Editorial

Grid reconfiguration for DE

no need for 'leapfrogging'

What is the role of the grid as the market share of decentralized power generation expands? This question was one of the main themes of the recent World Technology Network/UN conference in Paris on 'Leapfrogging the Grid – the Role of Distributed Generation in Developing Countries', with WADE Chairman, Tom Casten, giving the keynote address.

Behind the question is the frequently made assumption that WADE and other cogeneration/decentralized energy (DE) advocates support the idea that central power and existing grid networks should be substituted, completely and in the short term, with DE systems. That assumption is misguided. Clearly it would be a nonsense to do anything other than let existing plants continue to operate while it is economic for them to do so – premature closure does not make business sense.

No, nothing as radical as this is called for. The network will continue to have a major – but different – role to play as the market share of DE gradually grows. In OECD countries, the grid can be slowly reconfigured to accommodate this growth. Much of the new DE capacity can serve as network reinforcement and help avoid the need for expensive or unpopular network upgrade and expansion. Increasingly, DE and the grid would support each other.

In non-OECD countries, the grid will not be 'leapfrogged' – much DE needs a grid – but it can be developed in a quite different way, on a more local scale and at much lower cost. So, it will only be the 'grid as we know it' in OECD countries that will be by-passed.

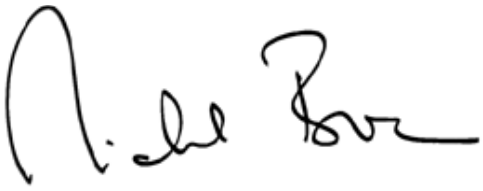
Such grid reconfiguration or development can probably be carried out on an incremental basis to absorb the gentle shift from new-build central power to new-build DE.

Yes, incremental. In most OECD countries, the current market share of DE in overall power generation is less than 10%. With consistently low electricity demand growth rates and mature grid systems, that share would still be less than 40% after 20 years even under a 100% DE (zero per cent central) plant replacement scenario. In other words, change in market shares would be very gradual. In three European countries, the DE market share already exceeds 40% today, thus even an extreme DE scenario is unlikely to pose serious challenges to grid operation. Indeed, grid reliability and security would almost certainly improve. Consumers would have lower bills and better-quality energy.

In non-OECD countries, demand growth rates are higher and the grid is much less extensive. Even so, under an extreme DE scenario, market shares would reach no more than 50%–60% after 20 years. This represents a steady transition rather than a dramatic transformation. In any event, some central power development is inevitable.

In short, a shift to DE would lead to only a gradual impact on the grid because of the slow shift in balance between the DE and central power. Is this really beyond the technical imagination? Unlikely. Nor does it mean a redundant or leapfrogged grid. On the contrary, what is more likely is an incremental evolution of grid operation from today's central system with unidirectional flow, to tomorrow's more optimal system based on a mesh arrangement and multi-directional flow. This transition will require much less long-distance transmission and transformation than we have today in the OECD. Rather, it would involve the gradual growth in use of clean and efficient fossil and renewable DE systems to produce electricity in urban and industrial demand centres at the point of use, with widespread local interconnection between generators and consumers. Non-OECD countries are in a better position than the industrialized world – they would not leapfrog the grid but can configure it quite differently.

So when you next hear doubts about the capability of the grid to accommodate on-site DE, keep in mind the gradual nature of what is involved. The electricity sector is one of the most capable and technically sophisticated industries in the world – it can handle such a challenge.



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