

## CHALLENGES OF THE EUROPEAN ENERGY TRANSITION

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**Abstract:** The European electricity market is facing many challenges today, adding new dimensions to the crises that need to overcome. The digital technology is stepping into high rhythm, involving changes in laws and regulations in every domain. The electric networks have to digitize and the software applications are playing an important role due to their self-acting implementation during current operation.

**Key words:** digital, sustainable development, efficiency.

### 1. INTRODUCTION

Romania is on the last positions from the EU countries viewing wind and solar energy per capita, although the EU leaders insist for rapid passing to clean energy and to reduce the dependence of Russia and the dependence of fossil. The growth of wind and solar production capacity is all the more important in the rise of energy price caused by the dependence of fossil fuel from Russia. The prices from summer months were about fourth time bigger than last year.

The energy transition includes all the technologies that ensure the transition from conventional to non-conventional fuels and accelerating the electrification of production technologies and services.

Sometimes, the life has demonstrated that it overtook, the world sanitary crises and pandemic have changed behaviors, the regulations and legislations are changing in a lot of fields [1], [6].

Nowadays, European states are severely affected by the war in Ukraine which led to historical natural gas and oil barrel prices. Russia provides a third of the block's gas demand and a quarter of the oil demand, dependents on that provider has become the biggest vulnerability in the European energy sector.

The energy efficiency requirements have also been reinforced, reflecting technological progress and market evolution in the past decade. The global energy transition is advancing so the risks to the transition are rapidly evolving [2].

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The energetically entities or private operators of photovoltaic systems and different types of monitoring electrical energy are representing new aspects in electrical networks and also new requirements for network operation. The operating behavior of electrical networks which were primary designed must be switched due to higher number of actors appearance of electrical network. The control systems of new actors as well be considered in the entire system due to their software components which can influence the stability and security of electrical network. For obtaining the desired control, the behavior of control systems has to take into account when new functionalities are implemented [4], [5].

## **2. ENERGY INDUSTRY IS ALSO MANAGING THE IMPACTS OF COVID-19 PANDEMIC**

The COVID-19 pandemic has been catalyst for accelerating the digitization of Europe and the world. A strong and effective competition policy and enforcement in this regard is required to contribute to a resilient recovery and a smooth transition. The COVID-19 pandemic has represented a catalyzer to accelerate the digitization on Europe and the world. A strong and effective policy in the competition domain is necessary to contribute at a resilient recovery and a double transition for ensuring rules of compliance.

The European electricity market is facing many challenges today, adding new dimensions to the crises that need to overcome. Every day marks new rethinking of the strategies on which energy companies are based, increasing volatility and uncertainty increase the inclinations of market players to act with more caution on momentan impulses. The entire energy sector has begun to give signs of concern in the longer time [3], [6].

The energy transition is as valid as at the beginning of the COVID-19 pandemic. The COVID-19 pandemic is still ongoing and here are some things to know [8]:

- energy and economic growth remain strongly coupled;
- not all economies recovery will support energy transition in the same mode;
- need assuring that people who are most vulnerable are protected;
- the challenges in international collaboration remain;
- inconsistent communication and administrative mistakes can lead to a loss of trust and lead to misinformation.

If there is a decreasing in the cost of competition between producer entities and supplier entities, which is more determined by production costs, also appears increase in market complexity costs given by transaction costs.

The effect of price on customers' behavior determines the concept on vulnerability measured by weight more than 10% of energy costs in family income residential consumer.

The effects of extended and updating processes on the large scale could not be tested into a real electrical network.

### **3. INCREASING THE DEGREE OF AUTOMATION IN ELECTRICAL NETWORKS AND DIGITALIZATION OF PROCESSES**

The digitization will determine a huge assignment both of network operators and for new participants on electrical networks. To maintain a safe operating, it is necessary to have the possibility of updating the software used in digitized operation. [6]

For an incremental structure, the software infrastructure will be permanently improved. Examples of similar software are applications that analyze the network behavior and can predict the potential problematic situations as overload or to adjust the voltage level.

The integration of new participants as charging station operation or private energy suppliers determines a global software management for which there are missing content regulation or technical interfaces [7], [5].

Nowadays, software management systems are integrated with the control of physical system that make possible to ordinary manage of various software system. The system state which is monitored also can be influenced in order to optimally implement the software.

An implementation program may include actions for loading behavior of the storage systems in the energy network, changing consumers or for bandwidth reservation in the IT communications network.

The effects of the extending and updating processes cannot be tested in a real power grid, so the negative effects from the beginning by temporally stopping the control functions are minimized.

The digitization technologies have a significant potential in contribution and facilitation of energy transition due to innovative solutions or systems which are contributing to a more functional, intelligent, integrated and clean energetically system. Standardization, requirements, budgeting and exchange of good practices to UE can accelerate the digitization of energetically system [8], [10]:

- Creating a series of studies and involving stakeholders to identify the ways through the digitization can support the energetically system
- Promoting the digitization solutions for allowing implementation of energy systems enabling utility operators and networks to better coordinate, plan developing and operating at the local level of energetically system.
- Standardization at EU level for digital solutions in energy domain inclusively for automation, control system, data protection and cybernetic security.
- Digitization as a distinct dimension in the energy labelling regulations/ ecological design, especially for heat system, representing ways to support the intelligent operation of equipment in buildings.
- Strengthening the framework of Readiness Indicators for Intelligent solutions to intensify measures regarding demand response, self-generation and self-consume.

According with the decarbonization EU politics the renewable energy sources are about 64-97% from total produced energy. Through the costs decreasing, the renewable sources have not need support politics. Due to the energy from renewable sources becomes available economical, processes digitization, innovation and the support

offered renewable sources determine that these sources to have bigger and bigger weight in energy mix with the approach of the 2050.[5][7]

It can observe now that the electrical energy price overtakes record levels without chance to decrease in the short period of time in the same time that the doubt increases the action of energy market actors based on the momentary impulses. Entire energy sector has begun to sign concerns on the long period of time. The gas demand is increasing worldwide.

The development of energy systems should require the intelligent solutions use for assuring the system security and energy needs.

Romania has an energy mix in correspondence with nowadays requirements. Romania produces half as much CO<sub>2</sub> per capita as the EU. At the same time, the energy mix is changing as technology advances, consumer preferences shift and policy measures evolve. The energy mix is accomplished from national energy resources [6]. Gas offers a much cleaner alternative to coal for power generation and can lower emissions at scale. In the transition period the coal power plant has to pass on natural gases for total decreasing the greenhouse effect till 2040. Romania can reach whole natural gases necessity even through on shore exploitation and off shore deposits from Black Sea [3], [9]. The nuclear energy which is considered clean energy from greenhouse effect point of view, will play an important role in this transition period. The renewable energy should be continuously developed for reaching about 30-35% from Romanian energy mix. For adding new technology in using or production energy, the digitization of entire energy system components is most important.

#### **4. CONCLUSIONS**

Energy transition is the main strategy for reducing greenhouse gas emissions and significant contribute to mitigate changes climate. The energy system development supposes using intelligent solutions in ensuring the system security an energy necessary covering. The energy sector begins to profit of digitize advantages through helping consumers gain more control over their energy consumption and bills through new digital tools and services; controlling energy consumption in the TIC sector, including through an eco-labelling system for data centers, of measures to increase transparency regarding the energy consumption of telecommunications services; consolidating the cyber security of energy networks through new legislation, including for cyber security aspects of cross-border electricity flows.

The growth of wind and solar production capacity is all the more important in the rise of energy price caused by the dependence of fossil fuel from Rusia. The electrical energy market in Europe has to face a lot of challenges taking into account the new dimensions of crises. The prices evolution is influenced both of business fundamentals and subjectivism that marks new rethinking of energy strategy. Artificial intelligence, faster data processing and other digital technologies have great potential for increasing efficiency and driving down emissions. However, the country's performance in terms of the integration of digital technologies and digital energy services is poor compared to other EU member states.

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