Vadyba
Journal of Management
2014, № 2(25)
ISSN 1648-7974

OFFSHORE WIND ENERGY SOCIAL COMPATIBILITY TOOL

Stasys Paulauskas, Aleksandras Paulauskas
Strategic Self-Management Institute

Annotation
In the article the problem of offshore wind energy social compatibility is analysing trough comparative expert poll in 2008 and 2013 years as part of South Baltic programme project SB-OFF.E.R. tasks. This gave possibility to define OWE innovation trends and work out special OWE social compatibility tool, which could be used in other coastal areas and OWE projects. The correlation between overall development level and acceptance of offshore wind energy countries was defined. During 5 years many attitudes of coastal living people were changed from negative to positive. This could be explained as result of increasing of knowledge related to positive and negative sides not only OWE, but all maritime activities. Recommendations on use of worked out tool and conclusions of the research gives significant knowledge for sustainable introduction of OWE in different coastal areas.
KEYWORDS: offshore wind energy, social compatibility, sustainable innovation, energy trends, sustainable energy, responsible energy, virtual modelling.

Introduction

Offshore wind energy (OWE) same as many other innovations frequently meets resistance from society side. Ignoring of such fact could build significant barriers on road of offshore wind energy introduction. Sustainable innovation methodology requires during each introduction of new technologies provide economical, ecological and social specialities, taking into account responsibility against actual and future generations.

Seeking to take into account needs and demands of coastal living people in connection to construction of offshore wind power parks a special Social compatibility study was prepared and implemented during INTERREG IIIa project POWER works in 2006-2008. The multilingual virtual questionnaire was worked out in four languages: English, Polish, Russian and Lithuanian. It was placed on Internet as single html tool for one time use. Results of this poll were very impressive and showed positive opportunities for offshore wind energy.

As continuation of activities and gained practice in POWER South Baltic programme project SB-OFFER provided to adapt and enlarge accumulated Social Compatibility experience for South Baltic area and offshore wind cluster. Single expert poll was developed as special tool, which should help to developers of offshore wind power investigate local social compatibility aspects and realise informational impact for successful entering of this innovation in different countries.

Main aim was to develop Social Compatibility Tool (SCT) as mean for reduction of potential resistance of some people during introduction of offshore wind power in coastal regions of South Baltic and European Community.

Main tasks were:

1. To overview general features of offshore wind energy social acceptance.
2. To define specific features of offshore wind energy social acceptance in South Baltic region trough comparative expert poll in 2008 and 2013 years.
3. To provide directions for further use of the SCT.

Main subject of this work was update and development of Offshore Wind Energy Social Compatibility Tool during implementation of South Baltic cross-border co-operation programme project SB-OFF.E.R. – South Baltic Offshore Wind Energy Regions.

The general features of offshore wind energy social acceptance

Offshore wind energy as advanced part of renewable energy is relatively new branch of human activity. Planes of European Commission displaces on European Strategic Energy Technology Plan provided *getting large scale offshore wind competitive within the short term and paving the way towards a competitive European off-shore Supergrid* [1]. This should be well grounded including social appropriateness of marine energy.

Prospective methodology of virtual modelling [9, 10, and 11] grounded on qualitative representation of development trends gives possibility to forecast energy transition according to primary energy substitution. The share of traditional primary energy sources - wood, coal, oil, gas and nuclear and its approximated trends goes down till 2006 year and later. This give ground for extrapolation of actual tendencies to time period till 2050 year. Planes of European community to reach target of 20% of renewable energy in 2020 year [12] let us to paint raising only renewable energy sources (RES) and total falling of all kinds of traditional energy sources. There are providing restrictions of burning and nuclear kind of energy during 10-20 years.

Renewable kinds of energy have very significant parameters of growth. The different applications of solar,

wind, geothermal and other kinds of renewable energy grows very quickly.

Using dichotomic model of single virtual relation [10] the model of energy transition is presenting as inversion of irresponsible energy, grounded on fuel burning technologies and centralised supply of energy, to responsible energy, related to use of renewable and decentralised energy distribution [9] (Figure 1).

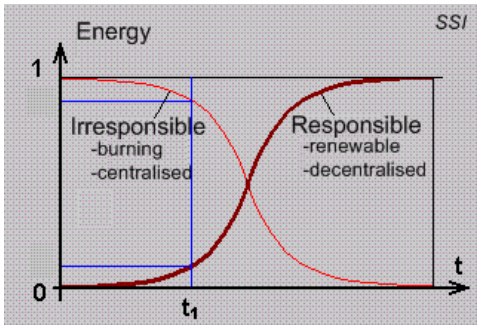

Figure 1. Dichotomic model of global energy qualitative transition. Source: Strategic Self-Management Institute

The results of sociological standardised poll of citizens of EU-25 "*Knowledge – Perception – Measures:* Energy Technologies Eurobarometer" made in 2006 approved positive preferences of EU inhabitants to responsible energy: solar, wind, hydro, ocean (offshore), and biomass. Burning and danger nuclear kinds of energy have much lower range, comparing to renewable kinds of energy.

However energy policy of EU is still not positioned on objective energy transition trend. This is reason why people of EU don't trust for information on energy given by political parties, national governments, journalists, electricity, gas and other energy companies, regional/local authorities. People of EU much more trust information about energy related issues from scientific and environmental protection organisation or consumer associations.

The wind energy has very high acceptance in many European countries. It's positive, that attitude of inhabitants of participating in project SB-OFF.E.R. countries are higher comparing to average EU-25 range: Denmark – 93%; Poland – 82%; Sweden – 74%; Lithuania – 73%; Germany – 71%.

There wasn't special question related to offshore wind energy. But the attitude of European inhabitants to offshore energy could be evaluated using answer related to ocean energy. Denmark, Sweden and Germany have higher comparing to average EU-25 acceptance of offshore wind energy: Denmark – 88%; Sweden – 68%; Germany – 67%; Poland – 50%; Lithuania – 40%. 50% of Polish and 40% of Lithuanian respondents are in favour to the use of ocean energy. 21% and 23% of inhabitants of mentioned States hasn't enough of information concerning this kind of energy.

Tall and elegant, spotless white in the open sea - in such a way offshore windmills should energise the world, environmentally compatible and sustainable, in the near future. As technical advanced industrial plants have offshore wind energy farms also a bearing on their environment. Hence, it is not surprising that the utilisation of offshore wind energy not only causes enthusiasm but also meets with questions and criticism in the broad public.

The experience from current offshore projects shows that the social acceptance is closely connected to the environmental impacts. The public concern is specially related to the impacts on birds and marine mammals, the navigational risk and the visual impact. Nevertheless, a view on the different North Sea Member states indicates that there is no absolute clear conclusion as to the social acceptance of offshore wind power. Especially in UK offshore wind energy receives a wide spread positive response for example. Wind farms near the shoreline attract people quite contrary to Germany where most people are bothered by the planned erection of offshore wind farms near the cost.

According to a study carried out by the Concerted Action on Offshore Wind Energy in Europe (CA-OWEE)[1] project the acceptance dilemma of onshore wind power applicable to offshore locations demonstrate that:

- public acceptance in general is high but falls when it comes to our own living surroundings,
- coastal areas are more sensitive to change because of great recreational values,
- local acceptance seems to increase after the installation of turbines, provided that no disturbances are experienced,
- Public acceptance increases with the level of information and economic involvement.

Considering these conclusions the planning and participation work stream aims at improving the public relation to counter the often ill-informed views of national populations. This task is assisted by providing information through (multimedia) information material and a visitor centre for example, and involves local populations in the development process by establishing an impartial platform for discussion in an Information and Decision Support System.

Sociological Investigation of The Reception of Horns Rev and Nysted Offshore Wind Farms in the Local Communities made in 2003-2005 years gave new knowledge on large scale of social acceptance of offshore wind energy for coast living people in Denmark [15]. The

[1] http://www.offshorewindenergy.org/ca-owee/indexpages/downloads/CA-OWEE_Social_Environmental.pdf

analyses of the reception in the two local communities and the comparison of the two cases have pointed out some similarities and differences leading to some overall conclusions:

The process

From the beginning, scepticism regarding the plan existed in both communities. The interviewees who had been involved in the decision making process at both sites have stated that they were ignored and it was perceived that the decision of wind farm erection was made in advance by the central authorities. At Horns Rev the scepticism changed into actual opposition when the locals felt ignored by the central authorities. The scepticism did not turn into opposition at Nysted but the experience from this, first process is claimed to cause aversion to the plans for a new wind farm.

Regardless of the size of the opposition, an important point of the analyses is the fact that the opposition was much more widespread than the governmental authorities apparently noticed. Furthermore, this indicates that in future projects it may be appropriate to establish an early dialogue.

The coverage in the regional newspaper

In both cases the decision process for the wind farms has been covered by the regional newspaper. The timing and extent have varied as well as activity from the readers in respect to debating points. In advance it was assumed that the newspaper could influence the attitude towards the wind farm. In both cases the newspaper has expressed negative attitudes towards the plans and wind energy in general. The last years (2003 and 2004) both papers have changed the attitudes as wind turbines have increasingly been related to national and regional occupational interests and export.

The analyses of the interviews have pointed to the fact that the papers have not changed the attitudes of readers who were already interested in the matter and being pro or con. Other readers have apparently not taken interest in the matter and presumably not taken notice of the coverage. Increasing of energy price due to wind energy development might have created a negative cultural resonance for negative opinions towards the wind farm.

The second phase of the Nysted study has pointed out that information about the results of the investigations of the impact on nature is important. It contributes to overcome some of the negative attitudes towards the farm based on fear of negative impacts on nature. The analyses indicate that it is important to pay attention a local debate in a regional paper in future projects and to use the paper to inform the local community.

Similarities in positive attitudes towards the wind farms

At both sites the supporters stress the environmental argument for being pro the wind farm. Many are concerned about the CO_2 emission and argue that Denmark has an obligation to reduce the emission. Others are more concerned about other kinds of emission and doubt the assumption about green house effect. Some of the supporters have participated in the local debate in the regional paper defending the plans for the wind farm. The occupational effect of production of wind turbines in Denmark is another important argument in favour of the wind farms.

Differences in negative attitudes towards the wind farm

The interviewees at both sites were concerned if the presence of the wind turbines and their visibility would alter the scenery negatively and at both sites, the regional and local authorities have made attempts to erect the wind farm further off the coast. The analyses have demonstrated the apparent existence of different arguments for the opposition in the two communities; at Horns Rev the opposition was based on substantial business interests in tourism; in Nysted the interviewed opponents wished to preserve nature unspoilt by human hands.

The fact that the view on aesthetic and landscape is based on different concerns at the two sites can explain the extent of changes in attitudes in the two local communities.

Changes in attitudes

A substantial purpose of the entire investigation is to detect the scope and direction of the change of attitudes:

- In both cases it can be concluded that time and adoption to a situation may change the attitudes towards offshore wind farms. At both sites interviewees have stated that the difficulty to imagine how 110 meters high turbines will look out in the water (10 km at Nysted and 14 km at Horns Rev) causes some concern.
- In both cases the general local attitude is reported to have changed to acceptance by the interviewees. One year after the erection the wind farms are no longer a matter of debate in the local communities.
- The opposition seem to have been louder at Horns Rev than at Nysted. But it also seems as if the attitudes were more easily changed when it turned out that the tourist did not disappear because of the visual change of the landscape.
- It seems as if the aesthetic argument is more solid at Nysted and hence the opponents have maintained their negative opinion.

The need for better information

Additionally, importance must be attached to thorough and professional information in the entire process. The local authorities do not necessarily feel obligated to inform about the process locally, and thus only the local newspapers bring up subjects for discussion. This has been demonstrated at both sites. Most interviewees at both sites have stressed the importance of information. During the decision process information is important to show the local community respect.

The information might not convince the opponent but they obtain a more qualified basis for their opinion. The analyses of the papers have pointed on the importance for information about the background for the plans and later the decision. Also myths are easily created and information can meet some of these. The recommendations from most interviewees are to invite the citizens to meeting to give

room for people to express their concerns and raise their questions in a more informal way than public hearings.

Specific features of social acceptance of offshore wind energy in coastal areas of South Baltic Region

Taking into account innovations culture of East and Central European countries - Poland, Lithuania and Kaliningrad region of Russian Federation, as accessing to methodology of sustainable development, it's reasonable to talk about some social compatibility directions and trends on which acceptability of offshore wind energy could rise to European level. Other position belongs to Denmark, Germany and Sweden, which OWE culture is more close to the European highest level. Targeted poll of interest groups, directly involved in use of marine and coastal areas, could locate positions of inhabitants of each country on defined development trends.

Social Compatibility of Offshore Wind Energy this is complex value, which reflects, how inhabitants of some Sea coast area accepts introduction of offshore energy in near marine area and coast infrastructure. According to methodology of Sustainable Innovation social compatibility should be examined taking into account impact of introduction of offshore wind energy to economy of country and region, environment and life conditions of inhabitants and visitors of a coast.

Seeking recognise dynamics in Social Compatibility of OWE the longitude sociological research is operating by Strategic Self-Management Institute, which participated in projects POWER and SB-OFF.E.R.

Measurement of OWE social compatibility was implemented as qualitative poll by use quantifiable indexes The questionnaire was implemented in qualitative mode with quantifiable evaluation of investigating features with provided deformalisation its back to qualitative sense. Many questions of questionnaire constructed in trichotomical (n=3) mode and consist of three quantifiable variants of answers with weight coefficients: "At big extent" – 1, "at small extent" – 0,5, "no" – 0. The weighted average measure of feature is calculating using equity (1).

$$Ki = \sum_{j=1}^{N} \frac{k_j n_i}{n} \quad (1)$$

Deformalisation of quantifiable measure K to verbal mode is implementing by placing K into appropriate interval: "At big extent" – K=0,67-1; "at small extent" – K= 0,34-0,66; "no" – K=0-0,33.

For evaluation of social compatibility of offshore wind energy in marine areas of participating in project POWER countries Poland, Lithuania and Russia (Kaliningrad region) multilingual virtual questionnaire was prepared and placed on Internet as single html tool. 129 experts participated in the poll in 2008 year, majority of them were from Lithuania and Russia. Taking into account not big differences in renewable energy development in Lithuania, Poland and Russia in 2008, received results of the poll was accepted as appropriate for South East Baltic region.

Measurement of second monitoring of Social Compatibility point was chosen in the end of implementation of South Baltic programme project SB-OFF.E.R. in April – May 2013 year. 5 year time is enough for await significant changes in expert's opinions and evaluations. The same questionnaire was used seeking to assure comparability of measurement data in 2008 and 2013 years.

Seeking to improve accessibility and universality of the poll the questionnaire in English was realised on Strategic Self-Management virtual portal iSS – http://www.virtualika.lt/iSS. This virtual tool gives possibility to operate filling of questionnaire, make control and summarising of results. It could be accessed on line by internet.

Virtualised questionnaire was activated and filling in links were sent to partners of project South Baltic programme projects related to energy SB-OFF.E.R., WEBSR2, LED, RES-Chains. The article with the link to questionnaire was published in portal of Innovations group Eksponente. The invitation to fill-in questionnaire was send to 95 thousand e-mails. More as hundred people tried to fill in questionnaires. But it needs specific knowledge and not all questionnaires were filled completely. After check 31 filled-in questionnaires were accepted for processing. Experts distributed by countries: Denmark – 10%, Germany – 26%, Lithuania – 35%, Poland – 10%, Sweden – 16%, other – 3%.

During preparation of methodology for social compatibility investigation were formed then groups of experts: administration, Science, Industry, Fishery, Navigation & Shipping, Real estate, Military, Energy, Tourism services, Public.

The largest represented groups of science, energy, industry and administration. More public respondents expressed interest to the poll in 2013 year.

It's very significant that understanding of climate change as very dangerous problem for humanity demonstrate 80% of respondents. Deformalised sense of this feature is – "This is a very dangerous problem for humanity". Answers to this question distributed equal and the attitude to climate change importance was not changed during last 5 years.

According to sustainable innovation paradigm energy culture is human feature, which shows how much sustainable energy is using. As it's more sustainability approach as higher energy culture.

Answering to question, what you think about information from World Health Organization that reduction of 17-20% of human life length is conditioned by use of traditional kinds of burning energy in 2008 year only 4% of respondents said that „There are no possibilities for use renewable energy in nearest future". Majority or 65% of participants of the poll were sure, that "Governments should guarantee optimal use of traditional and renewable energy sources". 5 years ago was dominated opinion about aim to assure mix of different kinds of energy – non renewable and renewable.

After 5 years the significant change was occurred on this matter. In 2008 year only 19% of respondents were sure that governments should do all for change fuel burning energy to renewable energy expressed. In 2013 year this attitude reached 65% of respondent's answers.

Energy culture is transiting from Traditional –A(t) to Balanced – B(t) and after – to Advanced – C(t). During 5 year balanced energy culture was changed to Advanced – replace burning kinds of energy to not burning. The last attitude is advanced what could be placed on virtual trichotomical trend and there no doubt, that it will rise in the nearest future.

Majority of experts agree that ecologically clean wind energy could be used more extensively in their country. This opinion is stable and it's changing only to positive direction.

Nature culture reflects quality of use of the nature. Outlook to nature use is transiting three qualitative stages: economical (irresponsible) use, nature sawing and responsible use. In 2008 year only 13% of respondents were at positions of economical outlook to use of nature. It was positive that majority or 61% of participated in poll experts expressed culture of nature sawing. Responsible use of marine environment, which requires reducing environmentally non friendly activities in marine areas, accepted 17% of respondents in 2008. However during 5 years occurred significant changes in nature culture approaches. Environment saving attitude reduced twice from 61 till 29%. Economical approach was raised from 13 till 45%. The last change is enough strange. However it could be explained as result of achieved clearness that OWE isn't danger for marine environment and only economical criterions left significant for decision making related to establishing OWE parks.

Different kinds of techniques and activities which effects bigger damage for environment at deep water marine areas were ranged by experts about equal in 2008 and 2013 years. The most danger for marine environment recognised dumped chemical weapons, oil drilling and mining, dumping, oil loading terminals, closed marine areas and cargo shipping. Underwater gas pipes, fishery, passenger shipping and underwater electricity cables are danger at small extent. Marine environment is no effecting by recreational fishing, wind power generators and sailing. So, this comparative evaluation gives very strong arguments when OWE is examining on environment issues.

Understanding of usefulness of OWE for costal living people was improved significantly. Answering to the question, what would be the impact of development of off-shore wind farms for coast living people in 2008 year 36% of experts expressed positive outlook, 23% - neutral and 12% negative. After 5 years number of positive opinion expressed experts increased twice till 61%, neutral – till 32%, and negative approach reduced till 6%. After 5 years the part of respondents without opinion on this mater reduced from 27% till 0%. There we could recognise impact of knowledge on understanding of usefulness of offshore wind energy provided to large publics.

Positive impact of OWE at national level was increased in all analysed aspects. As large impact of offshore wind energy on national level were defined in 2008 and 2013 year next positive changes: More environmentally-friendly electricity; less pollution to environment; advanced technologies; Independence from fuel suppliers. If in 2008 Investments in national economy; more work places for people living on the coast and more opportunities for local business were evaluated as impact in small extent, after 5 years these features were recognised as useful in large extent.

Many myths related to offshore wind energy were disappeared during the last years. To question, what would be the impact of off-shore wind farms for coastal zone residents and visitors in 2008 year 24% of experts expressed positive, 32% neutral, 22% negative position. No opinion and other positions expressed 15% and 7% of participated persons. Summary conclusion was – neutral in 2008 year.

Positive approach to impact of OWE to coastal living people is increasing. After 5 years no negative opinions were recognised in expert's answers. The opinion on neutral impact of OWE to coastal living people and visitors was increased till 58% and positive – till 35%.

The visual impact of offshore located wind power parks was one of negative features in 2008 poll. To question, what effects might occur in connection to marine landscape with wind farms, in 2008 year experts Trouble to watch natural and clean horizon line; Piling of a natural sea view; Coastal zone visitors' interest to such landscape; A view of rotating blades is joyful; Trouble, that some wind mills don't turn were evaluated as effecting at small extent. Coastal zone residents' interest to note how strong is wind and Optical exercises for eyes were evaluated as not effected features of offshore wind parks five years ago.

In 2013 years twice reduced fears related to piling of natural Sea view by offshore wind turbines and troubles to watch natural and clean horizon line. So, no more troubles for OWE development related to visual impact of OWE.

Answering to question, what are attitudes to construct large off-shore wind power parks there in marine areas of your country in 2008 year experts noted that this activity will be significant for local authorities' at large extent. Impact at small extent could be related to National strategy, National marine legislation, and National energy legislation. After 5 years experts double attention gave to impact of OWE to climate change. Local authorities and national marine legislation received reduced attention.

The use of Offshore Wind Energy Social Compatibility Tool

This Social Compatibility Tool could be used for next activities, related to OWE development:

1. On preparatory works at introduction of OWE in some coastal areas of a country. Accumulated data and discovered regularities and trends of changes could be used for explanation of usefulness and acceptability of OWE for national and local authorities, inhabitants and visitors of coastal zones.
2. As basis for monitoring of changes in attitudes to OWE in different regions and countries. 5 year monitoring step is the most appropriate.
3. The questionnaire could be translated into national languages for access with Social Compatibility knowledge of target groups which opinion are important for decision making and acceptance of OWE in a country or region.
4. As education mean during preparing planers and developers of offshore wind energy.

5. As set of arguments for answering to questions of potential investors concerning social acceptance of OWE.
6. As set of information for journalists writing on themes related to social acceptance of OWE.
7. Many other purposes connected to human activities offshore and onshore.
8. As basis for next accumulation of useful knowledge on social acceptance of OWE.

Conclusions

Creation, continuous used and development of OWE Social Compatibility tool trough implementation of cross-border cooperation in South Baltic projects POWER and SB-OFF.E.R. made positive changes and discovered new opportunities for Offshore Wind Energy culture, industry and mode of life:

Extrapolation of actual tendencies to time period till 2050 year, planes of European community to reach target of 20% of renewable energy in 2020 year, results of sociological standardised poll of citizens of EU-25 *"Knowledge – Perception – Measures:* Energy Technologies Eurobarometer" made in 2006 led us to paint raising only renewable energy sources, and total falling of all kinds of traditional energy sources. There are providing restrictions of burning and nuclear kind of energy during 10-20 years. Using dichotomic model of single virtual relation the model of energy transition is presenting as inversion of irresponsible energy, grounded on fuel burning technologies and centralised supply of energy, to responsible energy, related to use of renewable and decentralised energy distribution.

Citizens of participating in projects POWER and SB-OFF.E.R. countries Denmark, Sweden, Germany, Poland and Lithuania are positive concerning development renewable, wind and offshore wind energy.

However, energy policy of EU is still not positioned on objective energy transition trend. This is reason why people of EU don't trust for information on energy given by political parties, national governments, journalists, electricity, gas and other energy companies, regional/local authorities. People of EU much more trust information about energy related issues from scientific and environmental protection organisation or consumer associations.

It's very significant that understanding of climate change as very dangerous problem for humanity demonstrate 80% of respondents. Attitude to climate change importance was not changed during last 5 years.

According to sustainable innovation paradigm energy culture is human feature, which shows how much sustainable energy is using. As it's more sustainability approach as higher energy culture. 5 years ago was dominated opinion about aim to assure mix of different kinds of energy – non-renewable and renewable. After 5 years the significant change was occurred on this matter. In 2008 year only 19% of respondents were sure that governments should do all for change fuel burning energy to renewable energy expressed. In 2013 year this attitude reached 65% of respondent's answers. Energy culture is transiting from Traditional –A(t) to Balanced – B(t) and after – to Advanced – C(t). During 5 year balanced energy culture was changed to Advanced – replace burning kinds of energy to not burning. The last attitude is advanced what could be seen on virtual trichotomical trend and there no doubt, that it will rise in the nearest future.

During 5 years occurred significant changes in nature culture approaches. Environment saving attitude reduced twice from 61% till 29%. Economical approach was raised from 13% till 45%. The last change could be explained as result of achieved clearness that OWE isn't danger for marine environment and only economical criterions left significant for decision making related to establishing OWE parks.

Different kinds of techniques and activities which effects bigger damage for environment at deep water marine areas were ranged by experts about equal in 2008 and 2013 years. The most danger for marine environment recognised dumped chemical weapons, oil drilling and mining, dumping, oil loading terminals, closed marine areas and cargo shipping. Underwater gas pipes, fishery, passenger shipping and underwater electricity cables are danger at small extent. Marine environment is no effecting by recreational fishing, wind power generators and sailing. So, this comparative evaluation gives very strong arguments when OWE is examining on environment issues.

Understanding of usefulness of OWE for costal living people was improved significantly. After 5 years number of positive opinion expressed experts increased twice till 61%, neutral – till 32%, and negative approach reduced till 6%. After 5 years the part of respondents without opinion on this matter reduced from 27% till 0%. There we could recognise impact of knowledge on understanding of usefulness of offshore wind energy provided to large publics.

Positive impact of OWE at national level was increased in all analysed aspects. Positive approach to impact of OWE to coastal living people is increasing. After 5 years no negative opinions were recognised in expert's answers. The opinion on neutral impact of OWE to coastal living people and visitors was increased till 58% and positive – till 35%. In 2013 years twice reduced fears related to piling of natural Sea view by offshore wind turbines and troubles to watch natural and clean horizon line. So, no more troubles for OWE development related to visual impact of OWE. After 5 years experts double attention gave to impact of OWE to climate change. Local authorities and national marine legislation received reduced attention.

The scope of longitude sociological research on OWE Social Compatibility dynamics could be accepted as OWE Social Compatibility tool, which could be further used in large scale applications, targeted to sustain introduction of OWE in different countries and coastal regions.

References

An Energy Policy for Europe. Commission of the European Communities, Communication from the Commission to the European Council, Brussels 03.01.2007, COM 2006. http://www.euractiv.com/29/images/communication-epe-070103_tcm29-160692.pdf.

Annual Status Report 2003. Economic Valuation of the Visual Externalities of Off-Shore Wind Farms. FØDEVAREØKONOMISK INSTITUT DEN KGL. VETERINÆR- OG LANDBOHØJSKOLE. Alex Dubgaard. 11 April 2004.

Horns Rev and Nysted Offshore Wind Farms In the Local Communities Compiled by Susanne Kuehn ECON Analyse March 2005.

Jacob Ladenburg, Alex Dubgaard, Louise Martinsen, Jesper Tranberg. ECONOMIC VALUATION OF THE VISUAL EXTERNALITIES OF OFF-SHORE WIND FARMS. (2005). Food and Resource Economic Institute. Report No. 179 Copenhagen.

Knowledge – Perception – Measures. Energy Technologies Eurobarometer. Directorate-General for Research Sustainable Energy Systems. (2006). EUR 22396. http://ec.europa.eu/research/energy/pdf/energy_tech_eurobarometer_en.pdf.

Paulauskas, A., Paulauskas, S., Čiegis R. (2007). Sustainable Wind Energy, *The virtual self-education simulator and examiner*, Kaunas: Kaunas Technology University.

Paulauskas, A., Paulauskas, S., Problems and decisions of sustainability culture innovations in Lithuania. (2006). *Selected papers of International scientific conference "Citizen and governance for sustainable development"*, Vilnius, 28-30 September, 101-106.

Paulauskas, A., Paulauskas, S. (2005). Wind power as catalyser of sustainability culture's development, *XIII World's symposium of Lithuanian science and creation*, June 30- July 3, Vilnius.

Paulauskas S., Paulauskas A. (2008). The virtualics and strategic self-management as tools for sustainable development, *Technological and economic development of economy*, Baltic Journal on Sustainability. 14 (1) 76–88.

Paulauskas S. (1999). The Dialectics of Self-Management: Theory, methodology, models, *The monograph*, Klaipeda: Klaipeda University press, Klaipeda.

Paulauskas, S. (2005). The virtual relation as progressive tool for creation of the future, *XIII World's symposium of Lithuanian science and creation*, June 30- July 3, Vilnius.

Proposal for a DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on the promotion of the use of energy from renewable sources COMMISSION OF THE EUROPEAN COMMUNITIES Brussels, 23.01.2008 COM (2008) final.

REN21. 2008. "Renewables 2007 Global Status Report" (Paris: REN21 Secretariat and Washington, DC:Worldwatch Institute). Copyright © 2008 Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH. www.ren21.net.

Robert A. Hefner III. The GHK Company. (2006). Our Global Energy Future – Asia's Opportunity. Adapted from speech given at Lee Kuan Yew School of Public Policy. National University of Singapore, and January 25.

Sociological Investigation of the Reception of Nysted Offshore Wind Farm. Annual report 2004. Commissioned by ELSAM Engineering A/S.

Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions of 13 November 2008 – 'Offshore Wind Energy: Action needed to deliver on the Energy Policy Objectives for 2020 and beyond' [COM(2008) 768 final].

Perspectives of offshore wind energy development in marine areas of Lithuania, Poland and Russia. /Final scientific report on INTERREG IIIa project POWER. Coastal Research and Planning Institute, Klaipeda University. 2008. In Lithuanian and English languages.

Paulauskas, S. Potentials of offshore wind energy in the Baltic Sea (Lithuania). Offshore Wind - Magazine for THE OFFSHORE WIND INDUSTRY. Rotterdam. VoL IV, No01, 2013. -P35-36.

Paulauskas, S., Paulauskas, A. (2012). *Offshore wind will shine, shade and warm.* Science and Life. 9(646), 35-37.

Paulauskas, S. Sunset of Fire Culture. Science and Techniques. 2012 01, 34-35.

JŪROS VĖJO ENERGETIKOS SOCIALINIO SUDERINAMUMO ĮRANKIS

Stasys Paulauskas, Aleksandras Paulauskas

S a n t r a u k a

Straipsnyje nagrinėjama jūros vėjo energetikos (JVE) socialinio suderinamumo problema. Pietų Baltijos programos SB-OFF.E.R. eigoje atliktas 2008 ir 2013 metais vykdytų ekspertų apklausų rezultatų lyginamasis vertinimas įgalino nustatyti JVE naujadaros tendencijas ir parengti specialų JVE socialinio suderinamumo įrankį. Buvo nustatyta koreliacija tarp šalių bendro išsivystymo lygio ir JVE priimtinumo. Per 5 metus daugelis pakrančių gyventojų nuostatų į JVE priimtinumą pasikeitė iš negatyvių į pozityvias. Tai gali būti paaiškinta padaugėjimu žinių ne vien apie JVE, bet ir kitų jūrinių veiklų teigiamas ir neigiamas puses. Parengto įrankio naudojimo rekomendacijos ir bendros atlikto tyrimo išvados suteikia reikšmingų žinių darniam JVE diegimui įvairiuose pakrančių regionuose.

PAGRINDINIAI ŽODŽIAI: jūros vėjo energetika, socialinis suderinamumas, darnioji naujadara, energetikos tendencijos, darnioji energetika, atsakingoji energetika, virtualus modeliavimas.

Prof. **Stasys Paulauskas**, doctor of philosophy (applied sociology), director of Strategic Self-Management Institute. Fields of scientific researches: Sustainable development, Virtual modelling of development process, Strategic Self-management, sustainable innovations, sustainable and responsible energy. Author of monographs: Self-Management dialectics (1999), Democratic Self-Management (2000). He implemented more as 200 scientific and innovations projects, more as 150 publications. He is president of Lithuanian Wind Energy Association. Participated in EU programmes Leonardo da Vinci, INTERREG IIIa, South Baltic cross border co-operation programme projects. He was active in creation of idea, application and implementation of South Baltic programme project SB-OFF.E.R. E-mail: info@eksponente.lt

Mgr. **Aleksandras Paulauskas**, Master at management and international maritime law, project manager at Strategic Self-Management Institute. Fields of scientific researches: sustainable energy, onshore and offshore wind energy development. He participated in implementation of more as 100 scientific and innovations projects, more as 40 publications. He is Director of Lithuanian Wind Energy Association. Participated in EU programmes Leonardo da Vinci, INTERREG IIIa, South Baltic cross border co-operation programme projects. He was active part in creation of idea, application and implementation of South Baltic programme project SB-OFF.E.R E-mail: vejas@eksponente.lt