kindness.