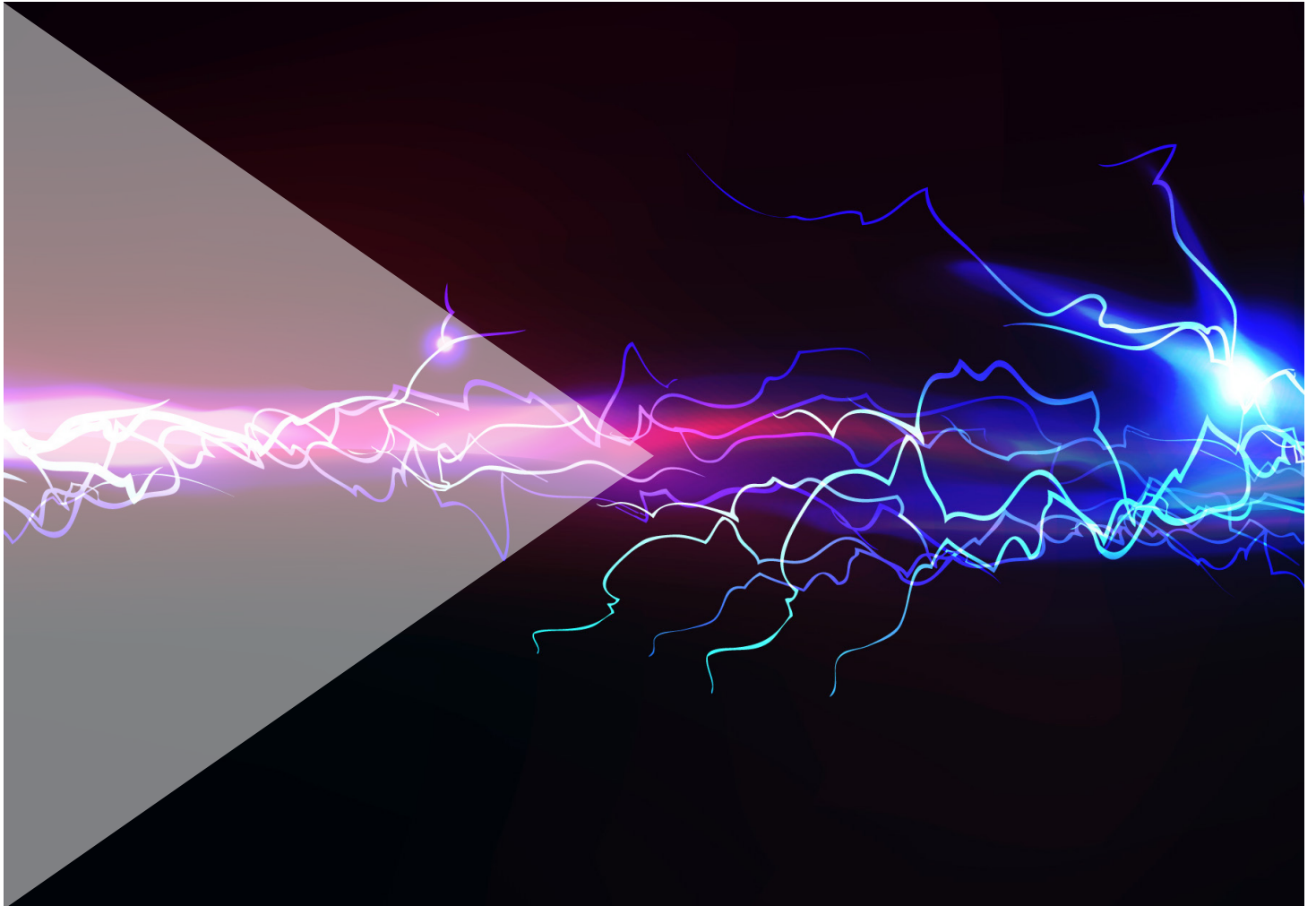


Global Agenda

Global Agenda Council on the Future of Electricity: Busting the Myth for Transformation

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Global Agenda Council on the Future of Electricity¹: Busting the Myth for Transformation

By 2030, we can live in a world that is significantly more electrified, more connected, more efficient, more consumer-driven, more decarbonized--and one that has a material impact on other systems and sectors.

Key Trends in Transformation²

- 1. The world is increasingly electrified.** Global demand for electricity increases, regardless of efficiency, due to electrification of heating and mobility; to satisfy increasing demand in developing regions, and to provide access in emerging economies. New actors are entering the sector in an increasingly complex system, bringing technological innovation and new approaches, reducing demand (as is the current trajectory) on traditional centralized grids in developed countries and expanding its outreach to a scale never seen before.
- 2. Renewable energy has the greatest capacity growth.** By 2030, the electrification of the world will be driven mainly by increased deployment of readily available, inexpensive and abundant renewable energy resources. With decreased levelized cost of solar and wind – already competitive with traditional fossil fuel generation in many markets – renewables, and in particular solar PV, are among the most competitive technologies available for investment in new generation capacity that decreases import dependency, reduces fuel poverty and empowers citizens, consumers and producers.
- 3. Renewable energy and other clean solutions enable growing universal access to electricity.** By 2030, access to affordable, reliable, sustainable and modern energy will be attained in a much more significant way, owing to falling costs in solar and hybrid power technologies. Access is fundamental to reducing poverty, improving health, better education and promoting economic growth.
- 4. Energy security increases as a result of indigenous clean electrification.** Large renewables projects and related grid infrastructure across borders will foster cooperation between nations, contributing to lowering the risks that can in turn attract capital. Volatility of prices is reduced because of stable fuel costs, ensuring more resilience in vulnerable economies. Increased digitization of the system enables improved accuracy of weather and renewable resource predictions, allowing for more reliable and resilient deployment.
- 5. Distributed energy resource (DER) deployment is significantly increased.** DERs aggregated with ICT technologies will function as reliable and flexible supply resources from the distribution side of the grid that will be dynamically integrated with existing sources, and in some cases will obviate the need for additional supply side resources. The increasing presence of DERs will significantly transform and create new business models for the existing power sector – and that of some adjacent sectors, such as natural gas, building and transportation. DERs will enable leapfrogging central-system grid infrastructure in developing countries to allow for cost-effective and more rapid access to electricity.

¹ Please see annex for the members of the Global Agenda Council

² This pre-read focuses on the key drivers of the transformation that the world power sector is anticipated to experience during the next few decades: decarbonization, massive renewables penetration, consumer empowerment and progressive decentralization. The authors (members of the Global Agenda Council) are aware that reliance on fossil fuels is a reality during this time and that the presence of nuclear power depends on political decisions at country level. Here we highlight the importance of trends in the power sector that we identify as becoming increasingly dominant in the coming decades.

- 6. Energy storage provides critical grid services.** A wide range of promising energy storage technologies are developed and deployed commercially, with costs driven down by the automobile industry. Low-cost renewables combined with increasingly cost-effective energy storage are replacing diesel generators and allowing decentralized power solutions that in turn spur emerging economy electrification and development.
- 7. Consumer engagement and choices shape future electric growth.** Consumers (large and small, households and businesses) in developing and developed economies are becoming increasingly able to store, produce, manage, buy and sell energy in an affordable, cost effective and profitable manner. New smart platforms and virtual market places support new business models, bringing consumers together, enabling individuals and communities to take control of their energy future, thus providing flexibility to existing, smart and distributed networks.
- 8. The system is more connected, resilient and secure.** By 2030 the electric system will be more connected and hybrid (a combination of centralized and distributed resources and grids), with countries and regions having different energy mixes depending on their resources. Connection remains important as a way for a “prosumer” to sell excess power and act as an “insurance policy” for continued supply; decentralized systems allow for efficient return to service in case of disruption. The electrification of transport enables electric cars to provide grid services, including storage. A more decentralized and intelligent grid reduces cyber and physical security risks.
- 9. The price of electricity may increase for some time, but then will decrease.** Forecasting future energy prices is notoriously risky, but, as the system and infrastructure are upgraded and modernized, there is every prospect that prices will fall to reflect the lower costs of renewables over those of traditional fossil and nuclear generation.
- 10. Regulation improvements support and accommodate electric grid changes.** A comprehensive pricing system allows for supply and demand resources to efficiently interact, contributing to a maximization of social, environmental and economic welfare.

Requirements for Transformation

- 1. Political targets – particularly for carbonization - must be clear, transparent and consistent across time and policies.** Mobilize political leadership to ensure appropriate policies are in place that include ambitious outcome-based targets for access, emissions and electrification, and that set out a road map to transition to sustainable, cost-effective, clean renewable resources.
- 2. Regulation should anticipate trends, eliminate barriers and create a favourable climate for investment.** Regulatory interventions are needed to allow investments in a cleaner renewable generation mix, creating conditions for regulatory stability, innovation and transformation to generate benefits for all stakeholders. Cost-effective programmes and incentive policies should combine goals and means to achieve those goals, informed and led by regulators in a transparent and participatory process, and preventing decisions that may imply excessive costs, granting discipline and control to cross subsidies that may emerge from policy choices.
- 3. Power markets and platforms must open for all participants.** Create transparent and open power markets that accept greater participation, embed location pricing for DER and move to more granular visibility of power markets.
- 4. Financing mechanisms must be clear and risk factors understood.** Risk mitigation is needed for large projects that could include mechanisms such as Multilateral Investment Guarantee Agencies, Power Purchase Agreements with Multi-National Corporations; financial institutions that can underwrite risk; redirection of fossil fuel subsidies to clean energy; Green bonds; and military reserves. Risk mitigation is also needed for micro-projects to allow for greater democratization of financing, including micro financing and other decentralized finance approaches that can provide for nimbler projects with shorter paybacks. Multilateral and bilateral funding mechanisms are needed for projects that are not commercially financeable.
- 5. Business and monetization models must evolve.** Cost-recovery mechanisms for utilities should be developed, allowing for evolution to new models and technologies that enhance the system; at the same time, grid participation should not be limited to utilities but open to additional players, including project developers, ICT providers and consumers themselves. In some developed economies, new viable business models of central grids need to develop to safeguard security of supply as distributed generation increases.
- 6. Consumers must be allowed to participate in all aspects of electrification.** Consumers and communities must be engaged to take full advantage of the evolving grid, including being educated about the opportunities afforded to them by the new offerings and their own behaviour, and being able to freely compete for the provision of flexibility to the electricity system, equal to other forms of generation and capacity within energy markets. Off- or semi off-grid consumers should not be expected to pay excessively for their investments through having to compensate network companies for lost revenue regardless of the cost of the impact on the network.
- 7. Special provisions should be made to ensure universal access to electricity.** Create a viable and stable business environment, supported by specific independent regulation and necessary subsidies for rural electrification, in particular for off-grid solutions – either permanently or as a bridge to eventual grid connection – but allowing for renewable-based off-grid production technologies.

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