



CONFERENCE DAILY

Day 1

Monday, 25 September 2017

HIGHLIGHTS

ERRA's 16th Energy Investment and Regulation Conference was opened in Astana on September 25th. The conference, hosted by the Committee on Regulation of Natural Monopolies and Protection of Competition under the Ministry of National Economy of Kazakhstan, was attended by 150 delegates from 31 countries and focused on key regulatory issues the energy sector faces in enhancing the energy security of supply while evolving to accommodate production from increasingly diverse energy sources. The conference discussed topics about the current status of the energy sector in Kazakhstan, opportunities in gas markets and competitiveness of LNG, the role of RES in meeting climate change goals and finally the changing energy market and its regulation.

Introductory Remarks

The conference was opened by Mart Ots, Chairman of the Energy Regulators Regional Association. Mr. Serik Makashevich Zhumangarin, Vice-Minister of National Economy of Kazakhstan thanked the ERRA Presidium for supporting Kazakhstan in hosting this year's conference and underlined the importance of regional cooperation in harmonizing energy legislation. Mr. Maitiyev,

Chairman of the Committee on Regulation of Natural Monopolies and Protection of Competition under the Ministry of National Economy of Kazakhstan noted the latest amendments of the Law on Electricity envision aggregation of small transmission companies with larger ones by means of enhancing and improving the functioning requirements. Kazakhstan's maximum price for electricity is on the bottom range of European prices of electricity. Mr. Maitiyev noted that the main goal of tariff policy in Kazakhstan is to attract investments for transportation along the main and distribution pipelines in order to reduce losses and improve the quality of service. A new tariff is applied to natural monopolies to work in the long term with investment tariffs available for 5-10 years. Mr. Maitiyev noted the importance of public consultation in approving tariffs in order to include the views of stakeholders, customers and public organizations.

Keynote Addresses

Mr. Alexandre Santos, President of the Mediterranean Energy Regulators (MEDREG) and Commissioner of the Portuguese Regulatory Authority (ERSE) was the conference Keynote Speaker. Mr. Santos noted that the member organizations of MEDREG provide much diversified experience in

regulation, which was the key message of his speech. The key strength of these regulatory associations, Mr. Santos highlighted, is diversity. Associations are important instruments in addressing such diverse challenges together. Mr. Santos noted that there are big challenges which are similar to each-other but different in each country and it is important that regulators have a role in supporting these challenges. Santos further emphasized the importance of creating regulatory frameworks for investments and for integration of Renewable Energy Sources (RES), for dealing with energy efficiency, incorporating innovation and the future of energy in consumers' grids. Finally Mr. Santos noted that it is important to have regulators and it is equally important that these regulators have a central role in developing investments in the energy sector.

SESSION I: CURRENT STATUS OF THE ENERGY INDUSTRY IN KAZAKHSTAN

Mr. Attila Nyikos, Vice-Chairman of ERRA, opened the professional part of the conference. The first panel was moderated by Shigeo Katsu, President of Nazarbayev University and Former Vice President of World Bank for Europe and Central Asia.

Mr. Talgat Abilgazy, Deputy Director of the Department of Electricity and Coal Industry, Ministry of Energy of the Republic of Kazakhstan, presented major areas of work on the power sector. Statistically, from 2016, Kazakhstan's electricity consumption was 92 billion kWh, and generation was 94 kWh, 65% of which was coal-based and the rest was mixed

between gas, hydro power plants and RES. Kazakhstan was the first of the Post-Soviet countries to restructure the sector however the crisis of the 1990s provided disappointing results. Correspondingly the capacities which were available at the time were not demanded and prices decreased, therefore investments stalled. This lasted for 5-6 years. However, in the beginning of 2000, Kazakhstan's economy started to grow and there was limited capacity in supply, therefore the Government had to improve the legal framework in order to attract investments. New tariffs, so called "tariffs in exchange for investments" were put in place which promoted the creation of new capacities. It was decided that the whole country needed to be supplied with electricity. Tariffs provided better results, resulting in investment of over 1 Billion Tenge, which lead to an increased capacity of over 3000 MW. Since 2009 there is a new concept in place, introducing a capacity market which facilitates investment. If shortages in capacity are foreseen during forecasting stage, this triggers the need to tender the construction of new generation capacities. This may include, not only building new power plants, but also upgrading existing power plants. There is a single buyer which purchases the capacity through an organized market through different prices, therefore producing an average price for all capacities.

The RES target is expected to be 10% until 2030 and 50% until 2050. The biggest challenge remains the integration of intermittent RES generation to the grid. Kazakhstan's coal resources are vast. There are more than 400 coal deposits in Kazakhstan which, with the current extraction rates, is expected to last for the next 300 years.

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Mr. Yerkanat Uakbayevich Temirkhanov, Deputy Director General for Transformation and Development at KazTransGas JSC, spoke about the prospects of gas field development in the Republic of Kazakhstan. Mr. Temirkhanov noted that the main player in the energy sector is the gas industry and this is true not just to Kazakhstan but to all countries participating in the conference. Regulatory aspects in this respect are very important. Mr. Termirkhanov noted that, according to a Governmental decree on July 2013, KazTransGas was appointed as the main operator in the gas sphere. The company supplies more than 35 million customers. The gas sector should remain important for the country however this requires the improvement of the processing of the raw materials in order to provide processed products to the global market.

According to preliminary data, there are considerable deposits of Methane in Coalbed and they are being explored, extracted and developed. Many foreign investment companies, including US and Australian companies, are very interested in investing in the country.

Green Economy is also a very important component of the company and there are initiatives to transfer public transport to compressed gas, with 1000 units using this equipment in Almaty and 160 units in Aktobe.

KazTransGas's transformation program will generate savings which will provide sufficient revenues for additional investments in infrastructure. Eurobonds placed on the Irish Stock Exchange and Kazakhstan Stock Exchange generated \$750 million, noting that investors show great interest in these securities. Mr. Zhandos Demesinovich Nurmaganbetov, General Director of the Financial Settlement

Center of Renewable Energy LLP in Kazakhstan noted that the national potential for wind energy is 920 billion kWh, 3000 sunny hours a year from solar and 62 billion kWh a year from Hydro power plants.

Kazakhstan guarantees purchase of electricity from RES for a period of 15 years. Renewables also have priority dispatch and enjoy preferential treatment in the entrepreneurial code. There is great interest from investors and technical specifications have been issued for 4800 MW of wind, Solar and Hydro capacities. The support mechanism is well defined however interest rate fluctuations pose a risk which is proving to be an obstacle for investors. The biggest challenges with RES are related to its expensive price compared to traditional resources and to the technical problems with the integration of RES due to the fact that the system is not flexible enough.

Mr. Daulet Akhmetov, Member of the Board of Kazakhstan's Electricity Association, spoke about carbon emission regulation in Kazakhstan. He noted that we must admit that the power industry is a major contributor to carbon emissions and the role of regulators is very important in addressing climate change concerns. Mr. Akhmetov provided an overview of the legal steps Kazakhstan has taken to take its part in addressing climate change.

The Emission Trading Scheme was chosen as a tool to address emissions as it is a market-based tool which addresses economic growth priorities. It was also noted that this requires a sophisticated market design and an upgrade of the regulation of the energy sector.

The major challenge is related to the growing economy and the question is how to improve energy efficiency in energy consumption that is associated with this growth. The second

challenge is attracting additional investment to meet investment needs. The third challenge is to balance the need to have sustainable industry regulation which focuses on adapting to the growing renewable energy sector, attracting green investments, addressing the technological shift and stimulating demand response to protect vulnerable customers.

SESSION II: OPPORTUNITIES ON GAS MARKETS AND COMPETITIVENESS OF LNG (Investment, Incentives, Impact on Pipelines, Access, Interoperability)

Andreas Walstad, Editor of EU Policy and Regulation at Interfax Europe, moderated the second session of the conference. Mr. Walstad noted the key legislations adopted by the EU in 2017 which will have an impact on gas and power markets. These include the revised regulation on Security of Supply in Gas (994/2010) (also known as the „Solidarity Law”), the Transparency in Intergovernmental Agreements (IGAs), the Air Quality Directive (BREF) and the Revised Markets in Financial Instruments Directive (MiFID 2). Another significant development is the preliminary verdict in the Gazprom antitrust case.

Mr. Walstad also provided an overview on the EU legislation reforms which are currently taking place. The focus, in this case, was on the reform of EU’s Emissions Trading System (ETS), increasing energy efficiency targets for 2030 (demand reduction), the clean energy package – phasing out capacity payments for coal plants (emissions performance standard),

alternative fuels in transport and Nord Stream 2 legislation. Nevertheless, the aim of these regulations is to enhance the security of supply by easing access to grids and storage, to harmonize trading rules across borders, to increase market transparency and to interconnect the markets. Mr. Walstad also emphasized that the EC is not against Russian gas imports but would like to reduce dependency on Gazprom by diversifying supply routes (through LNG and Southern Corridor, etc.).

Mr. Walter Boltz, Senior Adviser, Former Executive Director of E-Control and Board Member at ERRA’s Strategic Advisory Board, provided a presentation on the Future of Gas in Europe. Mr. Boltz noted that the gross energy consumption in Europe has only gradually changed over the years but is characterized with a slow increase in renewables and with a decreasing trend in the consumption of gas and coal investments, implying that the change in energy mix is a gradual process. Europe produces around 30% of the national gas it consumes and the rest is imported either from Russia, Norway or Algeria and other various sources, especially in the form of LNG. The Russian supply share is roughly 1/3 and has been fairly stable but slightly growing, which is interesting because EU policy has been pushing to diversify more and reduce the dependence on Russian gas. Gas consumption in Europe peaked in 2010 and since then gas demand has gone down. The main reason behind this is the economic crisis and the fact that a certain share of gas consumption has been shifted out of Europe. Another reason for this is related to the reduction of electricity prices, which made it inviable to produce electricity from natural gas. The expectation

over the next couple of years is that it is very unlikely for gas consumption to increase.

In the future there are different projections about the consumption of gas in Europe, depending on the assumptions made about the propensity of switching fuel consumption to gas in Europe. However the view of the majority is that it is unlikely to see an increase in gas consumption.

Mr. Boltz noted that Europe has far-reaching priorities for the energy sector. Brussels intends to make Europe a successful example of transition from fossil fuels to non-fossil fuels. There are efforts to increase energy efficiency but also to reach these goals with a fair price for consumers. This is a challenge because the subsidies to RES producers have an impact on the final bills to customers. EU climate and energy targets, in principle, attempt to have a large reduction in Greenhouse gas emissions by 2050 which means that significant actions need to be taken in order for this to be achieved. RES expansion is a priority as the goals for 2020 should be met. The efficiency goals are, however, not so easy to achieve as many countries in Europe are already quite efficient in their energy consumption.

EU's current policies will not get the GHG emission targets in 2050 therefore more needs to be done from a policy perspective. EU's focus will be put on large power producers as all fossil fuels need to be phased out by 2050.

In light of these developments, the future of gas is being very intensively discussed. Currently it is not quite clear which direction these discussions will take however the next 1 or 2 years will influence the debate. Decisions will probably be made within the 5 years on which direction the gas will go.

RES pose a challenge to natural gas in European markets due to their zero marginal costs. However some European countries are shifting their support policies to more market-compatible mechanisms which are reducing the dependence on subsidies.

There are three possible scenarios for the role of Gas in 2030/2050. The first phase envisages a stepwise phasing-out of gas, which leaves very little gas by 2050. The second option envisages to de-carbonize gas step-by-step. The third scenario foresees gas retains a role especially in transportation and the industry. The transportation sector does have a certain potential, especially in LNG, which is more environmentally friendly than diesel.

Producers and transit countries should carefully monitor the debate and see the direction of the policy. Methane leakage should be reduced as much as possible. These countries should participate in experiments and trials for CCS as well as pilots for green gas. On a strategic level, gas producing countries should also look for other parts of the world for sales opportunities. Ms. Gulefsan Demirbas, Head of the Strategy Development Department at the Energy Market Regulatory Authority (EMRA) provided a presentation on Regulatory Perspectives in Developing LNG Infrastructure. The presentation was a Turkish case study, part of the ICER-IGU joint study to look at different regulatory choices.

According to the World Energy Outlook, there are three different scenarios for global gas development. In the future, LNG may have an even higher share than forecasted, depending on the policies responding to the global climate change. Developing LNG infrastructure is a complex process, although a growing number of Floating Storage Regasification Units (FSRU)

will help the growing market for LNG. The share of FSRU capacity now accounts for 12% of the global regasification capacity however this will be doubled in three years and most of these capacities will be built in Asia.

Turkey has a fast-growing gas market. It is the fastest-growing market amongst OECD countries and the fourth largest gas market in Europe. The share of the LNG in the total supply accounts roughly about 17%.

The legal framework was adopted by 2001 and transmission, storage and distribution facilities allow open third party access. Importantly, wholesale prices are not regulated.

Liberalization and competition increased market growth in Turkey with LNG growth rate much higher than the total market growth rate.

In 2016 EMRA issued a decision to license the regime of FSRUs, acknowledging FSRUs for the first time in Turkish legislation. The interest in the technology is continuing to grow and the state company Botas is planning to initiate two new FSRUs. The growing interest in FSRUs is due to the flexibility they can provide to the Turkish Gas market. However, the biggest challenges faced by FSRUs relate to the traditional legislation which was designed mostly for fixed LNG terminals.

There is a revenue-cap methodology applied on FSRUs that allows a tariff period of 3-10 years with regulatory depreciation of 5 to 22 years and a Weighted Average Cost of Capital (WACC) of 10%. Although the current legislation is compatible with EU legislation, there is additional work being done on standardizing and simplifying of the usage procedures, improving web-based capacity booking, adoption of TPA exemptions, building LNG liquefaction facilities and enhancing the development of a competitive market.

Mr. Luis Ignacio Parada, Head of Global Regulatory Services at ENAGAS in Spain, provided a presentation on Investment Security in LNG Import Infrastructure. Mr. Parada spoke about the context and the purpose of the ICER-IGU cooperation project. The purpose of the study is to look help analyze examples of best regulatory practice. The final outcome of this study will be a report summarizing the results of the case studies provided by the regulators and the industry. The final report is expected to be published in February and the presentation is expected to be provided the Forum which will be held in Mexico in March.

Some cases which are under development by IGU include Adriatic LNG in Italy, Dunkerque LNG and Elengy in France, Enagas in Spain, Independence LNG in Lithuania, Japan (by the IEE), Polskie LNG in Poland and GNL Quintero in Chile. The issues of potential interest for each case depended on various project characteristics ranging from technical design to licensing and permitting process.

The Dunkerque example was interesting because of the exemption granted in a country with several regulated terminals, the possibility to directly supply non-odorised gas to neighboring Belgian Market and the exemption conditions for Capacity Allocation and Congestion Management. Elengy was interesting due to the large experience managing 3 LNG regasification terminals. Enagas, as the main LNG regasification company in Europe and the EU country with the largest regasification capacity. The Terminal developer for SoS/diversification reasons in a strongly regulated environment in the case of Lithuania with a significant impact on import countries.

In Chile there is a lack of domestic gas production. Gas was introduced in Central Chile only in the 1990s after a protocol was signed with Argentina. However the economic crisis in Argentina in 2002 provoked a gas crisis in 2004 which resulted in a permanent halt of the flow of gas to Chile, which was associated with significant economic and environmental losses for Chile. This triggered the start of the LNG terminal.

The first LNG regas terminal is a \$1.2 billion project, 85% of which is project finance whereas 15% is financed by shareholders. The project is supported by the Government of Chile through ENAP (NOC of Chile). 3 phases of the project have already been completed. The first was a fast-track phase which included a very small tank of 15,000 cubic meters of LNG. Then the original capacity of the terminal was achieved when two larger tanks were built. GNL Quintero is the asset owner and service provider, however GNL Chile is the shipper with a 20-year access contract which aggregates demand for all downstream users ensuring terminal use optimization through a "Borrowing&Lending" system. Tariffs composed by capacity and commodity terms, ensure the return of the investment and fixed O&M costs and the second is a pass-through of variable costs. Roll-in tariffs ensure that all customers benefit from terminal expansions.

There was an investigation by the Chilean Competition Authority in 2014 on third party access and information asymmetry. The investigation aimed to assess if the access was fair to potential customers. The findings were that the contract durations were in line with industry practice, the minimum volumes are justified by the Borrowing&Lending system,

there is a high load factor and there is a liquid secondary market downstream.

In summary, the business model met the financing needs of the project. It is a flexible access model which enabled the initial objectives of the project to be met, with a very high load factor, serving the main area in Chile (90% of the population and 85% of GDP). There is no regulated TPA but FNE (Chilean Competition Authority) confirmed that the operation of Quintero GNL was made under competitive conditions.

After this, Mr. Attila Nyikos presented ERRA's Regulatory Research Award winning papers. Maria Manicuta, member of ERRA's Presidium, handed out the prizes.

„Smart metering: an evolutionary perspective. Guidelines and lessons learnt from the Italian regulatory Experience” of Piti, Alessandro et. al. Received High Acknowledgments.

„Estonian Experience in Implementation of Incentive Type of Price Regulation” (Ots, Hamburg, Kisel and Mere) received the award of the Third Winning paper.

„Perspectives on Regulating a Regional Electricity Market: The ECOWAS experience” written by Ms. Ifey Ikeonu won the award of the Second Wining Paper.

Finally, the Best Paper of 2017, was written by Palma Szolnoki and it is titled *„Monitoring Natural Gas Balancing Markets: A practical guide for regulators on how the performance of the implemented balancing mechanisms can be assessed”*. The paper proposes a measuring tool for assessing the development of balancing markets for those countries with underdeveloped balancing markets.

Discussions continued on the second part of Session II. Mr. Eser Ozdil, Secretary General of the Petroleum Platform Association of Turkey

spoke about Opportunities on gas markets and the competitiveness of LNG.

Mr. Ozdil noted, among others, that key trends in gas trading suggest that Gas is ample. This is a result of more diversified suppliers globally. Furthermore, COP 21 and the penetration of renewables and efficiency will affect the future of gas. Another key element affecting gas trends is that the global LNG supply increase is absorbed by Asian and Middle Eastern Markets. Additionally, there is stagnant demand, despite a relative increase in European gas demand due to colder weather.

Qatar is the most important and biggest supplier in the international markets while Japan is the biggest consumer. Until early 2000 Japan alone was consuming around 50% of LNG demands globally. Japan, S. Korea, China and India continue to remain the biggest consumers of LNG in the world.

Most investments in the future LNG production are expected to come from Australia and the United States. Egypt is also expected to be a major supplier. US producers will become increasingly competitive on the global market and, along with Australia, is expected to be one of the world's top producers by 2035.

Price level differences have gradually diminished over the last couple of years, with the falling of oil prices and increasing of competition.

Mr. Arman Satimov, Advisor to the Chairman of KAZENERGY provided a presentation on the impact of LNG on the gas markets of Kazakhstan.

opened in Astana on June 10 and closed just recently on September 10.

The Expo's theme was „Future Energy” and it had three subthemes related to *Reducing CO₂ emissions, Living Energy Efficiency and Energy for All*. The Expo occupied an impressive area of over 174 hectares with the exhibition space taking up to 25 hectares and featured an impressive display of thematic pavilions. The event was participated by over 110 countries and provided a discussion platform over the challenge of ensuring safe and reliable energy supply while reducing CO₂ emissions.

EXPO 2017 ASTANA - FUTURE ENERGY

Mr. Ardian Berisha, ERRA's Regulatory Expert, provided an overview of EXPO 2017 which was



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Day 2

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SPECIAL SESSION: GUEST COUNTRY

Day 2 of the 16th Energy Investment and Regulation Conference continued in Astana on September 26th. Mr. Alejandro Chanona of Mexico's Energy Regulatory Commission, presented the challenges and opportunities in reforming the energy industry in Mexico, ERRA's Guest Country on this year's conference.

Mr. Chanona noted that Mexico started its energy sector reforms in 2014. Prior to the reform the two incumbent utilities were vertically integrated. Mexico is now transitioning to an open market, accepting the participation and investment of both private and public companies throughout the supply chain. Mr. Chanona noted that the fact that Mexico is undergoing this transition at a later stage is enabling them to follow international best practice examples from countries which have undergone this process in the past.

Mr. Chanona believes that the reform is sustainable in the long run as the commencement of the reform required constitutional amendments which needed a wide political consensus. The estimated investment, which is a result of the reform, is expected to be around \$251 billion over the next 50 years, implying an approximate annual GDP increase of 1%.

Importantly, the gas market has been liberalized and gas prices now reflect market prices, providing good price signals to investors to allocate their capital.

On the electricity side, the major issue was related to the underinvestment which led to an aging Transmission and Distribution infrastructure.

Mexico is committed to achieve a 35% renewables target by 2024 and this is expected to increase to 50% by 2050. The target will be achieved through a Clean Energy Certificate System. This means that the collective target will be converted to individual commitments.

Electricity auction yielded very positive results with the development of solar materializing at a cost of just over 30 \$/MWh. In March 2017, CRE issued a new set of regulations which foster sustainable integration of distributed energy resources in the country.

Lastly, Mr. Chanona invited all participants to attend the 7th World Forum of Energy Regulation which will take place in Cancun, Mexico on March 20-23, 2018.

**SESSION III:
RETHINKING ENERGY: THE ROLE
OF RENEWABLE ENERGY IN
MEETING CLIMATE CHANGE
GOALS (How Policy Can be Used
to Promote Renewables Markets;
Mobilizing Investment into
Renewables; Impact of Innovation
on Renewables)**

Mr. Henning Wuester of the International Renewable Energy Agency (IRENA) provided a presentation on Mobilizing investment into the renewables sector: how different actors – in developing and developed countries, public and private finance institutions – can work together in order to accelerate the introduction of renewables.

IRENA and IEA are currently looking at the additional RES penetration which would have to take place in order to achieve the 2° C target. The outcome of the study is that, by 2050, renewable energy would have to increase its share to 65% and energy efficiency would have to be enhanced in order to achieve the said policy target.

The energy transition is expected to boost global GDP as it is expected to be 0.8% higher than in the reference case (with current policies in place and 'business as usual' approach) and is expected to employ 26 million people in the renewables sector by 2050. The biggest challenge is to shift investment to generate \$29 trillion of investments from the fossil fuels sector into renewables and energy efficiency. Importantly, this needs to be associated with transmission and distribution investments, including back-up and storage infrastructure. This requires an increase in current investment trends of 15 to 20 fold for smaller developing

economies whereas in developed economies investment would only have to be doubled which can be achieved more easily.

Achieving these targets requires stable policy and regulatory frameworks, adaptive power sector infrastructure and financial risk mitigation mechanisms. Regulators have a central role in this respect.

Regulators also need to do more to provide incentives to develop an adaptive power sector infrastructure. Utility-scale solar PV farms, for example, can provide ancillary services to the grid, smooth-out grid fluctuations, enhance system flexibility and reliability and reduce reserve needs.

Achieving these targets requires mobilizing private investment. The key challenges in this regard are related to the lack of investment-ready projects, perception of high risks associated with RES and insufficient investment size and high transaction costs.

The rest of the discussion in the third session was moderated by Mart Ots, Chairman of ERRA and General Director of the Estonian Competition Authority. David Boyd, of Midcontinent Independent System Operator (MISO), provided a presentation on State and Federal Roles in U.S. Carbon Policy. There are currently around 16,000 MW of RES installed in MISO and this number is likely to increase in the future due to the high number of projects in the queue. There is no Federal-level carbon policy in the US however the Environmental Protection Agency (EPA) has the authority to regulate. This leaves it up to the individual states to take initiative and some states do have such policies. Examples of proposals for Federal Carbon policies include the Waxman-Markey legislation, the Mercury and Air Toxics Standard (MATS), Clean Power Plan and the Paris

Accord. Other activities include the Regional Greenhouse Gas Initiative (RGGI), State-based carbon reduction targets and State-based energy efficiency standards. Renewable energy is further supported by Tax credits, state-based renewable portfolio standards (RPS) and distributed energy resources. MISO serves around 30-35 million customers and the generation portfolio is rapidly evolving. For example, 76% of the energy provided to MISO in 2005 was produced by coal and this number reduced to just 46% in 2016. The Electric sector has also made progress in carbon reduction. Transportation will likely be the next area of activity in the US. Mr. Boyd noted the views presented reflect his own personal views and not those of MISO or the US Government.

Mr. Abid Malik, Managing Director for ACWA Power Turkey & Kazakhstan held a presentation on the Shuaa Energy 1 PSC and NOOR PV I program. The presentation initially provided a snapshot of ACWA Power's activities and specifically their work on renewables as developers, investors and operators of RES projects. Mr. Malik then provided participants with an overview of two projects they've developed: the Shuaa Energy 1 PSC project in Dubai and the NOOR PV I Program in Morocco.

The Shuaa energy project is a greenfield independent power project with an installed capacity of 260 MW, making it the largest single-site solar project in the world. The off-taker of this project is the Dubai Electricity and Water Authority and is a Develop, Build, Own and Operate project with a BOO PPA of 25 years and a winning price of 5.98 USD cents/kWh.

The NOOR PV I Program, on the other hand, is a 135 MWac project constructed in three

different locations in Morocco. It's a Develop, Built, Operate, Own and Transfer (BOOT) contract with a 20 year PPA with MASEN - the Moroccan Agency for Solar Energy (with an indirect PPA with ONEE, the Moroccan national utility).

Mr. Alexander Oudalov of ABB, Switzerland, provided a presentation on the Impact of Innovation on renewables. Mr. Oudalov noted that innovation is crucial in achieving global sustainability goals. He noted that, although there are different types of innovation - including technological, business as well as policy and regulatory innovation - his presentation will be focused on technological innovation.

Mr. Oudalov highlighted that there have been vast reductions in renewable energy generation costs and projections suggest that these costs will continue to go down due to improvements in the manufacturing process as well as the efficiency of the components. The LCOE of Wind and Solar is expected to be more affordable than conventional generation in the future. On wind, for example, innovation has focused on the usage of the materials and growing size of single units (there are already units of 10 MW and there are forecasts to have even higher units).

Mr. Oudalov also spoke of the challenges of running systems with high share of variable renewables. Increasing system flexibility is critical to the reliable operation of future power systems with high levels of RES penetration.

The importance of bulk power transmission technology was mentioned. Having available capacity to accommodate wind from different locations, for example, is very important. Furthermore, investment in transmission can help get access to high-capacity factor locations as well as enable systems to profit from

resource complementarity. On storage, there has been a significant cost-reduction mostly related to the continuous innovation on product design, manufacturing process and capacity. Mr. Oudalov also mentioned digital technologies, which can help improve the operability of the grid by aggregating distributed energy resources (DER). In the end Mr. Oudalov summarized that well-designed policy and regulation facilitates the development of RES however regulation should be more proactive rather than reactive in fixing the problems. Mr. Oudalov also emphasized that all stakeholders, including policy makers, regulators, technology vendors and utilities need to work together to achieve a cost-effective energy sector decarbonization.

The discussion that followed was moderated by Mr. Ots. Speakers emphasized the importance of a regulatory framework which is stable, clear and predictable.

Mr. Mustafa Yilmaz, president of the Energy Market Regulatory Authority (EMRA) in Turkey, thanked the organizers of the conference for the event. Mr. Yilmaz announced that EMRA will host the next Energy and Regulation Conference in Turkey, which will convene in Antalya. Mr. Yilmaz lauded the high reputation of ERRA's Investment and Regulation Conference and invited all participants to attend the next conference in Antalya in 2018.

Mr. John W. Betkoski, First Vice President of the National Association of Regulatory Utility Commissioners (NARUC), moderated the discussions related to the role of renewables in meeting climate change goals.

H.E. Abdullah Al-Shehri, Governor of the Electricity and Co-generation Regulatory

Authority of Saudi Arabia noted that it is important for individual countries to implement measures which are suitable to their specific circumstances. RES are currently increasing in Saudi Arabia, however there are also currently low oil prices which are preventing and slowing down the increase of RES. The government, however, made a commitment to significantly increase RES in the system. In order to implement this, there need to be measures to reduce the gap between conventional and renewables cost through a „Balancing Account“. This needs to be announced officially in order to provide confidence to investors. The other policy which the government is following is the mitigation of low fuel prices in order to encourage more RES to be developed.

There is also a special focus on small-scale RES systems where incentives are put in place for customers to invest, and investments are expected. With the regulator's support, the government has focused first on improving the efficiency of the system through serious conservation policies, which are already showing significant results.

Ms. Maria Manicuta, Director General of the Network Access and Authorization Department at the Romanian Energy Regulatory Authority, focused on the panel question on how EU policy can influence renewable markets.

She noted the EC's recently launched winter package brings about many regulatory challenges. The first problem is to mobilize 177 billion euro of public and private investment per year in the energy sector starting from 2021. Another problem is to generate up to 1% GDP increase over the next decade and doing so by reducing the annual energy bill per year. One of the pillars of this policy is linked with the Renewable Energy Directive which is intended

to be adopted as a revised directive (revision from the current Directive 2009/28/EC). The new intention of the EC includes 6 directions to be followed. Enabling the framework for renewables in the energy sector, mainstreaming RES in heating and cooling, decarbonizing and diversifying the transport sector, empowering and informing consumers, EU sustainability criteria for bioenergy and making sure that EU-level binding target is achieved on timely and cost-effective manner.

Ms. Manicuta noted that this target is very important as, by 2030, 27% of all gross final energy consumption in the EU will be from RES. The further increase of RES will make the electricity sector more inclusive and diverse. However, innovation must continue and innovation must be provided with certainty and feasibility. The general principle that MS should follow is that the support schemes must be cost-effective and market-oriented. One-Stop Shops and time-limits should be placed for the development of projects. The biggest challenge in regulation is passing through the associated costs in the tariff. Another question, which remains open, is related to the additional investments in system operation, transmission and distribution lines to accommodate the additional RES capacities. As regulators, therefore, there is a lot of work to do in the next few years.

Ms. Anar Omarova, Head of the Astana Resident Office at the European Bank for Reconstruction and Development (EBRD) mentioned that EBRD has invested around 2 billion EUR in many countries in renewable energy projects. This sector presents many opportunities for the future but there are challenges in developing it. Ms. Omarova particularly named the global and financial

crisis, climate change, dramatic growth in RE, smart city construction and treatment of unconventional reserves. There are three main issues related to affordability, reliability of supply and sustainable energy. Having this in mind, EBRD works with countries to develop legislation in the area of renewables, promoting various technologies and methodologies as well as financing investment projects. The Green Economy Transition Approach was approved in 2015 and this means that EBRD will provide more investments in environmentally-benefitting projects. The goal is to increase investments in such projects from 25%, the current rate, to 40% by 2020. A landmark transaction was signed in Kazakhstan, for example, for a 50 MW solar power plant.

From a financing point of view, EBRD is very attractive as well because it finances in local currency and at very attractive terms compared to commercial banks. Ms. Omarova encouraged RES developers to visit EBRD for cooperation.

Vitaly Korolev, Deputy Head of the Federal Antimonopoly Service (FAS Russia) from the Russian Federation also addressed the participants.

Mr. Korolev noted that the question of unified markets with Kazakhstan and Belarus is currently taking place. Creation of such markets will allow to respond to the needs of the energy sector in a more sustainable way.

At first, RES implementation seemed like an exotic measure aimed at addressing environmental concerns but now we see that RES projects are becoming more competitive due to their reducing costs. He noted that sometimes there are isolated areas that have high-priced diesel fuel for generation and in considering solar or wind as an alternate

source, there may need to be an incentive measure for special conditions for connections of the RE sources.

There are obligatory measures to include RES in the network and these measures are being reflected in quantitative results. Furthermore, the Russian Federation includes a new type of renewable generation from household waste plants. These plants are not fully competitive, work is currently ongoing to improve their competitiveness however these technologies help address environmental concerns.

In the discussion that followed Dr. Al-Shehri noted that the most important trend enhancing the development in renewables is the reduction in production costs but this must be matched with a lower burden on customers, creation of new jobs in the production of these technologies, ensuring that developers and investors have a clear system, and for system operators, to make sure that the system integrity and operability is in place. Innovation in these areas will help develop renewables further and integrate them with conventional systems.

Ms. Omarova noted that the cost of RE in Kazakhstan is a challenge because coal-fired plants are so inexpensive, so the government needs to find a balance between development of RE and economic growth based on low-cost energy. Ms. Manicuta addressed the need to educate the ratepayer about the use and cost of RE. Consumers are put off by the higher prices, so the regulator needs to identify the hidden costs behind conventional energy and also work with the government on how to address pricing measures (subsidies) for low-income consumers.

**SESSION IV:
THE ENERGY CUSTOMER: THE
CHANGING ENERGY MARKET AND
ITS REGULATION (Prosumers,
End-user Pricing, Changing Role of
the DSOs)**

Dr. Ilka Lewington of DNV GL provided an introductory presentation on the changing energy market and its regulation. Ms. Lewington noted that the major trends of changes can be seen in the areas of policy, technology and economy. Any of these could be game-changers and certainly together they amount to something really new which needs to be addressed.

These change trends require prompt and effective responses in the form of fostering functional markets, addressing adequate regulation and facilitating institutional coordination.

Ms. Lewington also noted that these trends are only just starting. In the European Energy Sector, in the generation hubs and the demand hubs, a lot of things could change and regulators should not be seen to oppose this change but also need to contain the effect and make the transition somewhat smooth.

There are a number of challenges. For system operation, the challenges are at the Medium Voltage range as most RES connect to this level. On the Low-Voltage level there are also a lot of new developments related to small-scale storage, consumers participating as prosumers etc.

Other challenges relate to innovation. Apart from significant investments into “traditional”

generation and grids, substantial innovation is required to achieve the desired policy goals.

Ms. Lewington also noted the importance of new business models and the challenge they pose to regulators. The unbundling lines which regulators impose are getting blurred as companies become more and more diversified. Regulators need to think how to address such issues.

In the end, Ms. Lewington noted that there are other challenges which relate to public discontent, affordability of prices, political interventions such as intentions to limit price increases, knowledge gaps in regulatory institutions and unconstructive policies of companies' management.

The final panel discussion was moderated by Mr. Rolands Irklis, Chairman of the Public Utilities Commission (PUC) of Latvia and ERRA Presidium Member.

Mr. Irklis noted that the major trends changing the Energy Industry are occurring on the environmental and technological aspect but also customers want to be increasingly involved and they want the best service quality at reasonable prices. Flexibility is critical to increase renewables integration in the market. Systems are now more complex as more customers are becoming prosumers, which means there are generators also at the distribution level, which requires more flexible systems.

Mr. Irklis noted that Smart Meters are developing increasingly more in the European Union. Data suggest that, for most countries, there are clear benefits of implementing smart meters however some countries did not reach those benefits so far, such as Latvia, Denmark, Lithuania and Romania. For most of those

countries who did not benefit from smart meters, the reason was related to the small-scale roll-out of these meters.

New technologies are also approaching regulators at a very fast pace, including e-mobility, batteries, micro generation, digital solutions and virtual power plants, which unite consumers, aggregators and other service providers in a way that they can provide additional services in the market (mostly ancillary services and helping system flexibility). There are also a lot of new opportunities for prosumers. Solar panel prices are decreasing rapidly therefore it is becoming more beneficial for prosumers to install such technologies in their households. At the same time, prices of batteries are also reducing rapidly and this is facilitating the increase of prosumers.

The first question posed to the panelists was *"Who should take action for energy market digitalization? DSOs, regulators, suppliers, consumers?"*

Mr. Hando Sutter, CEO of Eesti Energia noted that the cleverest ones will take action first because digitalization provides many opportunities for growth. Most of the incentives today are to the suppliers. TSOs are probably next because they have large investments and with actual data they can improve the utilization of these networks.

Ms. Ilka Lewington of DNV GL noted that all stakeholders should be involved as the only way forward is to address these challenges together. The answer also depends on the country at hand, as each country has their specific circumstances, but in any case it is important to follow a gradual step-wise approach.

From a consumer's perspective, Zoltan Nagy, Energy Manager, Middle East, Central & Eastern Europe at Linde Group, Hungary suggested that the question should be divided in two parts and looked at from an industry perspective and from a household customer perspective. The industry is already ahead with these topics because they are very sensitive to prices and are using today's digitalization. The domestic customer, on the other hand, is a different story because it depends on the metering devices.

Mr. Ion Lungu, Chairman of the Romanian Electricity Supplier's Association provided a supplier's perspective on the topic. Particularly, Mr. Lungu noted that the whole supply chain needs to be digitalized, otherwise we will not see the full benefits. Furthermore, Mr. Lungu noted that, only supplying electricity is not a viable business and digitalization can help suppliers provide more services to the customer.

Ms. Ellen Nowak, Second Vice President of the National Association of Regulatory Utility Commissioners (NARUC) and Chairperson of the Wisconsin Public Service Commission, noted that regulators should make sure that there is a level playing field for market participants. It is unclear where technology will take the sector in the future and Regulators should not be in the driver's seat. Rather, the market and the consumers should decide what the priorities are. The regulator should make sure that there are tariffs and other policies in place so that those consumers who are not participating in any of these advantages are not harmed and that all consumers are treated fairly.

The second question posed by the moderator was: *"What tariff structure should be designed to cover costs for innovative and intelligent technologies, keeping the tariff design fair to all customers? How has each country handled reverse electricity flows and what changes have you made with respect to tariffs?"*

Ms. Nowak noted that this a challenge which is often posed to regulators. She provided an example in her own state of Wisconsin. Importantly, she noted that there is only a small scale of customers using these technological advancements and the role of regulators is to look at the entire customer base.

Mr. Sutter noted that it will be much cheaper for the society if the smart-meter roll-out is done fast. Consumers should have incentives to reduce their costs and technological innovation should enable them to do so.

As for tariffs, Mr. Sutter noted that tariffs will soon be out of regulator's tables because even renewables will be competitive.

The next question was related to the integration of prosumers to the market.

Mr. Lungu noted that their regulation varies between countries. The major question relates to whether these prosumers should be allowed to insert energy into the market and, if so, what price should be paid for this electricity. Both fixed prices and market prices and premiums could work.

Mr. Sutter noted that the prosumers definition is outdated for today's circumstances. He also agreed that none of the regulators will apply the same policy. He highlighted that the cross-subsidization problem should not be an obstacle as customers are constantly cross-subsidizing each-other, using the example of the cost of providing electricity service at a

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densely-populated city, compared to being supplied at a remote area, to illustrate the point.

The fourth question was related to the definition of prosumers: *“Who might be prosumers? Should it only be those who produce energy from RES and other technologies? Do the criteria need to be developed to set the status of prosumers?”*

Ms. Lewington noted that there should be a discussion on the sunk costs and the recovery of those costs and also noted that technological developments will take time to reach Energy Community countries or former Soviet Union countries.

Mr. Sutter, on the other hand, noted that the principle should be that the best offer should win.

The next question was related to the significance of energy market openness during the time of new technologies’ development: *“Does a regulated price in the retail market have an impact on the entry of new technologies into the market?”*

Ms. Lewington’s opinion was that there is continued work against regulation in the retail market. Continuing to regulate retail market is no longer a desirable policy.

Ms. Nowak stated that, in the case of Wisconsin, the sector is vertically integrated. Regardless of the development of the market, however, she noted that subsidies can have a negative effect of reducing transparency and preventing other entrants into the market.

Mr. Sutter noted that, according to the World Energy Council, 1.5 billion people in the world are living without energy supply. He mentioned a business model which is picking up in India where, in some cases, people who are living with \$2 per day are willing to pay 50 cents for

electricity. There is no need for regulation on the retail market.

MEDIA AND INSTITUTIONAL COVERAGE OF THE INVESTMENT CONFERENCE

The Conference received unprecedented media attention in Kazakhstan. The links to the various media and institutional web-sites are provided below:

Online media:

- <http://24.kz/kz/zha-aly-tar/o-am/item/198140-zha-a-zhyldan-bastap-kommunaldy-tarifterdi-ba-asy-sedi>
- <http://kaztrk.kz/news/qogam/2018-zhyldan-bastap-kommunaldy-gyzmetterge-tarifter-osedi-102668>
- <http://24.kz/kz/zha-aly-tar/o-am/item/19>
- http://www.elarna.com/koru_kk.php?tur=1%26
- <http://khabar.kz/kz/news/kogam-kz/item/9>
- <https://mail.kz/kz/news/kz-news/elordada>
- <http://namba.kz/news/read.php?id=2632501>
- <http://news.invest.kz/130780385-tarify-na>
- <https://kapital.kz/economic/63239/tarify>
- <http://www.lsm.kz/vvedenie-differencirov>

Television:

- <https://www.youtube.com/watch?v=myTw2IO5sW4>
- <http://www.24.kz/ru/news/social/item/198>
- <http://qostanay.tv/ekonomika/tarify-na-k>

CONFERENCE DAILY

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- <http://kaztv.kaztrk.kz/news/qogam/2018-z>
- <https://kaztrk.kz/news/qogam/2018-zhylda>

Printed media:

- <http://kostanaytany.kz/archives/55105>
- <http://www.syrboyi.kz/zedelnews/13855-za>
- <http://kazinform.kz/kz/zandagy-ozgeriste>
- <http://inform.kz/kz/zandagy-ozgerister-k>
- <http://mln.kz/content/dvukhtarifnoe-nach>
- <https://zonakz.net/2017/09/25/dvuxt-arifn>

News Agencies:

- <https://www.nur.kz/kk/1627506-zhanha-zhy>

Other:

- <http://economy.gov.kz/ru/news/v-astane-dlya-obmena-opytom-vstretilis-mirovye-lidery-regulyatory-energetiki>