Environmental and sociological aspects of sustainable development in green energy: a comparative analysis of the contexts of Europe (Sweden, Denmark, Iceland) and Asia (Japan, South Korea)

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Abstract. This article analyzes the environmental and sociological aspects in such a relevant topic for 2021 as green energy on the example of a number of countries in Europe and Asia, as a rule, the most developed in this segment. The main attention is paid to the history of formation, the genesis of green energy in each of them, advantages and disadvantages, differences and similarities in the contexts of development and modern functioning both between regions and between neighboring countries. The main similarities are the limited and compact space of countries, the lack of access to oil and gas resources within countries, the active introduction of scientific and technological achievements. The differences are the following: proximity to the PRC in Asian countries and contact with its contexts, a relatively rapid transition from industrialization and low environmental standards in Asia, as well as the dynamic and advanced pace of development of science and technology in Japan against the background of selected European countries (Sweden, Denmark and Iceland).

1. Introduction
In an era when climate-warming changes are forcing many countries around the world to adopt sustainable energy solutions, Iceland's situation is unique. Today, almost 100 percent of the electricity consumed by this small country with a population of 330,000 people is generated by renewable sources. In addition, nine out of ten homes are heated by geothermal energy. Iceland's history of abandoning fossil fuels may inspire other countries that want to increase the share of renewable energy in the overall energy mix. Is Iceland's experience unique and unrepeatable, or can the whole world follow suit?

In the modern era, which is closely linked to the discourse of climate change, it is necessary to think about modernization, about modern solutions in the field of sustainable planning in the environmental sector. Thus, many countries, especially the most developed socio-economically, are actively interested in modern technologies in this context. This is especially true for small countries located in a limited space without access to significant hydrocarbon resources. Exceptions to this rule in Europe can be called, for example, Norway. In North America, in turn, Canada. In Asia, first of all, Malaysia, which is similar to Canada in terms of population and availability of natural resources. Nevertheless, even such countries are trying to diversify their economies in various ways, depend on raw materials and keep up with their neighbors and competitors in the economic and geopolitical
niche. Thus, it emphasizes and proves in an additional way the relevance of this green energy agenda in the global space, as this topic affects all continents. Leaders include, for example, Sweden, Denmark, Norway, Iceland, and Finland in Europe; South Korea, Taiwan, and Japan in Asia; New Zealand in Australia and Oceania; Canada, USA and Chile in America; and South Africa and Tunisia in Africa.

2. Materials and methods
The research methods are: analysis, synthesis, comparative-historical method; as well as a special method (content analysis that reveals the sociological context of the study, namely: discourse analysis of the current Youtube: video, channels and comments on them, as a rule, having cultural and educational overtones and acting as a source of relatively objective information about green energy in selected countries of both Europe and Asia, on the selected topic, within the framework of 2015-2021.

In this study, only those countries that meet the following parameters will be selected: the absence of significant resources in the hydrocarbon sector (thus, the list does not include: Norway, Canada, the United States, Malaysia); the relatively compact size of the country and, accordingly, the uniformity of regions for the representativeness of the sample (thus, the list does not include Chile, Australia). The study focuses around the two largest regions: Europe and Asia. New Zealand, despite meeting the absolute majority of criteria, does not fall into this comparative list, firstly, because of its remoteness from both Europe and Asia; secondly, New Zealand should be compared in this context with Australia, due to their geopolitical and cultural-historical ties in technological and institutional development, however, Australia does not fall into this list due to its size and dependence on other sources in the energy dimension.

Thus, the final list includes three Northern European countries that are significantly united by cultural and historical ties (Sweden, Denmark, Iceland); two North-East Asian countries (Japan, South Korea) that also have significant cultural and historical ties (both from the Japanese Empire, and against the background of the development of the so-called "Asian tigers" in the late 1990s and early 2000s and the continued growth of Japan in this segment).

3. Results
Iceland, symbolizing "fire and ice" both in the cultural-historical and mythological space of representation, is one of the symbols of environmental friendliness, "green world" in the connotation of sustainable development of green energy. Iceland has significant potential in understanding the wind energy complex, which, however, is not used to all available capacity by 2021. Nevertheless, by January 2021, Iceland is able to compensate for its energy needs (for example, with regard to heating in homes, washing, melting snow on sidewalks, heating swimming pools and greenhouses for growing fruits and vegetables), which is primarily due to the geothermal and hydroelectric contexts. Nevertheless, it should be noted that transport by 2021 still uses hydrocarbon raw materials, unlike many other sectors that use mainly green energy.

The cultural and historical discourse in materialism is simple: Iceland in the 1970s, like Denmark and Sweden, suffered significantly from fluctuations in oil prices, which led to the search for alternative sources in the form of sustainable energy. Such a one was green energy and renewable resources primarily in the form of stable and specific energy of geothermal sources, the issue of Iceland dictated by their remoteness from even Northern Europe and especially Norway and Denmark, the UK, and the countries of Eastern Europe and the Middle East, which had in the 1970s and 1980s considerable resources of hydrocarbons. To reduce the risks associated with the use of a geothermal resource, Iceland covered private companies for losses (due to risk) in exploratory drilling and related contexts, which in this example can be considered as a discourse of sustainable and institutionalization on the part of public policy. In those years associated with the oil price crisis, Iceland turned to hydroelectric power generation in many contexts, which influenced the global discourse in this context, which was associated with a rational and innovative policy of resource diversification in the region and in general in the Icelandic economy.
In this context, it is necessary to understand the historical and cultural background of Iceland, which at that time was recovering from centuries of poverty and lack of accurate data on its own resources, as well as actual experience in testing and implementing its state projects (independent of Denmark, first of all). Despite its differences (from the socio-economic, corruption and management discourses of Iceland to other countries, primarily not related to the highly developed countries of the world), its unique experience in green energy can be partially extrapolated and interpreted in the context of other countries, for example, in Ethiopia, Kenya, Chile, Peru and others.

As for Sweden, it is necessary to make a cultural and historical remark on the so-called "green certificates". In Denmark, this context is referred to as "pure measurement systems". Despite the absence of a historical bar for the European Union in the current year 2020 (twenty percent of green energy in total energy consumption, in a number of countries, primarily the largest in the European Union, this share is slightly less than twenty in Germany and France (for comparison, slightly less than half as much in the UK). As for the most developed EU countries in this discourse, in Sweden this is more than fifty percent, and in Denmark more than thirty [1].

Sweden, like Iceland, is historically closely linked to the oil and gas crisis in the early 1970s, when oil imported from the Middle East rose fourfold against the backdrop of familiar prices. For Sweden, which accounted for three-quarters of its industry in the hydrocarbon import market, this turned out to be "shock therapy". This affected the construction of nuclear power plants, which, however, stopped after a few years (primarily due to the accident in the United States). After the referendum on safe energy sources, Sweden changed the discourse in the direction of hydroelectric power plants, including the so-called "mini-hydroelectric power plants" [2].

At the beginning of the XXI century, Sweden introduced a system of "green certificates", thus increasing the interest and commitment of the capitalist market to the introduction of green technologies in life. The system of penalties designed to reduce the market for hydrocarbons has also significantly affected the use of renewable energy (for example, fines of more than 100% of the value of missing certificates). By 2040, Sweden plans to create fully renewable energy for its country, by the same decade to become the first carbon-neutral country with zero carbon dioxide emissions. As for the context of Denmark, it is necessary to say that after the crisis in the seventies of the last century, it, unlike Sweden, reoriented itself to coal-fired power as opposed to nuclear power. However, coal energy has become a source of controversy due to its non-ecological nature. Denmark's priority subsequently turned out to be wind power, which it subsidized and financed at various stages of purchase and promotion. In the early 1990s, Denmark introduced a "green tariff", which allowed for a decent level of competition in wind energy, which met with support in the population. By the end of the 2010s, Denmark had covered almost half of its electricity needs through wind farms. By 2030, Denmark plans to completely eliminate coal, as well as in many context other forms of non-green energy. As for wind energy, it tends from year to year to ensure that wind turbine installations are located closer to the sea and further from the living space of the land [3].

As for the reduction of electricity taxes, which is closely related to the reduction of electricity prices, it will encourage the installation of, for example, heat pumps, which is directly related to carbon neutrality. As for South Korea, it is necessary to say that more than forty percent of the state's energy comes from burning coal, as well as thirty percent, in turn, from nuclear power plants. The total capacity of renewable energy in South Korea was more than 13 thousand megawatts in 2018, in turn, investment increased by three-quarters (up to five billion US dollars), primarily for coastal wind power (up to half). This is largely related to the draft energy policy until 2031 in the issue of twenty percent of renewable sources in the total mass. At the end of 2020, South Korea implemented a plan to develop an electric vehicle context (including hydrogen fuel) to make environmentally friendly cars more common and affordable for the population. So, by the end of 2020, the number of electric vehicles slightly exceeded one hundred thousand. As for the sale of South Korean cars up to one million. Some households will be sold with built-in charging units. In South Korea, fast charging stations will be implemented (in less than half an hour) [4].
In 20 years, sales of electric vehicles will account for more than half of car sales in general, according to the forecast of the South Korean authorities, as well as by the end of the 2020s to increase the number of hydrogen cars in South Korea (more than one and a half million cars per year). South Korea should completely abandon nuclear power by 2080, according to the plan. So, this period is considered long enough for the country to have time to transform towards green energy. For example, the South Korean authorities have suspended four new nuclear power plants, and the work of the remaining ones should last for sixty years, primarily due to the lack of an alternative option with energy security. By early 2020, nuclear power generates less than a third of the country's electricity. On the issue of wind power, it is necessary to emphasize the context of the supply of Danish equipment in contrast to the local, South Korean context. So, the share fell by more than a third by September 2018. Thus, it affected the closure of specialized companies of South Korean origin, for example, Hyundai, Samsung and Doosan Heavy, which significantly affects the competitiveness and self-sufficiency of South Korean production in this context [5].

As for Japan, it is necessary to note the context of using renewable, environmentally friendly, so-called "green" clean resources by 2050. So, by today, 2021, only ten percent, the rest is primarily due to the burning of mineral resources. As for the nuclear power plant, after the tragedy in Fukushima in 2011, the level of nuclear power plants in Japan has sharply decreased in percentage terms. The Japanese Government encourages the use of energy from the natural forces of nature. However, it must be recognized that Japan is very different from Denmark, Sweden and Iceland in terms of the cost of energy generated from solar panels, despite the difference in actual insolation. Japan plans to increase the share of hydrogen use in the energy sector over the next ten years [6].

In the matter of subsidies, the Japanese government plans to allocate approximately twenty billion US dollars and implement a number of benefits. Thus, the cost of producing hydrogen energy (against the background of liquefied natural gas) is about ten times higher. In specific aspects, this applies to hydrogen for the implementation of the transport context, primarily in the form of fuel, for example, in urban and intercity buses. In the export project, hydrogen production is implemented for the Japanese market primarily through the electrolysis method. Under electrolysis in this context, it is necessary to understand that, firstly, it is the most environmentally friendly; secondly, the most expensive green hydrogen [7].

4. Discussion

Thus, the contexts of Sweden, Denmark and Iceland were analyzed both among themselves and with the context of Asia (South Korea and Japan) in this segment: in the issue of sustainable development of green energy. So, Sweden is a leader in the European Union, and in General the Nordic dimension for the success of the transition to the context of green energy that is associated with the stability of the state financial-economic and socio-economic paradigm of the country amid oil in Norway, Iceland, experienced financial and energy crisis; Denmark, have chosen the path of coal in energy during the first decades after the crisis in the early 1970-ies; Finland, a number of indicators as similar to the context of Sweden, which differ in overall performance in sustainability as a percentage within the EU [8].

It should be noted that the sociological context of this study is most clearly manifested in the discourse analysis of the Youtube-content on the topic (including analysis and synthesis based on comments on the topic). So, the following stands out in a special way.

First: "Who is leading in renewable energy? / CNBC Explains", 793,006 views, 29-11-2019, 1,192 comments. Second: "The Biggest Lie About Renewable Energy", 987,599 views, 9-09-2020, 11,191 comments. Third: "Top 20 Country by Renewable Electricity Production (1960-2018)", 489,712 views, 29-11-2019, 2,282 comments. Fourth: "Clean energy: New Japanese turbines generate electricity from sea waves-TomoNews", 452 957 views, 30-09-2017, 288 reviews. Fifth: "SolarCity Seoul,' the future of solar energy in S. Korea, 3,336 views, 28-11-2017.

The analysis and synthesis of these materials in most categories confirms and emphasizes what has been studied using the comparative historical method and literature analysis for the selected regions.
(Sweden, Denmark, Iceland, South Korea and Japan). A special feature of the Youtube-content is the popularization of knowledge and comparative lists in order to expand general and special information on the selected context, and therefore less, but concentrated information directly concerns country-specific information within the discourse.

5. Conclusion
As a conclusion, the following features should be noted: first, with regard to the sociological and cultural-historical discourse of countries, it is necessary to note the sustainable and long-term development of Sweden as a state with a purposeful policy in the sustainable development of green policy. Thus, after the crisis of the early 1970s, Sweden, unlike Denmark (which switched to the coal segment) and Iceland (due to the subsequent crisis in the financial sector), has an exclusively ecological and green discourse, in which it is largely united with Finland, however, in statistical terms, Sweden still ranks first in the rating in terms of the percentage of transition to green energy sources in the European Union. This is confirmed by the study of the Youtube content in this area, and the official statistics of the European Union. [9].

In turn, Denmark and Iceland, differing in the unique contexts of coal, hydrocarbons and, as for Iceland, the financial sector crisis, which also affected the geothermal sector of green ecology, it is necessary to note the modern success of sustainable development policies, which is also confirmed by both statistics and interpretation on the Youtube platform, however, lagging behind Sweden as a leading country in the world dimension [10].

Examples of countries from Northeast Asia in this direction (South Korea and Japan) are culturally and historically different from those in Northern Europe. So, in the 1970s, they were much less affected by the crisis situation with the prices of Middle Eastern oil and the subsequent transition to autonomous provision. On the other hand, to a greater extent, Japan and to a lesser extent South Korea, due to the lack of their own oil and gas, limited resources and high demand for the needs of industrialization and technological development, have a significant interest in developing their own (alternative, green) resources. As well as the gradual withdrawal from nuclear power (especially after the situation in Fukushima in 2011 in Japan) and coal power in the next fifty years, which forms the agenda of modern problems and tasks, and subsequently their resolution [11].

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