ERRA CHAIRMEN MEETING
October 28th, 2020
Virtual

Meeting notes

The representatives of the following ERRA Member Organizations were present:

ERE, Albania
CREG, Algeria
PSRC, Armenia
E-Control, Austria
AERA, Azerbaijan
BEA, Bhutan
SERC, Bosnia and Herzegovina
FERK, Bosnia and Herzegovina
ARSEL, Cameroon
Energy Regulators Association of East Africa
ECOWAS Regional Electricity Regulatory Authority
CRE, France
GNERC, Georgia
HEA, Hungary
CRNM, Kazakhstan
ERO, Kosovo[1]
PUC, Latvia
NERC, Lithuania
ANRE, Moldova
ERC, North Macedonia
NEPRA, Pakistan
Osinergmin, Peru
ERO, Poland
FAS, Russian Federation
ECRA, Saudi Arabia
AERS, Serbia
RONI, Slovakia
ERC, Thailand
EMRA, Turkey
NEURC, Ukraine
DoE Abu Dhabi, United Arab Emirates
RSB Dubai, United Arab Emirates

Welcoming Comments

Ms. Maia Melikidze, ERRA Chair; Commissioner, GNERC Georgia welcomed all participating member Chairmen and other representatives. In her speech, Ms. Chair emphasized the importance of this format of high-level meetings, that have been held by ERRA for 11 years and said it should be withheld in the future as a valuable platform of expertise and information exchange.

The Exchange Rate Risk and Tariff Regulation

The introduction to the topic was made by Mr. Ardian Berisha, ERRA Regulatory Specialist. As the first remark, Mr. Berisha mentioned that the emerging market currency is likely to fall over the course of the life of infrastructure projects. He mentioned that regulations need to address and be clear about the issue of exchange rate risk allocation. He said that the rate risk will be borne by either customers, government or investors:

[1] This designation is without prejudice to positions on status, and is in line with UNSCR 1244 and the ICJ Opinion on the Kosovo Declaration of Independence.

Risk allocation and responsiveness

Risk allocated to	Why?	Pros/cons
Customers?	• Should bear the risk because they should pay the true cost of service, including the exchange rate risk	Pro: • Risk allocated to whoever is causing the cost Cons: • No incentive for producer to seek ways to mitigate exchange rate risk. • Customers cannot hedge against it.
Government?	• Should bear the risk because they are responsible for macroeconomic policies which influence the exchange rate. • They provide guarantees to cover the repayment of foreign currency debt	Pros: • Risk allocated to party responsible for managing it Cons: • No incentive for producer to seek ways to mitigate exchange rate risk. • Government doesn't have full control over exchange rate volatility (other factors important) • Gov't doesn't respond to financial incentives in the same way that firms and individuals do.
Investors?	• Should bear the risk as they are in the best position to diversify away country-specific exchange rate risks	Pros: • Risk allocated to party responsible for managing it Cons: • Foreign exchange risk hedging only available in developed markets

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In his following remarks, Mr. Berisha quoted publications on the topic, mentioning explicitly:

- Gray and Irwin (2003) – key points:
    - During crisis governments breach contracts or customers must bear large price hikes, undermining support for privatization
    - In the long run, very high correlation between inflation and currency depreciation, especially in cases of high depreciation.
    - Investors should face all financing-related exchange rate risk however tariffs need to be linked to an index of local inflation, possibly adjusted to reflect the actual cost of inputs (exactly what the Rule proposes).
    - Over the long term, the effect on prices will be similar with exchange rate or inflation indexation, but with a link to local inflation, currency crises will not cause immediate, politically perilous price increases.

and

- Matsukawa, Sheppard and Wright (2003) – key points:
    - Foreign investors that accept exchange rate risk will factor a risk premium in their expected rate of return on investment.
    - Empirical evidence suggests PPP holds over the medium term. If PPP holds, and the project's revenues are indexed to local inflation, the effects of foreign exchange risk should be neutral over the medium to long term.
    - "Liquidity facilities" (support mechanisms to help projects cope with problems that are believed to be temporary) can provide standby financing to enable a project to continue to meet its debt service obligation by spreading the tariff impact of exchange rate changes over longer periods.

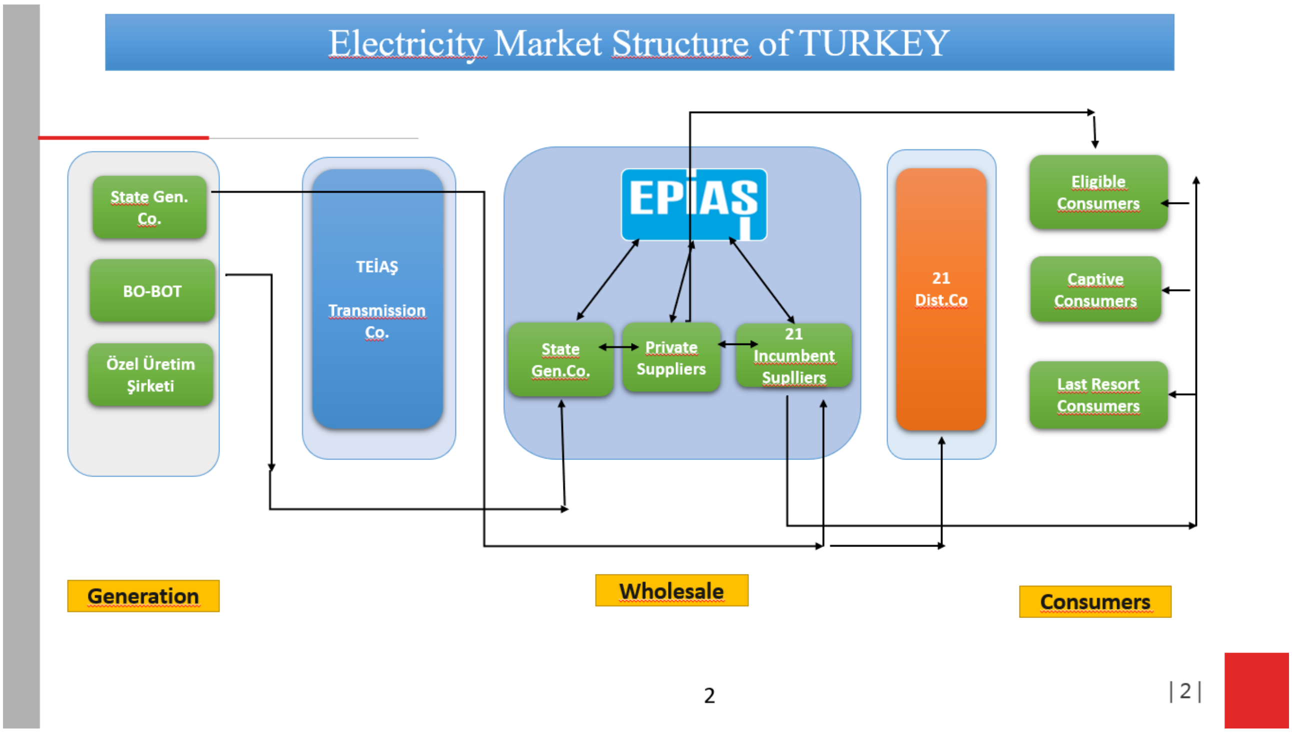
For the policy considerations for the potential way forward, Mr. Berisha mentioned:

1. Reflecting all pass-through costs at the actual exchange rate during the time of purchase;
2. Reflecting all capex purchases at the applicable actual exchange rate in the regulatory asset base;

3. Pass-through power purchase costs from IPPs, which may be denominated in a foreign currency, should be automatically passed through to allowed costs at the actual exchange rate applicable at the time of purchase, which fully addresses currency risk in purchasing energy from IPPs;
4. At the end of each year, indexing all costs to inflation should be performed, and adjusted within each year for differences between forecast and actual inflation
5. All other currency-related risks that can be addressed through the tariff methodology should be addressed through the WACC.

Case study - Turkey

The first presented case study was by Mr. Abdul Cebbar Karaoğlu, Energy Expert from EMRA Turkey. First, Mr. Karaoglu presented the structure of the Turkish electricity market:



Mr. Karaoglu said that the Gross Retail Margin was approved in EMRA for 3rd Regulatory Period (2016-2020) in 2015 and set to 2,38%.

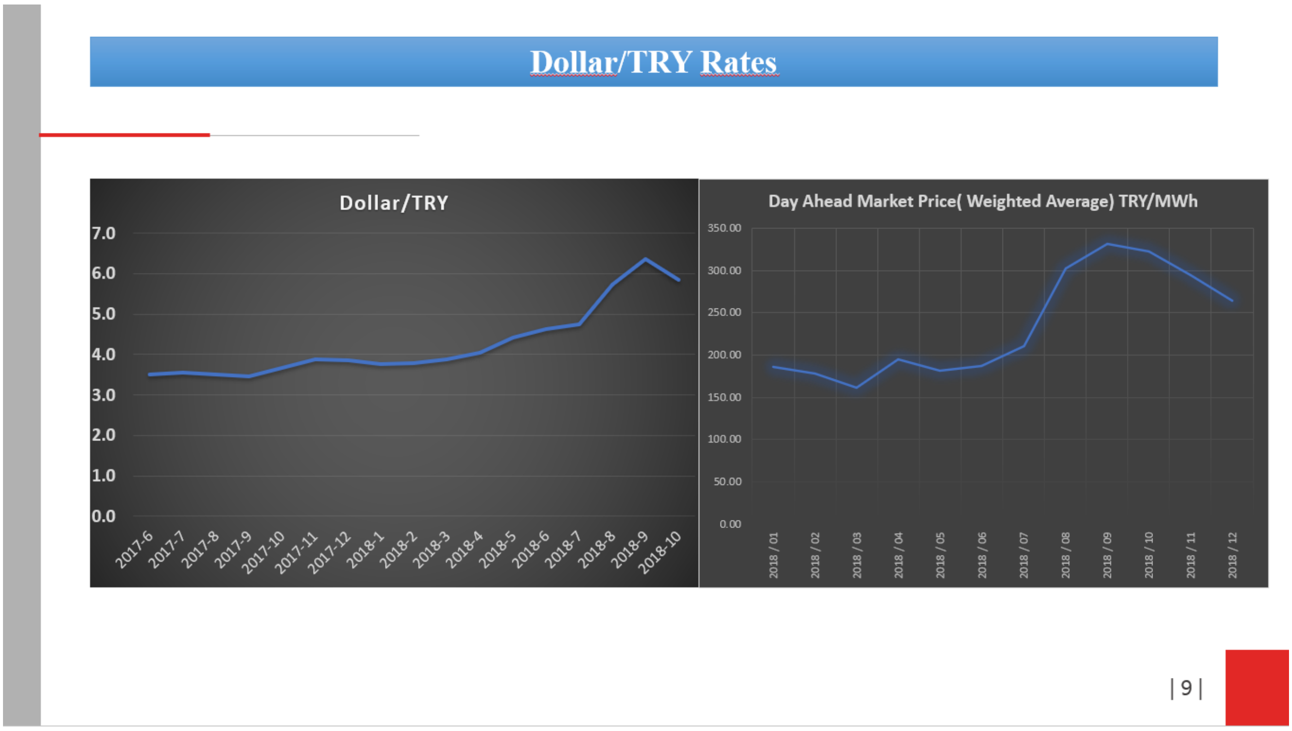
Regarding the Energy Sources and Financial Parameters, he said that:

- Plants registered for the Ressum mechanism is to be paid by kWh/Dollarcent
- Almost 30% of electricity generated by natural gas and it is imported.
- Coal etc. are mostly imported resources.
- Electricity purchases of incumbent companies were also effected by interest rates.
- Yearly adjustment of revenue caps are based on CPI.

There has been an exchange rate hike in Turkey:

- The Turkish lira depreciated above %30 in mid-2018 due to speculative attacks in global markets.
- This also pushed up the interest and inflation rates.
- Especially electricity stock market prices raised by %50 in July 2018 compared to June 2018 due to exchange rate hike.
- Energy companies faced some liquidity and funding issues.

- The increase in foreign exchange rates in the markets has been tried to be solved without direct intervention to end prices.



The price overview following the hike was presented as follows:

	June 2018	July 2018	August 2018	September 2018	October 2018
Ressum Unit Price (TRY/MWh)	73,17	56,46	68,37	55,83	49,547
Average Day-Ahead Price (TRY/MWh)	187,14	209,95	302,44	330,88	321,904
Total Market Price	**260,30**	**266,41**	**370,81**	**386,71**	**371,45**
Regulated Commercial Electricity Price (TRY/MWh)	244,74	285,19	285,19	343,26	434,78
Regulated Residental Electricity Price (TRY/MWh)	244,67	267,29	267,29	302,73	345,30

Mr Karaoglu commented that after drastic changes, most of the eligible consumers&suppliers broke their contracts and supplied by last resort suppliers. As a result the competitive market has been effected tremendously.

The exchange rate precautions undertaken by EMRA are as follows:

1. New parameter/model:
   a. A new parameter has been developed in tariff calculations as a result of the increase in the day-ahead market and bilateral agreements without EÜAŞ (State Energy Production and Wholesale Company) purchases and interest rates.
   b. A dynamic "Day-ahead market price + X" model has been developed to compensate for additional financial cost of purchases without State Gen. Co. X mentioned above includes a formula for companies' financial costs for the energy purchases without State Gen. Co.

2. Forecasted inflation rate:
    a. Realized inflation rates *(For 2018, real rate of 2017's October was used)* has been taken in to account by calculating revenue cap but with the new method; because of the increase in the inflation rate forecasted inflation rate of midyear added to the calculations. *(For 2019, forecasted June 2019 rate was used)*
    b. This forecasted inflation rate adjusted in the income difference transactions. In this way, the risk of deterioration in the cash flows of companies has been reduced due to the rise in inflation
3. WACC - the financial costs for electricity distribution companies are not taken into account in the tariff calculation in the revenue cap method directly. However, due to the rise in interest rates and expected inflation, the WACC rate approved for the implementation period covering 5 years- 2016-2020- was revised from 12,66% to 14,60% for 2018-2020 before tax and reel term.

As a result:

- Final prices for regulated consumer was risen.
- Financial stability of the regulated companies was retained.
- The number of eligible consumers started to increase again.
- Thanks to the dynamic model, there will be no need to intervene in the market in case of possible future shocks.

Case study - Georgia

The second presented case study was by Mr. Gochia Chitidze, Tariff and Economic Analysis Department from GNERC Georgia. First, Mr. Chitidze presented the Tariff Calculation Scheme at GNERC:

Rate of return regulation:

$$\text{Capex} = \text{RAB} \times \text{WACC} + \text{D}$$

RAB (denominated in local currency) - Historical cost model;
WACC - Local currency (in nominal terms).

The current WACC figure for Georgia is set for 16,4%. Later, the risk-free rate was discussed in detail:

Risk-free Rate

Exchange rate risk assessment 2018-2020			
Risk-free rate (r_f)	12.2%	2.0%	YTM US 10-Y Treasury Bond
		4.2%	Georgian Country Default Risk
		6.0%	Currency Risk

Exchange rate risk assessment 2021-2023			
Risk-free rate (r_f)	10.2%	0.8%	YTM US 10-Y Treasury Bond
		3.5%	Georgian Country Default Risk
		5.9%	Currency Risk

USD/GEL Exchange rate 2010 (Average)	USD/GEL Exchange rate 2020 (Average)	Average yearly depreciation (Geometric Average)
1.78	3.22	5.6%

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Mr. Chitidze concluded his presentation with presenting a discounted cash flows (DCF) analysis on a case of a USD 100 000 investment:

DCF analysis

Assumptions	
Year	2018
Lifetime	25
Inv (USD)	100,000
FX (2018)	2.53
FX (2042)	10.6
Curr Dep	5.6%
Disc. Rate	10.0%

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
NBV	243,316	233,178	223,040	212,902	202,763	192,625	182,487	172,349	162,211	152,073	141,934	131,796
Dep	10,138	10,138	10,138	10,138	10,138	10,138	10,138	10,138	10,138	10,138	10,138	10,138
Ret	39,904	38,241	36,579	32,772	31,211	29,651	27,135	25,627	24,120	22,612	21,105	19,597
Capex	50,042	48,379	46,717	42,910	41,350	39,789	37,273	35,765	34,258	32,750	31,243	29,735
Dep USD	4,000	3,596	3,148	2,982	2,824	2,675	2,534	2,400	2,273	2,153	2,039	1,931
Ret USD	15,744	13,565	11,360	9,640	8,696	7,824	6,782	6,066	5,408	4,802	4,245	3,733
Capex USD	19,744	17,161	14,508	12,622	11,520	10,499	9,316	8,466	7,681	6,955	6,284	5,665
DCF	19,744	15,601	11,990	9,483	7,868	6,519	5,258	4,345	3,583	2,950	2,423	1,985
NPV	99,606											

	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042
NBV	121,658	111,520	101,382	91,244	81,105	70,967	60,829	50,691	40,553	30,415	20,276	10,138	0
Dep	10,138	10,138	10,138	10,138	10,138	10,138	10,138	10,138	10,138	10,138	10,138	10,138	10,138
Ret	18,090	16,582	15,075	13,567	12,060	10,552	9,045	7,537	6,030	4,522	3,015	1,507	0
Capex	28,228	26,721	25,213	23,706	22,198	20,691	19,183	17,676	16,168	14,661	13,153	11,646	10,138
Dep USD	1,829	1,733	1,641	1,554	1,472	1,394	1,321	1,251	1,185	1,122	1,063	1,007	953
Ret USD	3,264	2,834	2,440	2,080	1,751	1,451	1,178	930	705	501	316	150	0
Capex USD	5,093	4,567	4,081	3,634	3,223	2,846	2,499	2,181	1,889	1,623	1,379	1,156	953
DCF	1,623	1,323	1,075	870	702	563	449	357	281	219	169	129	97

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Where:

FX – GEL/USD exchange rate

NBV – Net Balanced Value

Dep – Depreciation (const.)

Ret – Return on assets (NBV*WACC)

Mid table – values in GEL

Low table – values in USD

The conclusion from the analysis was that in a regulatory regime where exchange rate risks are compensated by a correctly set WACC the companies are able to receive an appropriate return on investment.

Case study – EREA

Uganda

The second presented case study was by Mr. Geoffrey Mabea, Executive Secretary at Energy Regulators Association of East Africa (EREA). First, Mr. Mabea set the scene for the Ugandan context:

- In Uganda's electricity supply industry (ESI) besides the Uganda shilling, the US Dollar is the main currency that is used in energy projects development, bulk energy purchases and operation and maintenance (O&M) of power plants. For example, up to 90% of bulk energy purchases by Uganda Electricity Transmission Company (UETC) from power generators; 100% of investments by the main distribution company and up to 40% of O&M costs are transacted in US dollars.
- As such, unanticipated changes in the exchange rate between the US Dollar and the Uganda Shilling has significant implications on the end-user tariffs and this poses challenges to tariff management. To mitigate the ESI exposure to Exchange rate risk, the following is being implemented by the Electricity Regulatory Authority (ERA) and ESI licensees:

Additionally, in Uganda:

- Tariff adjustment is made on quarterly basis. This smoothens the exchange rate fluctuation costs of potentially large swings in the currency when tariff adjustment is less frequent.
- Periodic (annual) review of the share of US Dollar denominated costs takes place in the O&M costs of licensees – especially companies operating government power plants and distribution assets.
- There is a stringent procedure of determination of the share of US Dollar denominated costs in place in the O&M costs of power generation plants.
- Hedging on a quarterly basis a partition of the bulk power purchase costs that are denominated in US Dollars from currency fluctuation. This exchange risk management procedure is at present being piloted by UETC, having been approved by ERA.
- Mainstreaming of the Buy Uganda and Build Uganda (BUBU) policy in the procurement of network assets of the electricity supply industry. This goes towards reducing share of investment or O&M costs that are denominated in US Dollars.

Kenya

Next, Mr. Mabea presented the case of Kenya:

- In Kenya, the foreign exchange risk is handled through a pass-through mechanism which is computed monthly and gazetted by the Regulator. This is known as Foreign Exchange Rate Fluctuation Adjustment and compensates the utility/offtaker from the deviation of the major currencies from the base exchange rates as provided by the Regulator.
- All fuel displacement and pass through costs shall be converted to Kenya Shillings using the CBK mean exchange rate of the calendar month immediately preceding each Post-paid Billing Period.
- All units billed to each Post-paid Consumer or purchased by each Pre-paid Consumer every month shall be liable to Foreign Exchange Rate Fluctuation Adjustment which shall be calculated in accordance with the following formula:

Foreign Exchange rate Fluctuation Adjustment-KENYA-2

$$FERFA_t = \frac{1}{1-L} * \left\{\frac{(\Sigma(F_{t-1})\, X_0) + (\Sigma(H_{t-1} * Z_t)\, X_o) + (\Sigma(IPP_{t-1} * Z_t)\, X_0)}{G}\right\} * 100$$

F_{t-1} =Sum of the foreign currency costs incurred by KenGen in the calendar month immediately preceding current Post-paid Billing Period or Pre-paid Units Purchase Period.

H_{t-1} = Sum of the foreign currency costs incurred by the Company other than those costs relating to Electric Power Producers in calendar month immediately preceding current Post-paid Billing Period or Pre-paid Units Purchase Period.

IPP_{t-1} = Sum of the foreign currency costs paid by the Company to Electric Power Producers (except KenGen) in the calendar month immediately preceding current Post-paid Billing Period or Pre-paid Units Purchase Period. calendar month immediately preceding current Post-paid Billing Period or Pre-paid Units Purchase Period.

The factor Z_t is the proportionate change in the exchange rate (X_t) in the current Post-paid Billing Period or Pre-paid Units Purchase Period t from the Base Exchange rate (X_0) in the base period and shall be determined according to the following formula:

$$Z_t = \frac{X_t - X_0}{X_0}$$

Where: X_t = CBK mean exchange rate for the calendar month immediately preceding current Post-paid Billing Period or Pre-paid Units Purchase Period. X_0 = CBK mean exchange rate.

Q&A session

moderated by Mr. Ardian Berisha, ERRA Regulatory Specialist

Question from Mr. Ivan Faucheux from CRE, France:

Is exchange rate a problem of volatility (thus tariff structure) or long term (thus WACC)?

Answer:

Mr. Berisha answered that from the quoted literature's point of view, which discusses the predominantly applied regulatory models, the pricing system should try to avoid reflecting direct impact of exchange rate volatility to the tariffs as exchange rate risk is beyond control regulated utilities. WACC with a risk premium component and a proper indexation to inflation should allow for a long-term catch-up of any negative exchange rate effects.

Reflecting on Court Decisions in the Regulatory Framework: Court disputes with regulated entities, Types of disputes (tariff, market rules etc.)

Latvia

The first presentation for this topic was delivered by Mr. Rolands Irklis, Chairman of PUC Latvia, ERRA Presidium Member.

Mr. Irklis spoke about 3 cases that PUC is dealing with:

1. Case in an administrative court regarding auction costs for ensuring the availability of natural gas - gas TSO JSC «Conexus Baltic Grid» versus PUC.
2. Case in an administrative court regarding JSC «Conexus Baltic Grid» compliance with certification requirements.

3. Case in the Constitutional Court regarding the regulations on natural gas transmission system connection for natural gas users – gas trader JSC «Latvijas Gāze» versus PUC.

He explained that the decisions by PUC are subject to Regional Court jurisdiction which is the 2nd out of 3 levels of judiciary in Latvia.

One of the presented cases was as follows (case no. 2 from above):

- In 2018, PUC assessed JSC «Conexus Baltic Grid» compliance with certification requirements in accordance with the provisions of Directive 2009/73/EC and the Energy Law. PUC concluded that:
  - Marguerite Gas I, the shareholder of JSC «Conexus Baltic Grid», is indirectly the holder of the capital shares of a company that carries out natural gas trading activities, therefore this shareholder participation in JSC «Conexus Baltic Grid» creates a conflict of interest.
  - Gazprom, a shareholder of JSC «Conexus Baltic Grid», is the dominant natural gas supplier in Latvia. Gazprom also controls energy supply companies that trade natural gas. Consequently, Gazprom's participation in JSC «Conexus Baltic Grid» does not comply with the requirements of the law.
- In September 2018, the PUC decided to certify the JSC «Conexus Baltic Grid» on the condition that the JSC «Conexus Baltic Grid» will ensure full compliance with the Energy Law from 1 January 2020, namely, changes will be made regarding the simultaneous participation of its shareholders in the JSC «Conexus Baltic Grid» and companies trading in natural gas.
- The JSC «Conexus Baltic Grid» appealed against the PUC's decision to the Regional Administrative Court. JSC «Conexus Baltic Grid» considered that:
  - its board of directors and supervisory board could not influence the company's shareholders and restrict their voting rights;
  - the law did not prohibit the participation of the same person in both the gas production or supply company and the transmission system operator if these persons' voting rights were restricted, for example in the company's articles of association.
- The Regional Administrative Court decided to reject the application of JSC «Conexus Baltic Grid». The examination of the case continues in the cassation instance.
- The process of disposing of JSC «Conexus Baltic Grid» shares was started only at the end of 2019 and completed in July 2020. Consequently, the JSC «Conexus Baltic Grid» did not comply with the time-limit laid down in the Certification decision.
- By the decision of April 9, 2020, the PUC acknowledged that JSC «Conexus Baltic Grid» had not fulfilled the conditions specified in the Certification decision within the specified term, issued a warning to the JSC «Conexus Baltic Grid» and imposed an obligation immediately, but not later than from 1 October 2020, to ensure compliance with the relevant requirements of the Energy Law.
- The JSC «Conexus Baltic Grid» appealed against the PUC's April decision to the Regional Administrative Court.
- On October 1, 2020, PUC adopted a decision recognizing that JSC «Conexus Baltic Grid» complies with the independence requirements of the Energy Law.

PUC's being an independent institution is responsible only in front of the LV Parliament.

Moldova

The next examples were provided by Ms. Daniela Dan, Legal Department from ANRE Moldova. Ms. Dan gave the following background to the presentation:

- On March 15, 2018, the producer of electricity from renewable sources SRL "PDG Fruct" submitted a request regarding the approval of the tariff for electricity produced from renewable sources.
- The tariff for electricity produced from renewable sources (wind) was approved at 0.83 MDL/kWh. ANRE Decision no. 103/2018 of 23.03.2018.
- The producer did not agree with the approved tariff and filed a lawsuit against ANRE, asking the Court to force ANRE to revise the approved tariff.
- The producer's argument was that the procedure of decisional transparency provided in art. 16 of the Law no. 174/2017 on energy was - **violated**.

She later presented some of the relevant legal provisions in Moldova:

- Art. 16 of the Law on Energy sets the following:
    - ANRE must conduct public hearings/meetings when examining: draft regulatory acts, regulated tariffs and prices, basic costs, or decisions that may have an impact on the energy market and public service obligations.
    - The licensees applications regarding the regulated prices and tariffs and the basic costs, are published on ANRE website to be exanimated within 10 days.
    - ANRE must examine the basic costs, prices and regulated tariffs within a maximum of 180 calendar days from the day the application was registered.
- Art. 24 of the Law 160 of 12.07.2007 on Renewable Energy (in force at that time) provides that the tariffs for renewable energy are set and approved annually, depending on the type and production capacity of installations, production volumes, expected delivery and the renewable energy delivery period.
- Point 13 of the Methodology on determining, approving and applying tariffs to electricity produced from renewable energy sources provides that renewable energy delivery tariffs will be approved as fixed tariffs - avoiding thus the discrimination of consumers.
- The tariffs are approved by the Administration Council of ANRE and published in the Official Gazette of the Republic of Moldova.

The presented ANRE's arguments were as follows:

- The respective producer is not a - **licensee**, and therefore the approval of tariffs for electricity produced from renewable sources does not fall under the incidence of art. 16 para. (5) of the **Law on Energy.** This Law apply to licensees only.
- ANRE based its decision on approving the tariffs for electricity from renewable sources on existing Legislation. The Law no. 160/2007 on Renewable Energy and the Tariff Methodology did not provide the requirement to organize public hearings on the adoption of the administrative act on tariff approval. The only obligation ANRE had at that time was to public this decision in the Official Gazette of the Republic of Moldova;
- According to Decision no. 103/2018 of 23.03.2018 on the approval of the renewable energy tariff, the producer benefits from the approved tariff as well as the guarantee that the central supplier will purchase the entire amount of electricity delivered in electricity networks, during 15 years from the day the tariff was approved.

- The fixed tariff approval for a period of 15 years represents a support scheme, according to art. 2 letter k) of *Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources*

The legal proceeding involved the following:

- The Decision no. 103/2018 of 23.03.2018 on the approval of the renewable energy tariff was adopted according to the Law no. 160/12.07.2007 on Renewable Energy which was **repealed** (abolished) on March 25, 2018.
- The new Law no. 10/2016 on promoting the use of energy from renewable sources (in force since March 25, 2018) and the Methodology for determining the fixed tariffs and prices for electricity produced by eligible producers from renewable energy sources, set **other principles** for determining, approving and revising the prices and tariffs of electricity produced from renewable sources;
- ANRE operates according to the legal framework in force, and does not have the right to apply - **repealed** normative acts.
- Repealing ANRE's Decision no. 103/2018 and approving another decision by ANRE will be possible only under the conditions of the Law no. 10 / 26.02.2016 on promotion of the use of energy from renewable sources, which sets a series of new conditions and obligations for producers of electricity from renewable sources. The applicant/candidate will no longer benefit from the guarantee of purchasing the entire amount of electricity produced from renewable sources.
- The Law no. 174 of 21.09.2017 on energy does not provide – ANRE with the attributions and rights to revise the files on tariff approval.

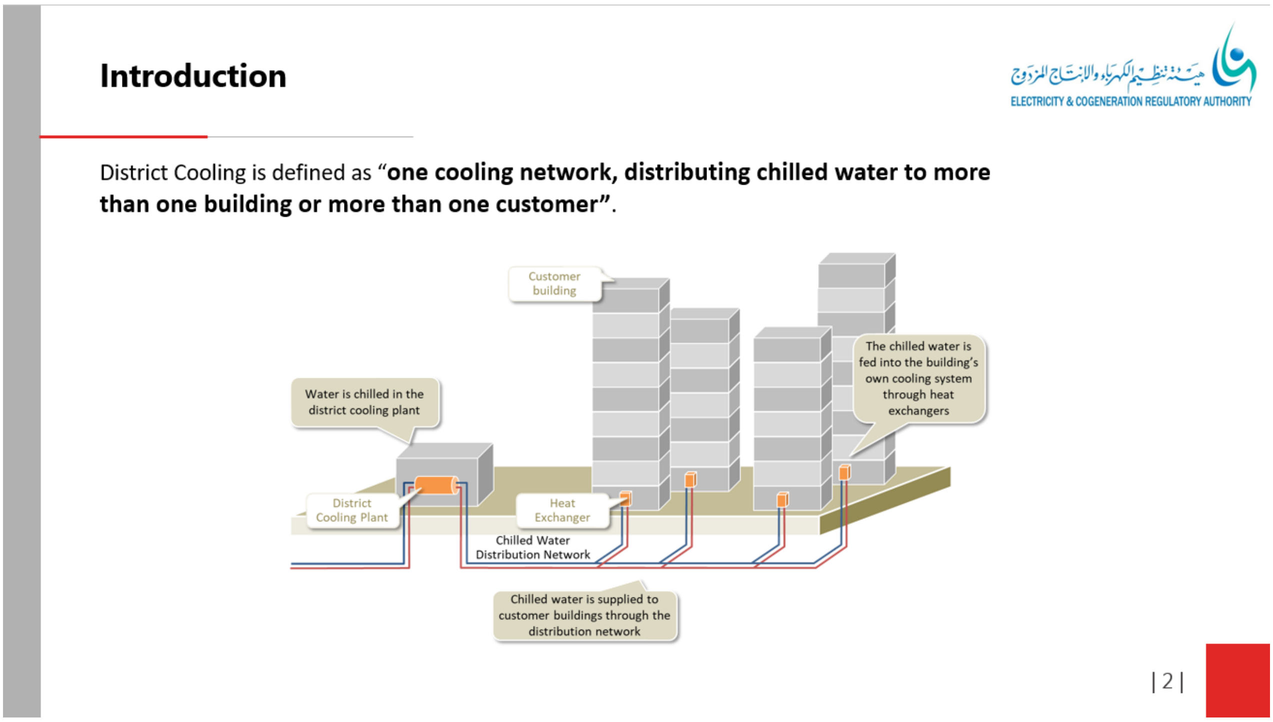
The decision of the court was the following:

- According to the Decision of the Chisinau Court issued on December 5, 2019, the lawsuit filed against ANRE by the producer of electricity from renewable sources was rejected/declined as unfounded.
- At the moment there is 1 similar litigation against ANRE.

District Cooling Regulation

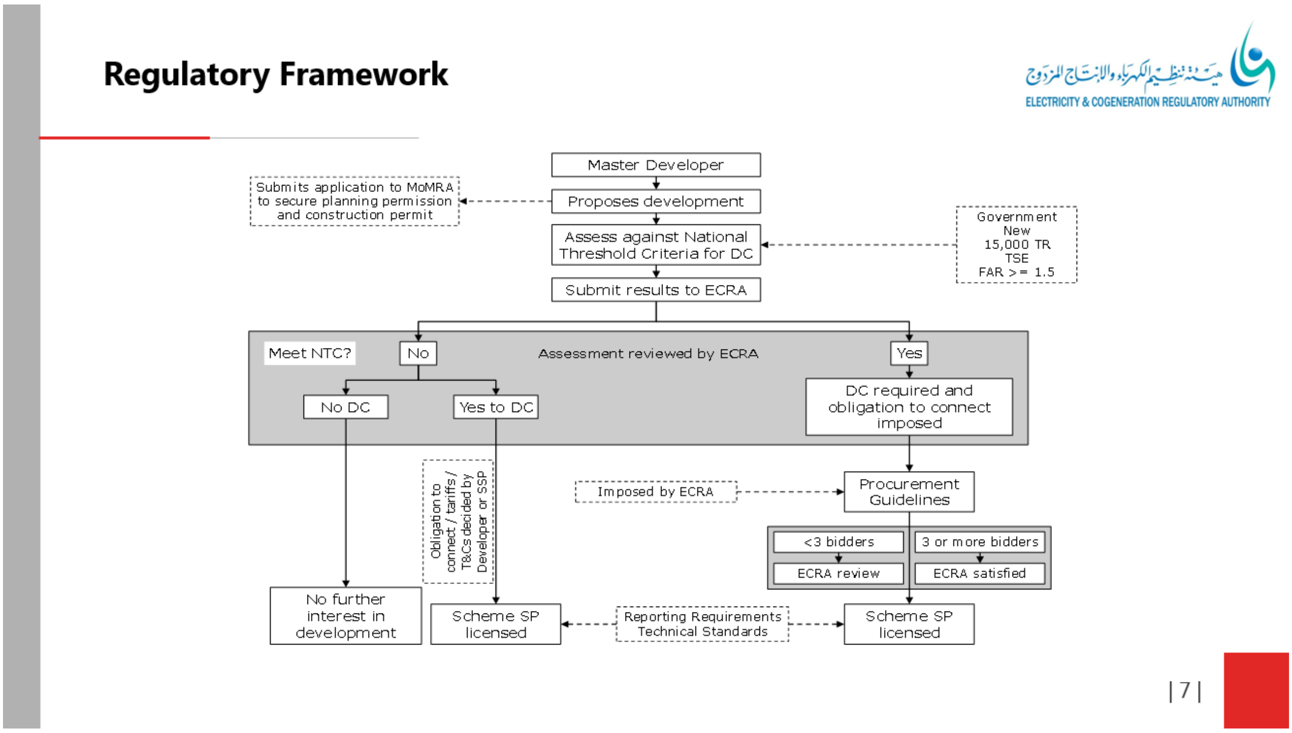
Saudi Arabia

Introduction to the topic was made by Mr. Saud AL-Dalbahi Meshari, Engineer at ECRA Saudi Arabia:



Air conditioning comprises the bulk of daily electricity usage in Saudi Arabia, by amounting to 55% of the demand. District cooling provides therefore a great opportunity for significant savings:

Regulatory framework in this respect includes licensing, economic and financial regulations:



ECRA follows the District Cooling Services Supply Code, which sets the following with respect to the District Cooling Service in the defined District Cooling Supply Area:

- The minimum standards of performance in accordance with which the Licensee is required to supply the service.
- The rights and obligations of the Licensee and a Consumer.
- The technical requirements and arrangement for supply connection.

The following KPI's are in place:

KPI	Ref	Description
Availability Factor	DC1	The Availability Factor is a measure of the extent to which the District Cooling system is actually available to supply chilled water
Water Consumption for Cooling Tower Makeup	DC2	Water Consumption KPI is designed to measure the amount of water that is required for Cooling Tower Makeup (m3) to produce Cooling Energy (TR-hrs) at the DC plant.
Quantity of Wastewater Discharge	DC3	Quantity of Wastewater Discharge KPI measures the quantity of wastewater discharged from the DC Plant to produce Cooling Energy
Electricity consumption	DC4	The Electricity consumption measures the amount of Electricity that is required to produce Cooling Energy (TR-hrs)

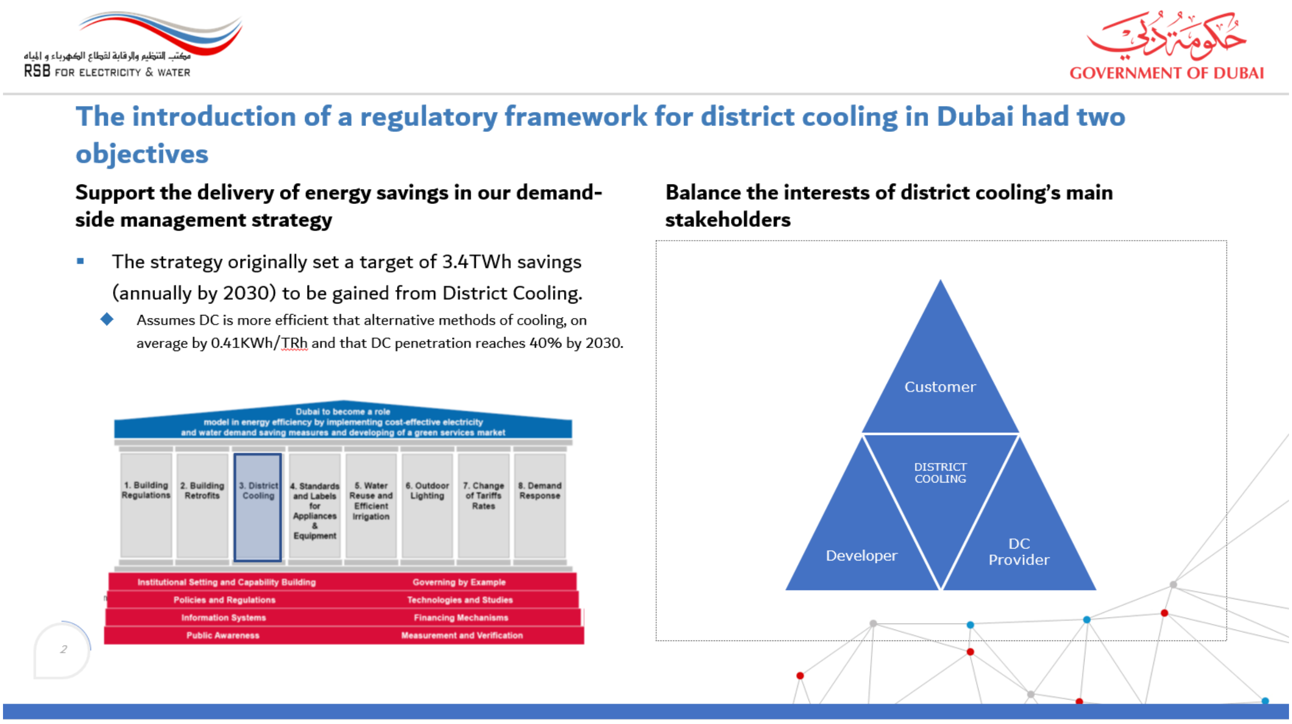
The performance is measured according to the following levels:

KPI	Water Source	Target	Unit
DC1 Availability Factor	Potable Water or TSE	99.5	%
DC2 Water Consumption for Cooling Tower Makeup	Potable Water	0.008	m^3/TR-h
	TSE	0.012	
DC3 Quantity of Wastewater Discharge	Potable Water	0.0015	m^3/TR-h
	TSE	0.0055	
DC4 Electricity consumption	Potable Water or TSE	1	KWh/TR-h

UAE - Dubai

The case was presented by Mr. Graeme Lindsay Sims, Executive Director at the Regulatory and Supervisory Bureau for Electricity and Water of Dubai (RSB) of United Arab Emirates

Mr. Sims explained that the motivations standing behind District Cooling (DC) in Abu Dhabi are similar to those of ECRA, Saudi Arabia:



Mr. Sims explained that RSB's experience is that it is challenging to introduce regulation to a sector unused to it, and with a mix of public and private sector participants:

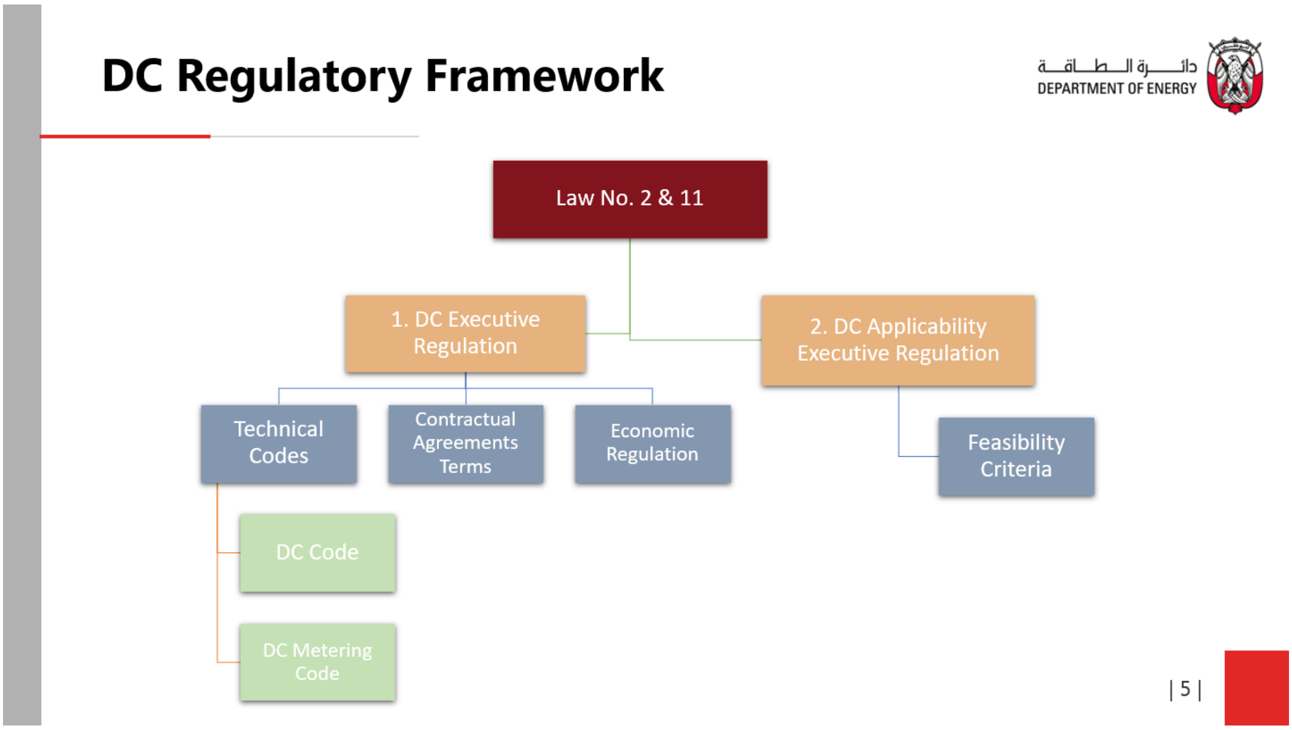
- RSB's improved understanding of the economics of district cooling has led to a focus on "efficient cooling", rather than simply district cooling,
- Comparisons tend to neglect the significant costs of DC water use,
- Unless carefully planned, the high plant and network costs of DC render it economically unattractive, and somewhat inflexible,
- Analogues with European district heating schemes are of little use, since those exploit "waste" heat,
- Any assessment does, however, need to take account of the rapid developments in energy and water supply – low solar PV and reverse osmosis costs,
- The consumer protection case for DC regulation, however, remains strong,
- Whilst there is "for the market" competition in DC, there is no "in the market" competition,
- Developers and customers incentives are not fully aligned,
- Building owners and tenants face a monopoly once they make the decision to buy or rent,
- This creates poor incentives on the DC firm to offer good service.

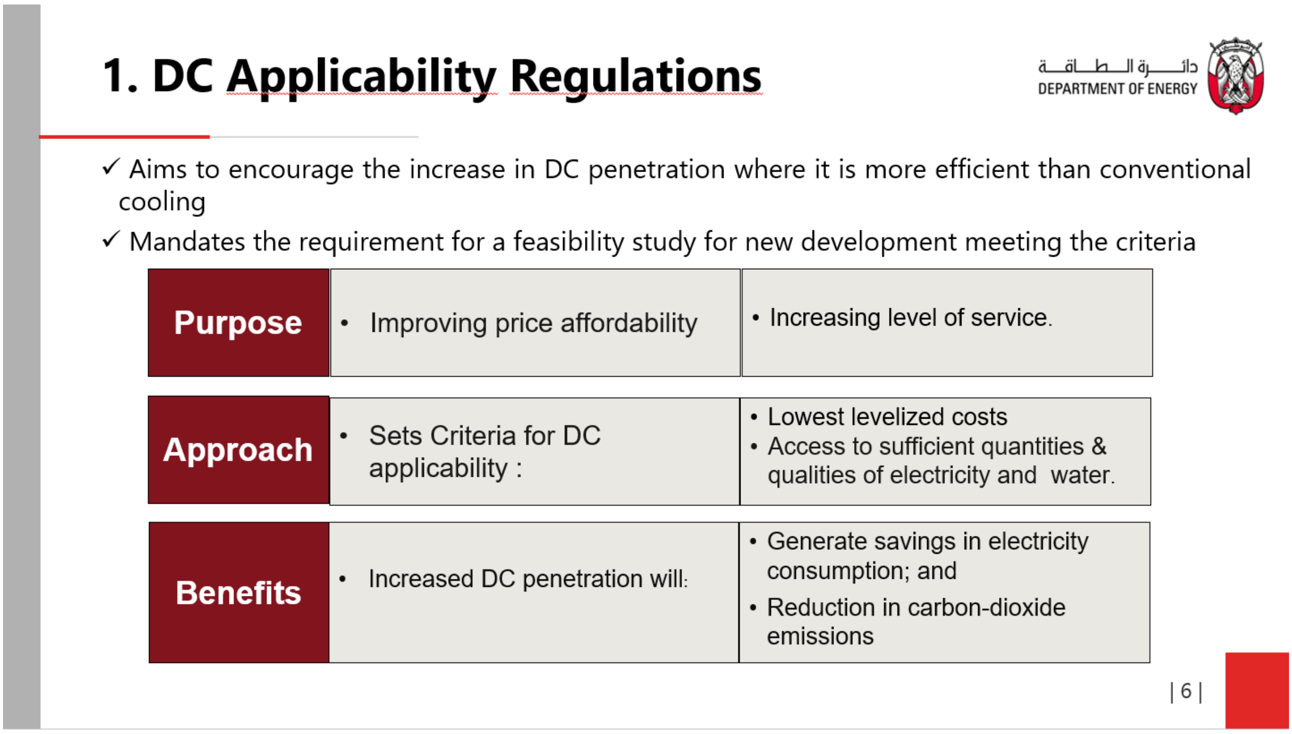
UAE - Abu Dhabi

Abu Dhabi example was presented by Ms. Leila Noubough Nasr, District Cooling Senior Specialist, Abu Dhabi Department of Energy (DoE) of United Arab Emirates.

Ms. Nasr explained that as Abu Dhabi Emirate continues to grow and plan for the next phase of development, its demand for energy continues to increase. Abu Dhabi's demand for cooling energy comprises more than 50% of the Emirate electricity demand. Therefore, promoting energy efficiency is a key priority for Abu Dhabi. All district cooling plants in the Emirate of Abu Dhabi, existing and planned, fall under the DC Regulatory Framework.

Abu Dhabi already has a functional DC regulatory framework:





1. DC Applicability Regulations

دائـــرة الــطـــاقـــة
DEPARTMENT OF ENERGY

✓ Aims to encourage the increase in DC penetration where it is more efficient than conventional cooling

✓ Mandates the requirement for a feasibility study for new development meeting the criteria

Purpose	• Improving price affordability	• Increasing level of service.
Approach	• Sets Criteria for DC applicability :	• Lowest levelized costs • Access to sufficient quantities & qualities of electricity and water.
Benefits	• Increased DC penetration will:	• Generate savings in electricity consumption; and • Reduction in carbon-dioxide emissions

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The DC regulations have 3 dimensions:

- Technical
- Economic
- Legal

DC Regulations – Technical Dimension

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District Cooling Technical Codes: Sets technical standards and guidelines on DC design, operations and metering

DC Code	• Planning Code • Design Code • DC Connection and DC Ready Building Code • Operating Code • KPIs
DC Metering Code	• General Conditions • Technical Requirements • ETS Metering Points

Technical Regulations Objectives and Key Principles:

– Reliability and quality of service for consumers
– Efficient use of energy
– Sound water management
– Health, safety & environmental compliance
– Long term cost-effectiveness

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DC Regulations – Economic Dimension

دائـــرة الـــطـــاقـــة
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Market Competition	• Competitiveness of DC pricing through competitive tendering for each DC Schemes; • Lower DC Levelized Cost than that of the best alternative Conventional Cooling solution; and • DC Provider should have the lowest DC Levelized Cost among all bidders.
Price Regulations	• To ensure DC prices reflect reasonable costs structure and allocation; • Connection charge, Capacity charge and Consumption charge paid by relevant parties to cover relevant costs; and • Windfall profit monitoring

Economic Regulation aims to mitigate existing market challenges and ensure the full realization of DC benefits

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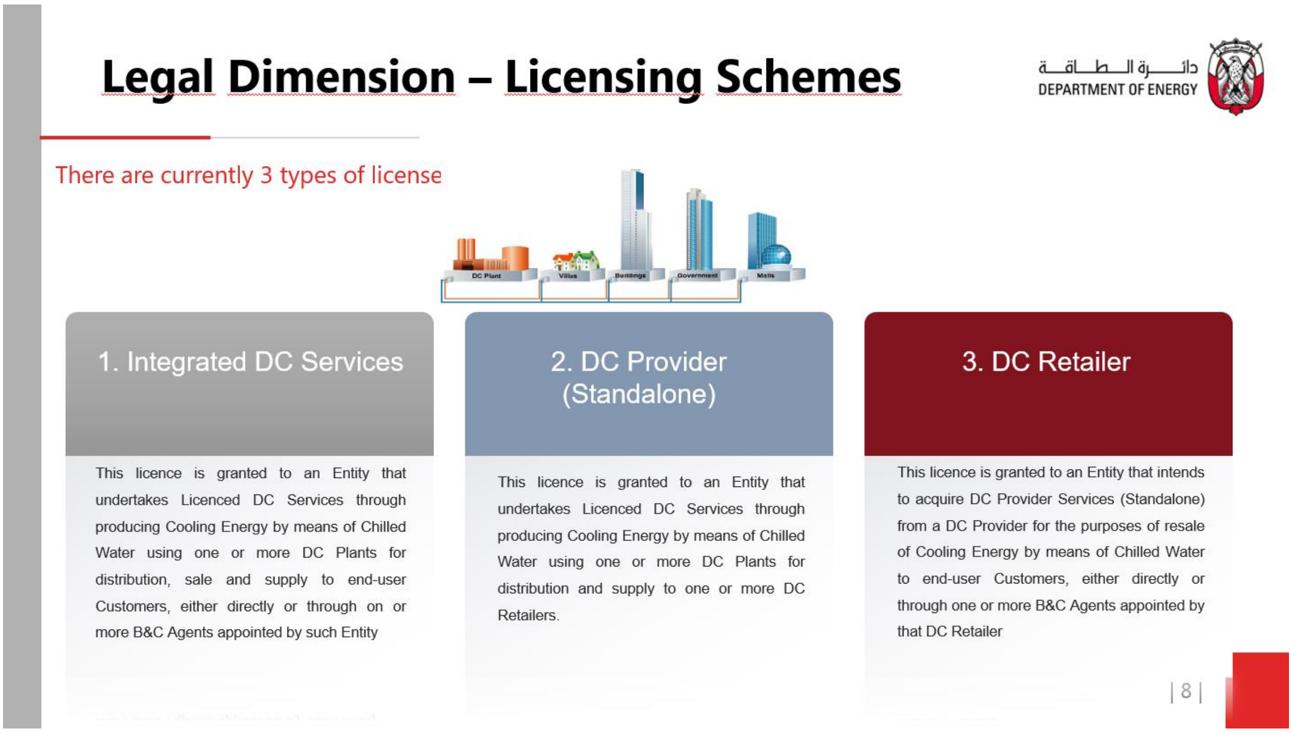


Ms. Nasr explained the concept of grandfathering, which aim is to achieve balance and fairness for pre-existing players when a new regulatory framework is imposed. Grandfathering includes either:

- A transitional regime for existing activities to adapt to the new regulatory framework;

Or

- Justified conditions or exemptions applied to activities which pre-existed the implementation of the framework

Policy and regulatory experience of ERRA members with regards to decarbonization with special emphasis on hydrogen

Introduction

The topic was presented by Mr. Gergely Szabo, Head of International Affairs at HEA Hungary. He started with describing the recent strategic documents to fight climate change, which are:

- European Green Deal (Dec 2019): Europe's roadmap to green transition
    - Strategy on Energy Sector Integration (Jul 2020)
    - Hydrogen Strategy (Jul 2020)
    - Methane Emission Strategy (Oct 2020)
- Sustainability and climate neutrality at the core of EU policies, need for the gradual decarbonization/ greening of the natural gas system (by e.g. H2, bio-CH4)

He also mentioned some EU initiatives

- Clean Hydrogen Alliance - deployment of hydrogen technologies
- European Hydrogen Backbone - creation of a dedicated European H2 transport infrastructure at an affordable cost

Mr. Szabo then presented the Hungarian outlook for hydrogen:

- Energy Strategy Documents:
    - National Energy Strategy 2030 with a view toward 2040, and
    - The Hungarian National Energy and Climate Plan (Jan 2020) aims inter alia to:
        - Increase the use of carbon neutral H2 to decrease natural gas consumption (and also to decrease import dependence)
        - Blending biomethane and H2 to natural gas
        - Storage of RE in form of H2
        - Examine possibilities to retrofit natural gas infrastructure (storages, TSO/DSO pipelines) for handling H2
        - Start pilot projects to reach these goals (e.g. P2G, blending)
    - Ministry for Innovation and Technology to develop National Hydrogen Strategy

Additionally:

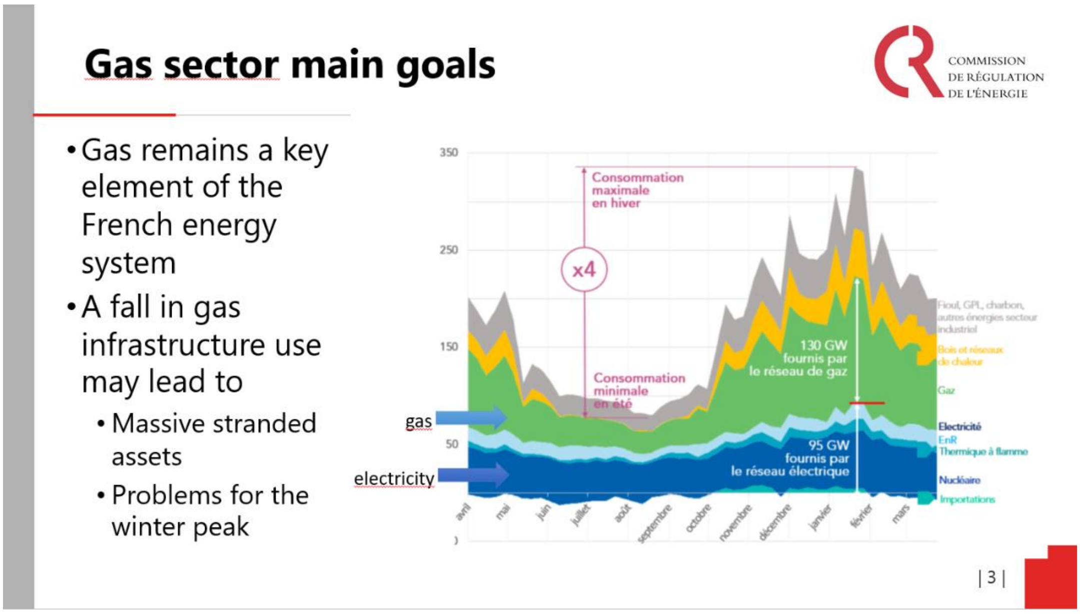
- National Hydrogen Technology Platform (Apr 2020)
- Strategic-professional platform to encourage cooperation of stakeholders active in the field of H2 technologies (companies, universities, research institutes). HEA is also involved.
- International Cooperation is of high importance for NHTP

Expert Presentation

The presentation was provided by Mr. Ivan Faucheux, Commissioner from CRE France. He started with explaining the French decarbonization context:

- French electrical mix is already largely decarbonized due to the nuclear installed capacity
- The development of electrical renewable production capacity has been recognized as a priority for the French energy policy. Only questions remaining
    - What stake for nuclear energy in the long term (is nuclear an option for a neutral mix in France?)
    - The replacement pace of nuclear by renewable capacities?
- In the gas sector, two main developments are foreseen:
    - Biogas
    - H2

Later on, Mr. Faucheux elaborated on the French natural gas context:



After that, he described the current outlooks for biogas and hydrogen:

Gas decarbonization outlook : biogas

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- Biogas :
  - Still expensive (80 to 100 € / MW.h)
  - only justified by externalities in terms of greenhouse gases reduction, grids avoided investment and agricultural policies
- By 2030, the technology's competitiveness could potentially improve:
  - Cost reduction potential of approx. 30%, notably through technological improvements, better performance and move to industrial-scale production
  - However, there is a persisting price gap with natural gas that is unlikely to disappear by 2030.
    - Today's natural gas price is below 25 €/MWh.
    - IEA projection: 33,2 €/MWh in 2030

Beneficiaries	Externalities	Financial valuation	Total
Public interest	Reduction of greenhouse gases	10,3€/MWh if CO² ton equal to 50€ 20,6€/MWh if CO² ton equal to 100€ (≈50€/ MWh if CO² ton equal to 250€)	15 to 30 €/MWh
	Limitation of water pollution	6,3€/MWh (AA) 6,4€/MWh (AT) 5€/MWh (IT)	
Energy consumers	Production of non-intermittent and storable energy	12,5€/MWh avoided compared to electricity grids	20€/MWh
	Making existing gas networks profitable	7,2€/MWh of increased costs avoided	
Bio-waste producers (IAA, local authorities)	Reduction of waste treatment costs	0€/MWh (AA) 6,2€/MWh (AT) 16,3€/MWh (IT)	0 to 16€/MWh
Farmers	Reduction of the use of nitrogenous mineral fertilizers	3,0€/MWh (AA) 2,9€/MWh (AT) 4,3€/MWh (IT)	3 to 4 €/MWh
Total	**From 40 to 70€/MWh** (till 100€ if CO² ton equal to 250€)		

Source : ENEA Consulting

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Gas decarbonization outlook : H2

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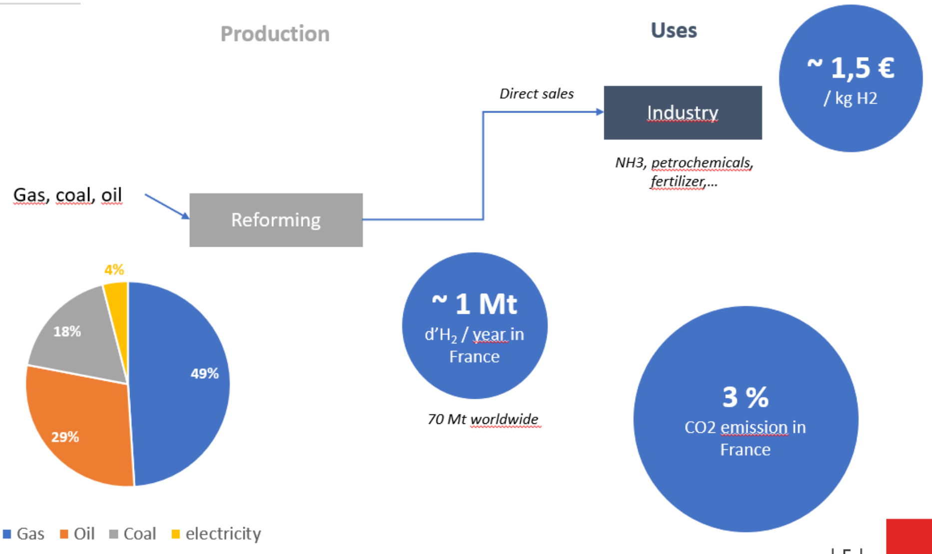
The current situation of H2 production / use is largely dominated by the industry uses and the production from carbonized sources (natural gas and oil)

➔Two main objectives

- Decarbonization of the H2 production
- Use of H2 in other fields as the industry



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In the context of hydrogen, more remarks were made:

- Taxonomy work ongoing: a confusion between renewable H2 and
  - decarbonized H2 from nuclear electricity
  - H2 produced from reforming with CCS
- H2 produced directly by renewable sources has an economic vicious circle
  - H2 production equipment are still very expensive
  - Hence, they must produce at least ~ 8000 hours / year to reach competitiveness
  - Renewable sources cannot match this level of availability

- H2 directly from renewable sources still around 8 € / kg in the mid term
- H2 direct injection in existing gas infrastructure: like mixing apples and pears, and still technical challenges not resolved
- H2 dedicated infrastructure?
  - Regulated or not if there are access issues for everyone?
  - Concentrated on territories
- The development of other uses of H2 still depends on its ability to be cost-effective compared to other storage technologies (batteries). In the transportation sector, H2 is widely seen as a second-choice technology compared to batteries (cas) and biogas (trucks and bus).

Mr. Faucheux also mentioned the ongoing R&D projects:

- Participation from TSO and DSO to R&D project
  - Jupiter 1000 in France (https://www.jupiter1000.eu/) is an industrial Power2gas demonstrator, rating of 1 MWe for electrolysis and a methanation process with carbon capture. It is operated by one of the French TSO (GRTGaz) and partially financed by the tariff.
  - European commission has conducted an analysis of the compatibility of such an operation with respect to the unbundling rules of TSO and finally assessed that TSA may finance and operate R-D demonstrator
- The economics of power2gas remain in the long term
- Another R-D project (GRHYD https://grhyd.fr/) in Dunkerque experimented direct injection of H2 in new gas network, up to 20%, for 100 household.

Roundtable Discussion

moderated by Mr. Dietmar Preinstorfer, Director of International Relations, E-Control Austria; ERRA Presidium Member

Mr. Preinstorfer asked Mr. Szabo:
How can the biogases and hydrogen be implemented in a context of 80% dependence of heating on natural gas that is predominantly imported from abroad?

Mr. Szabo replied the following:
I would like to point out that the replacement is a very ambitious plan. It is an ongoing process as the strategy is being drafted right now, there are no critical answers at this point.

Mr. Preinstorfer asked Mr. Faucheux:
Let's assume we cannot replace all our natural gas supply with biogas or hydrogen in the near future of 10-20 years, so there still would be needs to import fossil fuels. Where should the hydrogen be separated for the use – in other words, will it be provided through high-pressure gas pipelines, or maybe it will be shipped like LNG?

Mr. Faucheux replied the following:
My personal opinion is that hydrogen is too volatile as a molecule for a long-run transportation. To transport 1kg of H_2, you need 250kg of steel around it to store it safely. The same comes with the network transmission. It is always cheaper and more efficient to bind hydrogen molecule with a heavier one and thus reach a more stable compound like CH_4 or NH_3 and then to store it or transport. Our work on hydrogen economics shows that in the short-to-mid run hydrogen will remain a local energy vector. The long-distance transportation of pure hydrogen is out of question nowadays. The solution could be liquefied hydrogen, but for now it is only

utilized in the space industry as it requires a lot of energy to be put in the liquid state - the 30-40% of energy loss questions the economic sense of doing so. We don't foresee a lot of improvement in the compression technology in the near future.

Mr. Preinstorfer commented:
You mentioned that a lot of hydrogen uses are now concentrated in the industry – ammonia production, etc. We hope that in the future hydrogen will help energy systems on the local level and that the gas networks will still ship natural gas.

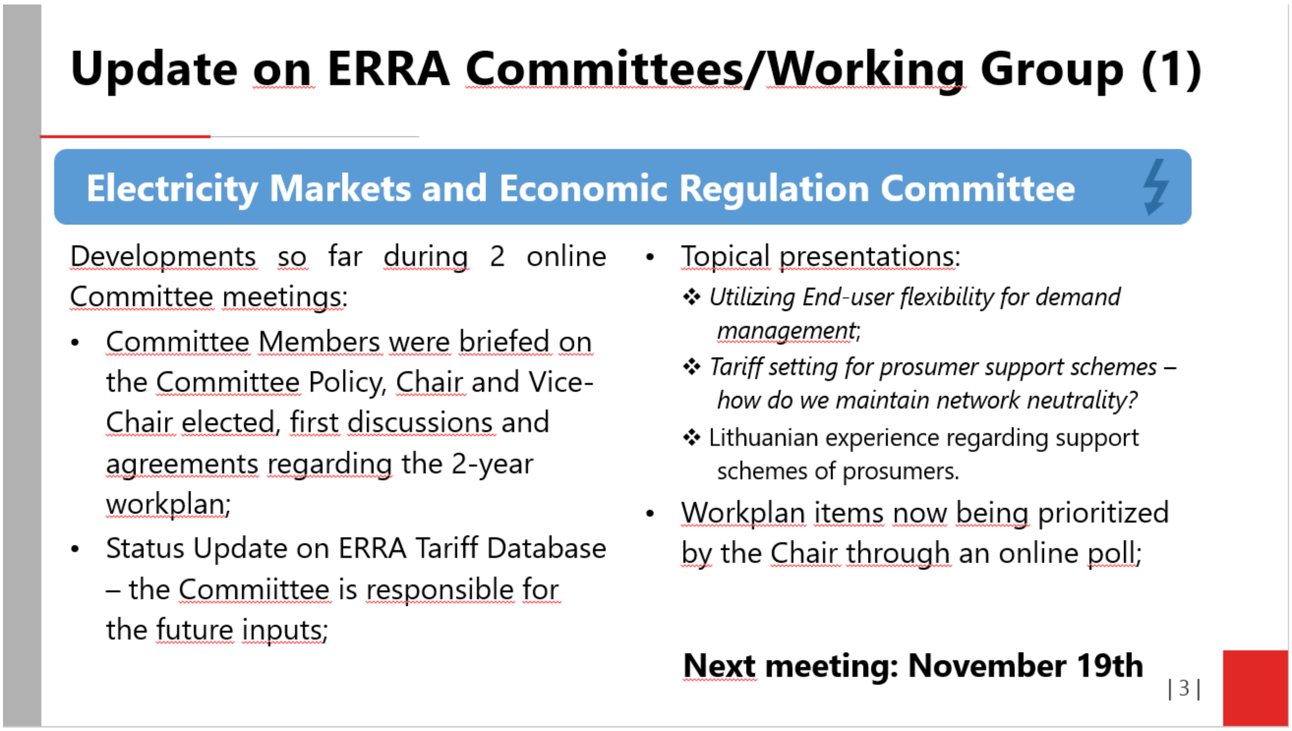
Mr. Preinstorfer asked Mr. Szabo:
Should generation facilities for hydrogen e.g. electrolyser be part of the regulatory asset base, or should it rather be exposed to competition? As of now the EU law states that it should be not part of the network.

Mr. Szabo replied the following:
I think this sort of infrastructure should be subject to market competition, not regulated infrastructure as it would be a "driving force" to boost the whole sector.

Mr. Faucheux replied the following:
In France we have authorized operation of two major electricity storage projects - either with battery or hydrogen. Our view is that it is necessary to authorize regulated bodies to perform this sort of experiments. As soon as the technology reaches the market level however, it shall not be regulated.

Update on ERRA Internal Committee Work and Future ERRA Programs

The update was given by Ms. Andrijana Nelkova-Chuchuk, *Commissioner, ERC North Macedonia, ERRA Presidium Member* who presented the ongoing developments in ERRA Committees and the Working Group as well as giving an overview of future ERRA programs.



Update on ERRA Committees/Working Group (2)

Renewable Energy Committee

Developments so far during 2 online Committee meetings:

- Committee Members were briefed on the Committee Policy, Chair and Vice-Chair elected, first discussions and agreements regarding the 2-year workplan;
- Kick-off sectoral survey results presented;
- COVID19 implications on RES projects – case study presentations from:
  - Armenia
  - Oman
- Kick-off sectoral survey results presented;
- Topical presentation:
  - *Impact of COVID-19 on Renewable Deployment – IEA*

Next meeting: November 18th

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Update on ERRA Committees/Working Group (3)

Natural Gas Markets and Economic Regulation Committee

Developments so far during 2 online Committee meetings:

- Committee Members were briefed on the Committee Policy;
- Chair and Vice-Chair to be elected, nomination from EMRA Turkey received.
- First discussion on the workplan was held;
- Kick-off sectoral survey results presented;
- Topical presentation:
  - *The role of market opening in facilitating competition*

Next meeting: November 26th

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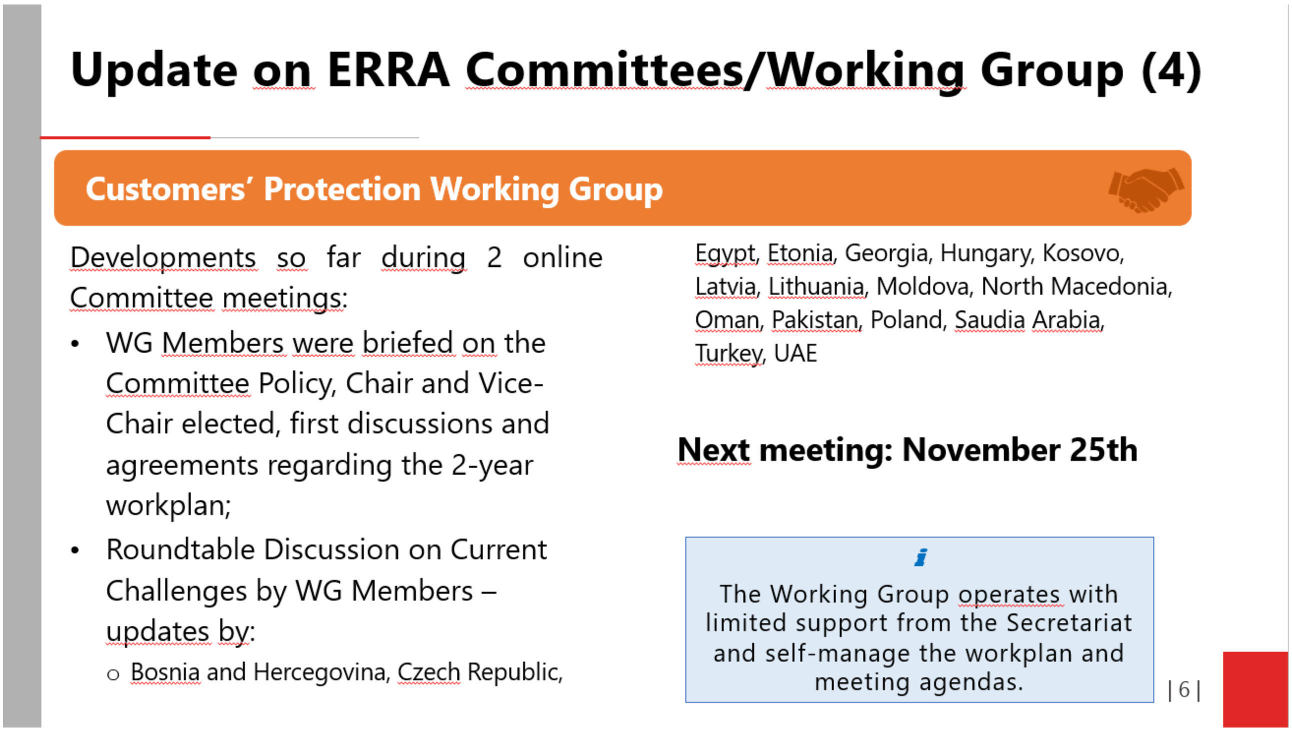

The upcoming ERRA programs mentioned by Ms. Nelkova-Chuchuk are as follows:

1. Topical Online Internal Workshops:
   a. Region-specific Workshops: MENA, Europe, Eurasia, Asia, and Africa (October 2020 – June 2021 period)
   b. COVID-19 Regulatory Implications Ad Hoc Meeting (January 2021)
2. Public Webinars:
   a. ERRA Regulatory Research Award webinar (November 24, 2020)
   b. LNG Regulation (Timing TBD)
   c. Webinar: EU REMIT Regulation: Market abuse and Market manipulation (Timing TBD)
3. E-learning online courses:
   a. "Summer" School: Introduction to energy regulation – November 2-December 4, 2020
   b. Regulatory tools for Capital Expenditure Review and Assessment – January 18-29, 2021,
   c. Introduction to Regulation of Flexibility in the Power Grid – February 22-March 12, 2021
4. ERRA 20th Anniversary: Jubilee Day event broadcasted from Budapest – December 11, 2020

Farewell

The meeting was adjourned by ERRA Chair, Ms. Maia Melikidze.