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End of previous Forum article

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The EU Electricity Sector Will Need Reform, Again

Over the course of the last ten years, climate change-oriented policies have upheld a radical transformation in the energy sector. As a result of the 2007-08 climate and energy package with a 20% legally-binding renewable target, policy-induced investments in very large volumes of renewable energy, mainly solar and wind, have been instrumental in reducing costs associated with renewable technologies. From 2007 to 2017, more than 880 additional TWh of variable renewable generation has been added to the market.[1] This equals an average yearly increase of more than 80 TWh or the equivalent of the annual final electricity consumption of Belgium or Finland in 2016 (82 and 81 TWh, respectively).

Generating electricity from renewable sources today is the cheapest possible option and is turning increasingly variable energy sources (wind and solar) into the foundation of the EU electricity market. This is changing balancing and dispatching markets as well as permanently altering the merit order principle. Renewables impact wholesale, day-ahead as well as intraday markets while requiring an ever increasing level of system flexibility.

The low-carbon transition, for example in line with the European Commission's proposed long-term strategy[2] with the net-zero[3] target by 2050 or the Commission President-

1 Gross final consumption of energy from renewable sources was 1493.35 TWh in 2007 and 2374.06 TWh in 2017. See Eurostat: Energy from renewable sources, 2017, available at https://ec.europa.eu/eurostat/web/energy/data/shares. All data are converted in TWh (GW where relevant).

2 European Commission: A Clean Planet for all – A European strategic long-term vision for a prosperous, modern, competitive and climate neutral economy, COM(2018) 773 final, 2018, available at https://ec.europa.eu/clima/policies/strategies/2050_en.

3 A net-zero greenhouse gas emissions target prescribes that any remaining emissions should be balanced by negative emissions such as carbon removal, e.g. by growing carbon sinks such as forests which absorb carbon dioxide from the atmosphere.

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Table 1

Estimations of electricity generation by selected scenarios

Scenario	2015	2030	2050
Shell Sky scenario	3,008 TWh (21% of total final consumption (end-users) in Europe[1]	4,320 TWh (32%)	7,175 TWh (56%)
IEA Energy Technology Perspectives, The 2C scenario	2,712 TWh (19.3% of electricity demand in the EU in 2014)	2,857 TWh (25%)	2,997 TWh (32%)
IEA Energy Technology Perspectives, The Beyond 2C scenario	2,712 TWh (19% of total final demand in 2014)	2,636 TWh (24%)	2,882 TWh (34.5%)
Eurelectric[2]	2,917 TWh (22% of total final energy consumption in 2014)		4,067 TWh (38%) for the 80% decarbonisation target 4,590 TWh (48%) for the 90% decarbonisation target 5,054 TWh (60%) for the 95% decarbonisation target
The EU long-term strategy	2,756 TWh (21.82% of final energy demand)	3,233 TWh (29%)	The highest increase of electricity both in absolute and % terms is in the ELEC scenario – up to 4,826.5 TWh in 2050 (53.27%). It would require additional 2,070 TWh.

Notes: [1] Including the EU, the EEA, the Balkans and Georgia. [2] The numbers increase an additional 600-1200 TWh when indirect uses of electricity are added. See Eurelectric: Decarbonisation Pathways, 2018, p. 5.

Sources: Eurelectric: Decarbonisation Pathways, 2018; European Commission: A Clean Planet for all – A European strategic long-term vision for a prosperous, modern, competitive and climate neutral economy, COM(2018) 773 final, 2018; IEA: Energy Technology Perspectives, 2017; Shell: Shell Scenarios: Sky, Meeting the Goals of the Paris Agreement, 2019.

elect 'climate neutrality' objective, will require a very large increase in electricity, especially for low-carbon solutions in mobility, heating and cooling and the decarbonisation of energy-intensive industries.[4] Electrification continues to be identified as the least expensive decarbonisation option; most analyses point to the need to double or even triple the electrification rate from the current 23% (see Table 1).[5] At the same time, these very large volumes of low carbon electricity will need to be competitive and affordable for both industry and citizens.

Massive renewable electricity required for climate neutrality in 2050

Consequently, the long-term strategy presented by the European Commission at the end of 2018, expects electricity demand to increase significantly by 2050 in all decarbonisation scenarios.[6] For 2030, projections foresee a rise in electricity generation in the EU from 2,756 TWh in 2015 to 3,233 TWh in 2030, 22% and 29% respectively of final energy demand. For 2050, electricity in final energy demand is expected to account for from 3,570 TWh (1.5 LIFE) to 4,826 TWh (ELEC) (see Table 2). The scenario with the highest share of electricity in 2050 – with a 53% electrification rate, the so-called ELEC scenario – projects an increase of 2,070 TWh in comparison to 2015. This represents almost the entire final total energy consumption of Eastern and South Eastern Europe in 2016, i.e. all energy sources including oil, gas, coal, nuclear and renewables.[7] By 2050, even the lowest electricity volume foreseen by 1.5LIFE requires an increase in electricity consumption to at least 814 TWh, which is more than the final electricity consumption in 2016 in the Baltic States and Nordic countries, Central and South East Europe (735 TWh).[8] An estimated 5,054 TWh of electricity consumption to reach a 95% decarbonisation target by 2050, as for example presented by the European electricity industry association Eurelectric,[9] equals almost the 2016 final total energy consumption of France, Germany and Italy together.[10]

4 Electrification allows switching from emitting fuels to carbon neutral electricity from renewables and nuclear in heating, transport and industry, sometimes referred to as direct electrification. Indirectly, electric production of fuels such as hydrogen and Power-to-X would provide for electrification of end uses in the sectors where the direct use of electricity is currently not feasible (such as in marine transport, aviation and selected industrial processes).

5 European Commission: A Clean Planet…, op. cit.; Eurelectric: Decarbonisation Pathways, 2018, available at https://cdn.eurelectric.org/media/3457/decarbonisation-pathways-h-5A25D8D1.pdf; IEA: Energy Technology Perspectives, 2017, available at https://www.iea.org/etp/; Shell: Shell Scenarios: Sky, Meeting the Goals of the Paris Agreement, 2019, available at https://www.shell.com/promos/business-customers-promos/download-latest-scenario-sky/_jcr_content.stream/1530643931055/eca19f7fc0d20adbe830d3b0b27bcc9ef72198f5/shell-scenario-sky.pdf.

6 European Commission: A Clean Planet…, op. cit.

7 European Commission: EU Energy in Figures: Statistical Pocketbook, 2018, p. 82, available at https://ec.europa.eu/info/news/eu-energy-statistics-latest-data-now-available-2018-oct-04_en.

8 Ibid., p. 83.

9 Eurelectric, op. cit.

10 European Commission: EU Energy in Figures, op. cit., pp. 82-83.

Table 2
Final energy consumption and the share of electricity in EU long-term strategy scenarios

	2015	2030	Baseline	EE	CIRC	ELEC	H2	P2X	COMBO	1.5TECH	1.5LIFE
Final energy consumption (TWh)	12,630.18	11,095.02	10,246.03	7,815.36	8,582.94	9,059.77	9,408.67	9,664.53	8,652.72	7,954.92	7,303.64
Electricity (TWh)	2,756.31	3,233.14	4,058.87	3,756.49	4,093.76	4,826.45	3,965.83	3,977.46	4,128.65	3,989.09	3,570.41
Increase of electricity from 2015 (TWh)		476,83	1,302.56	1,000.18	1,337.45	2,070.14	1,209.52	1,221.15	1,372.34	1,232.78	814,1
Share of electricity in final energy consumption (%)	21.82	29.14	39.61	48.06	47.77	53.27	42.15	41.16	47.72	50.15	48.89

Source: European Commission: In-depth analysis in support of the Commission Communication COM(2018) 773, p. 18, Figure 20.

All of this electricity will need to be low carbon, i.e. renewable or nuclear. Given the cost structure and acceptability, the largest share by far is expected to be covered by renewables. For example, the EU long-term strategy projects a significant phase-down of fossil fuels power generation capacities from almost 44% in 2015 to 24% by 2030, as shown in Table 3. The maximum remaining share of fossil fuels drops to a bit less than 12% by 2050 (ELEC scenario). Nuclear power is expected to be halved from some 12.5% in 2015 to a maximum share of about 6% in 2050 under the EE scenario. Under the same scenario, the share of nuclear power would go down to approximately 7.5% in 2030. The most ambitious decarbonisation scenarios even foresee a decrease in fossils to only 4.5% (1.5 LIFE) and a phase-down of nuclear to less than 4% (1.5TECH) of total installed capacity (see Table 3).

As a result, renewable energy, notably wind and solar, will be essential to satisfy energy demand in the EU. Wind is expected to be the leading source in all scenarios, most of which foresee more than 40% of installed capacity for wind, and solar will come in second with around 30%. In capacity terms, installed capacity for renewables is expected to double – from around 432 GW in 2015 to almost 870 GW by 2030 (see Table 4). The most ambitious scenario (1.5 LIFE) expects even more than 2,394 GW

Table 3
Installed capacity in EU long-term strategy scenarios
in GW and % of total installed capacity

	2015	2030	Baseline	EE	CIRC	ELEC	H2	P2X	COMBO	1.5TECH	1.5LIFE
Wind total	141.4 (14.36%)	351.3 (27.69%)	583.8 (37.02%)	679.8 (41.19%)	754.4 (41.34%)	864.8 (40.45%)	997.5 (43.20%)	1,176.5 (44.05%)	1,058.5 (44.04%)	1,517.4 (34.17%)	1,387.6 (52.69%)
Solar	94.7 (9.62%)	320.5 (25.26%)	441.5 (28.00%)	492.6 (29.85%)	543.8 (29.80%)	683 (31.95%)	803.9 (34.81%)	966.4 (36.19%)	828.4 (34.47%)	1,029.8 (26.75%)	769.8 (29.23%)
Other RES	196.1 (19.91%)	197.7 (15.58%)	209.6 (13.29%)	211.1 (12.79%)	217.4 (11.91%)	226.6 (10.60%)	225.8 (9.78%)	224 (9.14%)	235.2 (9.79%)	244.8 (7.59%)	237.2 (9.01%)
Nuclear	122 (12.39%)	96.5 (7.61%)	86.8 (5.50%)	99.3 (6.02%)	106.7 (5.85%)	112.9 (5.28%)	114.1 (4.94%)	116.9 (4.38%)	116.9 (4.86%)	121.3 (3.77%)	114.8 (4.36%)
Fossil fuels	430.6 (43.72%)	302.7 (23.86%)	254.2 (16.12%)	166.4 (10.08%)	200.2 (10.97%)	248.5 (11.62%)	166.4 (7.21%)	161.4 (6.04%)	160.1 (6.66%)	118.2 (5.17%)	119.1 (4.52%)
Fossil fuels with carbon capture and storage	0 (0.00%)	0 (0.00%)	1.1 (0.07%)	0 (0.00%)	1 (0.05%)	0.3 (0.01%)	0.4 (0.02%)	4.2 (0.16%)	1.1 (0.05%)	16.7 (0.04%)	2.5 (0.09%)
Bio-energy with carbon capture and storage	0 (0.00%)	0 (0.00%)	0 (0.00%)	1.1 (0.07%)	1.3 (0.07%)	1.9 (0.09%)	1.1 (0.05%)	1.3 (0.05%)	3.2 (0.13%)	49.1 (0.10%)	2.6 (0.10%)

Source: European Commission: In-depth analysis in support of the Commission Communication COM(2018) 773, p. 22, Figure 24.

Table 4

Renewables total capacity in EU long-term strategy scenarios

in GW

	2015	2030	Baseline	EE	CIRC	ELEC	H2	P2X	COMBO	1.5TECH	1.5LIFE
Renewables capacity total	432.2	869.5	1,234.9	1,383.5	1,515.6	1,774.4	2,027.2	2,386.9	2,122.1	2,792.0	2,394.6
Renewables capacity increase from 2015		437.3	802.7	951.3	1,083.4	1,342.2	1,595.0	1,954.7	1,689.9	2,359.8	1,962.4

Source: European Commission: In-depth analysis in support of the Commission Communication COM(2018) 773, p. 22, Figure 24.

of total renewable capacity will become operational by 2050; even the baseline scenario expects almost 803 GW of additional renewables capacity to be installed by 2050 or a yearly increase of 23GW, some 15% higher than the growth from 2014 to now. The 1.5TECH scenario foresees an increase of capacity from 2015 to 2050 with nearly an additional 2,360 GW. This would be more than five times the current installed capacity for renewables or a yearly increase of around 67 GW. This compares to the actual yearly increase in renewable capacity in the EU of around 20 GW from 2014 to now (see Table 5), achieved with the help of massive financial and government support.

The EU electricity market under transformation

It is reasonable to expect that further penetration of variable renewable generation in the electricity mix, coupled with a stable contribution of nuclear, will transform the economics of the power sector, thereby triggering far-reaching effects in the way the power sector operates and investment decisions are being made. By 2030, around 65-70% of electricity output – renewables and nuclear combined – will have zero marginal costs. This means that capital costs have a stronger impact on the total costs of such technologies than they have on fossil fuels. By shifting the cost structure of the offer towards fixed costs (as low-carbon electricity generation is highly capital-intensive), the volatility of wholesale electricity prices increases, creating risks for investors.[11]

The current EU electricity market design – an energy-only market – is generally considered the cornerstone of the liberalisation policies for the electricity market in the EU during the last decades.[12] In the energy-only market, the day-ahead price is uniform, i.e. non-discriminatory, and is set as a result of intersecting offers and bids all day. Typically, this price is set by the variable production costs of the marginal power plant, i.e. the last power plant that is needed to satisfy electricity demand. This means that all generators face the same price irrespective of their variable production costs. As a result, generation units with variable production costs below the market price receive

Table 5

Net-generating renewable capacity in the EU in 2014-2018

in GW

GW	2014	2015	2016	2017	2018
Renewable total	373.46	396.51	418.27	439.59	424.51
Wind	124.99	139.75	152.69	166.7	167.59
Wind offshore	6.84	9.87	11.75	13.9	16.84
Wind onshore	118.14	129.88	140.94	152.8	150.75
Solar	88.34	94.31	100.26	105.96	96.59
Solar PV	86.04	92.01	97.96	103.66	94.28
Solar thermal	2.3	2.3	2.3	2.3	2.3
Bio	23.8	24.98	25.94	26.7	26.93
Biomass	20.45	21.47	22.35	23.37	23.87
Biogas	3.35	3.51	3.58	3.33	3.06
Geothermal	0.99	1	1	1	0.81
Renewable waste	3.12	3.05	2.92	3.24	3.2
Renewable hydro	130.29	129.97	131.94	132.39	126.18
Hydro pure storage	52.15	49.72	47.61	48.4	45.65
Hydro run-of-river and pondage	58.76	59.47	60.61	61.1	59.13
Hydro mixed pumped storage (renewable part)	19.14	20.54	23.47	22.65	21.16
Hydro marine (tidal/wave)	0.24	0.24	0.24	0.24	0.24
Other renewable (not listed)	1.24	3.45	3.26	3.28	2.95
Non identified (other not listed)	0.68	0	0.27	0.31	0.27

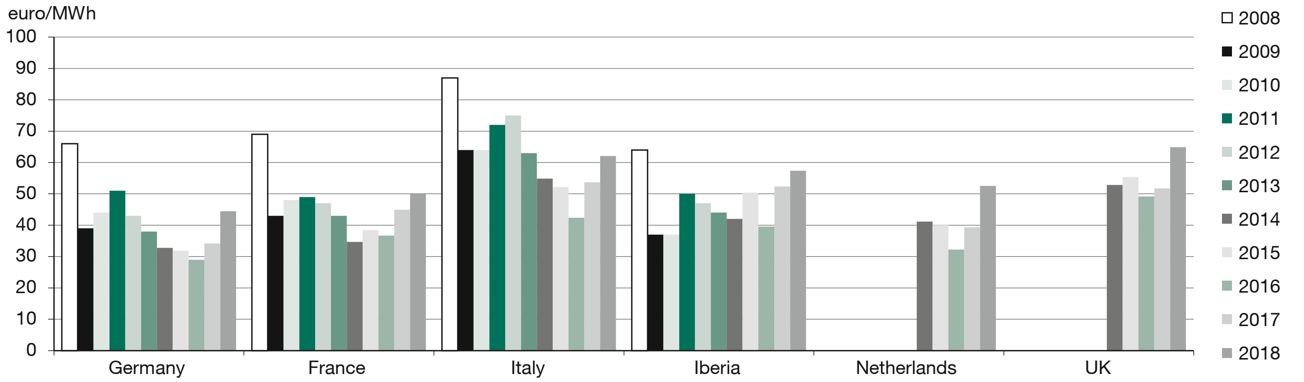
Note: Includes renewable hydro, excludes hydro.

Source: ENTSO-E: Net-generating capacities, data set, 2019.

11 F. Genoese, C. Egenhofer: Designinig a Market for Low-Carbon Electricity, in: Intereconomics, Vol. 50, No. 4, 2015, pp. 176-180, available at https://archive.intereconomics.eu/year/2015/4/the-future-of-the-european-power-market/search/egenhofer/0/.

12 European Commission: Energy Economic Developments, Investment Perspectives in Electricity Markets, Institutional Paper No. 003, July 2015, pp. 32-36.

Figure 1
Evolution of annual day-ahead electricity prices in a selection of European markets



Source: Agency for the Cooperation of Energy Regulators: Electricity Wholesale Markets of the 2018 Market Monitoring Report, Underlying data sets, 2018.

a so-called 'infra-marginal rent'. This margin – typically referred to as gross margin – is used to cover fixed operation and maintenance costs as well as to recover investment costs.[13] If market prices were always equal to the variable production costs of the marginal plant, this plant would not even be able to cover its fixed operation and maintenance costs, let alone recover its investment costs. This is why so-called 'scarcity prices' are required to let an energy-only market function properly. Such price increases are expected to occur when supply struggles to meet demand. This can happen when consumption peaks, when production from intermittent renewable sources is low or when there are large, rapid swings in demand or supply. During these hours, the price would rise above variable production costs of the marginal plant and thus offer a so-called 'scarcity rent' to all resources in the market. These additional revenues are needed to fully recover both fixed operation, maintenance and investment costs, particularly for the marginal plant.

Large-scale penetration of renewables – notably solar – have shaved off the peaks, e.g. the mid-day peak. While this is positive from a total systems perspective, it has undermined the economics of peaking plants and remuneration of the sector. In addition, wholesale price signals throughout the last decade have not been in line with investment needs nor the rate of investment required for at least a decade (see Figure 1), even if wholesale prices have recently recovered. Various factors have contributed to this situation, i.e. the economic cycle, structural change and energy efficiency in industry, international gas prices and overcapacity in generation. The overcapacity problem stems from the fact that the renewable capacities brought into the system as a result of EU and national policies should have been offset by equivalent closures of existing inflexible capacities. This was necessary, and in part still is, because electricity demand has been stagnating if not contracting for the whole 2012-2020 period. The size and speed of these closures has been largely insufficient to address the oversupply. For example, in Poland non-renewable net-generating capacity has remained stable since 2014 with a slight increase from 30.5 GW to 32 GW by 2018; Germany has somewhat reduced non-renewable capacities from 103 GW in 2014 to 92 GW in 2018, although a more significant closure has been witnessed in the Netherlands (from 27 GW to slightly under 21 GW) and the UK (from 64 GW to 51 GW) for the period 2014-2018.[14]

After a decade of stagnation, a recovery of wholesale prices in 2018 has been observed in almost all bidding zones.[15] On the demand side, this might be explained by the economic growth in 2018; on the supply side, the downward effects on wholesale prices by the increasing share of renewables in the electricity generation were "more than offset by the significant increase of the costs associated with fossil fuel electricity generation" – coal,

13 For example, see CEPS Task Force Report: Reforming the Market Design of EU Electricity Markets. Addressing the Challenges of a Low-Carbon Power Sector, 27 July 2015, p. 21.

14 ENTSO-E: Net-generating capacities, data set, 2019.

15 Agency for the Cooperation of Energy Regulators: Market Monitoring Report 2018 – Electricity Wholesale Markets Volume, 11 November 2019, p. 16, available at https://www.acer.europa.eu/Official_documents/Acts_of_the_Agency/Publication/ACER%20Market%20Monitoring%20Report%202018%20-%20Electricity%20Wholesale%20Markets%20Volume.pdf.

gas and CO_2 allowance prices climbed by 4%, 32% and 170%, respectively.[16]

While 2018 wholesale prices have recovered to around 45 and 50 euro/MWh in Germany and France as well as up to 65 euro/MWh in Italy and the UK and renewable generation technologies' costs continue to fall,[17] there are doubts as to whether EU electricity wholesale prices alone will be sufficient to encourage investment, especially in the magnitude required. While some technologies may be profitable at current wholesale prices – based on levelised costs of electricity – it may be questionable whether this applies for a wide array of technologies, even assuming further cost reductions. Questions on oversupply and how the EU ETS and member state policies will address it as well as the issue of system costs allocation and the more general challenge of high capital intensity remain. The latter will be exacerbated should capital costs increase.

The gap between full costs of generation – renewable and conventional – and wholesale prices will need to be bridged in some way. Long-term power purchasing agreements (PPAs) between renewable generators and consumers will play an important role in this context because they can provide financial certainty.[18] Yet it is hard to see how they could, alone, solve the imbalance. Pricing PPAs are not completely immune from the general price performance of electricity markets. In addition, bilateral contracts may not always reflect the costs of security of supply in the power price. Finally, PPAs are typically possible for large integrated energy-intensive industries, and mainly for marginal production volumes in the downstream operations where some flexibility exists. Ultimately, PPAs will not escape the structural shift towards renewables that will continue to exert downward pressure on wholesale electricity prices across the EU.

As time goes on, the disparity between wholesale prices and investment signals might become more and more apparent, jeopardising the large volumes of required renewable capacities. The emerging structural inconsistencies between the decarbonisation targets and the current electricity market design have been observed already as early as the 2010s.[19] The case has been made that investments in generation capacities received insufficient attention during the market reforms, and doubts were voiced about "the quality of the price signal on the hourly markets to trigger and orient pure producers' investment decisions".[20]

The new market

Hence, there is a distinct possibility – if not likelihood – that recent and foreseeable developments of electricity wholesale prices might not be enough to generate a sufficiently robust and stable signal for new investments in renewables or even to remunerate existing assets. As stated by the 2018 European Commission report on energy prices and costs,[21] a decoupling effect between investments and price signals can be observed. While a market is generally described as a place where the behaviours of participants are driven by price signals, among other things, one may argue that in the current EU electricity markets, an increasing number of decisions are driven by policy-generated signals rather than prices.

Meanwhile, it is crucial to ensure that investors receive adequate price signals. First, an ever growing share of renewables in the energy mix would further increase fluctuations in electricity generation due to weather conditions varying from almost zero to close to the installed capacity. This brings a flexibility challenge to grid operation and requires new solutions,[22] such as the digitalisation of electricity systems and potential for electricity storage and, logically, investments into these things.[23]

Second, for the foreseeable future, the most important scarcity in the market seems to be transmission and distribution capacity; investment in the grid and in grid innovation is also a no-regret policy. Incentives to perform necessary investments in hardware and services will have to be provided primarily by the regulators who face the challenge of ensuring that grid operators are rewarded

16 Agency for the Cooperation of Energy Regulators, op. cit., pp. 16-17.

17 For example, see International Renewable Energy Agency: Renewable power generation costs in 2018, May 2019.

18 European Commission: Competitiveness of corporate sourcing of renewable energy sector, Part 2 of the Study on the competitiveness of the renewable energy sector, Final Report, ENER/C2/2016-501, 28 June 2019.

19 D. Finon: The transition of the electricity system towards decarbonization: the need for change in the market regime, in: Climate Policy, Vol. 13, No. 1, 2013, pp. 131-146.

20 D. Finon: Investment and competition in decentralized electricity markets: how to overcome market failure by market imperfections?, in: J.-M. Glachant, D. Finon, A. de Hauteclocque (eds.): Competition, Contracts and Electricity Markets: A new perspective, Cheltenham 2011, Edward Elgar Publishing, pp. 58-93.

21 European Commission: Energy Prices and Costs in Europe. Report from the Commission to the European Parliament, the Council, the European Economic and Social Committee of the Regions, COM/2019/1 final, available at https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1548155579433&uri=CELEX:52019DC0001.

22 G. Weale: Future Changes and Challenges for the European Power Market, in: Intereconomics, Vol. 50, No. 4, 2015, pp. 193-197, available at https://archive.intereconomics.eu/year/2015/4/the-future-of-the-european-power-market/.

23 A. Zerrahn, W.-P. Schill, C. Kemfert: On the economics of electrical storage for variable renewable energy sources, in: European Economic Review, Vol. 108, 2018, pp. 259-279.

within their regulated revenues for investing in smarter grids, rather than just in larger ones.[24]

Third, as discussed above, significant investments in renewables are required in all scenarios to meet the decarbonisation targets by 2050. To meet only the 2030 targets, an estimated 90 billion euro needs to be invested annually in generation capacity in the power sector.[25]

All this suggests the need to rethink electricity pricing based on a methodology that takes into account energy, capacity, flexibility and needs across the system and manages to allocate costs and generate revenues accordingly. Revenues from these markets should be able to cover both capital and operating costs as the central focus. The market may need a long-term price signal to plan adequate returns on future assets and stabilise financial planning but also to reduce the cost of capital by reducing the risk premium. A precondition for any signal to work will be a level playing field between the growing number of market participants, implying inter alia, carbon pricing, reforming grid tariffs, aligning competition policy with decarbonisation objectives and ensuring that wholesale prices are the main component of retail prices.

24 International Energy Agency: Re-Powering Market. Market Design and Regulation during the transition to the low-carbon power systems, 2016, pp. 209-210.

25 European Commission: Energy Economic Developments, op. cit., p. 41.

Conclusion

The Clean Energy Package, an electricity market design approved last year, provides a robust and fit-for-purpose reform of the way new electricity markets, notably dispatching work in the context of an ever-growing share of renewable generation, function. However, the market design reform does not, and was never meant to review the way wholesale electricity is priced in Europe. Yet without a new pricing model, and without the ability to shift the policy debate to the harder question of how to price the commodity in line with the current way the EU electricity system works and the basket of the technologies it utilises, the necessary investments to decarbonise first the EU power sector and then the economy may not be forthcoming. After having spent the last decade creating and fine-tuning markets to accommodate ever-increasing shares of renewables, and having successfully embraced change, the EU needs to refocus the debate on which tools are most suited to ensure investments and to remunerate assets in a competitive market.