3rd Regional Exchange of Modelling Experts involved in the Development of Integrated National Energy and Climate Plans (NECPs) in Southeast Europe

Building up Modelling Capacity for Integrated Energy and Climate Planning

Meeting minutes

Virtual exchange via MS Teams, 09-Jun-2020, 10:00-11:00 am CET

Participants invited

Representatives from Albania, Bosnia and Herzegovina, Kosovo*, Montenegro, North Macedonia - government stakeholders, local and regional experts; consultants: REKK, SERA and Klimapolitika; the Energy Community Secretariat (ECS) and GIZ.

Opening remarks and introduction

The representatives of GIZ and Energy Community Secretariat have welcomed the participants and raised their appreciation for the strong commitment and ownership demonstrated by the national institutions and technical experts to participate in the regional exchange of knowledge and experience that could significantly strengthen the quality of the development of integrated National Energy and Climate Plan (NECPs).

Mr. Raisch presented the Agenda and stressed that the purpose of the meeting is to discuss the modelling methods with specific focus on **sensitivity analysis**.

Having shared the purpose of the exchange, the floor has been given to Mr. Aleksandar Dedinec to present the North Macedonian case and get all participants familiar with the sensitivity analysis-related approach taken for the development of the NECP.

Expert presentation

Being thankful to the opportunity provided by GIZ and Energy Community to open a discussion on Sensitive Analysis based approach, Aleksandar has provided his presentation focusing on the most important elements of the method.

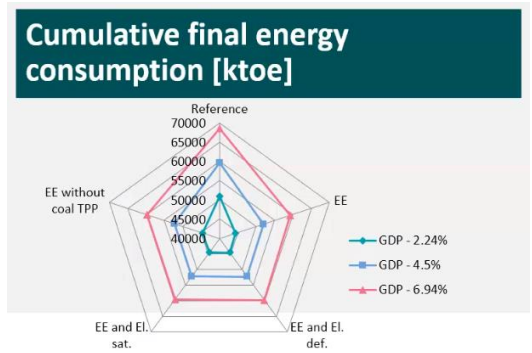
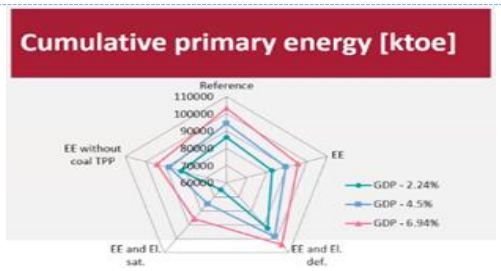
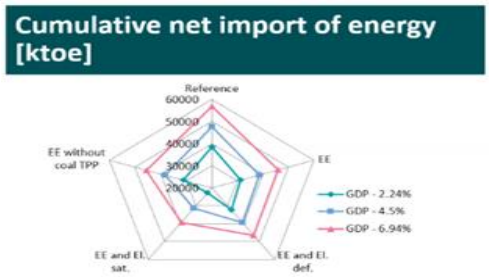
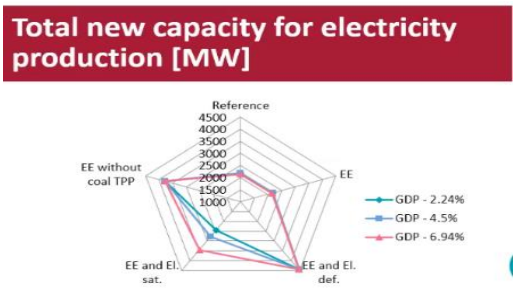
Mr. Dedinec has shared the details of the factors that are heavily influencing the energy development sector, predominantly focusing on the GDP growth (including current situation with Covid 19), the population growth, availability of energy sources, energy price fluctuation, availability/ energy efficiency/ cost of the energy production/ consumption/ transmission technologies, reliable proactive policies and measures, the geopolitical events etc. Each component should be analyzed separately prior having integrated analysis. For example, the population growth in North Macedonia has a very limited impact to the useful energy demand underpinned by the results of the sensitivity analysis: the difference in useful energy demand between the two scenarios where we use the highest and lowest population growth is only 2%. In the contrary, GDP growth has a huge influence on energy demand in the residential, commercial, industrial and agricultural sectors. The projections for useful energy demand resulting from assuming either 2.24% or 6.94% in GDP growth differ by 59%.

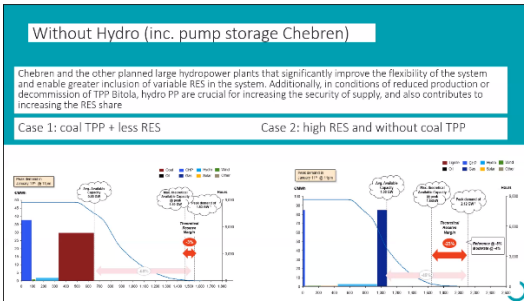
Further on he provided his thoughts on the main factors that are influencing the accuracy of the energy development forecasting. Hereby, the focus has been given to the accuracy of the energy development factors that are used during the planning processes. Also, the reliability of the software, the quality of the input data, and reliability of the assumptions and limitations have been listed and explained as being important from the accuracy and forecasting point of view.

Mr. Dedinec has familiarized the participants with the identified uncertainties that make difference in modeling. In order to better transfer the experience, he briefly explained the influence penetration of EE measures, penetration of RES, policies related to CO_2 price, changes in prices of technologies for utilization of RES, energy price changes, prices of accumulation of energy, and prices for balancing the changing power sources. Moving from theory to practice, Mr. Dedinec has translated the uncertainties in modeling on global scale to the list of uncertainties that are applicable to Macedonian reality. In that sense several parameters have been listed and briefly explained such as: policies related to penetration of energy efficiency measures; policies related to CO_2 price and subsidies for RES; prices for technologies; prices of energy sources (natural gas, electricity); prices for accumulation of energy; prices for balancing the changes of power sources; uncertainties about construction of main gas pipelines and connection options; uncertainties on economically feasible coal reserves for thermal PP; utilization of the Vardar valley, wind energy potentials; geopolitical events etc.

The households' projection should be taken into consideration very carefully due to its high impact to the development of the energy system. Different scenarios should be analyzed in order to identify the most optimal option. The most important input parameters are growth rate of the households and persons per household, migration from rural to urban areas, the size of the dwelling, and heated area by type of dwelling. We need to test the system using different scenarios based on the parameters mentioned above to see how the results are obtained by using different input data.

Having said that Macedonian Academy for Science and Art (MANU) is using the sensitivity analysis for each document that they are developing, Mr. Dedinec has shared one example that has been used three years ago. The analysis has used five main scenarios that have the following definitions: (1) Reference scenario (no new technologies, domestic and imported coal, current capacity of the natural gas, RES up to the capacities of the national energy regulatory commission, and no additional large HPP); (2) Scenario with improved EE on demand side (new technologies with higher efficiency in place, while supply side is following the reference scenario); (3) Scenario with electricity deficiency in the region; (4) Scenario without new coal based TPP; and (5) Scenario with electricity saturation in the region (electricity demand increased, closure of the dilapidated facilities, opening of new facilities abroad and no room for electricity export). Based on those scenarios, in-depth analysis have been made according to the following four parameters: 1) cumulative final energy consumption; (2) cumulative primary energy; (3) cumulative net import of energy; and (4) total new capacity for electricity production. While using different input data for each scenario and parameter, there are different results.

	If the GDP growth rate is selected, we have the following results: Using 2,24 and 6,94% of GDP growth rate as an input data makes difference of almost 20,000 kilo tons of energy equivalent in the cumulative final energy consumption. This shows a huge influence of the GDP growth rate to the cumulative final energy consumption, hence pushing modelers to have a strong focus on this while developing the scenarios.
	The assessment showed that when focusing on primary energy consumption, GDP growth rate has a strong influence on the reference scenario but also to the scenario with limited electricity capacity in the region. Since the security of supply is very important, it is important to test how the net import of energy is performing when using different input data. The results show that the reference scenario will require approximately 60,000 ktoe (with 6,94% GDP growth rate) and scenario with limited electricity capacity will follow with almost 50,000 ktoe.
	When analyzing the scenarios from the perspectives of the new capacities for electricity production it is important to be mentioned that the reference scenario and energy efficiency scenario provides almost the same parameters (MW new installed capacities) for each of the three GDP growth rate input data. However, when using the scenario with enough electricity capacity in the region, there is an evident variation in the new installed capacities.
	This clearly indicates that when models are planning and decisions are to be made, strong focus should be placed in getting very familiar not only with the situation in the country but also the situation in the region in order to have reliable projection.



Mr. Dedinec has shared the results of the analysis that were focused on the lignite thermal power plant Bitola (where 2025 is identified as the most critical year if we are going with its decommissioning without building a new capacity, hence influencing the level of investment in the renewable energy sources) and the Hydro Power Plants (that influences the security of supply, import dependence, but also strongly influence the flexibility of the system).

Discussion

Mr. Raisch briefly summarized the presentation noting that it helps to raise the awareness on the potential level of analytical detail, and how important the quality of input data is in order to have reliable projections and valuable outputs.

Mr. Raisch opened the floor for questions and/or comments and asked about the major challenges that the modelers are facing while doing the sensitivity analysis.

Mr. Dedinec answered that the sensitivity analyses are made in order to test the input data, the model itself, but also in order to provide clear information to the policy makers what is happening if the proposed measures are not implemented in practice and how that influences the energy security, import of energy, financial market etc.

Ms. Bosnjak opened a discussion on the importance of sensitivity analyses as part of the NECP process at this stage. There is a dilemma when it is essential to understand the stage of application of this method, either during the preparation of the draft document or as soon as the draft document is prepared, and all additional data has been collected.

Also, Ms. Bosnjak asked about the depths of sensitivity analyses and methods anticipated in other countries. Mr. Dedinec stressed that in Chapter 5 of the NECP is a question focused on the risk factors that could influence the projections and this is the room that should be used for integrating the findings from the sensitivity analyses. In that sense, the North Macedonian NECP is already integrating a set of information that are representing a risk factor for implementation of the NECP such as the number and total installation of HPP, the pipeline connection with Greece etc.

Ms. Isufi asked whether a specific study was used for the development of the scenario with deficiency of energy and electricity in the region?

Mr. Dedinec has informed the participants that North Macedonia's ENTSO-E has a very reliable study on energy development in the region in their 10 years network development plans so the data (including the data on electricity demand) are used for development of the Macedonian NECP. This analysis also integrates information on the potential for constructing new (hydro) power plants in neighbouring countries. The team for development of the Macedonian NECP are also doing analysis on the situation if some of the intended power plants are not going to be built, if there is a situation of having deficit of electricity in the region

and is there a potential of having North Macedonia playing certain role in meeting the neighboring countries' needs for electricity.

Mr. Memedov was interested in information on who requested this approach (sensitivity analysis-based approach) to be used while developing the national strategic documents. Is this request from the national institutions or your team just realized the necessity for it in order to strengthening the quality of the document? Mr. Dedinec answered that the team recognized that certain parameters have a strong influence to the projection (modeling) of the energy system. There was no request from the institution. It was further mentioned that some of the parameters showed that they have no considerable influence to the resulting projection e.g. population growth. For upcoming studies these parameters would not need to be tested anymore.

Mr. Wittrock provided information that the GIZ CDCPIII project mandated to support the process of the development of the NECPs in Albania and Montenegro are having a team of modelling consultants who will also integrate and run sensitivity analyses.

Mr. Raisch asked the presenter what are the challenges while conducting sensitivity analysis?

Mr. Dedinec provided information that the major challenge he is facing while developing the sensitivity analysis is the intensive time-consuming challenge. Taking the national energy development strategy, the technical team developed more than 30 different scenarios in order to provide clear perspective to the working group what are the option and how each parameter brings different challenges.

Ms. Rosenberg was interested in knowing what the main purpose was of using the sensitive analysis.

Mr. Dedinec said that the first importance is to find the most important parameters, adjust and then make a finetuning of the model itself. The last case of modeling we made showed that we have to change/adapt the transport sector modeling by splitting transport modes further into short and long distance cars and into in-city and inter-city buses and to change the household heating model by basing it on useful energy demand per square meter.

Mr. Smajlovic agreed that the time-consuming element is very critical but also emphasized that that the optimization of the model could be very challenging too since experts are used for covering specific sectors and they are standing quite strong behind their models based on their personal sensitivity analysis made for that specific sector. Also, there are some elements that usually pop out as very critical. For example, having clear vision on how the transport sector should look like BiH modelers came up with conclusion that there is one criterion that could change everything and that is the restricted economic power of citizens or their ability to afford more efficient cars (for example) and other investments at the same time. So, we have to be careful in jumping to all sectors with sensitivity analysis then we have a challenge first with the time and second with the flexibility of the models.

Ms. Cherepnalkovska informed about the quality and consistency of import data that are taken from the official documents. It is quite challenging that there is different information on the

same parameters in different documents. The team of experts should take the most appropriate and reliable input data and further ensure consistency of the data.

Mr. Dedinec has also stressed the importance of questioning and analyzing the data coming from the official institutions. For example, in North Macedonia the State Statistical Office in their report place one information on the contribution of the biomass (consumed) in the energy balance, but if we multiply the number of households with the firewood consumption given in the budget survey will result in a 4 times higher energy consumption compared to the one reported officially in the energy balance. In that case there is a need to take care about different elements, for example, on biomass sustainability (cannot use biomass above a certain limit). However, this issue was solved now by the State Statistical Office.

One general recommendation on this issue was to consider and adjust existing models – in case new consultants come into place - instead of building a new model.

Mr. Veit Raisch summarized the discussion. Special focus was given to the data consistency, baseline assumptions, and time-consuming element that remains challenge. He mentioned that it is very valuable to discuss such topics in order to strengthen the quality of the documents we intend to produce (the NECPs).

Since there were no immediate proposals for additional topics to be considered for the next regional exchange, it was decided that the participants are going to share their proposal in a written way, through email to Ms. Bosnjak and Mr. Raisch.

Closing remarks and warm thanks to the presenter, moderator and all participants were provided by Ms. Bosnjak, Ms. Rosenberg, and Mr. Wittrock.