"Energy Transition Driven by Renewables"

Remarks

by

Mr. Adnan Z. Amin

Director-General
International Renewable Energy Agency

at the session

The Changing Role of Utilities in an Era of Global Energy Transformation, Driven by Renewables Growth

During the

European Utility Week 2017

Amsterdam, 3 October 2017

Distinguished Guests,

Ladies and Gentlemen,

I am delighted to be here today and I wish to thank the organizers for the invitation to address this important gathering. These are truly exciting times in the energy world. Renewables, alongside new technologies and services are transforming the business of supplying and delivering energy. A more responsive, decentralized and interconnected energy system is emerging. This changing energy landscape offers new opportunities for bold leadership and action. Utilities will play a key role in ushering in this new era, but also Europe which has historically been at the forefront of renewables development and spurred many of these changes. European countries have committed to ambitious emissions cuts (at least 40% by 2030) and have embarked on the "Clean Energy Package" through which Europe could continue to assert its leadership in boosting renewables, energy efficiency and economic growth.

At the same time, the transition to a sustainable energy future is well underway not only in Europe but elsewhere, with renewables at its core. Last year, global investment in renewable energy reached nearly USD 265 billion, while renewable power generation capacity increased by a record 161 GW.

This unprecedented scale-up is driven by declining costs, technological innovation and enabling policy frameworks. Solar and wind projects now offered for 3 US cents per kWh and even less. Last April, Germany announced that it had accepted its first subsidy-free offshore wind auction bid with record-low weighted average of USD 4.67 a megawatt-hour, less than a tenth of the previous offshore wind deal. Impressive cost reductions for renewables are expected to continue. We find that the costs for solar PV could drop by a further 60%, offshore wind by 35%, and concentrated solar power by almost 45% over the next decade.

These remarkable advances in less than a decade have happened faster than anyone expected. On a sunny and breezy day in Germany last May, wind, solar, biomass and hydro power provided a record 85 per cent of the country's total energy. And we just learned that nearly a third of all UK's electricity came from renewable sources in the second three months of this year, setting a new record for clean energy generation. And more is yet to come. The global drive to implement the Paris Agreement is providing further impetus for renewable energy deployment worldwide. Earlier this year, we launched a study in collaboration with the International Energy Agency (IEA), on decarbonisation of the energy sector in line with the 'well below 2C' target of the Paris Agreement. The

report, *Perspectives of the Energy Transition,* finds that we need to raise the share of renewables in the primary energy supply to 65 per cent by 2050, up from 15 per cent today. By 2050, renewables and energy efficiency would meet the 90% of emission reduction. Important investments would be needed, especially to transform the end-use sectors. But these investments would be outweighed by the macroeconomic benefits of the energy transition. GDP growth would be boosted by around 0.8% by 2050, and renewable energy jobs would reach 26 million.

This new energy reality is reshaping the way energy is produced, distributed and consumed around the world. With growing renewables generation at both the large-scale and small-scale distributed level, the so-called "Energy 3D" – decarbonisation, decentralisation and digitalisation – is altering the entire paradigm of the power sector. Facilitated by renewable power technologies, 3 million energy users in Europe are now estimated to be generating at least some of their own power. Enel has brought over 30 million smart meter points across Italy covering close to 100 percent of Italian households. In Norway, Sweden, Finland, and Denmark, smart meter penetrations are also nearing those rates. China State Grid has now deployed 350 million smart meters. These developments are at the heart of IRENA's work on the power sector transformation. Along with leaders from the utility industry, we are

looking at innovative efforts and priority action areas for achieving a zero-carbon grid by the middle of this century.

It is no secret that the power system transformation creates challenges for utilities. On the one hand, consumers may produce their own electricity, but on the other hand, new demand is emerging from the electrification of end-use sectors through electric vehicles, electric boilers, heat pumps and other applications. Higher shares of variable renewable penetration in the grid and increasing bi-directional flows of electricity require a more flexible power system. Distributed energy resources are decentralizing our electricity networks and moving them away from traditional baseload generation concepts and operating practices. In Germany, for example, more than 95% of all renewable generators are connected to the distribution grid. 35% of the RES installations are owned by citizens, and the aggregated share in total distributed generation capacity of the big four incumbent utilities is only 5%. Therefore, the relation between distribution system operators, transmission system operators and consumers is evolving as new roles require more data exchange and coordination.

At the same time, the energy transformation also brings many opportunities for additional value streams beyond selling kilowatt-hours. These innovative business models are not limited to just mechanisms and

technology to ensure overall system flexibility. They also comprise new services that empower consumers to take more control over their individual consumption and production, turning them into active market participants. Fast moving utilities can now leverage new services for retail customers through distributed renewable generation, capturing customer relationships while branding and positioning themselves as a utility of the future. For instance, Oklahoma Gas & Electric's smart grid deployment serves as the backbone for the world's largest demand response program, reducing peak demand by 33% in the hot summer months and helping customers earn electricity savings. In the Netherlands, the utility Eneco has evolved from a company operating in a centralized electricity system to now supporting customers with distributed generation, storage and the exchange of this energy via local networks.

As market facilitators, utilities can bridge the gap between distributed energy resources like behind-the-meter storage appliances and demand response, with system operators and markets. Siemens and RWE announced they would jointly build the IT backbone of a mass-market virtual power plant to coordinate hundreds of megawatts worth of distributed energy projects from wind and solar farms. Furthermore, a number of utilities are launching pilot programs to test battery storage on their networks. Pacific Gas & Electric, in California, has developed a

project with SolarCity to understand how storage supports the grid, and how to get additional revenues from it.

With the rapid developments taking place in power electronics, flexible generation and big data, utilities can leverage advances in asset management. CAISO, NREL and First Solar recently undertook a study that found that a large solar farm, equipped with advanced inverters and software controls, can meet the ancillary service response usually provided by natural-gas-fired peak plants. Having better access to data and forecasting techniques also helps capture variability, reducing the need for backup resources. System operators across Europe are embracing machine learning and big-data technologies to build robust prediction models.

In the end-use sectors, utilities are embarking on sector coupling. This is particularly relevant for the transport sector, as more utilities engage in EV services that are transforming our cities. ENEL is deploying mobile apps for smart charging of EVs, and Innogy is running a pilot program with blockchain technology to authenticate and manage the billing process for autonomous EV charging stations. In the Netherlands, grid operators have joined 325 municipalities in the "Living Lab for Smart Charging" program, which is testing EV smart charging and grid support from mobile batteries. Equally important to these efforts for power

utilities is the heating and cooling sector. Electric boilers and district heating and cooling systems can operate with surplus of renewable electricity, while balancing power systems.

So, it is clear that opportunities abound for utilities in the energy transition. The key question remaining is how best the industry can monetize these potential new value streams from providing new services to distributed and renewables-based markets. The shift from selling kilowatt-hours to additionally selling services to the customer is unfolding before us. While these revenue streams might be marginal today, the need and value for such services will be undoubtedly increase as the energy transition accelerates.

The evolution of power market design therefore must ensure sufficient compensation for ancillary services. IRENA's recent report, *Adapting Market Design to High Shares of Variable Renewable Energy,* finds that price signals need to reflect market conditions and encourage resources to provide flexibility. This needs to be a joint-venture between the utility industry, regulators and government as it entails incentives to encourage flexible behaviour on the supply side and dynamic rates on the demand side, together with changing regulatory framework that rewards distribution system operators for their performance as opposed to energy sales. We see important initiatives currently exploring these interactions

between distributed renewables and wholesale markets with New York's Reforming the Energy Vision and California's Distribution Resources Plan.

The increasing digitalisation of the power system is leading us to a more intelligent, efficient, and low-carbon grid. While numerous start-ups have already realized the business opportunities in this new paradigm, utilities have largely been late entrants. However, the industry has begun to understand its critical role and in many cases accelerating distributed renewables uptake. In Europe, more than twenty energy firms like EDF, Endesa, Eneco, Engie, Enel, E.ON, Iberdrola, Vattenfall and RWE are engaged in a peer-to-peer energy trading platform based on blockchain technology.

This type of leadership by the utility industry to transform grids is critical if we are to achieve an energy transition that is affordable, reaches all consumers and exploits our vast renewables potential. Continued innovation in renewable energy technology, policy, regulation and finance in the coming decades will be essential to accelerate the global energy transition. In turn, this can help bring about rapid and deep decarbonization and sustained economic growth. This was precisely the focus of the first IRENA Innovation Week last year, which we will be

holding again next year and hope you can join us to share best practices in order to help take the energy transition to the next level.

No one can predict precisely how the energy system of the future will look and operate, but it is clear utilities can position themselves to be key facilitators. The efforts to continuously decarbonize and modernize our grids will be immense, and renewables will be central to our success. In this context, IRENA looks forward to working with the utility industry as we pursue our sustainable energy future.

Thank you very much.