



Can self-sufficiency contribute to regional power trade?

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The question posed in the title is deliberately paradoxical – self-sufficiency must surely always be the enemy of expanding trade in electricity.

Apparently not: self-sufficiency in generation capacity (MW) can be what unlocks political acceptance of expanding trade in electrical energy (GWh).

Regional power trade is very well established in Europe and the Americas, but less so in other parts of the world. This Viewpoint provides perspectives on politically-driven constraints to power trade in two developing country regions.

SAPP Pool Plan 2018

Integrating regional power grids is attractive because it enables countries to meet national electricity demand at lower cost and with higher levels of reliability. There are technical benefits (shared reserves, frequency and voltage stability), operational benefits (importation of the least cost energy available) and planning benefits (such as taking advantage of big projects with economies of scale). The largest economic potential lies in the planning dimension, through savings in generation investment costs and optimising the capacity mix to back up intermittent renewables.

In the Southern African Power Pool (SAPP), previous regional planning exercises stopped at the stage of deriving the least cost generation and

transmission investment plan for the region as a whole. This proved to be politically unacceptable to those countries scheduled to be highly dependent on importation of power.

In the latest masterplan, referred to as the SAPP Pool Plan 2018, the SAPP ‘Security Criterion’ was applied as a constraint. This requires that each of the 12 countries, at the end of the planning period (2040) should have sufficient installed capacity to meet national maximum demand. This still allows for imports of low cost energy from major new hydropower plants on the Zambezi, Congo and Rufiji Rivers, with overall costs being only 2% higher than when the region is treated as one country.

The SAPP Pool Plan 2018 is the first shared regional plan to be adopted by the Ministers of Energy from the region. Priority is to be given not just to the major regional hydropower projects but to transmission inter-connectors. The cost of these is only 3% of the total investment costs, yet they unlock electricity trade options which deliver significant overall benefits for SAPP members.

Pursuing power trade in the Lower Mekong Basin

SAPP’s coordination of regional planning stands as a challenge to other parts of the world, such as the

Lower Mekong Basin (LMB). The countries involved (Cambodia, Laos, Thailand and Vietnam) have a strong inward focus in their national power planning.

LMB does not have an interconnected grid, but it has moved towards integration in a *de facto* approach that is very different to SAPP. The LMB 'model' is one where the importing country, notably Thailand, takes effective control of hydropower projects located in exporting countries. As well as ownership of the projects by the importing country, the export component of the project is electrically isolated from the host power system, giving full control to the importing country. By doing so, concerns over reliance on imports are greatly reduced.

Despite this reassurance, and the incentive of low energy prices, there remains a reluctance among importing countries to become dependent to any great extent on LMB hydro-energy. This is unfortunate, as it means that many smaller projects, where the complex arrangements described above are difficult to implement, may go unrealised. The opportunity is also lost to scale-up the benefits of importing energy (reduced thermal generation costs and avoided greenhouse gas emissions) by taking the additional step of relying on imported capacity (reduced investment in generation capacity).

Economic Consulting Associates was established in 1997 to provide economic and regulatory consulting services to industry and government. Our senior staff have many years' experience of carrying out economic, market and policy analyses in the electricity, natural gas and water sectors.

Deepening regional power sector integration

Both SAPP and LMB can learn lessons for each other on how to promote regional power trade while recognising concerns over self-sufficiency. SAPP shows that a low cost regional plan can be developed that recognises these concerns. LMB shows that joint projects can reassure importing countries about the reliability of electricity supply.

Building on these approaches, within SAPP a confidence-building measure would be for countries to invest in capacity in shared projects outside of national borders. To date, only Namibia has taken this step, financing part of the rehabilitation of Zimbabwe's main coal plant in return for assured supplies of power.

For the LMB, regionally coordinated planning of hydropower projects is being discussed. If realised, this would increase the benefits of hydropower development and provide a means to mitigate the negative social and environmental impacts of hydropower.

In the long-run, of course, the removal of self-sufficiency restrictions on power trade would optimise benefits. But the interim measures identified above, of recognising concerns while pursuing integration, offer a valuable means of moving towards this goal.

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