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Editorial

The Fukushima disaster in 2011 and Germany's decision to phase out the use of nuclear energy by 2020, as well as the temporary closure of two Belgian reactors have resulted in a turn in public opinion against nuclear power in Europe. The position of the European Commission in this matter is neutral because it is the Member States that bear sole responsibility for the decision to use or not to use nuclear energy. Most of the fourteen states which have nuclear power plants are planning to uphold them or even to construct new ones. The Polish government, on 28 January 2014, adopted *the Polish nuclear energy program*. It creates several conflicting emotions and expectations of stakeholders - similarly to other investments referred to as "nuisance".

The Polish nuclear energy program poses many challenges, such as the need to build legal and organisational infrastructure, scientific and research support, personnel training system, etc. Given the socio-political conditions in the country, including the lack of developed technology assessment by the Parliament, the social capital level, political culture, high controversy of nuclear technology (stigmatisation) and a low level of knowledge about energy in Polish society, the construction process may be significantly longer.

The process of nuclear power plant construction, the period of its operation, shut down and radioactive waste storage are related to the necessity to adopt a specific solution for the provision of institutional and citizen control over information transparency in this regard. Understanding the complexity of the social perception of nuclear technology could allow for the communication process to be adapted to a large extent to the needs and expectations of the community where they are to operate.

The experiences of European countries which already have nuclear power plants specify the conditions for good communication and participation in energy projects. These include the recognition of different interests and perception of the local community, communication addressed at specific groups vital for acceptance, information distribution using tools and channels compatible with the residents' needs, continuous dialogue with local groups, especially those in opposition. Communication problems with the society are multifaceted. The most important are political, sociological, economic, ethical and psychological. In recent years in Poland we have seen more and more protests against unwanted investments. Such a situation may inspire to undertake research into the causes of these conflicts and seek pre-emptive solutions.

The present issue of the "European Journal of Transformation Studies" is devoted to social, political and psychological determinants of nuclear project implementation. It is assumed that the relationship between science and society, and between society and technology play an increasingly important role in the

introduction of new technologies, modernization of the existing ones or expansion of technological applications. The common perception and acceptability of technology and related risks depends on many factors, including the social processes of knowledge transfer on technological risks, on the message style, content, form and on a broad social context in which this transfer of knowledge and views on risk takes place.

The first article examines social determinants of nuclear technology implementation in Poland. The conclusions of the authors recommend paying more attention to social communication issues in nuclear programs implementation and emphasise that the ignorance of these issues can lead to the failure of many investments and numerous conflicts surrounding technology. In addition, they warn against uncritical introduction of solutions in Poland which operate in countries with many years of experience in nuclear facilities operation, yet have different conditions under which these solutions were implemented.

The second article titled 'Media discourse on nuclear energy in Poland' starts with the assumption that the mass media, especially dailies and opinion-shaping weeklies, play a role well documented in the theory of agenda setting (McCombs, Show 1972); a role in determining the themes around which public opinion and the basis for content evaluation by readers are built. The paper presents study findings whose aim was to establish the leading discourses on nuclear technology in the printed press in Poland.

Another article presents a psychological perspective on the perception of risk associated with controversial technologies. The author emphasizes that no consensus has been reached as to which factors are the most important predictors of negative attitudes towards energy technologies. It is, however, possible to distinguish variables and risk assessment models that enable explanation and prediction of these assessments. The most important include the psychometric model, a model based on heuristics and cognitive distortion, a model based on values and cultural theory of risk perception, a model based on attitudes and specific as well as non-specific sensitivity to threat. In this article the author examines the relationship of personal experience and values, and risk perception as well as discusses the implications of cognitive errors for technology risk assessment.

A further essay titled "2030 framework for climate and energy policies - challenges for the Republic of Poland" points out another problem, more important from the point of view of Polish nuclear power program, namely the issue of obligations of the EU Member States to achieve necessary indicators in the implementation of the Europe 2020 Strategy: A strategy for smart, sustainable and inclusive growth. This paper attempts to present Poland's progress in realising the commitments of the third target: climate change and sustainable energy use in individual European semesters and an indication what role the Polish nuclear power program plays in this process.

The last article makes an attempt to present the French model of social communication in nuclear energy. It presents institutions operating in this area with the emphasis on the purpose, tools and methods of information distribution and communication in French society. An attempt was made to evaluate the effectiveness of the "French model". The Flamanville 3 project was referred to.

The collection of the presented articles is only an introduction to the complex issues of society-technology relationships and was created in response to the commencement of the Polish nuclear power program implementation. The authors point out the need for the development of Polish research and international research cooperation for the development of the under-developed discipline of Science-Technology-Society in social sciences. Simultaneously, the authors express hope that this issue of "European Journal Transformation Studies" will inspire young researchers to undertake research in this issue in their academic work.

REPORTS AND STUDIES

SOCIAL DETERMINANTS OF NUCLEAR TECHNOLOGY IMPLEMENTATION IN POLAND

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Abstract

The paper presents partial results of research on the social determinants of the fourth generation nuclear technology implementation (High Temperature Reactors) in Poland. The results of in-depth interviews (IDI) are presented during which three classes of questions were asked: attitudes towards technology, knowledge and attitudes towards nuclear technologies and social communication in nuclear technologies implementation. It is assumed that the relationship between society and technology plays an increasingly important role in the introduction of new technologies, the modernization of existing ones or the expansion of technological applications.

Key words: *nuclear technology, social acceptance, decision making*

INTRODUCTION

The article presents partial results of the research conducted in 2013-2014 as part of the strategic research project *Technologies facilitating the development of safe nuclear energy in Poland, A social determinants analysis of HTR technology implementation*. The project was developed in response to the request to increase the country's energy security in the context of nuclear power implementation in Poland and is linked to the implementation of *the Polish Energy Policy until 2030* which was adopted in 2009 by way of the Resolution of the Council of Ministers and the adoption by the EU of the climate and energy package.

The study assumed that the analysis of the conditions of HTR reactor technology implementation in Poland, including the construction and starting the first industrial plant in over ten years, necessitates taking into consideration not only technological, industrial, infrastructure, etc. conditions, but also social ones. It was assumed that the relationships between society and science as well as between society and technology play an increasingly important role in the introduction of new technologies, the modernization of existing ones or the expansion of technological applications. Nonetheless, the common perception and acceptability of the technology and related risks depend on multiple factors, including the transfer of knowledge on technological risks via social processes, message style, content and

form and the social context in a broad sense in which this knowledge transfer and views on risk takes place.
The process of building a nuclear power plant, its operation period, shutdown and storing radioactive waste necessitate the adoption of a specific solution to communicate about, inter alia, power plant processes, inspection procedures and the society's participation in those. These problems will be current in the case of the fourth-generation technology. Understanding the complexity of the social perception of nuclear technologies will, to a large extent, enable adjustment of the communication process to the needs and expectations of the community where they are to operate.

GENERATION IV SYSTEMS

Generation IV systems are to be sustainable energy systems which supply energy at competitive prices, with optimal use of raw materials, with high levels of safety, reliability and resistance to nuclear materials and equipment used for nuclear weapons production.
A group of countries clustered around the Generation IV International Forum facilitates the development of new nuclear energy systems. This is an organization formed by Argentina, Brazil, Canada, France, Japan, South Korea, South Africa, the United States and Great Britain.
The members of the Generation IV International Forum chose six most promising systems worthy of joint development. These are gas-cooled fast reactor (GFR - Gas-Cooled Fast Reactor), high-temperature reactor (VHTR - Very-High-Temperature), supercritical water reactor (SCWR – Supercritical-Water-Cooled-Reactor), sodium-cooled fast reactor (SFR - Sodium-Cooled Reactor), lead-cooled fast reactor (LFR - Lead-Cooled Fast Reactor) and molten salt cooled reactor (MSR - Molten Salt Reactor)[1].
In 2002 a technology roadmap was published[2] for generation IV nuclear energy systems. The map pointed out the main objectives for nuclear energy systems development. Among them are ensuring sustainable energy production enabling achieving the targets for reducing air pollution, promotion and efficient use of fuels for the world energy production through systems whose use will be possible in the long-term; improving nuclear waste management by minimizing its amount, particularly with reference to waste load requiring long-term storage in order to improve public health and the environment; gaining a clear advantage over other types of energy sources in terms of the entire life cycle costs, i.e.: the facility construction, operation and decontamination, as well as the costs of fuel exploration, production, processing and storage; reaching the financial risk level comparable to other energy investments; gaining an advantage over other systems of operational security and reliability; very low probability and mitigated effects should the core melt; no need for external assistance in case of emergency; unattractiveness for theft of materials which might be useful in the production of weapons and increased physical resistance to acts of terrorism.

[1] http://www.nuclear.pl/energetyka,genIV,reaktory-iv-generacji.html (access: 12.07.2014).
[2] World Nuclear Association, http://www.world-nuclear.org

In Poland, the preliminary work on the HTR reactors implementation are conducted at the initiative of the Academy of Mining and Metallurgy and focus on the participation of Polish scientific and industrial units in EURATOM programmes, participation in Europe's High Temperature Reactor Technology Network (HTR-TN), Europe's Sustainable Nuclear Energy Technology Platform (SNETP) and its working group Nuclear Cogeneration Industrial Initiative Task Force. The preparatory works are intended to build a base for potential Polish investors, operators and users of process heat supplied by HTR reactors through the development of knowledge capital, competencies, staff and by sketching the vision for further scientific programmes development with their infrastructure (generally, creating conditions for HTR reactors purchase market development). Currently, the HTR reactor implementation programme should be seen as complementary, or as reserve at most, building competencies, attracting modern technologies to Poland, affecting mainly energy-intensive industry which uses process heating, and, in the second line, affecting commercial energy sector (Bielski, Cetnar, at. el., 2012, pp. 134-135). Polish institutions also participate in international research on nuclear cogeneration application based on high-temperature reactor technology in producing electricity and heat of a high temperature potential for industry. For example, the Stanislaus Staszic University of Mining and Metallurgy in Cracow is the leader in the HTRPL project, and the National Centre for Nuclear Research (NCBJ) is the leader in the NC2I-R project and the contractor for the ESNII project, the company Prochem chairs the NC2I task team which was set up under the SNETP (Sustainable Nuclear Energy Technology Platform)[3].

SOCIAL ASPECTS OF NUCLEAR POWER DEVELOPMENT

Poland lacks complete political consensus on nuclear energy development, without which the civilian nuclear programme development is impossible. Politicians determine the form and scale of nuclear technology development by allocating research grants, adopted energy strategies and political manifestos. The analysis of political manifestos (2011-2015) of the main parliamentary parties confirms this state of affairs (Kijewska 2014, 1221). The ruling party (Civic Platform) is an advocate and on 13 January 2009 they passed a resolution to start work on the Polish Nuclear Energy Programme (PPEJ)[4], and later in November that year they adopted a document called the Polish Energy Policy until 2030[5] which assumes the nuclear power introduction in order to diversify the electricity generation structure. While the coalition party (Polish Peasants' Party - PSL) and the largest opposition party (Law and Justice - PiS) declare conditional support, as their backing will depend on the referendum results should social controversy arise. Left-wing parties (Democratic Left Alliance - SLD and Your Movement - TR) unequivocally oppose nuclear power. Therefore, the citizens' attitude towards nuclear energy is key. It is worth remembering that in 1990 Tadeusz Mazowiecki's government passed a resolution to close the construction of the Żarnowiec nuclear power plant due to the

[3]http://www.ncbir.pl/programy-strategiczne/technologie-wspomagajace-rozwoj-bezpiecznej-energetyki-jadrowej/

[4] The Polish nuclear energy programme…

[5] Polish energy policy…

growing economic crisis and social opposition, after the referendum results in which almost 90 percent respondents were against (Syryjczyk, 1999).
Regular opinion polls indicate that support for nuclear energy in the Polish society is highly dependent on international events. The Fukushima disaster in March 2011 and the decision by Germany to shut down nuclear power plants led to a permanent decline in support – opponents made the majority until 2014. However, now, in the context of the conflict in Ukraine – Poland's neighbour in the east – with a major energy supplier (natural gas) – Russia – two thirds of Poles welcome the plans to build a nuclear power plant - 64% in favour (PISM Report, 2014, 47).

METHOD

In the study a method of in-depth individual interviews (IDI) was employed. The interviews were based only on an open-ended questions scenario (non-standardized interview) aggregated in three areas: attitudes towards technology, knowledge and attitudes towards nuclear technologies and social communication and nuclear technologies implementation. The interviews were conducted with respondents intentionally selected due to their position, social role and confusion when at the potential nuclear power plant location. Altogether, the total of ten in-depth interviews was conducted, including two with representatives of the local community (resident), two with local authorities' representatives (local authorities), three with active NGOs representatives (NGOs) and three with technical industry entrepreneurs (business).
The open-ended questions meant that the researcher sketched the response direction only to a limited extent – it was the respondent who decided how to answer questions, what he/she deemed the most important in the context of the issues in question. Interviewees' responses were spontaneous, which allowed the reconstruction of real views, ways of thinking, attitudes occurring in the tested population. Simultaneously, the interviewer had the opportunity to ask additional in-depth questions, leading to the high value and comprehensive nature of the information obtained. Conducting the intended number of in-depth interviews allowed us to make a qualitative analysis of the responses and enabled comparison of the respondents' statements. For control purposes, the interviews were audio recorded, and then transcribed.
First of all, the respondents were asked about their attitude towards technology. At the start of the interviews the respondents were asked in which areas of daily life they noticed technological presence? The respondents almost unanimously pointed to ICT and medical technology; both those used for diagnostic and therapeutic treatments. The level of knowledge on the technology application and specification varied and corresponded with the respondents' work experience (business representatives made a direct link between technology and their work); nonetheless, each participants perceived technologies as a fundamental element in the civilisation development and progress benefiting mankind in the first place.

> (BUSINESS) In the first row I'd see information and multimedia technologies. But we also shouldn't forget about medical progress as well as technological.
> (NGOs) I can see technology in every area of daily life because it is everywhere at the moment. First of all, technological development makes our

lives easier; secondly, it becomes longer, and thirdly, it becomes more and more interesting.

The main source of knowledge about technological development for the respondents was the Internet, interpersonal contacts and mass media. However, their opinions varied. The respondents who declared a low interest in technological development (residents) indicated television and advertising as a source of knowledge (TV, billboards). This indicates that they attributed propaganda messages (advertising) an informative nature. However, the greater the interest in technology, the greater the precision and diversity in identifying sources of information. They pointed to popular science magazines (NGOs, business), opinion making periodicals (NGOs) and information purposefully searched on the network (business, local authorities). Regardless of the source types, all respondents unambiguously declared that the information they possessed was sufficient for their needs.

> (NGOs) Actually, I look for information in rather publicly available media, like TV or possibly magazines, but they are not scientific magazines, or specialized, only current affairs ones. Current affairs writing is about moulding a certain picture of the reality according to the author's views. It may be that he/she is in favour of or opposed to, for example, some technology and then I always try to check if there is any discussion on this attitude, if there are any other views on this matter, and it actually is interesting. Because you can always read arguments on either side; and then I try to draw some conclusions and adopt an attitude of my own. Also, the information pluralism is very important for me, because you can't develop an opinion on a subject on the basis of only one piece of information presented only by one side.
>
> (BUSINESS) I gain knowledge by creating demand for my students' degree essays and it is they who gain knowledge for me, and I learn from them through induction.

The questions posed in the second area were to determine the respondents' attitudes towards nuclear technologies. Numerous studies (Horlick-Jones et. al., 2010, p. 515) confirm that among ordinary citizens nuclear technologies evoke negative associations associated with accidents, environmental contamination, cancer, etc. In literature, this phenomenon is referred to as "nuclear stigmatisation".

The respondents, when asked about the first free association with the term "nuclear energy", mostly referred to neutral concepts related to the technical aspects of nuclear power plant operation. Only direct questions about threats facilitated responses which recalled the Chernobyl or Fukushima disasters, though not in all respondents; in the local authorities group - the reeve sees it as a threat that in social perception nuclear power is linked to military applications or the Chernobyl disaster. However, he does not share this perception himself.

The risk of failure with its environmental contamination effects is, according to the respondents, a major drawback of nuclear energy. Among the arguments in favour of nuclear energy development the respondents mentioned reduction of CO2 emissions (BUSINESS), regional development (NGOs) as well as scientific and technological progress (NGOs). Local communities' representatives had no opinion

in this regard, and only the questions asked provoked them to list potential benefits.

It should be noted that the differences in the respondents' associations correspond with their work experience. Local authorities' representatives place nuclear power in the context of the Polish Nuclear Power Programme (PPEJ) whose construction will create opportunities (benefits) or problems for local government units.

> (LOCAL AUTHORITIES) Lake Żarnowiec belongs to the territory, the name of our town is Żarnowiec, but it belongs to the municipality of Gniewino. That's why we talk about, the Krokowa-Gniewino location, because these 30 acres, of the buried lake [is on the borderline of these municipalities (added by the interviewer)] that's why we all work here together and one percent of tax on such a building is a lot of money, but one percent spread evenly over the neighbouring municipalities.
>
> (LOCAL AUTHORITIES) and we want that within the economic outlook, because every municipality wants to do these projects, wants to do some joint projects. So, for example, communication safety, that is some pavements along major roads. So to when those cars, the service will be driving along, then those people would be transported.

For business representatives, NGOs and local authorities, nuclear power is an acceptable and futuristic source of energy, at times in the form of conditional approval - yes, but not on our land (NIMBY syndrome), as exemplified by the statement of a local authorities officer:

> (LOCAL) In general, as far as I am concerned perhaps, but I think it is perceived so by the majority of the population, we are slanted towards any innovation in principle, towards wind power, shale gas power, nuclear energy, but provided that this does not concern us, that this happens somewhere out there beyond us.

Interpretation of the meanings contained in the interviews indicates that the process of obtaining energy from nuclear fission did not raise any controversy. The scepticism about the construction of nuclear power does not apply to nuclear technology, but the evaluation of non-technical conditions of this investment in Poland. The interviews pointed to the political-cultural aspect of nuclear power development. Most respondents (NGOs, business, local authorities) indicated the problem of politicization in decision making. In particular, the respondents pointed to the problem of the tenure in the context of decisions and the associated risk of dropping previous decisions in case authorities change.

> (LOCAL AUTHORITIES) Because it can't be that after the elections the political option changes and we have a different outlook on the economy. The economy should be separated from politics and then we wouldn't have problems like we have today, right?
>
> (LOCAL AUTHORITIES) Because really as for today, we are not being informed, for example, about the direction in which our energy policy has to go, right? Whether we're going to continue with coal, or we will seek some green solutions which are not always cheap and which we not always can afford.

In the respondents' opinion there is no coherent and strong vision for energy development for this country. Despite governmental strategies of national energy

development[6], the respondents feel there is a lack of consistent and long-term national energy development concept. This assessment is probably linked to the ambivalence of political parties' leaders present in the media.

Trust is another important element related to nuclear power implementation. The responses indicate a low level of trust in the government, both on the level of political dissidents, as well as state, market and non-government institutions. The low level of trust became apparent especially in the responses by business and non-government organisations representatives.

> (BUSINESS) So the problem with nuclear power is not in technology, though it is a certain problem, because in Poland there are no engineers and staff, who would be able even to take over nuclear technologies that the French or Americans would sell us... The absolute lack of trust exists even without a lack of trust in this context, the same applies to business. This will cause that we will not be able to do such large projects. Without breaking this barrier we will not do large projects.
>
> (BUSINESS) A large part of these ecological companies is there just to cash in on it. They keep in very shallow esteem people, frogs and various other things. They are there to earn and therefore are protesting against the investment so that at some point some compensation appeared in their account.
>
> (NGOs), All this technology is built somewhere else, not here. Therefore, the nuclear power plant in Poland means import of technology without creating jobs. And actually, my arguments are again non-government resulting from some knowledge of social sciences, not to mention political sciences, right? So the whole campaign is ideological, to build this plant is lobbying to me. There are groups that want to make money on this, which are reminiscent...

The third area aimed at identifying communication factors in nuclear technologies implementation and determining the respondents' expectations in terms of information and participation in the project. According to the respondents, there is a lack of full, prior information.

> (LOCAL ATHORITIES) First, you have make the local authorities aware of the risks, benefits, how the technology operates so that we can pass it on to the residents.

Secondly, the respondents pointed to the lack of a complete (comprehensive) information, including the national energy strategy.

> (LOCAL AUTHORITIES): First of all, you should have started with educating the residents, making them aware of what the technology is, what are its characteristics, what risks it brings, but also what benefits. Because most of these protests stem from ignorance. The information we have comes from the Internet, where it is not always presented fairly, as most often what is shown is only the good points.
>
> (LOCAL AUTHORITIES): We are not being informed, for example, of the direction in which our energy policy is to go, right? Whether we are going to continue to be coal dependent, or we will seek some ecological solutions

[6] Polish Ministry of Economy, Poland's Energy Policy until 2025, of 4 January 2005, Polish Ministry of Economy, Poland's Energy Policy Project until 2030, from September 2008.

which are not always cheap and we not always can afford them. There is a lack of such national policy;

(BUSINESS): If you take some action based on an opinion poll study, it is hard to expect that someone will get a grip on such a hot potato as the construction of a nuclear power plant in Poland. In the context of persistently such low support, I think, for this type of investment on the part of residents, no-one specifically wants to take this up. This is my perception looking at what the government is doing, or what various institutions are doing in this field. On the one hand, we are given expert data which clearly shows we are in for an energy deficit within the next decade or so, on the other hand, we really do not see any action aimed at bringing us closer to the solution of such problems.

The respondents pointed to the lack of knowledge about the institutions responsible for the programme implementation. This points to the need to specify the leader-institution of the nuclear project. A multitude of agents involved in nuclear power development contributes to the confusion.

Research on the social perception of nuclear technology indicates that treating residents as stakeholders is a factor which increases approval (Ruuska et. al., 2011;). The question of involving regular residents into decision-making and the identification and analysis of the views of the interested parties (fears, aspirations with respect to the newly built nuclear power plant) is the essence of the involvement model (participatory) in social communication. In this regard, the respondents indicated that the decision as to the direction of energy development (including nuclear power development) is the responsibility of the state institutions. They understand their participation only if the investment is to be carried out in their place of residence.

(LOCAL AUTHORITIES): A decision should be taken at the government level.

(NGOs) The decision as to 'whether' is taken by the government, and 'where' by the society.

(BUSINESS): The decision should be taken by the state in consultation with local communities in the vicinity of which the investment would be carried out.

(BUSINESS): The decision is up to the investor, the state as a regulator granting terms and conditions.

The respondents unequivocally indicated that the direction of the national long-term energy development lies in the power of the central government. Participation from others in decision-making happens only at the level of location selection.

CONCLUSIONS

The researches revealed that attitudes towards nuclear power are complex and do not relate merely to the question of technology acceptance, which does not usually raise major controversies. The factors that determine the perception of nuclear power as important include: (1) the level of trust, (2) the political-economic context, and (3) the location, national and destination target dimensions of the investment; in particular, the level of trust in state institutions, government and politicians (the Minister responsible for the programme), law regulating and inspection institutions

(PAA, the Ministry of Economy, scientists) and market institutions (investors: PGE EJ1, technology providers: AREVA, Candu, and others). The research showed a low level of institutional trust, which confirms the general tendency among Poles (Czapiński, Panek, 2013, p. 425) - a high level of interpersonal trust (family and friends - more than two-thirds showed trust here) and low institutional trust (one third is showed trust here). As for institutions, we are dealing with the so-called negative trust; the research confirmed suspicions against persons and institutions responsible for the nuclear power programme implementation, and these suspicions are deepened by the confusion resulting from a large number of agents involved in the development PPEJ. This points to the need to specify the leader-institution in the nuclear project.

Moreover, the respondents' opinion indicates that the distrust is further deepened through sponsoring educational exhibitions, training programs, briefings by foreign energy companies (e.g. Worley Parsons, EDF). The respondents refer to these activities as lobbying the negative sense[7], while energy companies as activities in corporate social responsibility (CSR) and sustainable development.

The research findings indicate a number of areas which require in-depth research in order to obtain full responses.

One of them is the issue of the lack of willingness to "be involved". Despite the low level of institutional trust, the respondents do not see themselves (the society) as a party involved in the decision-making, even if in a limited manner by way of a referendum. This may indicate that at this stage residents are not prepared to participate in nuclear power decision-making processes. The explanation of the tendency of individuals to get involved can be found in Dahl and Stinerbrickner (2007, 171). They point out the correlation between getting involved and meeting the following conditions: potential rewards, alternatives, being in control over the outcome; belief that the outcome will not be satisfactory if we do not take action; the level of knowledge and skills; the necessity to overcome as few obstacles to action as possible; motivation to participation by others.

Another important factor is the colloquial perception and acceptability of the technology and its risks. Gadomska (2008, 6) emphasizes that they are dependent on many factors, including social knowledge transfer processes on technological risks, on the style, content, form of communication and broadly on social context in which this transfer of knowledge and views on risk takes place. The research findings in the project Create Acceptance (2008, 114) indicate that an essential element in determining acceptance conditions is to take into account national and local political, cultural (environmental and energy awareness, the level of research funding), institutional, social, economic, material and geographical contexts. The results of the above study coincide with those in the IDI. They lead to the conclusion that it is particularly important in the process of energy technologies implementation to ensure information availability, currency and reliability as to the transparency of political and economic decision-making. Particular attention should

[7] Lobbing and regional challenges in the EU – Among EU states, Poland stands out with its lack of acceptance of lobbying. In Polish public debate lobbying most often equals corruption-like activities. A similar perception of lobbying is also typical for various opinion polls institutions and organisations as well as journalists and publicists (Mrozowska S., 2014, p. 126).

be paid to monitoring the availability of official communication channels (e.g. web pages of the concerned institutions). No information, lack of updates, not including sources and insufficient information at the local authorities level (municipality, district) facilitates the spread of a "culture of mistrust"[8]. Communication activities should take into account the local and nationwide contexts. The nationwide context is one-sided communication from the leader-institutions which enjoys high social trust, whereas at the local level it is dialogue communication – inclusive.
Subsequent deductions lead to the conclusion that risk assessment triggers associations with nuclear disasters at Chernobyl (1986) and Fukushima (2011). The stigmatisation effect appears only in targeted questions about risks. Another negative association is the military use and the risk of a terrorist attack on the plant.
Currently, in the European public debate there is a clash of arguments in favour of nuclear energy development among which point to the need to reduce CO2 emissions – e.g. in connection with the implementation of Europe 2010 strategy by the European Union – and the supply security against arguments in favour of Europe's withdrawal from nuclear power which raise the problems associated with the disposal of radioactive waste and plant safety. In the interviews, the argument regarding the emission reduction was raised by only one respondent (business), whereas the issue of waste disposal was not raised. The situation may be related to objective factors resulting from the lack of fully formed public discussion on nuclear energy; this being due to the fact that there is no nuclear power plant in Poland and the fact that the respondents do not feel to be sufficiently informed in order to have an opinion on nuclear energy benefits and threats.
The interviews allowed to identify the research areas which require in-depth interdisciplinary research in Poland involving e.g. sociologists, political scientists and psychologists. Running research is an essential element to adopt solutions in communicating processes inside a power plant, control procedures and the participation in them by the Polish society. Implementing the solutions which already exist in countries with many a year experience in nuclear units operation may lead to the failure of many investments and emergence of conflicts around technology.

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[8] Understood as common and generalised suspicion towards people and institutions, compelling one constantly to monitor and control their activities for fear of fraudsters, abuses, lies, incompetence, plots and conspiracies (Sztompka P. 2003, pp. 326-327).

REFERENCES

Bielski P., Cetnar J., Grzyb R., Kucharski J., Lotz T., Pieńkowski L. (2012), Jądrowa kogeneracja. Reaktor jądrowy typu HTR jako skondensowane źródło ciepła do zastosowań industrialnych (Nuclear cogeneration. Nuclear HTR as a condensed source of heat for industrial application), K. Jeleń, Z. Rau [Eds], In: *Energetyka jądrowa w Polsce (Nuclear energy in Poland),* Warsaw: Wolters Kluwer, pp. 126-151.

Czapiński J., Panek T., (2013), Diagnoza Społeczna 2013. Warunki i jakość życia Polaków. Raport (Social Diagnosis 2013. Conditions and Life Quality in Poland). http://analizy.mpips.gov.pl/images/stories/publ_i_raporty/DS2013/Raport_glowny_Diagnoza_Spoleczna_2013.pdf [21.11.2014].

Horlick-Jones T., Prades A., Espluga J. (2010), Investigating the degree of "stigma" associated with nuclear energy technologies: A cross-cultural examination of the case of fusion Power, *Public Understanding of Science* 21(5) pp. 514–533.

Kijewska B. (2014), Problematyka energetyczna w ujęciu politycznym: kwestie energetyczne w programach politycznych (Energy problems in the political context: energy questions in political manifestos), *Przegląd Naukowo-Metodyczny „Edukacja dla Bezpieczeństwa" (Science-Methodology Review 'Education for Safety'),* Year VII, No 3/2014 (24), pp. 1215-1227.

Mrozowska S. (2014), *Lobbing a wyzwania regionalne w Unii Europejskiej (Lobbying and regional challenges in the EU)*, Gdańsk: Gdańsk Uniersity Press.
Nuclear energy in Poland PISM Report (2014),
http://www.pism.pl/publikacje/raporty-PISM/Energetyka-jadrowa-w-Polsce
[21.11.2014].

Ruuska T. Ahola, K. Artto, G. Locatelli, M. Mancini (2011), A new governance approach for multi-firm projects: Lessons from Olkiluoto 3 and Flamanville 3 nuclear power plant projects, *International Journal of Project Management*, Volume: 29 Issue: 6 pp. 647-660.
Sztompka P. (2003), *Socjologia (Sociology)*, Kraków: Znak.

Syryjczyk T. (1999, Przesłanki decyzji w przedmiocie likwidacji Elektrowni Jądrowej Żarnowiec (Circumstances for the decision to close down the Żarnowiec Nuclear Power Plant), access: http://www.syryjczyk.krakow.pl/Elektrownia%20Jadrowa_T.htm [20.12.2014].

Dahl R.A., Stinerbrickner (2007), Współczesna analiza polityczna (Contemporary olitical analysis), Warsaw: Wydawnictwo Naukowe Scholar.

Gadomska M. 2008), Potoczna percepcja i społeczna akceptacja skomplikowanych technologii. Przypadek syntezy termojądrowej (The colloquial perception and social acceptance of complex technologies. A thermonuclear synthesis case study), Postęp Techniki Jądrowej (Nuclear Technology Progress), 2008, vol. 51, z.1., p. 6.

Create Acceptance (2008), Factors influencing the societal acceptance of new energy technologies: Meta-analysis of recent European project, www.esteem-tool.eu/fileadmin/esteem-tool/docs/Resourcesreport.pdf [12.12.2014].

MEDIA DISCOURSE ON NUCLEAR ENERGY IN POLAND

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Abstract

In January 2014, the Polish government decided to build a nuclear power plant. Nuclear technologies raise social controversy, and the media are an important source of information for social interpretation. The information presented in the media is becoming increasingly important due to the attention devoted to it. The reality aspects which are publicly interpreted (news framing) gain social significance. Since the media play an important role in shaping public perception, I examined print media coverage of nuclear energy. I analysed the content of editorials and news items from two newspapers: The Gazeta Wyborcza and Fakt, and two magazines - Wprost and Newsweek. The analysis allowed distinguishing nine thematic frames in which nuclear energy is dealt with. With over two-thirds (72%) constituting the three frames of Nuclear Power Plant, Energy Policy and Personal Matters. The remaining ones (six) are those whose references were marginal. The disposal of radioactive waste and environmental impact assessment are utterly removed from the picture. The media coverage is dominated by activities within the adopted nuclear energy development programme and energy strategies of the European Union, which are currently ongoing at the level of political decisions. Information and journalistic commentary is visible from the perspective of power, not that of a citizen's.

Key words: *nuclear energy; media framing; content analysis*

Experience with nuclear power

The beginnings of nuclear energy development in Poland date back to the mid-50s, when in 1955 the construction of an experimental research reactor EWA (the rector operated until 1995). Currently, the only functioning nuclear reactor is the research reactor MARIA at the National Centre for Nuclear Research in Świerk (NCBJ). The reactor is used to produce medical radioisotopes (molybdenum isotope) which Poland sells to 78 countries, covering 18% of the global market.

The nuclear power plant Żarnowiec was to be the first step in the development of Polish nuclear power by the Resolution of the Council of Ministers of 18.01.1982. However, the deteriorating economic and political situation of the country in the transition period 1989-90 was not conducive to this investment. The Chernobyl accident played a significant role in terms of social resistance. In November 1989, environmental organizations activists and some local residents blocked the transport of the first two tanks and one block for the main reactor. The most active

participants of the protest included Franciscan Ecological Movement[1] activists, Gdańsk Ecological Forum[2], Freedom and Peace Movement, 'I'd rather be' Movement[3]. The intensity of protest led to the decision to organize a referendum under the Public Consultations and Referendum Act of 1987. The Żarnowiec project lost in the referendum. Among the 44.3% of the voters, 86.1% were against the construction continuation, and 13.9% were in favour. The referendum result, due to a low turnout, did not lead to an immediate decision to abandon the construction, so demonstrations continued. The second nuclear power plant was to be built in Klempicz (decision of the Planning Commission of the Council of Ministers of 05.06.1987). The decision to abandon the nuclear power plant project was finally taken 04.09.1990[4].

The discussion on nuclear energy development in Poland returned in January 2005 in the *Polish Energy Policy by 2025*[5] document adopted by the government. Whereas the final decision to build a nuclear power plant was confirmed by the Council of Ministers in the "Polish Nuclear Power Programme" (PPEJ) adopted on 28.01.2014. the programme assumes the construction of two nuclear power plants by 2035 with a total capacity of 4500 MW (PPEJ, pp. 34, 44). In addition, research projects are being carried out on Generation IV nuclear technologies (NC2I-R - Nuclear Cogeneration Industrial Initiative - Research[6], Technologies supporting safe nuclear energy development[7]).

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[1] In 1986-1988, Franciscan Ecological Movement (FRE) organized a series of lectures presenting the potential risks associated with the construction of a nuclear power plant, mini-conferences at the Gdańsk Scientific Society and actively protested against the construction of the power plant. FRE organized, among others, camps for 700 children from the Chernobyl region. The most-renown FRE activists included: Jerzy Jaśkowski (*Katastrofa w Czarnobylu a Polska* [*Chernobyl disaster and Poland*], Gdańsk 1992), Władysław Dobrowolski, Tomasz Burek. Official website: http://www.frech.org.pl.

[2] Gdansk Ecological Forum (GFE) was the main organizer of public protests (demonstrations, leaflets, letters to the authorities). One of GFE objectives was to prevent the development of nuclear power in Poland.

[3] *Freedom and Peace*, and *I'd Rather Be* applied, among others, protest in the form of blocking roads together with local residents and hunger strikes.

[4] See more [in:] I. Kordulska, *Zanim wejdziesz na drzewo. Poradnik prawny obrońcy środowiska*, Rozdz. 4, *Wybrane przykłady udziału społeczeństwa w ochronie środowiska* [Before you climb a tree. A Legal Guide for Environmentalists, Ch. 4 Selected Examples of Public Participation in Environmental Protection], J. Waluszko, *Przyczyny skuteczności protestu przeciw budowie Elektrowni Jądrowej Żarnowiec 1985-1990 [Causes behind the effectiveness of protests against the construction of the nuclear power plant in Żarnowiec 1985-1990*],
http://www.tezeusz.pl/cms/tz/fileadmin/user_upload/nowastartowa/EJUG2.pd (date read: 12.08.2014).

[5] Polish Energy Policy by 2025., "Monitor Polski", No. 42/2005, pos. 562.

[6] National Centre for Nuclear Research, http://www.ncbj.gov.pl/node/2789

[7]National Centre for Research and Development,http://www.ncbir.pl/programy-strategiczne/technologie-wspomagajace-rozwoj-bezpiecznej-energetyki-jadrowej/

Public opinion and nuclear technologies

In Poland between 2006-13, nine national surveys[8] were carried out in order to measure the approval of nuclear power plant construction and the acceptance of its location in a close vicinity of the respondents' place of residence. The number of those in favour of the investment both at the national (48% in 2009 down to 35% in 2013) and local level (36% in 2009 down to 25% in 2013) clearly decreased following the Fukushima accident; while in the 2014 measurement (PISM) it increased up to 64% (with 21% strongly in favour). Support for nuclear energy in Polish society is labile and highly dependent on international events. Disasters or threats to gas supplies as a result of the ongoing armed conflict with Russia in Ukraine translate into public acceptance of nuclear technologies as a way to increase the energy independence of the country.

The role of media in framing public discourse about nuclear energy

Research, starting with the pioneering studies of Katz and Lazarsfeld (1955), confirm the connection between mass and interpersonal communication. Media content penetrate into interpersonal discussions. Mass media dominate the communication process, as news present in gains importance due to the attention devoted to it. The reality aspects which are publicly interpreted (*news framing*) gain social significance. They are deemed facts (e.g. the news) which are then discussed in a given society, and which guarantee the continuation of both the discourse and construction of social reality. According to Entman, *framing* means focusing on certain aspects of the presented reality and making them more salient, while at the same time skipping others in order to promote a particular definition of the problem in question, causality interpretation, moral evaluation, and remedies (Entman 1993, p.52).

Through framing (frame interpretation) media promote a particular definition of a problem and its current interpretation (Weaver 2007, pp. 142-147). The concept of framing has been summarized by Callaghan and Schnell (Pralle and Boscarino, 2011, p. 325) as the "process by which all political players, including the media, use linguistic cues define and give meaning to issues and connect them to the larger political environment. ... Essentially, frames set the boundaries of public policy debates." Frames, like a photographer's lens, focus on some aspects of reality while minimizing, obscuring, or excluding others. As such, they suggest a particular way of thinking about a public problem or solution by defining what the essential issue is. Media can shape public discourse in ways that have negative and positive impacts (McQuail, 2007). Although the media can yield positive and negative impacts, research specific to media framing of controversial issues suggests that powerful interests often take precedence over public interests. Herman and Chomsky (1988) argued that the primary function of the mass media is to mobilize

[8] CBOS – 06.2006, 07.2008, 04.2011, 04.2013; study by the British Embassy 02.2009; study for the Ministry of Economy – 09.2009, 09.2010; TNS OBOP – 07.2011, 11.2013; Millward Brown SMG/KRC - 11.2012

public support for powerful interests that saturate the government and private sector. As they illustrated, media manipulation of information (i.e. framing) to serve more powerful interests and marginalize dissenting views is well documented in the social sciences.

Nuclear technologies, like biotechnology (nanotechnologies, GMO) are among those which in the public perception are controversial and strongly divide public opinion. As Nisbet (2006) says of the debate over nuclear power: "[f]raming will be the central device by which both advocates and opponents of nuclear energy manage public opinion at the national level." The recipient has a limited capacity in terms of perception of information relating to complex and security-oriented content. In this regard, print media are an important source for social interpretations. However, as Hodgetts and Chamberlain (2007, p. 411) warned: "we should be careful ... not to regard media power as overly deterministic... [as] stigmatizing and discriminatory media practices and representations can be resisted, refused and challenged through such things as media advocacy work or the use of alternative media." This article analyses the main thematic framing in print media on nuclear energy in Poland.

Singer and Endren's research (1993) found that the media ignore potential long-term risks associated with nuclear power. Gamson and Modigliani (1989) found that media framed nuclear energy in terms of benefits resulting from technological advancement. Angelique and Cunningham (2006) found that media took a pro-industry approach following the Three Mile Island (1979) accident, marginalizing anti-nuclear activists. Such findings reflect an emphasis on "nukespeak" (the use of metaphor, euphemism or technical jargon to portray nuclear technology in 'neutral' or positive ways) which can constrain or eliminate public deliberation (Culley at. el, 2010, p. 499).

METHOD

To assess the nature of print media coverage of nuclear energy the content of two newspapers was analysed ('The Gazeta Wyborcza' quality newspaper and 'Fakt' tabloid) and two opinion magazines ('Newsweek' and 'Wprost'). For the analysis titles with the largest readership share were selected.

The Gazeta Wyborcza (GW), published by Agora SA, is read by about 2.4 million people on weekdays. Fakt, published by the company Ringier Axel Springer, is a tabloid which has been in circulation in Poland since 2003. Fakt is read by about 3.5 million people on weekdays. 'Newsweek' and 'Wprost' are opinion-shaping magazines whose readership exceeds 1.5 million readers.

Using the keywords 'nuclear energy' and 'atomic energy', I conducted a database search of the newspapers and magazines from November 2013 to October 2014. The timeframe selected for analysis begins in the year when the government decided to build a nuclear power plant.

SAMPLE

Sixty-six articles included in the papers explicitly concerned nuclear energy. Of these, 43 were published in the GW and nine were published in Fakt, eleven were published in Wprost and only three in Newsweek (see Table 1).

Table 1. Total number of articles by newspaper and magazine.

Number	Title	Number of texts
1	GAZETA WYBORCZA	43
2	WPROST	11
3	FAKT	9
4	NEWSWEEK	3

RESULTS

An empirical analysis of all press releases which included the terms 'nuclear/atomic energy' allowed to distinguish nine thematic frameworks (see Table 3) with over two thirds (72%) constitute the frames of Nuclear Power Plant, Energy Policy and Personal Matters. The remaining ones (six) are those whose references were marginal (between 1 and 6 articles).

Table 2. Thematic areas covered in articles with nuclear energy.

Thematic framing (ramy interpretacyjne)	No articule	Issue
Nuclear Power Plant	17	Investement costs or operatives, stakeholders, construction and operation of NPP (national, international level)
Energy policy	15	legislation, EU energy policies, European Energy Union, costs of energy production, energy scenarios/foresight, Energy security, diversification of supply, energy scenario
Personal matters	16	office, salary, corruption, dismissal, nomination, politicians' statements
Millitary application	6	nuclear weapons control, non-proliferation treaties
Alternatives to nuclear energy	4	coal, biomass, wind, solar, geothermal …
Science, research	4	projects and results, future nuclear

		technology, IV generation, fission
Health and Safety Risks	2	Fukushima/Charnobyl accident
Climate protection	1	CO2 emissions, protection, low carbon, clean energy
Public opinion	1	public opinion surveys, social point of view

Nuclear Power Plant. This is a frame which contains most of the references (26%). This area includes the materials relating to the project to build the first nuclear power plant in Poland. The materials were of informative and pro-atomic nature connected with the adoption of a government document *Polish Nuclear Energy Programme* (28.01.2014). The materials contains estimated construction costs of the power plant, potential location the participation of state-owned companies in the project. The reader could find out from the articles that atom-based energy is the cheapest source of final energy (Atomic Polish, The GW, 29 January 2014, p. 20). On the other hand, they could find out that in Germany, because of trend towards renewable energy sources, energy prices rose for the end user. Equally positive context for nuclear materials was presented in the articles describing foreign investment in countries like Hungary, China or return to nuclear energy in Japan (Japan reconciles with atom, because it costs them a fortune anyway, The GW, 12 April 2014, p. 9).

Energy Policy. Energy policy was the second dominant theme in the press (23%). This topic included the issues of the European Union common energy policy as requested by Poland (common energy market, Wprost, 16 June 2014, p. 72) as well as the obligations of membership on climate and energy. Nuclear power appeared in a positive context as one of elements of the national energy policy.

Personal matters. This frame contains just under one fourth of the printed matter (24.5%). These concern the material relating to the people officially involved in the nuclear power plant project. The lead theme was the investigation by the Central Anticorruption Bureau (CBA) instigated against one of the Directors of the Nuclear Energy Polish Energy Group concerning the expenditure of 11 million PLN without a tender. The information related to shifts in executive and ministerial positions and their dismissal allowances made the headlines in all the analyzed publications. The materials were of a clearly negative character, which built in the reader a conviction that the public money had been carelessly expended and that politically nominated civil servants made fortunes. These types of reports are characteristic for the tabloidisation process which occurs in contemporary media.

What is important is that the matters of the first three thematic frameworks was present in all the analyzed publications (see Table 3).

Table 3. The number of articles in selected print media.

Thematic framing	GW	Fakt	Newsweek	Wprost
Nuclear Power Plant	11	4	1	1
Personal matters	10	3	1	2
Energy policy	8	1	2	4
Millitary application	5	1	0	0
Alternatives to nuclear energy	0	0	0	3
Science, research	3	0	0	1
Health and Safety Risks	2	0	0	0
Climate protection	2	0	0	0
Public opinion	1	0	0	0

The remaining material was only marginally treated by The Gazeta Wyborcza (total of 14) and Wprost (4).
The question of the military application of nuclear energy could be found in daily newspapers in the form of information from ongoing negotiations with Iran.
The press articles about alternative sources of energy as opposed to nuclear power accounted for less than 5% and referred to shale gas and renewable energy sources. It is noticeable that the subject was only directly undertaken in socio-political weekly Wprost, which remains silent or even unfavourable towards nuclear power. For example, the article titled 'Orban, Putin, the two nephews' (Wprost, 4 August 2014, p. 76) concerns the plans to build a nuclear power plant in Hungary based on Russian technology. It brands the collaboration between a member of the European Union and Russia, "Hungary becomes the Russian foothold in the European Union".
In the period under review, there were also three reports on the participation of Polish research centres in projects on the use of and generation IV reactors in co-generation and the vision of energy development based on thermonuclear fusion.
Utterly marginal treatment was given to issues that deal with public perception of nuclear technology and its safety. The Gazeta Wyborcza took up the issue related to the harmful effects of radiation in case of exposure to high doses as a result of a malfunction only in two articles of meaningful titles: 'Atomic Man' (22 August 2014, p. 22) and 'The Lesson from Fukushima' (23 September 2014, p. 2). However, the representation in both texts is basically positive. The author of the first article states: "nuclear power is a 'green' – it does not contribute to global climate change, it does not cause air pollution and acid rains". The conclusion from here might be that with proper observance of safety standards and relying upon the new generation reactors the risk of failure is minimal.

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REFERENCES:

Angelique, H., & Cunningham, K. (2006). Media framing of dissent: The case of initial anti-nuclear protests following the Three Mile Island accident. The Australian Community Psychologist, 18, 42–57. Retrieved 1 July 2009, from http://www.groups.psychology.org.au/Assets/Files/acp_- vol18_no2_aug06.pdf
Culley, M.R., Ogley-Oliver, E., Carton, A.D., Street, J.,C., (2010). Media Framing of Proposed Nuclear Reactors: An Analysis of Print Media, Journal of Community & Applied Social Psychology 20: pp. 497–512.

Nisbet, M. (2006). Going nuclear: Frames and public opinion about atomic energy. Retrieved from http://ww.csicop.org/specialarticles/show/going_nuclear_frames_and_public_opinion_about_atomic_energy/ (accessed July 17, 2007).

Gamson, W., Modigliani, A. (1989). Media discourse and public opinion on nuclear power: A constructionist approach. American Journal of Sociology, 95, pp. 1–37.
Herman, E. S., Chomsky, N. (1988). Manufacturing consent: The political economy of the mass media. New York: Pantheon Book.

Katz, E., Lazarsfeld, P.F. (1955). Personal influence: The part played by people in the flow of mass communications, The Free Press, New York.

Pluwak, A. (2009). Geneza i ewolucja pojęcia framing w naukach społecznych [The Genesis and Evolution of 'Framing' in Social Sciences]. Global Media Journal–Polish Edition, (1), 5, pp. 49-76.

Singer, E., Endreny, P. M. (1993). Reporting on risk: How the mass media portray accidents, diseases, disasters, and other hazards. NY: Russell Sage.

Weaver, D. (2007). Thoughts on Agenda Setting, Framing, and Priming, Journal of Communications, no. 1, pp. 142-147.

Pralle, S., Boscarino J., (2011), Framing Trade-offs: The Politics of Nuclear Power and Wind Energy in the Age of Global Climate, Reviw of Policy Research, Volume 28, Issue 4, pp. 323–346.

PSYCHOLOGICAL MECHANISMS UNDERLYING PERCEPTION AND EVALUATION OF RISKS RELATED TO TECHNOLOGY: A SHORT OVERVIEW[1]

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Abstract

Presented article concentrates on the psychological mechanisms related to the public perception of technology. Overview of how social representations and personal values could influence perception of the science and technology is highlighted. Moreover I present past research related to two more factors that are very important for the understanding of the information's distortions and biased perception of social world: that is (a) affect and availability heuristic, and (b) motivated reasoning. Consequences of the cognitive biases for the evaluation of risks related to technology are discussed

Key words: *social perception; risk; cognitive biases*

As this overview is conducted from the social psychology perspective, I would like to start the introduction of the factors related to perception and evaluation of risks with a short overview of how people create meaning in social life. For this purpose the classic idea of *social representations* would be very useful. This term was introduced by Serge Moscovici, and he described it as the system of values, beliefs and practices. Social representations allow to establish an order, which will enable individuals to orientate themselves in their chaotic material and social world, understand it and control it. In short, shared social representations: (a) allow people to understand and explain social and material world and evaluate it on good-bad dimension (b) influence our perception of what other people think; and (c) they create social reality and allow people to interpret new objects and events in the light of already existing beliefs and based on their interpretation of the history (Elcheroth, Doise, & Reicher 2011; Moscovici 1973; Moscovici 1988).

Often the interpretations of the facts and history described by the social representations predominant in ones group, are only perceived as true because they are shared among members of this group, and not because they are some objective evidences. Social representations and lay theories related to technologies may also affect social trust; especially trust in the government and in decisions politicians make. For example in previous studies researchers found that those individuals, who exhibited lower levels of trust in government, were assessed greater risk associated with nuclear power plant accident (Goodwin, Takahashi, Sun, & Gaines 2012). Similar studies in Canada have shown that confidence in the government's

[1] Part of this paper was presented previously on XX Biotechnology Summer School, organized by Intercollegiate Faculty of Biotechnology of University of Gdansk and Medical University of Gdansk, 2-7.09.2014, Stegna, Poland.

actions were negatively associated with perceived risks associated with radiation (Hine, Summers, Prystupa, & McKenzie-Richer 1997). When it comes to the relation between social representations and risk perception, Robin Goodwin works could be cited. He highlighted that social representations play important social functions in managing and justifying actions and beliefs. They help to explain, for example, often seemingly "irrational" views on infectious diseases, presented by individuals and whole communities (Goodwin, Haque, Hassan, & Dhanoa 2011). In fact, shared social representations help people in explaining all sorts of complex phenomena and new technologies, anchoring them within the existing system of knowledge and already held stereotypes. This, in turn, might be a cause of the formation of new social problems, affects the reception of awareness campaigns or distort and impede discussions on the advantages and disadvantages of technologies (Goodwin et al. 2011).

Social representations are also related to the values predominant in the one's cultural context. Values could be treated as guides for people, and people base their decisions on them. Values that people highlight (e. g. tradition, authority, self-development) indicate those areas of life, which are most precious for individuals. Values can be defined as broadly articulated goals in life, whose function is to direct activities and attitudes (Bilsky & Schwartz 1994; Schwartz, Sagiv, & Boehnke 2000). In the area of technology's perception, previous theories link cultural values to the risk's evaluation. For example Cultural Theory of risk perception, proposed by Douglas and Wildavsky assumes, that based on the values most important to people, we can group individuals into four main categories: 1) egalitarians, 2) individualists, 3) hierarchists and 4) fatalists (Douglas & Wildavsky 1982). According to this theory, people with egalitarian attitudes are more sensitive to the risks associated with technology and the environment. More individualistic oriented are more concerned about the possibility of the outbreak of wars and threats of trade and financial markets. People hierarchy-oriented are sensitive to violations of rules, laws and social order. In contrast, people that are fatalists, present the lack of sensitivity to these risks.

Results of other studies on the role of values, suggest that values may be the important predictors of the level of anxiety and risk assessment. For example, studies on the Schwartz theory of values' structure showed, that values, which emphasize the importance of tradition, social conformity and security, were related to the expression of concerns related to various social and natural phenomena (Schwartz et al. 2000). In addition, individuals who exhibited a high level of conservative values, have greater concerns about contagion during the H1N1 influenza pandemic (Goodwin, Gaines Jr, Myers, & Neto 2011). Similarly, conservative values are related to the perception of greater risk associated with earthquakes in Japan (Goodwin et al. 2012).

Shared group beliefs affect also the way people discuss important issued and solve social problems. For example, research on information sharing during the group discussions help us to understand why do members of the group fail to share information effectively? Studies repeatedly show that when people have information of two kinds - first kind is information that is only available to them, and the second one, information that is shared among group members - people tend to bring up arguments based on information that members hold in common before

discussion (Stasser & Titus 1985). Thus, the answer to the question why do members of the groups fail to share information effectively is: biased information sampling (Stasser, Vaughan, & Stewart 2000). That is, group members often fail to effectively pool and share their information because discussion tends to be dominated by (a) information that members hold in common before discussion and (b) information that supports members' preferences.

When people base their evaluation of social objects, issues, events or technologies, on the information that their group members hold in common, this could have important social consequences. Because all of us live in some kind of information or filter bubble (for analyses of information bubble in internet see for example Pariser 2011), we tend to be friends with people that have similar view to us, we get more information from our side of the discussion, and so on. For this reason, people base their evaluations and decisions on above mentioned biased information sampling. This could lead to the false consensus effect - people think that most people think similar to them, and this is often the base for radicalization of attitudes and social polarization effects (Burnstein & Schul 1983).

Information bubble has as effect on cognitive frames we used to interpret social issues, people's behaviors and vague objects. Many studies show importance of framing effect in understanding distortions in individuals' perception of social life (Chong & Druckman 2007; Iyengar 1990; Listerman 2010; Slothuus 2007). Framing effect is related also to marketing practice of presenting information about something or someone (an issue or person) in a specific context, as to viewers or listeners could draw conclusions, which person who presents this information want them to have. People tend to evaluate objects by comparing them to the easily available anchors (i.e. to the context an object is presented in). This frame (or context) influence viewers' perception without having to alter the facts. Even life-giving water could be presented as an evil doer (Gnad 2007). People's tendency to base their judgments on the context is related to the cognitive mechanism know as anchoring heuristic (Kahneman 2011; Tversky & Kahneman 1974). Social representations - and related to them naive theories and discourses related to the technologies and science spread by media - could work for people as frames, anchors for interpretation of what is good and what is bad.

For the understanding of information processing distortion and biased perception of social world two more psychological mechanisms are very important. That is (a) affect and availability heuristic, and (b) motivated reasoning.

Affect heuristic describe the effect that people make judgments based on their emotions. Kahneman (2011) writes that, when faced with previously unknown dilemma, person or technology we tend to answer ourselves to the questions: Do I Like I it? Love it? Hate it? Answer to this easy question - how do I feel about it - serves as an answer to hard question - What do I think about it? (Kahneman 2011). Researches on perception of technology show for example that technologies that are more liked by people - automatically seem to be less risky (even when people have no information about risk nor evidence about its safety).

Another important cognitive shortcut that influences our judgments is availability heuristic. Kahnemann (2011) wrote in his recent book that in social context, although all heuristics are important, availability one is "more equal then the others". Researchers often agree (see e.g. Sjöberg 2000). Availability cascade - as

Kahneman described it - is a self-sustaining chain of events, which may start with media report of relatively minor event and may lead to public panic and even large-scale government intervention. Media stories about possibility of risk could catch the attention of some viewers and readers; they can react with fear and negative emotions, which may lead to more media coverage; and this - as a cascade - create more emotional distress among public and more emotional reactions (Kahneman 2011).

The fact that our beliefs, preferences and ideologies distort our perception of social word and our information processing is now a truism in psychology. Lots of studies show that the same event or technology could be viewed differently depending on individuals' preexisting preferences, beliefs or world-views. Everybody who watches, for example, football game with fans of both teams, can observe it. Referee is always unfair for our team and their goals were from offside positions. Classical psychological studies show that we process information based on our unconscious motivation to confirm our beliefs and to sustain our positive self-views. This effect is known as believing is seeing effect and is related to people's tendency to engage in motivated reasoning (Gawronski, Bodenhausen, & Becker 2007; Jost, Glaser, Kruglanski, & Sulloway 2003; Kunda 1990; Nam, Jost, & Van Bavel 2013; Shepherd & Kay 2012). People in general are very good at finding and concentrating on those information that support their values and beliefs, and avoiding or downplaying information that oppose their preferences or worldviews. That is, we do not process information in an objective, cold, rational way. Quite opposite - we process it with a tendency to adjust it to our needs. And we hardly ever know about it.

One striking example of this effect is an fMRI study conducted by Drew Western and colleagues and published in Journal of Cognitive Neuroscience (Westen, Blagov, Harenski, Kilts, & Hamann 2006). For the study researchers choose people who were declared as a strong republicans or liberals supporters. The task of the participants was simple. They were presented with statements from their party presidential candidate (back then they were Bush and Kerry) while their brains were scans in fMRI machines. Psychologists were interested in two things. First, if participants will notice the same amount of contradictions in in-group and out-group politician. Second, how their brain will respond to this threatening information, that my candidate can say one time one thing, and next time something totally opposite, something completely different. The results confirm motivated reasoning mechanism - liberals saw more contradictions in the statements of republican candidate, and republicans saw more in liberal candidate. "Our" candidate was always judged as more coherent. What is more - when researchers analyze brain scans, they confirm that in the face of information that are threatening for the self, brain's areas responsible for rational processing of information are being less active. In other worlds, when the conclusions of people's thinking could be threatening to their beliefs and preferences, people think less rational.

Another good example of motivated reasoning is recent study conducted by Dan Kahan and colleagues (Kahan, Peters, Dawson, & Slovic 2013). They show that this motivated processing of information is also predominating among people with high numerical, logical and mathematical skill; that is among people, who should be

convinced by numbers and facts. Even they - highly numerate people - relay upon simple heuristics, when those heuristics lead to the answer that supports their preexisting beliefs (but are wrong).

Kahan found that people are able to draw logical conclusions and give a good answer, if the topic of the task is neutral one (for example effectiveness of a skin cream) but not if it is emotionally engaging and important to the self. Participants first completed numeracy and logical reasoning tests, to check their numeracy ability, and then they were randomly assigned to four conditions. Two neutral conditions - people were asked to answer if the skin cream is good or bad for skin rush, based on data given. Data was presented in such a way, that using easy heuristics thinking led to wrong answers. In the first condition, numbers, if properly analyzed, suggested that the rush got worse because of the skin cream, and the second condition suggested that the skin got better and rush decreased. Third and fourth condition included ideologically and emotionally engaging subject - that is gun control. Republicans in the USA are generally against bans on guns, and they think that those bans would lead to increase in crime. Liberals are pro ban on guns and beliefs it would lead to decrease in crime.

Results show that in skin cream condition, everything is like it is supposed to be - more numerical people give correct answer more often, no matter if skin cream was working or not. But when the numbers provided in the mathematical task conflicted with people's beliefs about gun control, they couldn't do the math right, even though they could count right when the subject was skin cream. Liberals and conservatives alike. Researchers used gun control and crime as their example, but those conclusions also apply to biotechnology, nuclear energy and so on. To all subjects that are emotionally engaging and people have strong feelings about them.

To sum up, I would like to highlight that results of many studies suggest that it is very hard to convince people to change their minds or to convince them to new technologies, scientific results or to social interventions, when people have already strong beliefs about those issues. It is hard to convince even the people, who have the ability to make inferences and draw logical conclusions from the numbers and evidences, and are scientifically literate. Thus, scientists should popularize and explain both risks and chances related to new technologies to general public, to allow people builds their opinions on empirical research. Moreover, what should be highlighted is the role of including general public and community members in dissemination of research, treating them as partners and not only passive recipients of expert information.

REFERENCES

Bilsky, W., & Schwartz, S. H. (1994), Values and personality, in European Journal of Personality, 8, 163-163.

Burnstein, E., & Schul, Y. (1983), Group polarization. In H. H. Blumberg, A. P. Hare, V. Kent, & M. Davies (Eds.), Small groups and social interaction, Wiley, New York.

Chong, D., & Druckman, J. N. (2007), Framing Theory, in Annual Review of Political Science, 10, 103-126. doi:10.1146/annurev.polisci.10.072805.103054

Kahneman, D. (2011), Thinking, Fast and Slow, Macmillan.

Douglas, M., & Wildavsky, A. (1982), Risk and culture, University of California Press.

Elcheroth, G., Doise, W., & Reicher, S. (2011), On the knowledge of politics and the politics of knowledge: How a social representations approach helps us rethink the subject of political psychology, in Political Psychology, 32(5), 729-758. Retrieved from http://onlinelibrary.wiley.com/doi/10.1111/j.1467-9221.2011.00834.x/full
Stasser, G., & Titus, W. (1985), Pooling of unshared information in group decision making: Biased information sampling during discussion, in Journal of Personality and Social Psychology, 48(6), 1467-1478.

Gawronski, B., Bodenhausen, G. V., & Becker, A. P. (2007), I like it, because I like myself: Associative self-anchoring and post-decisional change of implicit evaluations, in Journal of Experimental Social Psychology, 43(2), 221-232. doi:10.1016/j.jesp.2006.04.001

Gnad, M. (2007), MP tries to ban water, in New Zealand Herald. Retrieved from http://www.nzherald.co.nz/nz/news/article.cfm?c_id=1&objectid=10463579

Goodwin, R., Gaines Jr, S. O., Myers, L., & Neto, F. (2011), Initial psychological responses to swine flu, in International Journal of Behavioral Medicine, 18(2), 88-92. doi:10.1007/s12529-010-9083-z

Goodwin, R., Haque, S., Hassan, S. B. S., & Dhanoa, A. (2011), Representations of swine flu: perspectives from a Malaysian pig farm, in Public Understanding of Science, 20(4), 477-490. doi:10.1177/0963662510392484

Goodwin, R., Takahashi, M., Sun, S., & Gaines, S. O., Jr. (2012), Modelling psychological responses to the great East Japan earthquake and nuclear incident, in PLoS ONE, 7(5), e37690. doi:10.1371/journal.pone.0037690

Hine, D. W., Summers, C., Prystupa, M., & McKenzie-Richer, A. (1997), Public opposition to a proposed nuclear waste repository in Canada: An investigation of cultural and economic effects, in Risk Analysis, 17(3), 293-302. doi:10.1111/j.1539-6924.1997.tb00867.x

Iyengar, S. (1990). Framing responsibility for political issues: The case of poverty, in Political Behavior, 12(1), 19-40.

Jost, J. T., Glaser, J., Kruglanski, A. W., & Sulloway, F. J. (2003), Political conservatism as motivated social cognition, in Psychological Bulletin, 129(3), 339-375. doi:10.1037/0033-2909.129.3.339

Kahan, D. M., Peters, E., Dawson, E. C., & Slovic, P. (2013), Motivated numeracy and enlightened self-government, in Yale Law School, Public Law Working Paper No. 307. doi:http://dx.doi.org/10.2139/ssrn.2319992

Kunda, Z. (1990), The case for motivated reasoning, in Psychological Bulletin, 108(3).

Listerman, T. (2010), Framing of science issues in opinion-leading news: international comparison of biotechnology issue coverage, in Public Understanding of Science, 19(1), 5-15. doi:10.1177/0963662508089539

Moscovici, S. (1973), Foreword. In C. Herzlich (Ed.), Health and illness: A social psychological analysis (pp. ix-xiv), Academic Press, London/New York.

Moscovici, S. (1988), Notes towards a description of social representations, in European Journal of Social Psychology, 18(3), 211-250. Retrieved from http://onlinelibrary.wiley.com/doi/10.1002/ejsp.2420180303/abstract

Nam, H. H., Jost, J. T., & Van Bavel, J. J. (2013), "Not for all the tea in China!" Political ideology and the avoidance of dissonance-arousing situations, in PloS one, 8(4), e59837. doi:10.1371/journal.pone.0059837

Pariser, E. (2011), The filter bubble: What the Internet is hiding from You, Penguin Press, New York.

Schwartz, S. H., Sagiv, L., & Boehnke, K. (2000), Worries and values, in Journal of Personality, 68(2), 309-346.

Shepherd, S., & Kay, A. C. (2012), On the perpetuation of ignorance: System dependence, system justification, and the motivated avoidance of sociopolitical information, in Journal of Personality and Social Psychology, 102(2), 264-280. doi:10.1037/a0026272

Sjöberg, L. (2000), Factors in risk perception, in Risk analysis, 20(1), 1-12. doi:10.1111/0272-4332.00001

Slothuus, R. (2007), Framing deservingness to win support for welfare state retrenchment, in Scandinavian Political Studies, 30(3), 323-344.
Stasser, G., Vaughan, S. I., & Stewart, D. D. (2000), Pooling unshared information: The benefits of knowing how access to information is distributed among group members, in Organizational Behavior and Human Decision Processes, 82(1), 102-116.

Tversky, A., & Kahneman, D. (1974), Judgment under uncertainty: Heuristics and biases, in Science, 185, 1124-1130.

Westen, D., Blagov, P. S., Harenski, K., Kilts, C., & Hamann, S. (2006), Neural bases of motivated reasoning: An fMRI study of emotional constraints on partisan political judgment in the 2004 US presidential election, in Journal of Cognitive Neuroscience, 18(11), 1947-1958.

2030 FRAMEWORK FOR CLIMATE AND ENERGY POLICIES. CHALLENGES FOR THE REPUBLIC OF POLAND

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Abstract

Energy policy was one of the first areas around which the European Communities began to originate. The first European integrative economic organisation after the Second World War was the European Coal and Steel Community. Problems of fuel supply security and minimisation of negative human impact on the environment are key issues debated presently in the European Union (and beyond as well). Today, Poland also belongs to this Community, and as a member state it can influence European politics in the broadly-conceived field of energy (Gąsiorowska *et al.* 2009; Malko 2012). As a full member of the European Union, Poland is obliged to implement European legislation on the national level. In case of energy and climate policy, this is tied to a fundamental "re-evaluation" of the goals of national economy.

The aim of the following paper is the insight into the European Union issues of energetics and climate, as well as the application of the aforementioned to the national problematics, i.e. social, economic and legislative results of the implementation on the national level.

Key words: *energy policy, nuclear power, strategy*

THE EUROPEAN UNION LEVEL

The document: Europe 2020 A strategy for smart, sustainable and inclusive growth is a Union growth strategy for the next decade. In the changing world of the EU, there is a need for an intelligent and balanced economy which is favourable towards social inclusion. Simultaneous work on these three priorities should help the EU and its member states to achieve an increase in employment, productivity and social cohesion. The Union has developed a specific plan encompassing five goals - in the fields of employment, innovation, education, social inclusion and environmental/energy changes - which are to be achieved by 2020. In each of these areas, all of the member states have in turn designated their own national goals. Specific actions on both the Union and national levels strengthen the implementation of strategy.

One of the priorities of *Europe 2020 A strategy for smart, sustainable and inclusive growth* (European Commission, 2010) is the Flagship Initiative: *Resource efficient Europe*.

The aim is to support the shift towards a resource efficient and low-carbon economy that is efficient in the way it uses all resources. The aim is to decouple our economic growth from resource and energy use, reduce CO2 emissions, enhance competitiveness and promote greater energy security. At the EU level, the Commission will work:

- To mobilize the EU financial instruments (e.g. rural development, structural funds, R&D framework programme, TENs, EIB) as part of a consistent funding strategy that pulls together the EU and national public and private funding;
- To enhance a framework for the use of market-based instruments (e.g. emissions trading, revision of energy taxation, state-aid framework, encouraging wider use of green public procurement);
- To present proposals to modernize and decarbonizes the transport sector thereby contributing to increased competitiveness. This can be done through a mix of measures e.g. infrastructure measures such as early deployment of grid infrastructures of electrical mobility, intelligent traffic management, better logistics, pursuing the reduction of CO2 emissions for road vehicles, for the aviation and maritime sectors including the launch of a major European "green" car initiative which will help to promote new technologies including electric and hybrid cars through a mix of research, setting of common standards and developing the necessary infrastructure support;
- To accelerate the implementation of strategic projects with high European added value to address critical bottlenecks, in particular cross border sections and inter modal nodes (cities, ports, logistic platforms);
- To complete the internal energy market and implement the strategic energy technologies (SET) plan, promoting renewable sources of energy in the single market would also be a priority;
- To present an initiative to upgrade Europe's networks, including Trans European Energy Networks, towards a European super grid, "smart grids" and interconnections in particular of renewable energy sources to the grid (with support of structural funds and the EIB). This includes promoting infrastructure projects of major strategic importance to the EU in the Baltic, Balkan, Mediterranean and Eurasian regions;
- To adopt and implement a revised Energy Efficiency Action Plan and promote a substantial programme in resource efficiency (supporting SMEs as well as households) by making use of structural and other funds to leverage new financing through existing highly successful models of innovative investment schemes; this should promote changes in consumption and production patterns;
- To establish a vision of structural and technological changes required to move to a low carbon, resource efficient and climate resilient economy by 2050 which will allow the EU to achieve its emissions reduction and biodiversity targets; this includes disaster prevention and response, harnessing the contribution of cohesion, agricultural, rural development, and maritime policies to address climate change, in particular through adaptation measures based on more efficient use of resources, which will also contribute to improving global food security.

A resource-efficient Europe – Flagship in initiative under the Europe 2020 Strategy is a specification of this strategy, intended to ease the transition to a low-emission economy, efficient in terms of its use of resources. The initiative for a resource-

efficient Europe creates a long-term framework for action in many areas of policy, such as ameliorating climate changes, energy, transport, industry, resources, agriculture, fishery, protection of bio-diversity, and regional development. It is designed to increase the safety of leading investments and innovative activity, as well as to ensure taking into account the question of effective use of resources in all areas of policy and in a balanced way.

The European Commission, by publishing the Green Book - 2013 Framework for Climate and Energy Policies in March 2013, has begun a broad discussion about new policy goals.

The EU has a clear framework to steer its energy and climate policies up to 2020. This framework integrates different policy objectives such as reducing greenhouse gas (GHG) emissions, securing energy supply and supporting growth, competitiveness and jobs through a high technology, cost effective and resource efficient approach. These policy objectives are delivered by three headline targets for GHG emission reductions, renewable energy and energy savings. There are additional targets for energy used by the transport sector. In parallel, the EU has put in place a regulatory framework to drive the creation of an open, integrated and competitive single market for energy which promotes the security of energy supplies. While the EU is making good progress towards meeting the 2020 targets, creating the internal market for energy and meeting other objectives of energy policy, there is a need now to reflect on a new 2030 framework for climate and energy policies (European Commission, 2013).

Central to the current policy framework are the three headline targets to be achieved by 2020: (1) an EU based target for GHG emission reductions of 20% relative to emissions in 1990; (2) a 20% share for renewable energy sources in the energy consumed in the EU with specific target for the Member States; (3) 20% savings in energy consumption compared to projections. In addition, there are specific 2020 targets for renewable energy for the transport sector (10%) and decarburization of transport fuels (6%). The framework also recognizes Member States' different energy mixes, economic wealth and capacity to act, and therefore includes mechanisms to ensure a fair distribution of effort between them. It includes measures to address the risk of carbon leakage and its impacts on energy-intensive industry sectors. It is supported by a broad set of Union financial instruments and a Strategic Energy Technology plan (the SET-Plan). Furthermore, the Commission has proposed revising the EU legislation on taxation of energy products and electricity (COM(2011) 169 final.) to remove overlaps between existing fiscal instruments. The framework for 2020 is complemented by the Energy 2020 Strategy (COM(2010) 639 final) which assesses the challenges and measures to ensure a competitive, sustainable and secure energy system.

According to a press release from the European Commission (2014), the Council has published country-specific recommendations for each Member State, on what is needed to return to growth and jobs. The recommendations are based on a thorough assessment of every Member State's plans for sound public finances (Stability or Convergence Programmes, or SCPs) and policy measures to boost growth and jobs (National Reform Programmes, or NRPs). The Commission has already screened Poland for possible macroeconomic imbalances and carried out in-depth reviews.

There are still very high potential gains from improvements in energy efficiency in all sectors of Poland's economy and such gains could support growth, improve competitiveness and contribute to reducing Poland's energy dependency. Domestic energy generation capacity is ageing and the electricity grid is still congested but projects to create more interconnection capacity to neighboring Member States are advancing. The key problem in the natural gas market concerns the lack of diversification and competition (European Council, 2014).
In the same document from the European Council it is recommended that Poland takes action within the period 2014-2015 in order to: renew and extend energy generation capacity and improve efficiency in the whole energy chain, speed up and extend the development of the electricity grid, including cross-border interconnections to neighboring Member States, and develop the gas interconnector with Lithuania, ensure effective implementation of railway investment projects without further delay and improve the administrative capacity in this sector, accelerate efforts to increase fixed broadband coverage, improve waste management
The three pillars of the EU energy strategy – competitiveness, security of supply, and sustainability of energy – are interlinked. Therefore, it is essential that the Europeans define priorities and develop an integrated framework. This will require the EU members to intensify their debate on how to translate policy statements into concrete actions in each of the pillars. In the near term, a comprehensive strategic EU approach towards energy security is unlikely to emerge. Given rising energy prices, growing demand, and unpredictable suppliers and routes, this lapse could impact negatively on the economies of the European member states (Closson S., 2008) including Poland.

LEGAL REGULATION AND PROGRAMS IN POLAND

Modernization, restructuring and extension of energy infrastructure is key for ensuring adequate conditions for the stable growth of Polish economy, while guaranteeing that the "20/20/20" targets in the field of energy and the environment established for the entire EU in the Europe 2020 strategy will be achieved in 2020. Poland decided that the reduction of primary energy consumption will serve as an indicator and a means of achieving these triple targets. Such a reduction does not only directly contribute to decarbonization of the economy, but also, in economic growth conditions, leads to increased energy efficiency. This effect will be additionally strengthened by a growing share of energy generated from renewable energy sources in the overall energy structure (Council of Ministers, 2014) .
Climate and energy policy of the EU has a great impact on the development of Polish energetics in the 2030 perspective. It is true both for conventional energy, renewable energy (OZE), and nuclear energy. The execution of the guidelines of Energy Package 3 x 20 and of EU ETS (EU Emission Trading Scheme) ties in with the need on the part of energetics for extensive capital expenditures in the area of modernization of sources of conventional energetics, in particular through engagement with low-emission technologies, construction of nuclear energetics, promotion of renewable energy sources, and improvement of the effectiveness of energy transformations (Szczerbowski, 2014).

As stated in National Reform Programme Europe 2020 the intervention framework for the performance of actions adhering to the objective of the Europe 2020 strategy in the field of sustainable development is provided primarily by the Operational Programme Infrastructure and Environment (OP I&E) as well as the supplementary Operational Programme Development of Easter Poland (OP DEP) and regional operational programmes. The following investment priorities will be implemented with respect to CO2 emissions reduction:

OP I&E:
4.5 promoting low-carbon strategies for all types of territories, in particular for urban areas, including the promotion of sustainable multimodal urban mobility and mitigation-relevant adaptation measures
4.7 promoting the use of high-efficiency co-generation of heat and power based on useful heat demand
7.4 developing and rehabilitating comprehensive, high quality and interoperable railway systems

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Support for renewable energy sources shall be provided within the framework of the OP I&E under the following investment priorities:

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 infrastructure, including in public buildings and in the housing sector

Support for energy efficiency shall be provided under the following investment priorities within the framework of OP I&E:

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 infrastructure, including in public buildings and in the housing sector
4.4 developing and implementing smart distribution systems that operate at low and medium voltage levels

4.5 Promoting low-emission strategies for all types of territories and in particular for urban areas, including the support of sustainable multimodal urban mobility and adaptation efforts intended to mitigate climate change
4.7 promoting the use of high-efficiency co-generation of heat and power based on useful heat demand

In addition, the document indicates the main actions to be adopted within the framework of NRP 2013/2014**.** On 11 September 2013, the act amending the energy law and certain other acts dated 26 July 2013 entered into force. The changes introduced in the amended act pertain, inter alia, to the guarantee of full ownership unbundling of the gas transmission system operator, the introduction of an obligation for a specific volume of natural gas (designated by statute) to be traded on commodity exchange and the introduction of a possibility for natural gas sector enterprises to participate directly in the activities of a commodity exchange as well as the possibility for distribution companies to make plans of operations in the field of acquisition, transmission and processing of measurement data from remote reading meters and the imposition of an obligation on enterprises to ensure the appropriate level of safety of the data obtained from remote reading meters.
Works were underway on the Energy Security and the Environment Strategy, in the course of which additional analyses were performed, along with the verification of data and the updating of the list of actions. On 15 April 2014 works were completed by the adoption of the Strategy by the Council of Ministers.
On 29 October 2013, the Council of Ministers adopted the Strategic Adaptation Plan for the sectors and areas vulnerable to climate change until 2020 (with an outlook to the year 2030).
On January 28, 2014, the Council of Ministers adopted the Polish nuclear energy programme which specifies the tasks to be implemented by 2024 (with an outlook to the year 2030) which are necessary in order to establish nuclear power plants in Poland. Furthermore, the draft act amending the nuclear law and certain other acts was adopted by the Council of Ministers on 5 November 2013, with the aim of implementing the Council Directive 2011/70/EURATOM.
On 23 March 2014 Parliament passed the act on bio-components and liquid biofuels. In addition, works on other legal regulations were also underway in 2013 and shall be continued: draft act on renewable energy sources – adopted by the Council of Ministers on 8 April 2014; draft act on the emissions trading system – submitted for interministerial and public consultations on 17 December 2013; draft act on transmission corridors – at consultation level (Committee of the Council of Ministers); draft act on energy characteristics of buildings – accepted by the Committee of the Council of Ministers on 20 March 2014, with a recommendation for consideration by the Council of Ministers. In addition, actions pertaining to energy efficiency were performed on an ongoing basis within the framework of programmes implemented by the National Fund of Environmental Protection and Water Management.

POLISH CASE STUDY

The *Long-term* National *Development Strategy* 2030 (DSRK) document posits the achievement of select goals in energy safety and environment by 2030. It is important to note that in this document, the definition of energy security does not cohere with the legal definition used in the relevant bill. DSRK defines energy security as the provision of the optimal amount of energy with the lowest possible prices and the diversification of the sources of supply. The Energy Legislation bill, however, defines energy security as a state of the economy allowing the fulfilment of long-term recipient demand for fuel and energy, in an economically and technologically justified manner, and in keeping with the requirements of environmental protection. A difference between those two definitions is therefore perceptible. In particular, the lack of taking into account of environmental aspects in the first document shows the vector of transformations approved by the Polish government. By analysing particular goals and indicators, we can notice that the change in the structure of the energy mix by 2030 is especially important. The main guidelines in this area are the lowering of the role of coal in the overall energy production to 50-60%, the increase of the role of renewable energy sources to 15%, as well as initiating energy production in nuclear plants. The proposed changes bring with them challenges of technological, legal, economic and, above all, social nature. This last element is to some extent tied to s with every type of energy investments, however in case of nuclear plants the problem of social acceptance of investments is particularly important. The *Polish* Nuclear Power *Program* document, approved by the Polish government in 2009, ties in with the need for the establishment of an appropriate institutional system for societal governance of technological change (Stankiewicz, 2014). This is a direct response to the negative perception of the risks involved in the building of this type of plant. It is very important, insofar as the society perceives nuclear energy primarily through the lens of risk (Special Eurobarometer, Europeans and Energy Safety 2010). One of the causes generating social uncertainty about the use of nuclear energy in Poland is said to be an insufficient interest on the part of social scientists in the issues of energy safety and security, and energy more broadly (Łucki, 2011)

Ulrich Beck's observations and his identification of the characteristics of a 'risk society' can be of particular help in achieving the social requirements for the acceptance of nuclear energy. As argued by the German sociologist, the state of social uncertainty over the great dangers of late modernity, including nuclear energy, is a natural phenomenon. It is caused by the nature of the origin of the risk, which in this case is generated by the system of modernity itself (Beck, 2002). The main anxieties are determined by the by-products of scientific and technological progress. In the case of nuclear energy, an important characteristic of the risk is the irreversibility and incompensability tied with certain kinds of nuclear energy system malfunctions. However, those potential risks are unequally spread across different populations, have different likelihoods of occurring, but their results can be felt in more than one generation. The specificity of the Polish situation in terms of social acceptance of the building of a nuclear plant comes from the fact nuclear energy has never been used in Poland to produce electric energy on an industrial scale. The late introduction of a nuclear programme to Poland means that the risk

of its incalculability is not present. Potential dangers and their scale are currently known, based on the example of the practice of using nuclear energy by other countries, the established safety systems, technologies, as well as the results of catastrophes related to the utilisation of this type of infrastructure.
In order to evaluate the chance of fulfilling conditions relative to the initiation of nuclear programme in Poland, and its delimitations of social nature, it would be useful to cite the results of research by TNS on behalf of PGE EJI Sp. z o.o., a public limited company responsible for preparing the investment process of a nuclear power plant in Poland. According to the results of a research project completed in 2013, a division between favourably-disposed residents of the Pomeranian voivodeship and unfavourably-disposed residents of the West Pomeranian voivodeship is clearly visible. In two of the West Pomerianian districts studied (Mielno and Koszalin), the support for the building of a nuclear power plant in Poland is respectively 25% and 42%. This support is significantly lower, if the residents are asked about the location of such investment in the vicinity of their place of residence – only 12% and 36%, respectively, express their approval. What is interesting is that the Pomeranian voivodeship's results in this study differ significantly. In this region, the research has been conducted in a greater number of districts, and the results are presented below.

Table 1. Support for the building of a nuclear power plant in Poland.

	Autumn 2013	
Gmina (district)	Support for the building of a nuclear power plant outside of vicinity of place of residence	Support for the building of a nuclear power plant in the vicinity of place of residence
Krokowa (Pomerania)	56%	58%
Choczewo (Pomerania)	60%	57%
Gniewino (Pomerania)	85%	74%
Gdańsk (Pomerania))	45%	42%
Gdynia (Pomerania)	55%	51%
Sopot (Pomerania)	59%	44%
Mielno (West Pomerania)	25%	12%
Koszalin (West Pomerania)	42%	36%

Source: *author's summation of study available at: http://www.swiadomieoatomie.pl/media/94271/140130_informacja_wyniki_dot._bada__opinii_publicznej.pdf*

It should be noted that in the Pomeranian voivodeship, in most cases the support of the respondents for this investment is very similar. One can surmise that the NIMB (Not in my backyard) syndrome does not occur in this case, or occurs to a very limited degree. Exceptions to this are Gniewino and Sopot. In case of the former, it is difficult to establish what is the reason for the NIMB syndrome, given a small percentage of unfavourably-disposed respondents. The group of opponents is thus

very small, which – in conjunction with a relatively small sample (301 interviews) – does not provide an authoritative result. Further studies are needed in this area. Sopot, however, is a health resort, and therefore uncertainties relating to the lowering of the area's attractiveness for tourists are of great importance. The same correlation is visible in case of Mielno in West Pomerania. As far as 59% of the respondents have pointed to the lowering of the region's attractiveness for tourists as an important argument against building a plant. Can the differences in opinion of the respondents as divided by voivodeships be reduced to an economic factor of the lowering of the tourist value of the region? Certainly, it is not the only reason, but it is a key determinant. In the Pomeranian voivodeship, there are only two seaside health resorts – Sopot and Ustka. In the west Pomeranian voivodeship, however, there are four seaside health resorts: Dabki, Kamien Pomorski, Kolobrzeg, Swinoujscie, as well as one lowland resort, Polczyn Zdroj. Given the fact that in tourist towns one can see a lower degree of support, the results of such study are likely to have equivalence on the scale of the entire voivodeship, showing a division between the favourably-disposed residents of the Pomeranian voivodeship and unfavourably-disposed resident of the West Pomeranian voivodeship. To a great extent, historical factors are also of importance. Information about the plans for building the first nuclear power plant in Poland has been released already on 19th December 1972. It was then that the Ministers' Council Planning Commission has chosen Krotoszno in the Pomeranian vioivodeship for its location. Initial preparations for the building have been made, including the relocation of some of the village's residents. Over the last 42 years, the idea of building a plant has been discussed numerous times. One can therefore surmise with a great deal of likelihood that the divergence of positions is not influenced to any great extent by political views, because those are very close for the residents of both aforementioned regions. The evidence of this similarity is the result of parliamentary elections in the last two terms, in 2007 and 2011. Platforma Obywatelska (Civic Platform) won in both voivodeships. One element which has not been studied, but a possible important determinant of support for investment in Pomerania is the inhabitation of designated plant building location by an indigenous population of the Kashubians. Therefore, the influence of ethnic differences on the disposition of local community to nuclear energy requires a further study.

The progress of implementation of Polish Nuclear Power Programme guidelines can be successfully taken to be an indicator of the achievement of goals defined by the Long-Term National Development Strategy, namely the reaching of 15% share/contribution level on the part of nuclear energy in the overall energy mix of Poland. PNPP is a programme covering the period of 2014-2014, which according to its guidelines will be elaborated every 4 years. 4-year periods will provide regular verification of adopted guidelines. Work on the programme project began in 2009 and it has envisioned the ratification of PNPP by the Ministers' Council by the end of 2010, as well as amendment of nuclear legislation and preparation of new legislative acts by the middle of 2011, the choice of location and supplier of technology for the first nuclear power plant by the end of 2013, the beginning of building work in 2016, and the completion of first block in 2022. PNPP has only been approved by the Ministers' Council in 2014, four years later than it has been

envisioned in the schedule; the final choice of location has not yet been made. The number of possible investment location has only been limited to the Krokowa and Chlewino district ("Zarnowiec" investment) and Choczewo ("Choczewo" investment). However, the completion of the first block has been rescheduled to 2014 (Stankiewicz, 2014). This means that even in the first phase of the project there have been delays.

While the provision of the planned extent of nuclear energy in the energy mix is related to the need for substantial investments, the other indicator – the reduction of the extent of coal power plant contribution – is easier to achieve. This is a result of the need for gradual extinguishing of obsolete and overused elements of the infrastructure. Next to changes to the energy mix, the Long-Term National Development also speaks of directions for interventions in the areas of modernization of infrastructure, diversification of gas resource providers, implementation of smart network programme, integration of select commodity markets, strengthening of the role of final recipients in the governing of energy use, creation of incentives to accelerate the development of green economy, and increasing of the level of environmental protection. Among the means to achieve those are the building of a second line of the Pomeranian pipeline, increasing of gas magazine volume, replacement and modernization of obsolete elements of distribution and feeder networks, introduction of integrated measurement systems, protection of water quality through the finalisation by 2015 of the National Communal Sewage Treatment Programme, and implementation of the plan for adaptations to climate change (*Long-term* National *Development Strategy* 2030). These are only some of the measures included in the LTNDS, but most of those are of a significantly general character, lacking proposed time-frames or descriptions of specific legislative and economic means through which the aforementioned goals are to be achieved by 2030.

After completing the analysis of select documents, one can surmise that the plans approved by the Polish government are imprecise, generalised and often lack suggestions as to the means through which the required levels and indicators were to be achieved. However, on the basis of developments in projects relating to nuclear energy investments, as well as good social and economic prognoses, it can be concluded that Poland has a viable chance of achieving all the posited indicators in energy and climate policy, in the original suggested time-frame or with a slight delay.

CONCLUSIONS

The development of low-emission economy is a series of planned, simultaneous, mutually-complementing actions, aiming at the improvement of energy efficiency, increasing of energy production from renewable sources, and reduction of greenhouse gas emissions while sustaining economic growth.

Energy and climate policy on the national and European levels is overly focused on climate-related aspects, which impacts the achieving of basic goals of energy autonomy, energy security, and above all, costs. Due to the utilization of coal as the basic fuel for electro-energetics, the Polish energy sector is sensitive to the restrictions relative to emission standards and limits.

It is comforting that Poland has been able to negotiate the right to recreate a system of free entitlements for energetics, and to furthermore create a modernization fund. Thanks to this, the Polish sector will be able to reduce and balance the influence of new regulations on the prices of electric power.
In addition to this, a modernization fund for electro-energetics will be created, and it will be financed from the European Union's emission entitlement reserve. Poland will receive resources from this fund for the modernization of energy production and the improvement of energy efficiency.

REFERENCES

Bauer M., (2009), The evolution of public understanding of science - discourse and comparative evidence, [online] Available at: <http://eprints.lse.ac.uk/25640/1/The_evolution_of_public_understanding_of_science_%28LSERO_version%29.doc.pdf>, [Accessed 24 January 2015]

Beck U., (2002),Społeczeństwo ryzyka. W drodze do innej nowoczesności, Scholar, Warszawa

Beck U., (2012), Społeczeństwo światowego ryzyka. W poszukiwaniu utraconego bezpieczeństwa, Scholar, Warszawa

Closson S., (2008), Energy Security in the European Union, [online] Available at: <http://www.css.ethz.ch/publications/pdfs/CSS-Analyses-36.pdf> [Accessed 24 January 2015]

Eggermont G., Meskens G., Neerdael B., Veuchelen L., Hardeman F., (2001), Integration of social sciences in nuclear research projects of SCK•CEN in Energy and Environment, t. 12, nr 1, Multi Science Publishing, Mol

Frączek P., (2010) Wybrane uwarunkowania występowania syndromu NIMBY, [online] Available at: <http://www.ur.edu.pl/pliki/Zeszyt17/24.pdf>, [Accessed 22 January 2015]

Gąsiorowska E., Pekacz J., Surma T., (2009), Polityka energetyczna Unii Europejskiej wobec zmian klimatu in Polityka Energetyczna t. 12, z. 1, IGSMiE PAN, Kraków

Latek S., (1999), Postawy społeczeństwa polskiego wobec energetyki jądrowej. Problemy Techniki Jądrowej, t. 42, z. 1, Polskie Towarzystwo Nukleoniczne, Warszawa

Leszczyński T., (2008), Energetyka jądrowa w państwach Unii Europejskiej, in Biuletyn Urzędu Regulacji Energetyki, nr 5 (61), Urząd Regulacji Energetyki, Warszawa

Łucki Z., (2011), Wyzwania energetyczne Polski w świetle spójności społeczno-ekonomicznej, [online] Available at: <http://www.ur.edu.pl/pliki/Zeszyt18/29.pdf>, [Accessed 25 January 2015]

Łucki Z., Misiak W., (2010) Energetyka a społeczeństwo, Scholar, Warszawa

Malko J., (2012), Globalne wyzwania energetyki – energia dla wszystkich (SE 4 All), in Polityka Energetyczna t. 15, z. 3. IGSMiE PAN, Kraków

Paska J., Surma T., (2013), Polityka energetyczna Polski na tle polityki energetycznej Unii Europejskiej in Polityka Energetyczne, t. 16, z. 4, IGSMiE PAN, Kraków

Stankiewicz P., (2014), Zbudujemy wam elektrownię (atomową!). Praktyka oceny technologii przy rozwoju energetyki jądrowej w Polsce in Studia Socjologiczne 2014 1 (212), PAN, Warszawa

Stankiewicz P, Lis A., Dla kogo elektrownia jądrowa? Opinia publiczna o planach rozwoju energetyki jądrowej w Polsce i wybranych województwach w latach 2010-2011, [online] Available at: <http:// www.energetyka.gpnt.pl/doc/raport.pdf> [Accessed 25 January 2015]

Szczerbowski J., (2014), Wpływ uwarunkowań prawnych dotyczących ochrony środowiska na produkcję energii elektrycznej w Polsce in Kwiatkiewicz P., Szczerbowski R., Europejski wymiar bezpieczeństwa energetycznego a ochrona środowiska, Fundacja na rzecz Czystej Energii, Poznań

Tomiałojć L., (2008), Energetyka obywatelska, czyli od kopalń do wiatru i słońca in Czysta Energia, nr 6 (80), Abrys, Poznań

Communication form the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: A resource-efficient Europe – Flagship initiative under the Europe 2020 Strategy COM(2011) 21 [online] Available at: < http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52011AE1385&from=EN> [Accessed 19 January 2015]

Council Recommendation of 8 July 2014 on National Reform Programme 2014 of Poland and delivering a Council opinion on the Convergence Programme of Poland, 2014 (2014/C 247/19) [online] Available at: < http://ec.europa.eu/europe2020/pdf/csr2014/csr2014_council_poland_en.pdf> [Accessed 13 January 2015]

Europe 2020 A strategy for smart, sustainable and inclusive growth (COM/2010/2020 final) [online] Available at: < http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2010:2020:FIN:EN:PDF> [Accessed 18 January 2015]

European Commission, 2014 . 2 June 2014. Available at: < http://ec.europa.eu/europe2020/making-it-happen/country-specificrecommendations/index_pl.htm [Accessed 23 January 2015]

Green Paper A 2030 framework for climate and energy policies COM (2013) 169 [online] Available at: < http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52013DC0169&from=EN> [Accessed 11 January 2015]

Long-term National *Development Strategy 2030*, [online], Available at: <https://mac.gov.pl/files/wp-content/uploads/2013/02/Strategia-DSRK-PL2030-RM.pdf> [Accessed 13 January 2015]

National Reform Programme Europe 2020 Adopted by the Council of Ministers on 22 April 2014, The Republic of Poland [online] Available at:< http://ec.europa.eu/europe2020/pdf/nrp/nrp_poland_en.pdf> [Accessed 20 January 2015]

Poland's Energy Act, Dz. U. 1997 nr 54 poz. 348, [online] Available at: <http://isap.sejm.gov.pl/DetailsServlet?id=WDU19970540348> [Accessed 16 January 2015]

Polish Nuclear Power *Program,* [online], Available at: <http://bip.mg.gov.pl/files/upload/16134/PPEJ_2014_01_28_po_RM.pdf>, [Accessed 16 January 2015]

Special Eurobarometer 324 "Europeans and nuclear safety", European Commision 2010 [online] Available at: <http://ec.europa.eu/public_opinion/archives/ebs/ebs_324_en.pdf> [Accessed 13 January 2015]

SOCIAL COMMUNICATION IN NUCLEAR ENERGY PROJECTS INFRANCES[1]

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Abstract

European countries which have nuclear power plants use various tools for information distribution, communication and involvement of stakeholders in nuclear projects. This diversity is connected with many factors, among which are: the democratisation level of the state, social expectations about the commitment level, energy culture, political culture, the experience of the countries in nuclear projects implementation or stakeholder involvement and decision-making phase.
France is a good example of the country which has applied an extensive system of informing the society about nuclear energy. The French system with its High Committee for Transparency and Information on Nuclear Safety (HCTISN) and the institution of public debates is considered comprehensive in this regard.
This article attempts to present the French model of social communication in nuclear energy. It presents institutions operating in this area with the emphasis on the purpose, tools and methods of information distribution and communication in French society. An attempt was made to evaluate the effectiveness of the "French model". The Flamanville 3 project was referred to.

Key words: *nuclear technology, social acceptance, decision making*

European countries which have nuclear power plants use various tools for information distribution, communication and involvement of stakeholders in nuclear projects. This diversity is connected with many factors, among which are: the democratisation level of the state, social expectations about the commitment level, energy culture, political culture, the experience of the countries in nuclear projects implementation or stakeholder involvement and decision-making phase.
This article attempts to present the French model, which with its High Committee for Transparency and Information on Nuclear Safety (HCTISN) and the institution of public debates is considered comprehensive in this regard. The article is to be treated for information purposes.

[1] This article was written in response to the implementation by the Pomeranian Special Economic Zone of research activities titled *An analysis of the social determinants of HTR technology implementation in Poland* as part of the research section entitled *The development of high-temperature reactors for industrial application* in the research project titled *Technologies supporting the development of safe nuclear power*, subsidised by the National Centre for Research and Development.

The first part of the article presents determinants relating to France's membership in the European Union and points out the EU "background" for the processes taking place in France in the field of energy policy.
The following section presents the French institutions operating in this area with an emphasis on the purpose, tools and methods of information distribution and communication. An attempt is made to assess the "French model". The Flamanville 3 project is referred to[2].
The currently implemented energy strategy in the European Union is based on the so-called third Energy Package of 2009. The objectives of this package have been included in the "Europe 2020" strategy[3] and they consist in the third target of that strategy and are called: climate change and sustainable energy use – in the following form: to reduce greenhouse gas emissions by at least 20% compared to 1990 levels, increase the share of renewable energy in final energy consumption to 20%, and achieve a 20% increase in energy efficiency (the so-called 20-20-20 programme).
The challenge of reducing greenhouse gas emissions has forced the EU Member States to face the need to take relevant political decisions to achieve the objectives set out in Europe 2020. One of the decisions relates to further development of nuclear energy[4]. The 2007 framework nuclear power programme, which aimed to provide information on the role of nuclear energy in the European Union, called upon the European Commission's position under which, among other things, nuclear energy can help to diversify and increase energy supply security for many reasons; primarily because of the availability and distribution of nuclear fuel (natural uranium), the limited impact of price changes of the fuel on a plant's operating costs, as well as the controlled market of nuclear material used for peaceful purposes. (...) Nuclear energy contributes to the emission of very small amounts of CO2, making it an interesting option in the fight against climate change. Currently, this sector is the largest source of energy in Europe with low CO2 emissions. (...) The reception of the sector by the public opinion is crucial when it comes to availability and future nuclear energy production. This means ensuring that citizens have access to reliable information and opportunities to participate in a transparent decision-making process[5].
The Fukushima disaster in 2011 and Germany's decision to phase out the use of nuclear energy by 2020, as well as the temporary closure of two Belgian reactors after the discovery of cracks in their reactor vessels have increased pressure to phase out nuclear energy in Europe. The position of the European Commission in this matter is officially neutral because it is the Member States that bear sole responsibility for the decision to use or not to use nuclear energy. The Member

[2] This part of the article is based on the study visit conclusions at the nuclear power plant in Flamanville and institutions dealing with social communication in terms of nuclear energy, including CEA, CLI, EDF, Flamanville in October 2014.
[3] The Commission's communication *Europe 2020. A strategy for smart, sustainable and inclusive growth.* KOM(2010) final version, http://ec.europa.eu/eu2020/pdf/1_PL_ACT_part1_v1.pdf.
[4] The EU programme SNE-TP (Sustainable Nuclear Energy Technology), part of an wider energy programme SETP (Strategic Energy Technology Plan).
[5] The Commission's communication to the Council and the European Parliament of 04.10.2007 titled *The framework nuclear illustrative programme,* COM (2007)565.

States' position towards nuclear energy is varied. Currently, 14 EU Member States have nuclear power plants. Most of them are planning to uphold them or even to construct new ones. The Polish government, on 28 January 2014, adopted the Polish nuclear energy programme[6].

Günther Oettinger, EU Commissioner responsible for energy policy (2010-2014), expressing his opinion on the future of energy policy stressed that *global challenges for energy markets are growing. This is a result of a set of circumstances, climate change, dwindling fossil fuel exploration, growth in global energy demand and changing geopolitics. I believe that the only way to face these global challenges is a more Europeanized energy policy (...). 2020 in the field of energy is a short perspective. Europe must agree on a strategic vision for next decades. Based on the proposed by the European Commission 2050 Energy Roadmap we are beginning to create a new frame for 2030 and subsequent periods. It is true that we do not know exactly way we will choose, but in the document the Commission makes it clear: energy decarbonisation is desirable, feasible, and related costs are not too high. (...) Looking to the future, we need to keep up the energy transformation pace at such a level that we can achieve the targets and still remain competitive. Financial markets need to be convinced that it is a safe investment. And as the European Union we have to stick together. This way the energy transition will be easier and cheaper for both the industry and consumers*[7].

The European Union, which has defined policies on energy and climate for 2020, in 2013 in Green Paper - a 2030 framework for climate and energy policies[8] launched a debate on the future of energy policy[9]. The European Commission's proposals are based on the assumption of a directional reduction target by 80-95% greenhouse gas emissions in the EU by 2050 compared to 1990. The main targets of this policy included:

• to create stable conditions for long-term investments,

• to support innovation and competitiveness in line with the sustainable development principles,

• to ensure EU leadership in climate protection,

• to reach the target of reducing greenhouse gas emissions by 80 - 95% by 2050 compared to 1990 levels in order to comply with the global target of limiting the increase in average global temperatures to 2˚C – in order to achieve this, greenhouse gas emissions in the EU should be reduced by 40% by 2030,

• to support the long-term competitiveness and security of supplies,

• to increase the renewable energy share (30% by 2030, as proposed in the Energy Action Plan for 2050), to improve energy efficiency and to provide better and more intelligent energy infrastructure,

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[6] Ordinance no. 15/2014 of the Council of Ministers of 28 January 2014 on the programme called *Polish nuclear energy programme*, "Monitor Polski", 24.06.2014, position 502.

[7] G. Oettinger, "Nowa Europa", no. I (14)/2013, pp. 19-20.

[8] *Green Paper. A 2030 framework for climate and energy policies,* COM (2013) 169.

[9] For more, see [in:] the Commission's communications: *Energy 2020. A strategy for competitive, sustainable and secure energy,* COM (2010)639; *Europe 2020. A strategy for smart, sustainable and inclusive growth,* COM (2010)2020; *Energy Roadmap 2050,* COM (2011)885; *2030 framework for climate and energy policies*, COM (2011)169; 2020-2030 *Political framework for climate and energy,* COM(2014)15; *European Energy Security Strategy,* COM(2014)330.

• to increase investment in the modernization of the energy system[10].

The above targets require not only the creation of a relevant financial, organizational and legal framework, but also gaining public support for the proposed vision.

The European Union, where the so-called social democratic deficit[11] is present, is aware of the consequences of the remoteness of the average citizen from the European institutions. The consequences became evident during referendums where people rejected the EU Constitution. EU institutions attempted to solve this problem through a number of initiatives and activities (including: social dialogue development, participatory democracy tools development: horizontal and vertical civil dialogue, the European Commission consultations, the European Citizens' Initiative, "Agora", Plan-D for Democracy, Dialogue and Debate[12], the European communication policy development[13], the establishment of the Europe for Citizens Programme[14] and the European Year of Citizens[15]). It turned out that the issue of communication with European citizens is much more complex than assumed. In the case of energy policy, and particularly such a controversial energy source as nuclear energy, building a platform for dialogue with the public can be an important element in the success of new nuclear projects. The EU activities in this field show the importance of understanding the social determinants of successful energy strategy implementation on the part of the EU institutions, as evidenced by new initiatives to stimulate participation and dialogue with the public on energy.

The issue of informing the public on nuclear energy is undertaken by the European institutions in various forms. The European Nuclear Energy Forum functioning since 2007 is a proper example here, which provides a platform for discussion between Member States' governments, European institutions (including the European Parliament and the European Economic and Social Committee), the nuclear industry, electricity consumers and civil society. Three working groups operate within the Forum, including the Transparency Working Group which was established at the Forum inauguration conference on 26-27 November 2007 in Bratislava. Currently, the group focuses its activities on the following issues: challenges and gaps in the nuclear emergency communication, public dialogue, work on the establishment of the Energy Transparency Centre of Knowledge. The

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[10] Current information on the EU energy policy can be found on official websites: Energy Strategy for Europe: http://ec.europa.eu/energy/index_en.htm (27.07.2014); Energy Roadmap 2050: http://ec.europa.eu/energy/energy2020/roadmap/index_en.htm (20.07.2014)

[11] For more, see [in:] Kurczewska U. (ed.), *Deficyt demokracji w Unii Europejskiej a europejskie grupy interesu [Democratic Deficit in the EU and European Interest Groups],* Warsaw 2008; S. Mrozowska, *Deficyt demokracji w Unii Europejskiej i wybrane sposoby jego przezwyciężania [Democratic Deficit in the EU and selected ways to overcome it], "*Przegląd Naukowy Disputatio", Vol. XII, Gdańsk 2011.

[12] *Plan-D for Democracy, Dialogue and Debate*, COM (2005) 494.

[13] *White Paper on European Communication Policy, C*OM (2006)35.

[14] Decision by the European Parliament and the Council no. 1904/2006/WE of 12 December 2006 *establishing the Europe for Citizens Programme on Active Citizens for Europe 2007-2013*, Official Journal of the UE 2006 L378, p. 32.

[15] Decision by the European Parliament and the Council no. 1093/2012/UE of 21 November 2012 *on the European Year of Citizens 2013*.

working group operates through two special groups, the first of which focuses on emergency communication, the other on principles of energy production and application.

One of the results of the Transparency's activities is the development of guidelines for improving communication and participation of stakeholders in decision-making in the nuclear energy context. As a result, a good practices guide has been devised[16]. The authors of the recommendations emphasize that some guidelines are applied in countries which have adopted the Aarhus Convention[17] and in the environmental assessment. However, their implementation does not always go in accordance with stakeholders' expectations.

The authors of the guide recommend, inter alia, that stakeholders, including public authorities, state and private companies, NGOs, seek to ensure that the information on nuclear energy be as widely available and disseminated as possible in order for the public to achieve the highest possible level of knowledge on the subject. Moreover, the quality of the information provided must be ensured. Sources of information should be transparent, and easily accessible. Information should be timely, reliable, accurate and comparable; tailored to the individual stakeholders' groups with varying levels of knowledge. Furthermore, the information should be made available at the request of all parties concerned. Information dissemination should be done through a variety of channels. Stakeholders should be encouraged to seek information and get involved into the decision-making process through briefings, information centres, local councils and committees. Interested parties should commit to cooperate and communication process should be open and lead to build trust among stakeholders. Concerns and expectations of the residents should be taken very seriously. Honesty, integrity and respect for all concerned should be taken care of during the whole communication process. In terms of the stakeholders' participation, it is recommended that transparency standards and openness be established; information on participation should be known prior to the decision-making process commencement. The public participation process should begin as soon as possible and its objective should be clearly defined. The public should be encouraged to participate in decision making. The decision-making process should be made known to the public before its start in order to allow all parties concerned to prepare for effective participation in decision-making. Public authorities' decisions should be transparent and take into account the procedures for appealing. Furthermore, it should be noted that in contrast to the process of information distribution, communication is a two-way process, and public involvement requires the creation of cooperation mechanisms between stakeholders.

The initiative of the European Economic and Social Committee is another initiative in building energy dialogue. Initiating the establishment of the European Dialogue on Energy, the Committee justified its decision as follows:

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[16] *Good Practices Guide on Transparency for nuclear projects in the European Union*, http://ec.europa.eu/energy/nuclear/forum/transparency/doc/guide_on_good_practices.pdf (16.07.2014).

[17] *Convention on access to information, public participation in decision making and access to justice in environmental matters,* Journal of Laws 2003 no. 78 position 706.

(...) If the EU is to meet energy targets, the public must stand by its side. The European dialogue on energy will be a coordinated, multi-level, action-oriented talk on energy policy, conducted in all Member States and among them. It will be synonymous with providing reliable information on energy, and practical issues will be discussed in a manner understandable to ordinary people[18].

The dialogue is to serve consumers in obtaining explanations concerning compromises and expressing their preferences and provide negotiation space allowing the discussion of political decisions in terms of their social impact and social acceptance of them and the investment and resources strategy. In addition, it shall make a new structure taking into account the social and civic engagement. As a consequence, it is supposed to deepen the public debate on energy and influence policy making concerning all energy types and play a role in stimulating convergence at the EU level in close liaison with the framework for energy policy and climate protection policy for the period after 2020. The aim of the European Economic and Social Committee is to establish and direct a permanent European energy dialogue conducted at national, regional, metropolitan and local levels with the support of the European Commission[19].

EU initiatives in dialogue building are often referred to as idealistic and difficult to implement. However, practical examples of energy investments implementation exhibit similar effective communication characteristics. For example, the results of research conducted within the Create Acceptance project[20] concerning 27 case studies of energy investments implementation list the following indicators of good communication and participation: the recognition of different interests and perception of the local community, understanding local communities, communication addressed at specific groups vital for acceptance, information transfer using tools and channels compatible with residents' needs, continuous dialogue with local groups (especially the opposing ones). According to the report authors, the factors identified above should be taken into account at the national and local levels, as the differences in national and local contexts create different conditions for social acceptance[21].

Nuclear Energy Agency (Organisation for Economic Co-operation and Development) points to the potential effects of stakeholder involvement in nuclear projects all over the world, emphasizing that the effectiveness of the tools mentioned depends on many factors.

"Bottom-up, inclusive approaches for information gathering and deliberation are likely to enhance the credibility of the decision-making processes. This is not the only type of positive effect that may be expected from a well-run stakeholder involvement initiative. Three classes of effects may result from the application of consultation and deliberation techniques. Substantive effects include: better, more acceptable choices from the environmental, economic, and technical points of view.

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[18] Press release no. 27/2013 of 15.05.2013, the Economic and Social Committee, www.eesc.europa.eu/resources/docs/cp-27-2013-pl-ten-503.doc *(12.07.2014).*

[19] Ibidem.

[20] *Factors influencing...*, op. cit., p. 114.

[21] Source: *Factors influencing the societal acceptance of new energy technologies: Meta-analysis of recent European projects*, p. 115, http://www.ecn.nl/docs/library/report/2007/e07058.pdf (20.06.2014).

Procedural effects include: better use of information; better conflict management; increased legitimacy of the decision making process. Contextual effects include: better information to stakeholders and/or the public; improvement of strategic capacity of decision makers; reinforcement of democratic practices; increased confidence in institutional players. These potential positive effects of stakeholder participation may also be quoted as justification for involving stakeholders in policy decisions".

Francois Bidard, attaché for international affairs at the EDF Department of Nuclear Engineering confirms that *social acceptance of nuclear facilities requires arrangements that should be started at a very early stage of the project and continued throughout the life of the plant. Active social communication, employees' integration with the local community and the socio-economic support plan are crucial for acceptance. Also independent power plant control is important, performed both at the local and national levels. Public support is not given once and for all. It is important to remember always to adjust the operation to social expectations*[22].

In 1974, France, in response to the global oil crisis, decided to re-evaluate the structure of energy production. The strategic objective which was behind this decision was energy self-sufficiency realised through nuclear power plants. The decision was connected with, on the one hand, a small amount of national energy resources, such as oil and coal, and on the other hand, with a high potential of French engineers.

French political parties in power during recent years are in favour of nuclear power. The French Socialist Party does not oppose nuclear energy development, but changes can be seen in its attitude depending on whether it is in opposition or in power. The French Communist Party, strongly opposed to nuclear weapons, is in favour of nuclear power. The Greens - renewable energy supporters - reject nuclear energy. The most active movement against nuclear energy in France is *Sortir du nucleaire* (Get out of nuclear energy) which counts over 800 smaller groups with similar goals.

At the beginning of 2013 a national debate on energy changes was commenced, which involved all relevant stakeholders into the decision-making process. The National Council is composed of state representatives, members of parliament, employers, and trade unions, NGOs dealing in environment protection, local authorities and consumer associations. It aims to provide guidelines and propose recommendations which will form the basis for the Energy Change Act.

In 2014, the French Parliament began a debate on the *Energy Transformation Act - towards green growth*. The act defines long-term energy consumption goals and greenhouse gas emission limits, at the same time increasing the renewable energy potential. The goals included: reduction in energy consumption by 50% by 2050 compared with 2012, reduction of greenhouse gas emissions by 40% by 2030 and by 75% by 2050, reduction in the fuels consumption by 30% and increase in renewable energy sources to 32% by 2030. The Act also assumes a reduction in the nuclear energy share from the current 75% down to 50% by 2025. However, this means that France does not intend to abandon nuclear energy completely.

[22] Materials from meetings during the study visit in Flamanville. Author's own archives.

The majority of French society accepts nuclear power, understands the problems related to radioactive waste and environmental implications of nuclear energy. Public support for nuclear power in France is associated with its management, including public consultations on all issues and activities of relevant institutions (Table 1).

Table 1. French institutions informing the society on nuclear energy.

level	name	www
National	High Committee for Transparency and Information on Nuclear Safety (HCTISN)	http://www.hctisn.fr/
	Parliamentary Office for Evaluation of Scientific and Technological Options (OPECST)	http://www.assemblee-nationale.fr/opecst/
	Social Debate National Commission (CNDP)	http://www.debatpublic.fr/
local	Local Information Commissions (CLI)	www.asn.fr/index.php/Bas-de-page/Autres-acteurs-du-controle/CLI

Source: author.

Among the direct elements shaping the French model of social communication in terms of nuclear energy are two acts of 2005 and 2006. The first one was adopted by the French Parliament on 13 July 2005 as a programme act to set the energy policy direction. It was decided then and there to maintain the nuclear option. A year later, on 13 June 2006, an act was adopted on transparency and nuclear security (TSN), which by modifying the organizational framework of nuclear activities control confirmed the contemporary principles: prevention, precaution, the "polluter pays", information distribution and public participation in decisions, nuclear operators' liability for the safety of their installations, ad at the same it sanctioned the public's right to information in this regard. The Act introduced the independence of the Nuclear Safety Agency (ASN). The ASN, under the authority of the state, exercises control over nuclear safety and radiological protection as well as informs the public in this regard. Besides the ASN control, the Act also increased information transparency on nuclear safety, among other things by increasing the resources allocated to the Local Information Commissions (CLI) established at individual nuclear facilities and also through the creation of the High Committee for Transparency and Information on Nuclear Safety (HCTISN). In 1945, the Atomic Energy Commission was established which was renamed in 2009 to the Alternative Energies and Atomic Energy Commission (CEA). In 2008, the Nuclear Policy Council (CPN) was established whose aim is to promote and develop the energy potential of France.

The High Committee for Transparency and Information on Nuclear Safety (HCTISN) was established by the Act of 13 June 2006. It replaced the High Council for Nuclear Safety and Information (CSSIN). The HCTISN consists of parliamentarians, environmental organizations, trade unions, operators, the ASN. It operates as a consultative body on matters related to information distribution on the nuclear sector's activities, their safety and impact on humans and environment. The Committee may organize consultations and debates on sustainable materials and radioactive waste management. It deals with issues related to the information,

nuclear safety and its control at the request of the ministers responsible for nuclear supervision, the chairmen of the relevant committees of the National Assembly and the Senate, the chairman of the Parliamentary Office for Evaluation of Scientific and Technological Options (OPECST), the chairmen of the Local Information Commissions, stationary nuclear installations operators. Table 2 presents selected areas of activity of the HCTISN.

Table 2. Selected areas of activity of the High Committee for Transparency and Information on Nuclear Safety (HCTISN).

REPORTS	On radio-ecological monitoring of waters around nuclear facilities and the management of former radioactive waste storages (06.11.2008) On information regarding the fuel cycle and its transparency (12.07.2010) On nuclear transparency and secrecy (10.03.2011) On searching for long-life low-radioactive waste storage locations (07.10.2011) On nuclear safety supplementary assessment after Fukushima (13.12.2012) On the Cigéo project concerning deep geological disposal of radioactive waste (28.03.2013)
OPINIONS	On plutonium import and sea transportation between Great Britain and France (23.09.2008) On the event of 7 July 2008 at SOCARTI plant (23.09.2008) On informing the public and patients participating in radiology and/or nuclear medicine activities (08.10.2009) On devising the technical specification of the Nuclear Safety Authority concerning security audits at French nuclear facilities (03.05.2011) On public consultations concerning stationary nuclear installations (23.09.2011) On the nuclear safety supplementary assessment process in France (08.12.2011) On the initial amendment project to change the safety directive (28.03.2013)
WEB PORTAL	To launch a web portal containing information on the nuclear facilities in France, and links to supplementary information (www.hctisn.fr)
COLLABORATION WITH NUCLEAR ARHUS CONVENTION (ACN)	Participates in the work of CAN in consultation with National Association of Local Information Committees and Commissions (ANCCLI)
WORK IN A WORKING GROUP LED BY THE NUCLEAR SAFETY AUTHORITY (ASN)	Participates in a working group led by the ASN, which deals with the grading system implementation of event gravity associated with releasing radioactive materials into the environment

Source: based on information from the Vice-President of the HCTISN Monigue Sené (meeting of the National Economy Committee of the Senate of Poland, Warsaw 04.06.2013) and the official website www.hctisn.fr.

The Parliamentary Office for Evaluation of Scientific and Technological Options (OPECST) was established in 1983. It focuses on informing the Parliament of the consequences of the decisions made in the area of science and technology. Periodically, it performs tasks as a parliamentary control body, examining nuclear safety organization and radiological protection.

The OPECST is an unusual structure within the Parliament: its members, who are appointed so as to ensure proportional representation of the political groups, belong both to the National Assembly and to the Senate. It is composed of eighteen MPs and eighteen Senators; each member may be appointed as a "rapporteur". A "rapporteur" is an MP or a Senator in charge of writing a report on a given subject. The OPECST is chaired alternately for a period of three years by a member of either assembly. Internal rules stipulate that the First Vice-President shall belong to the other Assembly.
The OPECST acts as an intermediary between the political world and the world of research. It must listen to the researcher and requests authorized opinions. In order to carry out its task, the OPECST is assisted by a Scientific Council reflecting the diversity of scientific and technological disciplines in its very composition, as it is made up of twenty-four leading figures selected on account of their expertise (Parliamentary Technology Assessment in Europe. An overview of 17 institutions and how they work, EPTA, 2012, p. 37.).
The results from the rapporteurs are most often presented in the form of reports. Dozens of them have been published since its inception[23].
Another channel of communication on nuclear power is the formal public debate which may be initiated before public consultations at the request of the investor if the value of projects exceeds 300 million euros. The investor makes a request to the National Public Debate Commission (CNDP) in connection with any installation or infrastructure project with the public utility status, of a high socio-economic significance or of a potentially significant environmental impact. The CNDP decides on the relevance of the public debate. The debate has two main objectives. Firstly, to inform the society as fully as possible and to enable them to express their views on the project; secondly, to provide investor with information in order to enable them to make a decision whether to proceed with the project or withdraw from it. The public debate lasts 13-15 months. Also public consultations are conducted in order to inform the public about the project and to provide the authorities with the collected opinions and suggestions. The consultations run approximately 2 months. In addition, certain investments may acquire the "Grand Construction" status; the name for a procedure of external project-related socio-economic support.
All nuclear installations in France are subject to the operations of the Local Information Committees (CLI). Their aim is to monitor, settle, inform of the risks of a nuclear facility. These activities include the possibility to conduct surveys, measurements and environmental protection. CLI passes information from the ASN and operator to the parties concerned. The CLI consists of local councillors, environmental organizations, etc.
The Local Information Committee Secretary from Nogent-sur-Seine - Francois Brunet – while presenting the role of the committee said that (...) *the Committee is financed mainly with the local authorities' means and consists of, among others, of representatives of workers and trade unions as well as environmental organizations. Regular meetings are held where residents can ask questions and an operator can*

[23] Among others: *Nuclear safety, the scope of nuclear safety, present and future outlook of the nuclear industry, by Messrs Christian Bataille, deputy and Bruno Sido, senator (13th legislature, February 2012,* http://www.senat.fr/rap/r10-701/r10-7011.pdf. (20.01.2015).

present their plans. Extraordinary meetings are also possible, like after the Fukushima accident. The CLIs perform general tasks relating to monitoring, informing and conducting consultations on nuclear safety, radiation protection and the impact of nuclear activities carried out at these plants on humans and the environment. The CLIs are required to ensure wide dissemination of the results of their work in a form most accessible to the widest public. They can also commission expert opinions, epidemiological studies and all measurements and environmental analyses of emissions from a nuclear facility installation. CLI members are representatives of local authorities departments, municipalities and regions, parliamentarians elected from departments where the facility is located, as well as representatives of environmental associations, business associations, and freelance trade unions. The Act of 2006 strengthened the legal status the CLIs and increased resources for their functioning. The CLI are associations whose expenditures are financed by the state and local authorities where nuclear facilities are located. They are associated in the national association structure (ANCLI), which represents them before the national and European authorities (p. 133).

The EPR reactor currently being built in France in Flamnaville is a generation III+ pressurized water reactor. It is a response to the growing requirements from nuclear power plants in terms of safety, competitiveness and minimal impact on the environment.

In the case of the EPR in Flamanville all French nuclear project standards for information distribution and communication have been applied.

First of all, there was a public debate about the EPR during which over twenty public meetings were held (10.2005-02.2006) in Upper Normandy and major French cities. Over four thousand participants attended the meetings.

The debate participants expected access to information, information on the energy production structure. Most questions and doubts concerned dismantling the equipment and financial costs, the project environmental data, the life of the equipment and safety control.

In result of the debate, EDF committed itself to transparency and openness at every stage of the project, including enabling the general public to access the draft version of the report on safety, and extended collaboration with the Local Information Commission.

The construction of the EPR was granted the "Grand Construction" status. Its aim was the project whose socio-economic effects would benefit the region. The "Grand Constructions" envisaged adapting services and infrastructures, creating conditions for migrant workers, enabling B2B collaboration and employment of local staff, planning and organizing the post-construction period.

The preparation of a support program for the "Grand Construction" included drawing up, based on the diagnosis and potential arrangements and choices, a list of projects for individual local authorities including funding rules. Fifty-eight projects were adopted for Flamanville III. Each project was the subject of an agreement concluded by the local authorities (owner), the contractor and EDF. Each agreement defines the scope of work, a cost estimate, financing, including the investor's share and responsibilities.

In the case of Flamanville III, EDF, as an investor, brings two types of financing, of which the first one concerning the objects justified by mere construction (e.g.

access roads, port infrastructure for unloading, car parks, etc.). The second type concerned the construction or modernisation of public facilities (nurseries, schools, gyms, community centres). The support programme was approved by the state in the amount of 123 million euros (01.09.2014).

Based on the conducted surveys and the study visit at the French institutions dealing with social communication several general conclusions can be formulated:

In France, information distribution and communication on nuclear energy are at a high formal and organizational level. This does not mean, however, that efficient communication ensures public acceptance once and for all. The financial and organizational commitment of the French government meant that recently support in relation to nuclear energy has been successfully maintained. However, the international situation and the obligations towards the EU may cause the support for nuclear energy to fall among the French.

The French model is unique also because of its genesis. The history of the nuclear power development in France, and the time when the French were in favour of nuclear energy (oil crisis) warn against the direct adaptation of a model which was successful in different conditions. The countries developing nuclear energy often cite the French model as an example of effective communication on controversial topics, nuclear energy being one such topic. This hypothesis is confirmed in the Polish nuclear power program. An attempt to adopt French solutions with the inability to provide the same conditions as in France, where communication solutions are implemented, meant that they now require adapting to Polish conditions. Particularly important in the context of better alignment of communication tools can be the democratization level of the country, social expectations about the commitment level, energy culture, political culture, the experience of the countries in nuclear projects implementation or stakeholder involvement and decision-making phase.

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REFERENCES:

Ekstowicz B., (2010), *Determinanty społeczno-polityczne i gospodarcze rozwoju energetyki jądrowej na świecie. Implikacje doświadczeń francuskich dla Polski* [*Socio-political and economic determinants of nuclear power development in the world. Implications of the French experience for Poland*], *Elektroeneregtyka,* No. 1 (3).

Hecht G., (2009), *The Radiance of France: Nuclear Power and National Identity after World War II*, MIT Press, Cambridge-Mass.

Parliamentary Technology Assessment in Europe. An overview of 17 Institutions and how they work, (2012) EPTA.

Schneider, M. (2008), *Nuclear Power in France. Beyond the myth*, March
Wszystko o energetyce jądrowej. Od atomu A do cyrkonu Zr [*Everything about nuclear power. From atom A to zirconium Zr*], France 2008.

Gadomska M., *Potoczna percepcja i społeczna akceptacja skomplikowanych technologii. Przypadek syntezy termojądrowej,* „PTJ", vol. 51, z.1.

Łucki Z., Misiak W. (2012), *Energetyka a społeczeństwo. Aspekty socjologiczne*, Warszawa.

Wynne B. (2011), *Rationality and Ritual. Participation and Exclusion in Nuclear Decision-Making,* London.

Gupta N., Fischer A., Frewer L.J. (2011), *Socio-psychological determinants of public acceptance of technologies: A review,* "Public Understanding of Science", no. 21(7).