IMPLEMENTATION OF EU RENEWABLE ENERGY POLICY - CASE STUDY OF THE KINGDOM OF SWEDEN AND THE CZECH REPUBLIC

Jana Janderová
University of Pardubice, Faculty of economics and public administration, the Czech Republic
jana.janderova@upce.cz

David Kobo Abban
abbankojodavid@gmail.com

ABSTRACT
The contribution analyzes the European Union legislation on renewable energy and its implementation in the Czech Republic and Sweden. The level of achieving the policy goals to make EU member states energy production more sustainable, is studied through comparison of promotion instruments used in two Member states. Both have met the 2020 national targets, however with much different share of renewable energy sources of the total energy consumption. In the conclusion lessons from member states from Implementation of the Renewable Energy Directive, are summarized.
Keywords: *the Czech Republic, Emissions, EU Policies, Policy Implementation, Renewable Energy, Sustainable Development.*

1. INTRODUCTION

Fossil fuels have a limited supply, which means we cannot rely on them for an unlimited time seeing the unlimited demand with the increase in population. The byproduct of fossil fuels is the greenhouse gas emissions namely the CO2 emission, with a deadly impact on the Earth, with its effect on climate change. “Greenhouse gas emissions are gases that trap heat within the earth's atmosphere by absorbing energy and preventing heat from escaping into space. There are various types of gases, including carbon dioxide, methane, nitrous oxide, and fluorinated gases that each impact climate change at varying levels – known as global warming potential. The effect of each gas depends on the concentration of the gas in the air, length of time the gas remains in the atmosphere, and the strength of its effects on the atmosphere." (Wang, 2020)
Ultimately there is a need for a sustainable approach, and renewable energy is what has passed the litmus to be an alternative energy source, seeing the merits attributable. Renewable energy is energy that is obtained from sources that can replenish themselves over time (Owusu & Asumadu-Sarkodie, 2016). The main advantage of renewable energy is its unlimited supply as compared to fossil fuels. The production of renewable energy can be obtained from varied sources such as wind, solar, hydro, tidal, geothermal, and biomass. The usage of renewable energy is also significant to the lowering of fossil fuels imported into the EU, which in turn makes its energy usage sustainable.
The EU is committed to drastically reducing dangerous greenhouse gas emissions. To avoid a catastrophic climate change, the EU has committed to lower its greenhouse gas emissions by at least 40% below 1990 levels by 2030 under the Paris Agreement and to set out a way forward towards carbon neutrality by 2050. In the fall of 2018, the European Commission set out a working schedule to word towards carbon neutrality that will help reduce the emissions and fight climate change by 2050. (European Commission, 2018)
This research was conducted to investigate the alternative use of renewable energy as a sustainable energy resource. In doing so, the renewable energy policy by the EU was analyzed comparing the Czech Republic to the Kingdom of Sweden. The above countries are both in the EU have a target set in the renewable energy policy to be met and have been selected given

their various infrastructure and progress made or pitfalls encountered in implementing the renewable energy legislation. The Kingdom of Sweden currently tops the EU member states as the country with the highest renewable energy usage, with 54% of its energy sources being renewable. The Czech Republic fell below the EU average of 16.4% and stands at 13.6% as of 2018. This vast disparity was of interest to the researchers.
Furthermore, the implementation methods of the EU policy were of the utmost interest to the researchers as well, because of the specificities of environmental protection policy. "Tools to manage the environment are very different from those used for agriculture, for example. The environment is diificlut to legislate for because it is harder to influence outcomes. Because of the size of the problem, the environment involves many more organizations and participants. There are contrasting local, national, and supranational dimensions to environmental problems." (John, 2012)

2. METHODS

The contribution aims to analyze the European Union legislation on renewable energy and to reveal its implementation in the Czech Republic and the Kingdom of Sweden. The level of achieving the policy goals – i.e. to lower EU dependence on imported fossil fuels, make its energy production more sustainable, and create a stable legal environment for businesses – is to be studied through comparison of promotion instruments used in two Member states that have met the 2020 national targets, however with much different share of renewable energy sources of the total energy consumption. The research seeks to provide answers to research questions as to what the goals and main features of the EU policy on Renewable Energy are, how does Sweden and the Czech Republic implement the EU Renewable Energy Legislation, what the strengths and weaknesses of both countries' Renewable Energy practices are and how can lessons from these countries thus contribute to a Sustainable Development future.

3. EU ENVIRONMENTAL POLICY

The European Union has undoubtedly been noted for holding one of the highest standards for environmental protection. (European Union, 2021) This principle holds dear to the commitment of combating if not reducing the barest minimum concerning water pollution, air pollution and waste management. (Ambec, S et al, 2014). The general principle has always been the polluter pays for the consequence of the pollution. These policies are immersed in other international policies and agreements, particularly the UN Sustainable Development Goals.
The importance of EU's Environmental Policies can not be over-emphasized because it gives member states a roadmap for what is allowed and what can be managed. The legal basis for this policy can be found in Articles 11, 191 to 193 of the Treaty on the Functioning of the European Union (TFEU). The articles mainly represent the agreed upon stipulations bound by the treaty. The main articles regarding environmental protection will be reviewed for the purpose of our study. Article 11 of the TFEU requires that environmental protection be integrated into the implementation of the union's policies and activities for sustainable development. Article 191 of the TFEU stipulates policies on the environment shall be with the following objectives:

- Preserving, protecting and improving the quality of the environement.
- Protecting human health.
- Prudent and rational utilization of natural resources.
- Promoting measures at the international level to deal with regional and worldwide environmental problems and in partcular combacting climate change.

The EU adopted the following emission reduction targets:

- to reduce greenhouse gas emissions by 20% by 2020 compared to 1990
- to reduce greenhouse gas emissions at least by 40% by 2030 compared to 1990

In the longer term, the EU plans to shift to low-emission economy to reduce greenhouse gas emissions by at least 80–95% by 2050 compared to 1990.
The environmental policy also takes into consideration the protection of the diverse plants, animals and other living organism within the member states. Preventive principle should be the aim of the member states are destruction should be contained and resolved at the source. The polluter pays principle must be adhered to at all times.

In preparing for the union policy on the environement, the European union shall consider:

- Available scientific and technical data.
- Environmental conditions in the various states of the union.
- The potential cost and benefits of the lack of action or action.
- The economic and social development of the union as a whole and balanced development of the regions.

The union shall corperate with member states, third countries and international organizations within their areas of competence. The arrangements will be a subject of agreement between the union and third countries or internatinal organizations.

3.1. Enviromental policy principles

The environmental policy principles are based on precaution, prevention, and rectifying pollution at source, as well as the polluter pays principle. This means that the first commandment of the policy is to take precautionary measures to first prevent pollution from happening, and if that should fail, rectifying the issue at source to stop the spread of the pollutants. If all else fails, the responsibility of cleaning up the mess falls on the polluter to pay for the damages caused. (Ambec, S et al, 2014). The precautionary is a risk alert tool where is scientific uncertainty about suspected pollutants to human health, risking animal life or threatening plants and other living organisms. These are non-discriminatory measures and are reviewed with the availability of new scientific studies.

3.3 EU Legislation on Renewable Energy

The EU renewable energy legislation was primarily brought about concerning:

1. To increase the energy used from renewable sources.
2. To create energy-efficient sources to reduce greenhouse gases.
3. To reduce the dependence on imported foreign fuels.
4. To improve local renewable energy production to reduce energy loss in transit and emissions.

The discussion and need for an alternative fuel is not one of a recent subject, however with the ever changing climate owing to global warming and the adverse consequences, it was necessary for the Commission to role out a directive. The Directive specifies what is required of each member state and the period for them to transition these into national laws and reporting system that serves as a follow up. Each country irrespective of the success in renewable energy production and usage was supposed to still make it a point to adjust upwardly. The Renewable energy directive (2009/28/EC) established a common framework for the promotion of energy from renewable sources. It sets mandatory national targets for the overall share of energy from renewable sources in gross final consumption of energy and for the share of energy from renewable sources in transport. It lays down rules relating to statistical transfers between Member States, joint projects between Member States and with third countries, guarantees of origin, administrative procedures, information and training, and access to the electricity grid for energy from renewable sources.
The EU's original Renewable energy directive (2009/28/EC) set an overall binding target of 20% final energy consumption from renewable sources by 2020. For EU countries to achieve this, a commitment to reaching their own national renewables targets for 2020 ranging from

10% in Malta to 49% in Sweden. All EU countries have adopted national renewable energy action plans showing what actions are foreseen to meet their 2020 renewables targets. These plans include sectorial targets for electricity, heating and cooling, and transport; planned policy measures; the different mix of renewables technologies they expect to employ; and the planned use of cooperation mechanisms.

Every Member State is to adopt a national renewable energy action plan. The national renewable energy action plans shall set out Member States' national targets for the share of energy from renewable sources consumed in transport, electricity and heating and cooling in 2020, taking into account the effects of other policy measures relating to energy efficiency on final consumption of energy, and adequate measures to be taken to achieve those national overall targets, including cooperation between local, regional and national authorities, planned statistical transfers or joint projects, national policies. Apart from the national targets required by the Commission, the member states have the liberty to achieve the set objectives by varying means. For instance, two or more member states may may cooperate on several projects to produce electricity, heating or cooling for renewable energy sources. Private operators are allowed to share in such projects. The proportion of energy produced from such collaboration is supposed to be reported to the Commission.

One or more member states may enter into joint coperations with third countries for the production of renewable energy. This kind of production may also invole private operators. Electricity produced in a third country shall only be taken into account where: the electricity is consumed in the member state for which it is produced. Another requirement is that the electricity is produced by a new instalation that came to function after 25th June 2009 or was refurbished by the increase capacity of installation after 25th June 2009. Finally, the energy produced in the third country should not be receiving support from a support scheme in the thrid country other than investment aid granted to the installation.

4.IMPLEMENATAION OF THE RENEWABLE ENERGY POLICY

4..1 Comparison of the Czech and Sweedesh Renewable Energy Policy Implementation

The "most different" systems design, also known as MDSD was used for selecting the compared cases of study. Both selected countries are members of the EU and have similar population sizes of just about ten million inhabitants. Now following the requirements of MDSD for subjects being maximally different, the Czech Republic and Kingdom of Sweden have a lot of differences. The most important difference is the emissions level. According to the current OECD data, the Czech Republic has CO2 emissions of 9.5 tonnes per capita, while that of Sweden is 3.6 tonnes per capita. The Czech Republic has 3 times more CO2 emissions than Sweden, the differences above are the subject of interest to the researcher and compliments the choice of MDSD.

The directive (EU) 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources is a framework for the Union's binding target of 32% renewable energy in gross energy consumption by 2030. The Directive is to ensure that member states take on their obligation to meeting the 2020 targets to set the trajectory for the future.

The Czech Republic has multiple energy sources with coal being the most used, that has now been largely contested due to the CO2 release and the harm they leave. Renewable energy is a more recent energy source that seeks to be a sustainable option. According to Eurostat, renewable energy usage as of 2009 was just 5% of the various sources of energy and 6% of the overall electricity. In that same year, 40% of energy consumption came from coal, and petroleum accounted for 21%, gas accounted for 15% and 16% from nuclear energy. The most electricity produced was with coal at 55%. In the Czech Republic the primary sources outlined were hydropower, wind, solar and biomass.

The overall EU target for the share of renewable energy sources (hereinafter referred to as "RES") to total energy consumption for the 2030 target, is set for 32%, towards the 2020 targets, respective member states are to set their national targets in line with the Directive 2009/28/EC. The Czech Republic, in alignment with the National Action Plan, set its RES target for 2020 at 13% and has achieved 14.89%. There is still more to go in making the Czech Republic achieve the RES targets on the 2030 RES agenda for the EU. The following proposals have been put across in supporting and approaching the achievement of RES targets. On 13th of January 2020, the Government of the Czech Republic approved the National Energy and Climate Plan which provides comprehensive insight into the progress of the Czech Republic. The plan is based on Article 3 of the EU regulation 2018/1999 on the Governance of the Energy Union and Climate Action, which entered into force on 24 December 2018. It contains objectives and key policies in all five dimensions of the Energy Union.
The Czech Republic is one of the least dependent European countries to import fuels due to the vast quantities of coal. The potential for renewable energy has yet to be tapped into mainly because of the abundance of coal. Aside from coal, nuclear energy has been the second source of energy in the Czech Republic, and this leaves renewable energy to be in the third area of energy focus or production. The country's national instrument for laying down policies for the promotion of the use of renewable energy is Act No. 180/2005 Sb., on the Promotion of Use of Renewable Sources, as amended. However, with the respective RES targets for 2020 and 2030, there is the opportunity for the Czech Republic not only significantly put RES as part of the energy mix but prioritize on it owing to the many advantages on the climate level. The existing RES does have great potential and may be expanded significantly towards expanding the infrastructure and consequently being less reliant on coal.

4.2 Implementation of Carbon decrease legislation in the Czech Republic
The Czech Republic adopted its Climate Protection Policy as Government resolution No. 207 of 22nd March 2017. The main objective of the Policy is to determine an appropriate mix of cost-effective policies and measures in key sectors that will lead to achieving the greenhouse gas reduction targets. The primary targets are in line with the EU enviromnematl policy to

- reduce national emissions by 2020 by at least 32 Mt CO2-eq in comparison with 2005
- reduce national emissions by 2030 by at least 44 Mt CO2-eq in comparison with 2005.

It follows up on the State Environmental Policy of the Czech Republic 2012–2020. The current policy thus builds on the steps that were taken in the previous period and which are used for the comparison in this contribtion as only the period terminated in 2020 may be successfully compared. The taken steps are as follows:
Carbon sequestration: The prolonged storage of carbon dioxide and other forms of carbon to defend the planet against global warming is a measure that has passed the implementation procedures of reducing CO2 in the Czech Republic. Government Decree No. 48/2017 Sb. facilitates mandatory compliance with the standards on goods and agriculture. It has laid down specific requirements for the agriculture sector to comply with in order to access government grants for their business. Paying support to farmers is now conditional on meeting the requirements to foster the sequestration of carbon as a measure to reduce the impact of CO2 emissions in the Czech Republic. One particular tool for expanding forest areas is increasing local support for afforestation under agriculture land provided under the Rural Development Program, enshrined in Government Decree No. 185/2015 Sb.
Waste Management Sector: The main objective of the waste management sector is reducing the amount of waste which consequently reducing the processing of waste. Thus, processing waster reduces the number of greenhouse gases produced. The Czech Republic's legal waste regulation plan can be found in Act No 185/2001 Sb.; the Act is in line with Directive 2008/98/EC of the European Parliament and Council. The obligation of the Act ensures that waste packaging and

recycling are observed at the highest levels, thus sorting out waste in the right labelling will lead to effective and efficient recycling reducing the need to process large volumes of waste unsorted, reducing emissions in the process.
Household Sector: Greening the heating source in households is one of the best ways to cut down on conventional energy usage from coal. Where possible, biomass boilers and heat pumps must replace the mainstream heating source cutting down on the use of energy. The New Green Savings Program in the Czech Republic supports the transition from older building heating measures to greener sources of heating in and in the process limiting emissions. The grants from the NGS are purposed to replace environmentally damaging solid fuel boilers with low modern emission boilers. Efficient and cleaner hearting in buildings is supported by the Boiler Replacement Scheme from the Operational Programme Environment 2014 – 2020.
Industry Sector: Prevention and control of pollution through an integrated approach may be realized ithrough the Act No 76/2002 Sb. The main aim is to reduce CO2 emissions by controlling ozone-depleting substance from the offset of gases from production sites. The entrepreneurs are obliged to prepare energy audits or to implement a system of energy management according to ISO 50001.

4.3 Implementation of Carbon Decrease in the Kingdom of Sweden Legislation
The target for Sweden for the RED 2020 renewable energy usage was 49%. That target has been achieved and exceeded standing now at 54.5%. Many factors are contributing to the achievement. First, the Kingdom of Sweden has an abundance of moving water that ensured the hydropower generation was a key element in energy production. Also, as has been elaborated above, the policy tools adopted by Sweden was one that ensured more rapid change and diversity in the scale of usage. The national policies have consistently rewarded the Swedes from individual homes to businesses and industriesSweden is gearing towards to zero net emissions by 2045 in line with the Paris Agreement for the curbing of CO2 emissions. The Swedish Parliament has passed a Climate Act to strengthen their commitment to controlling and preventing the release of greenhouse gases. Swedish ambitious aim is not just to land at zero emissions but eventually move to negative carbon emissions. Thus, greenhouse gas emissions are less than the amount of carbon absorbed by nature. The new Climate Policy Act is part of the framework which contains goals and plans for business and society to transition into a long-term reduction in emissions. Sweden's emissions targets started as far as 1988 when the Parliament adopted their first climate policy aimed to stabilize CO2 emissions at current levels. The climate policy of Sweden has evolved into the current 2017 framework to have net-zero emissions by 2045. Implementation measures are as follows with regards to the emission reduction strategy:
Carbon Dioxide Tax: A tax levied on CO2 content in fossil fuel was introduced in Sweden since 1991 that aims at reducing emissions of CO2. The tax has been increased since its introduction consistently from SEK 0.25/kg carbon dioxide (1991) to SEK 1.15/kg (2018). A yearly index of the tax level is applied the CO2 emissions proportionately based on fossil fuel carbon content. Sustainable biofuels are not subject to the carbon tax; this means an increased usage leading to an overall low level of emissions. The carbon dioxide tax has been the primary tool for reducing emission in Sweden and implemented in the following sectors of the economy: heat production, electricity production, industrial sector and agriculture sector.
Local Climate Investment program: Sweden introduced a Climate Leap in 2015 for local investors to access grants based on an estimated greenhouse gas reduction of each investment. All kinds of organization are eligible to apply for this grant, which has a budget of SEK 1.5 million as of 2018.
Environmental Code and Planning Legislation: The Swedish Government, in an attempt to minimize pollution, introduced an environmental code in January 1999. The code requires a

permit to be obtained for significantly hazardous activities to take place in the environment. Part of the requirement is assessing the CO2 emissions and ensuring compliance with the limits thereof or risk facing a fine.

Climate Change Communication: The communication aims to make available essential communication to mitigate the climate challenge provide people with the tools necessary for making changes in their ways. Sweden's attempt to become the world's fossil-free state requires the mobilization of entire societies, municipalities and businesses. The government launched a fossil-free Sweden initiative that brings out a dialogue between keys actors and the government agencies to provide partnership programs and resources needed to reduce emissions actively.

Emission Reduction Obligation: The obligation falls on fuel suppliers and large consumers to ensure the blend of biofuels to reduce the amount of CO2 emissions. The emissions obligation is part of the Fuel Change Reform schemed passed on 1 July 2018 in Sweden. The fuel change makes an essential contribution in reducing fossil fuel used for transport. The indicative target of emissions reduction by 40% by 2030, has a significant significance towards this obligation which introduces 50% of biofuels usage.

Electrical Vehicle Premium: In 2018, the Swedish government increased possibilities of commuting and transportation with electric bicycles and scooters at a premium for long distances. This measure aims to make people less dependent on cars and thus reduce emissions.

Charge at home-grant: An allocation of SEK 90 million has been made annually between 2018-2020 by the government to support installations as charging points for cars. Private individuals receive a rebate of 50% for either purchasing or installing these charging points in their homes. The aim of this measure is making it cheaper for households to transition to more sustainable modes of transportation.

Extended producer responsibility: A legislation enforcing producers to be more responsible for the afterlife of their products is underway to make significant reduction in the level of waste. The challenge that this measure seeks to meet is reducing the amount of waste to be processed by ensuring adequate sorting, collection and recycling of products

5. CONCLUSION

EU renewable energy policy and its implementation in the Czech Republic and Sweden is studied in this contribution. The EU’s liberal approach to the member states in enforcing the strategies is helpful to bring about innovation and create momentum for member states already achieving targets with their working strategies and tools. Both member states are employing diverse energy saving mechanisms to ensure the achievement. Whereas Sweden is rolling out on its charge at home grants to encourage a switch from fossil fuel to electric cars, the Czech Republic is ensuring building heating systems have individual heat adjusted for specific parts of the building, rather than heating the whole building, saving energy in the process. Another recent innovation has been insulation, which requires thicker walls with heat absorption capacity to warm buildings from their storage. Both member states have their larger shares of investment from the government grants, with some amount of support from local investors who benefit from tax exemption mostly. Tax exemption enables investors to have security in their first few years by saving on taxes and expanding the capacity to generate more energy. Both countries set national targets as well as regional targets for achieving set goals. Every region has different needs and inputs for energy generation. The spotlight for emission was however on the capital and industrial regions due to their emissions and energy usage. Finally, harnessing energy from newer building designs is very much in force. Building permits in both countries require for a clear plan of energy consumption and modern installations of heating systems that have capacity to save more energy. The Czech Republic may compensate its lack of renewable sources to increase substantial production of nuclear energy. However, this type of fuel is not

acknowledged by the EU as a renewable source. Thus, nuclear anergy forms a pontential for further research in the field of European energy policy and its further improvements.

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