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Statement of Opinion

Smart Sector Integration

bne Responses to the Public Consultation of the European Commission to prepare a future EU Strategy on Energy Sector Integration, 14 April 2020

Berlin, 15 May 2020. We greatly appreciate the initiative of the Commission to consult the priorities for the future EU strategy on smart sector integration. Below are our responses to the consultation. bne members are committed to a modern and flexible electricity market design allowing for truly competitive solutions. From our perspective, a truly integrated energy system enables a climate neutral future, is competitive and consumer-oriented, flexible, digital, is based on system efficiency and the sectors are integrated through an effective carbon price.

Link to EU Consultation:
https://ec.europa.eu/info/news/preparing-future-eu-strategy-energy-sector-integration-2020-apr-14_en

GENERAL MESSAGES

The EU has committed itself by signing the Paris Agreement, to keep the global temperature increase to well below 2°C and pursue efforts to keep it to 1.5°C; The European Green Deal aims to make Europe the first climate-neutral continent by 2050.

If sector integration is to have the expected impact, the basis must be the correct one. For this reason, when developing a strategy for Smart Sector Integration, the objective and the assumptions made should also be taken into account. A central problem is the focus to date on the year 2050 as the objective and, on the other hand, the fact that even in 1.5°C scenarios (EU28 Eurostat/LTS 1.5LIFE/TECH) considerable quantities of fossil fuels are still assumed for 2050. The German government is also acting with the number 2050, in which year CO2 emissions should be net zero and energy production should then also be 100% renewable.

However, there is only a limited CO2 budget available to achieve the 1.5 ° target: So far, it is assumed that this is 420 Gt CO2 worldwide. Some scientists estimate that the global emissions budget for this goal is no greater than 320 Gt CO2. Currently, the worldwide CO2 emissions are about 36 Gt per year. With these figures, the window of opportunity to even reach the 1.5 ° target is very tight and allows only one conclusion: The net-zero greenhouse gas emissions objective must be well before 2050.

CONSULTATION QUESTIONS AND BNE RESPONSES

1. What would be the main features of a truly integrated energy system to enable a climate neutral future?

A truly integrated energy system which enables a climate neutral future is competitive and consumer-oriented, flexible, digital, based on system efficiency and the sectors electricity, heating, cooling and transport are integrated through an effective carbon price.

#Competition and Customer Orientation as Basic Principles

From our point of view, smart sector coupling of electricity, heating and mobility works best with a competitive and customer-oriented core concept. The customer is in the focus and the regulatory framework ensures efficient, neutral networks and platforms. These are essential for new business models which solve old problems or satisfy new needs of the customer.

#Effective Carbon Pricing in All Sectors

Integration of electricity, heating and mobility is not possible without an effective carbon price. EU ETS works but has so far been ineffective due to quantity errors and does not cover all necessary sectors, such as heat and transport. An effective carbon price combines market mechanisms and climate protection; it promotes investment security and makes the development of non-fossil solutions predictable and profitable. It ensures that heating and cooling as well as transport generate a demand for renewable electricity. Thus, renewable energy is given a price.

#Flexibility of Energy Demand

Energy transition comes with various challenges for the existing electricity system: Despite fluctuating availability of solar and wind power, the demand for electricity must be covered anytime. In addition, the energy networks must be able to handle large quantities of renewable energy electricity at the same time. Therefore, the energy system based on renewable energies needs flexibility on the demand side. Within the limits of the network, consumers such as e.g. industry or private

households can react to an oversupply of wind and solar power and increase their consumption accordingly or reduce it if there is a shortage.

Part of the flexibility can be provided in the electricity sector. But the integration of electricity with other sectors **opens new dimensions of flexibility** especially where there are limits to the use of renewable electricity, system or other limits. Instead of switching off renewable production, it can be used to provide heat or cold or converted into hydrogen. The conversion technologies allow for seasonal storage and enable **full integration of renewable energies**.

#Digital Interconnection

The expansion of electricity generation from renewable energies comes with a larger share from decentralized installations. Storage, flexibility and consumption are also decentralized. Under these circumstances, coordination between production and demand is only possible in a digital energy system and with automation. Digitization enables data to be displayed down to every second. It is the basis for regional and local electricity trading.

Sector integration comes with a higher complexity and digitization helps to manage the requirements, to handle complexity and to reduce costs. The better availability of information and the possibility to react allows an expansion of renewable energies and their integration beyond electricity in other sectors. Digitization facilitates the optimization of the use of renewable electricity across the various sectors and thus increases cost-effectiveness.

#System Efficiency Instead of Energy Saving at Any Price

If we seriously aim at achieving greenhouse gas (GHG) emission reductions, a simple energy conservation focus doesn't do justice anymore to the complexity of the situation in an increasingly decentralized, digitized and decarbonized energy world. We need to assess the GHG emissions associated with various ways to power end uses, as opposed to simply count the number of kilowatt-hours consumed. To that end, "system efficiency" may be as or even more important than "energy efficiency" moving forward.

The traditional premise of saving energy without taking system efficiency into account made sense in an energy world that relied on a purely fossil fuel-based system (the same applies for nuclear) and on energy supply organized in a central way.

In times in which the energy system is developing fundamentally differently with the expansion of renewable energies, adaptability and system efficiency should prevail. The necessary sector coupling requires a predominant electrification of the heating and transport sectors. This will result in a higher electricity demand in the long-run. **Every kWh generated (from renewable energies) and every investment therefore should be used optimally in the interests of the overall system.** This new model should include the power, heating, and transport sectors. Linking these sectors intelligently, while unlocking flexibility and at the same time, enabling investment decisions and energy use under realistic conditions should be the model's

primary goal. The model should also take local differences and regional location factors into account and, in addition to saving energy, create space and impetus for the expansion of renewable energies and further decarbonization options.

Where do you see benefits or synergies? Where do you see the biggest energy efficiency and cost-efficiency potential through system integration?

If, on the other hand, *Efficiency First* is maintained, this can make sector integration considerably more difficult. A practical example of this is heat pumps, which have been optimized for energy saving due to the high energy efficiency requirements, but which limit their use as flexible power consumers in the energy market.

Only the paradigm shift towards system efficiency will make the intended smart sector integration possible and the benefits of using renewable electricity in other sectors can be fully harnessed and cost-effectiveness in GHG reduction in the overall system and for all stakeholders achieved.

The overall view in the integrated system offers the opportunity to take customer requirements into account in cost-benefit considerations and to review the assumptions made so far. The lower the energy respective heat consumption, the less the efficiency of the technology used to provide the heat matters. For example, in the case of 'almost zero-energy buildings', it is hard to explain to consumers why they should spend a lot of money for a highly efficient heating technology for the extremely low remaining energy demand instead of a simple heating solution such as direct electricity heating with renewable energies. The absolute efficiency gains of the highly efficient technology in these cases are low, but the customer must pay the cost of the much more expensive system. Also, in the sense of acceptance of the measures, the efficiency specifications must be developed further accordingly. Consumers expect solutions that completely solve their requirements when switching to a climate-neutral heating or cooling solution, fairly assess costs and obstacles and offer them more and different options.

The biggest challenge for intelligent sector integration will be: Rather than simply adding up the framework of existing sectors, the integrated system will have to be thought from a new perspective and designed simply. The aim should be to achieve more with fewer rules.

2. What are the main barriers to energy system integration that would require to be addressed in your view?

- Conflicting incentives
- Restricted focus on energy generation side instead of considering load flexibility
- Unequal burden and opportunity sharing
- Unattainably high efficiency requirements
- Restrictions on the use of renewable electricity

- High subsidies for small results regarding GHG reduction (e.g. plug-in hybrids, when they are practically not or hardly ever driven electrically)
- Direct or indirect promotion of CHP facilities that cannot be operated flexibly or use fossil fuels

3. More specifically:

- **How could electricity drive increased decarbonization in other sectors? In which other sectors do you see a key role for electricity use? What role should electrification play in the integrated energy system?**

The expansion of renewable energies in the heating and transport sectors has so far made very slow progress. At this rate, the climate targets in these sectors would be nowhere near achievable by 2050. By using renewable electricity in these sectors and in industry, the reduction of CO2 emissions can be accelerated considerably by replacing fossil fuels with renewable electricity or converting it into heat (power-to-heat) or hydrogen (power-to-gas, power-to-liquid).

It is important to electrify on the basis of renewable energies. The use of electricity from nuclear or fossil fuels (even with CCS) is neither target-oriented nor sustainable. If this is not met, it can have a negative impact on the acceptance of electrification.

- **What role should renewable gases play in the integrated energy system?**

Green hydrogen, i.e. hydrogen produced with electrolysers (power-to-gas) from renewable electricity, can contribute significantly to the solution of the energy transition. It is true that every conversion of renewable electricity means energy losses that must be compensated by higher renewable electricity production and thus also generation plants. It is therefore important to keep the conversion steps as small as possible. Nevertheless, power-to-gas alone has so far enabled the seasonal storage of renewable energies and has provided an important backup function for the energy system, which is increasingly based on renewable energies. In addition, some sectors and applications can only be decarbonised with green hydrogen, for example, which needs it because of its higher energy concentration than electricity. Finally, power-to-gas has the potential to fully exploit power generation from renewable energies - especially where bottlenecks in transport and grid expansion are currently blocking this.

The potential of other renewable gases is limited: The use of green gas or biomethane can only be expanded in a few member countries - if at all - due to the high land consumption. Synthetic methane has a disadvantage compared to hydrogen due to further conversion losses.

- **What measures should be taken to promote decarbonized gases?**

A basic distinction must be made between renewable and decarbonised gases. The latter also include those technologies where gas has been produced with nuclear power or from fossil natural gas by capturing the CO2 or separating the carbon.

The use of fossil natural gas with CCS is already possible today, but often fails due to the acceptance of CCS. This will not change if it is now called decarbonised gas. Even if the acceptance problem can be solved, for example by storing CO2 offshore, the storage capacities for CO2 are limited and lifecycle emissions e.g. at exploration or because of methane leakage are still high. Under these circumstances, promotion for decarbonised gases is not sustainable; instead, promotion should focus only on renewable gases.

- **What role should hydrogen play and how its development and deployment could be supported by the EU?**

See answer to previous question, too.

Power-to-gas, hydrogen and green gas have so far played a subordinate role, because their use in the energy market often encounters restrictions (e.g. recognition as a renewable energy source for heat supply, recognition as a long-term energy storage instead of devaluation due to efficiency losses in production) or is considerably disadvantaged by other regulation (e.g. levies). This must first be corrected in the legal and regulatory framework.
Power-to-gas technology for the supply of green hydrogen has already proven itself in many projects. However, in order to be competitive in the markets, the production costs of green hydrogen (and possibly synthetic methane) must be reduced. This is to be expected especially for larger production volumes in larger power-to-gas plants and their serial production.
Despite attractive opportunities, the market development for green hydrogen is not a self-runner. A suitable framework for a green hydrogen market has yet to be created, in which producers and suppliers as well as potential customers from industry and other sectors can participate. This includes
- A highly automated process
- Standard products from short to long term for trading
- Mapping of supply and demand by a pricing mechanism
- Enough price stability for buying and selling hydrogen for 2 years.

The decision as to how much power-to-gas or hydrogen is to be integrated into the gas system and when must under no circumstances be left to the TSOs or DSOs. On the other hand, the development of an own hydrogen network at an industrial site, can be implemented without regulatory requirements.

- **How could circular economy and the use of waste heat and other waste resources play a greater role in the integrated energy system? What concrete actions would you suggest to achieve this?**

The idea of circular economy is good. However, the concept must not be misused to turn waste above it into gold (green and carbon free) and produce more waste than before. Waste avoidance must be more important than its (energy) re-use.

- **How can energy markets contribute to a more integrated energy system?**

See our answers to previous questions.

- **How can cost-efficient use and development of energy infrastructure and digitalization enable an integration of the energy system?**

See our answers to previous questions.

Are there any best practices or concrete projects for an integrated energy system you would like to highlight?

Looking at best practices - it is of crucial importance, particularly in the context of sector integration, not to mix up market roles that have to be separated. Otherwise, the negative effects will affect several markets at once.

Specifically, it is about the clearly defined role of electricity and gas network operators: they provide transport infrastructure and related services. According to the fundamental unbundling principle for the competitive energy market, network operators are prohibited from generating, storing and selling energy. Anything else would distort competition in several markets at once, and the resulting consequential costs are always ultimately borne by energy customers.

When network operators operate energy storage facilities and power-to-gas plants, electricity and gas customers finance the development, construction and operation of the plants through network charges. However, by financing the plants via network fees, network operators do not bear any business risk and thus have an unacceptable competitive advantage over market-based plant operators. The latter must refinance their investment in plants from market revenues. Regulated players have no place on the market. Effective unbundling is essential if the market is to find solutions for sector coupling. This is a task for market players and must not be allowed to migrate into the regulated sector.

What policy actions and legislative measures could the Commission take to foster an integration of the energy system?

See our answers to previous questions.

Who we are: Bundesverband Neue Energiewirtschaft e.V. (bne) / Association of Energy Market Innovators – a strong voice for independent energy companies
bne represents the interests of grid-independent energy suppliers and energy service companies in Germany. By combining competition, renewables and innovation members create a new energy industry and unleash the forces of energy system transformation.

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