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Technical Assistance for Improvement of Performance-Based Tariff Regulation of EMRA For Turkish Energy Markets Through Introducing an Enhanced Monitoring System

Task 4.2 – Preparation of Smart Grid Road Map and Required Methodological Tariff Approaches for Natural Gas Market – International Benchmarks

Workshop

16th September 2020, EMRA, Ankara

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Agenda

- Italy
- Germany
- UK
- France

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Italy

- As elsewhere in Europe, there is a quite different approach by the National Regulatory Authorities regarding gas smart meter implementation and smart grid in general, at the distribution and transportation level.
- For the gas distribution sector, NRA have requested by the operators (DSOs in all but one case, suppliers in UK) detailed implementation plans, supported by cost-benefit analysis (CBA) and they have detailed the functional and technical specifications of the smart meters.
- For the gas transportation sector, where gas smart grid is already in place, the focus is currently on how to support and incentivize gas transportation smart grid in the decarbonizing process and targets, set by the EU for 2050.

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Italy

- From the regulatory point of view, the gas smart grid is considered and remunerated under two point of view:
  a) As investment (SCADA or other control systems, such as, for instance, demand forecasting, or telecommunication system), to be included in the regulatory asset base (RAB), once all the requested information and supporting documentation has been approved,
  b) As measurement activity, with a separate remuneration.

- In line with the other regulated infrastructure services in the electricity and gas sector, ARERA has confirmed for the new regulatory period 5PRT (2020-2023) the general principles for the determination of the allowed capital cost and operating cost incurred by TSOs, i.e. determining the target revenues as the sum of:
  a) an appropriate return on the regulatory net invested capital, including any additional remuneration allowed as incentive for new investments, starting from the second regulatory period,
  b) economic and technical depreciation,
  c) allowed operating expenditure,
  d) costs incurred by TSOs for the operational balancing service of the system.

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Italy

- Despite substantial continuity with the general principles currently in force, ARERA confirmed its proposal to introduce, starting from the 5PRT, some elements that may facilitate the possible transition to the cost determination methodology based on total expenditure (TOTEX). In this regard, ARERA confirms its intention to:
  a) ensure an increasing coordination between tariff regulation and the assessments of the national Ten-Year Transmission Network Development Plans set up by TSOs as required by the Legislative Decree 93/11,
  b) initiate a specific monitoring of the investments made and of the objectives achieved, also to check if they are consistent with the provisions of the Plans, requiring operators, starting from 2020, to provide reports that compare the outputs actually achieved with those declared in the Plans and used for cost-benefit analysis (hereinafter: CBA). These reports must be made available as annexes to the Plans of each, and must refer to the investments envisaged in the previous Plans and in operation for at least one year from the filing date of the report itself,
  c) require operators to also provide, in the reports described in point b) above, information on any discrepancies between the costs estimated in the Plans and used for the CBA and the costs actually incurred.
- In addition, ARERA deems that for the 5PRT, incentives might be designed on an experimental basis aimed at increasing the efficiency of the investment expenditures, related in particular to the additional remuneration granted.

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Italy

- ARERA also confirms the possibility of implementing **specific incentive mechanisms** for projects or applications that are particularly innovative for natural gas transmission, particularly for:
  a) Initiatives aimed at encouraging the attainment of environmental objectives, such as the reduction of CH4 emissions into the atmosphere, through specific mechanisms that encourage companies to take effective measures to control gas losses in the networks,
  b) Pilot projects to test innovative solutions to support energy transition, such as the use of transmission infrastructure that concerns biomethane and other green gases and P2G projects or hydrogen transmission, etc.).
- In this regard, the regulatory approach of ARERA is summarized by Section II of the Consultation Document 420/2018/R/GAS, concerning new uses of the transmission networks in relation to innovative technological solutions capable of providing systemic and environmental benefits to the entire energy sector.
- ARERA shares CEER's recommendations, contained in the 2018 study mentioned earlier, to improve the coordination between the electricity and gas sectors and to actively support and foster renewable gases and new technologies with specific programmes, such as financing innovative pilot projects. **The utilization of existing gas pipeline to carry renewable gases can attenuate the stranded asset risk**, helping the system in the decarbonizing process and in integrating electricity and gas sectors.

Italy

- As far as **the metering activity** is concerned, ARERA assigns to the TSOs the following tasks:

  a) Read, collect and validate the metering data of the flows to and from the network (meter reading activity), regardless of the ownership of the metering station; the owners of the metering station, responsible for installation and maintenance of the meters (metering activity), must therefore make these data available to the main TSO;
  b) Ensure the reliability of the metering data collected; for this purpose, the main TSO must have the power to determine minimum metering station performance requirements.

- In the tariff structure adopted by ARERA for the transmission metering service, classified as a non-transmission service, tariffs must reflect the costs, be non-discriminatory, objective and transparent, and be applied to the beneficiaries of a given non-transmission service in order to reduce the degree of cross subsidisation between network users.

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Italy – Pilot Project

- As first experiment in Europe, Snam, the Italian TSO, **has started in 2019 injecting gas and 5% hydrogen** in its gas transportation pipelines in a pilot project to directly supply H2NG (mix of hydrogen and gas) to two industrial customers in the province of Salerno.
- Applying the same 5% percentage of hydrogen to gas annually carried by Snam through its national pipelines would be equal to 3,5 billion cubic meters with a potential reduction of CO2 emission of 2,5 million ton (equivalent to CO2 produced by vehicles in Rome).
- This pilot will help Snam verify the feasibility of mass hydrogen transportation alongside gas through its pipelines.

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Germany

- The German gas transportation system is quite unique in its structure: with **17 TSOs** (compared with one in UK and the Netherlands and two in France), it has **the most complex infrastructure**, positioned in the middle of Europe, at the crossroads of North-South and East-West gas flows.
- The complexity of the gas transportation management increases if we consider also
  a) The separation of the gas market in two commercial market areas (to be unified in 2022) for booking, trading and balancing purposes,
  b) The transition from l-gas and h-gas pipelines to h-gas only grids, which is Germany's biggest national infrastructure project and which will take, due to the high level of investment required, around 10 years
  c) The decarbonization process.

- As a consequence of this complexity, one of the most important characteristics of the German gas transportation market is represented by the **high level of cooperation among TSOs**, notwithstanding the large number of TSO in the Country. Mandatory cooperation by the TSOs is also enshrined in the German Energy Act (EnWG).

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Germany

- Another aspect is the **high level of digitalization**, state-of-the-art SCADA systems and widespread smart metering, to manage the flows of data among TSOs and between all the points of each TSO's pipeline. This is also required by the planning of transportation focused on shorter timeframe (day-ahead or intra-day).

- The TSOs, according to the "gas market model", and in particular to the Metering Act (MsbG) of 2016, is responsible for processing and transmission of metering data (while for the electricity sector the responsibility has been transferred to the market role of meter operator). The Metering Act also required that smart metering technology should be implemented when installing transportation gas meters.

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Germany – TSO Remuneration

- An **incentive- based regulatory regime** was introduced in 2009 to replace cost-plus regulation. Under this regime, the revenue that network operators are allowed to earn within the regulatory period is determined using a mathematical formula and fixed for the period. It therefore makes sense (incentive) for network operators to lower their costs within the regulatory period (work efficiently) so as to increase their profits within the limits of the framework (revenue (fixed) minus costs (controllable) equals profit).

- The Bundesnetzagentur carries out **its efficiency benchmarking on the basis of the cost examination** (TOTEX) and structural data validation before the start of each new regulatory period for gas and electricity network operators separately. The efficiency benchmarking involves assessing the operators' individual costs against the services they provide and determining each operator's cost efficiency compared to the other operators.

- In addition to the (input) cost parameters, structural (or output) parameters are taken into account to replicate the services provided in each case as well as the regional characteristics. Possible structural parameters could include the number of connection points, peak load, the amount of energy delivered or injected, and transformer and compressor station data. The costs and structural data collected always relate to the base year, which is always the third year of a regulatory period.

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Germany – Hydrogen Strategy

- In June 2020, following months of discussions among ministries and relevant stakeholders, Germany's government has agreed on a national hydrogen strategy with focus on hydrogen made with renewable energies to boost its the energy transition.

- An important point contained in the document is that "only hydrogen produced on the basis of renewable energies ('green' hydrogen) is sustainable in the long term." Hydrogen made with natural gas using carbon capture and storage (CCS) which is quite controversial in Germany is only to be used "on a transitional basis."

- In a first ramp-up phase until 2023, the Federal Government will take 33measures affecting all the main industrial sectors and require a coordination at the European level.

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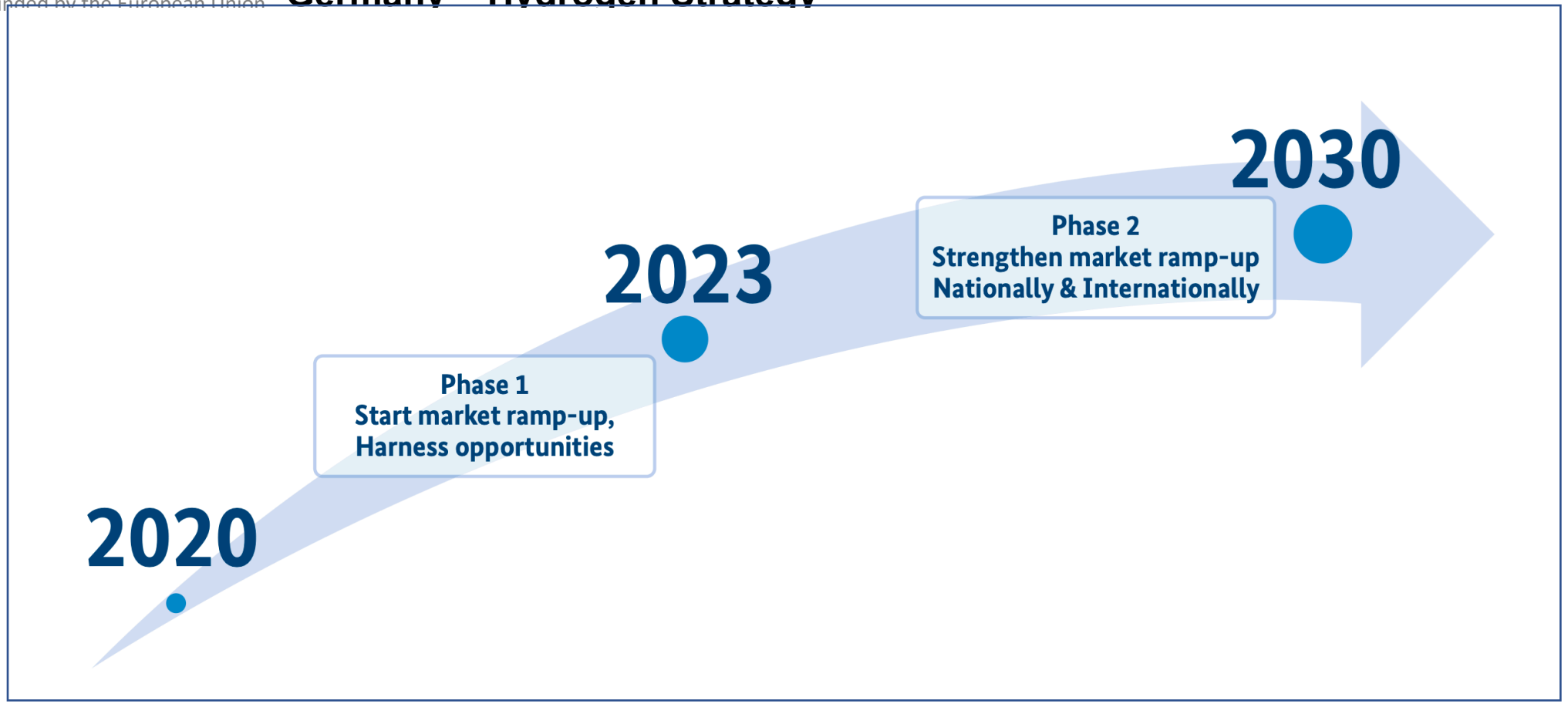
Germany – Hydrogen Strategy



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Germany – Hydrogen Strategy

Sector/Area	Measure	Content
Infrastructure /Supply	20	The need for long-term action within this transformation process is being assessed together with the relevant stakeholders and a report compiled, complete with recommendations for action. This means that the possibilities for using existing structures (dedicated hydrogen infrastructure as well as parts of the natural gas infrastructure than can be adjusted and backfitted to make it H2-ready), starting with the supplier to the end consumer, need to be discussed and initiated in time. The same applies for possibilities to re-dedicate and re-use pipelines etc. for future hydrogen supply. The necessary regulatory basis for the construction and expansion of a hydrogen infrastructure will be prepared swiftly. For this purpose, a market exploration procedure is to take place shortly.

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Germany – Hydrogen Strategy

Sector/Area	Measure	Content
Infrastructure /Supply	21	Efforts to better link up the electricity, heat, and gas infrastructure will continue. The aim is to shape the planning, financing, and the regulatory framework in a way that makes it possible to coordinate these different parts of the infrastructure and develop them as required in line with the needs of the energy transition and in a cost-efficient way. In this context, it is necessary to consider the potential of the existing hydrogen infrastructure whilst also ensuring its compatibility in the EU context (work in progress; outcomes of a long-term study commissioned by the Federation will be available in 2nd semester 2020).

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Germany – Hydrogen Strategy

Sector/Area	Measure	Content
Reasearch/ Innovation	23	A joint hydrogen roadmap that is to serve as guidance: Germany wants to position itself as a lead provider of green hydrogen technology on the global market. For this purpose, a roadmap for the German hydrogen industry will be developed together with the science and business communities and civil society. This roadmap is designed to have international ripple effects.

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Germany – Hydrogen Strategy

Sector/Area	Measure	Content
Reasearch/ Innovation	25	A new cross-ministry research campaign entitled ‘hydrogen technologies 2030’ will see a strategic bundling together of research activities into hydro- gen-related key-enabling technology. (Implementation begins in Q2 2020). Key elements of the research campaign include, for instance, ‘regulatory sandboxes for the energy transition’ so as bring up PtX technologies that are close to market to an industrial scale and accelerate the process of innovation transfer;

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Germany – Hydrogen Strategy

Sector/Area	Measure	Content
Need for Action at the European leval	30	To ensure that a market can develop which contributes to the energy transition and to decarbonisation, as well as boosting export opportunities for German and European companies, there is a need for reliable sustainability standards and for a sophisticated quality infrastructure, proof of origin for electricity from renewable energy and for green hydrogen and its downstream products. At European level, the German Government wants to set sustainability and quality standards in the field of hydrogen and PtX products, and thus to actively foster the establishment of the international hydrogen market. This includes support for the development of European regulations, codes and standards in the various fields of application which will form the groundwork for the international market and ensure that the market ramp-up in Germany takes place in line with the needs of the energy transition. In parallel to this, Germany will also intensify the dialogue on common standards with other countries in order to pave the way towards a universalisation in international organisations.

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Germany – Innovative projects

- TSOs are starting to assess the impact of feeding hydrogen into gas transportation network.

- For instance, Thyssengas, in a consortium with Gasunie Deutschland GmbH & Co. KG and TenneT TSO GmbH, is planning to implement the “Element One” project in Lower Saxony for sector coupling on an industrial scale. Regenerative electricity from offshore wind farms is to be converted into green gas. In several stages, a powerful electrolyser is planned for the production of hydrogen with a capacity of up to 100 MWel:

  a) In phases 1 and 2, hydrogen produced from green electricity will flow into the existing gas pipelines as a supplement to natural gas. This will already make existing natural gas provision for heating systems and industry more climate friendly. At the same time, industries and transportation companies can extract the hydrogen they need for their processes and mobility from the hydrogen connections that will be set up. For example, from hydrogen refuelling stations with tankers. This helps companies work in a more environmentally friendly way – no matter where they are located.
  b) In phase 3 of the project, CO_2 from biogas facilities will be chemically combined with the hydrogen produced using green electricity. The resulting synthetic methane can replace fossil natural gas or be mixed with it without limit. When it is burned, only CO_2 that has previously been extracted from the environment is released – the carbon footprint is completely offset. Large-scale power-to-gas facilities: an engineering challenge of the energy transition.

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Germany – Innovative projects

c) In phase 4, Thyssen will integrate the nearby cavern storage facilities into the system, which will be able to store huge quantities of energy. In this way, volatile, wind-dependent energy can be turned into a constant flow of power.

d) In the final phase 5, since L-gas supply is due to be terminated in the foreseeable future and there will be no more deliveries from the Netherlands, L-gas pipelines will become free. Thyssen will use the resulting pipeline capacities to transport the hydrogen created directly to industrial customers in North Rhine-Westphalia. This will improve the climate footprint in one of the most important industrial areas in Europe.

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UK

- According to the Office of Gas and Electricity Markets (Ofgem), the drive for decarbonization of the energy system in UK was expected to lead to substantial increases in the investment requirements on energy networks – its initial estimate was around £32bn by 2020 (around 75% of the existing regulatory asset bases of the network businesses). Besides, the decarbonization itself was likely to create an environment with higher risks of increasing costs as it was leading to a shift in the underlying generation mix to meet renewables targets and a change in the level and type of new connections.

- As it knows, to manage this paradigmatic change, Ofgem has introduced a new regulatory framework, called RIIO (Revenues = Incentives+ Innovation+Outputs) in 2010. RIIO is an output-led system with outputs a core 'building block'. Network companies are expected to achieve agreed primary outputs and secondary deliverables (i.e. interim actions that are expected to lead to benefits in future regulatory periods) and to justify their business plans and submitted revenue requirements in relation to these outputs. The output categories are linked to licence obligations, existing standards of performance and policy objectives that networks can facilitate. The six key output categories considered under RIIO are safety, environmental impact, customer satisfaction, social obligations, connections, reliability and availability.

- Within the regulatory framework of RIIO, Ofgem has introduced specific incentives to support innovations, i.e.:
  a) NIA (Network Innovation Allowance) which allows operators to recover 90% of the investment in innovative projects,
  b) NIC (Network Innovation competition), to support decarbonizing and sustainability projects, where national projects compete annually for a given amount of funds (20 Million £ in 2020).

The Initial Screening Process for the 2020 NIC has just concluded and two projects have been admitted to the next phase (Full Submission stage):

a) H100 Fife (SGN): The project aims to construct a new end-to-end distribution network to test hydrogen from production to use in real consumer homes, with the opportunity for customers to opt-in to live trials.
b) HyNTS (National Grid Gas): The project aims to test transmission network assets with flows of hydrogen blends between 20-100% at transmission pressures for the first time. The project intends to work in conjunction with Northern Gas Networks' ongoing H21 project at Spadeadam.

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France

- In the **Energy – Climate National Plan** (“Plan National Intégré Energie – Climat”,2019), the French Government has set its goals to fulfil the European decarbonizing targets. Key elements of this strategy are:
  - Support to the decentralization of energy production, which requires smart grids more flexible,
  - Development of the interrelationships among electricity, gas and heat sectors (“Power to gas” and “Power to Heat”),
  - Doubling the installed capacity of renewable electricity between 2017 and 2028 with 36% of renewable in electricity production in 2028,
  - Increase in the biogas injected in the gas transportation pipelines to 14-22 TWh in 2028 (vs 0,4 TWh in 2017),
  - Biogas should reach 6 to 8% of the gas consumption in 2028.
- The development of smart grids, especially with the deployment at distribution level of new equipments (smart meters, communication software, etc…), increase of digitalization and the development of IT platforms and software able to manage large amount of data will support this energy strategy and increase the energy efficiency.

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France – Regulatory Framework and Incentive for smart grid

- As elsewhere in Europe, smart meters, and supervisory/remote control and communication software are included in the allowed revenues of the two TSOs (GRTgas and TIGF).

- The tariff for the use of the GRTgaz and TIGF natural gas transmission networks, (known as the ATRT6) entered into force on 1 April 2017 for a period of approximately four years. It was adopted after extensive stakeholder consultation and as a result of published studies. **The ATRT6 tariff aims at giving gas TSOs the capacity to meet the challenges of the energy transition and to take into account the changes in the gas market in the coming years. TSO performance incentives are reinforced**: a "non-network" incentive on capital expenditure is introduced, and there is a reinforcement of incentives on the costs of the main network development projects and on the quality of service provided for the users.

- Besides, the tariff of the previous regulatory period (ATRT5) provided for **a 3% bonus** over 10 years, which was granted to **a limited number of projects**. Against the current background of decreasing demand and overcapacity on the European market, the ATRT6 provides for a new incentive regulation mechanism that introduces a bonus whose allocation and amount will depend on the results of a cost/profit analysis carried out by CRE (French Energy Regulatory Commission).

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France – Regulatory Framework and Incentive for smart grid

- Its level is set to include GRTgaz 2020 projects and TIGF Research and Innovation. The developments related to the ATRT6 tariff are part of a framework for controlling the tariff level of gas transport in a context of demand decrease.

- The French NRA, CRE (Commission de Régulation de l'Energie), sets funds at the beginning of the regulatory period for R&D expenses. Since 2017 a share of these funds is specifically earmarked to projects which investigate new utilization of the gas pipelines.

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Thank You / Teşekkürler

16th September 2020, EMRA, Ankara