



Funding Commitments and Implications on Service Delivery
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How much will electrification cost?

- From yesterday, we learned from the World Bank that electrification (i.e. distribution networks) will cost USD xxxbn
 - And that excluded the generation or transmission component
- Alternative options, including distributed and renewable sources, are also not free
- The World Bank has committed some USD400m in loans
- The ADB did not have any specific funding commitments

There is a big gap between expected costs and available funding.
Who will pay?

Typically transmission and distribution assets are highly capital intensive and long lived assets

- This means that the vast majority of the costs are up front
- There are some (much smaller) maintenance costs during the life of the assets
- In most countries:
 - Utilities borrow a very high proportion of the capital cost – from Government at concessional rates if the money is available, or from the private sector at market interest rates
 - The costs are amortised over all the consumers for many years through a tariff
 - It can take a long time to recover all the costs
 - Customers typically all pay the same charge, even if some are cheap to connect and some are expensive: This reflects the overall value to society of having electricity

In the long run, the consumers always pay

It is possible for the private sector to help with electrification

- There are current examples of private sector electrification in India and Philippines, for example
- Historically, this was quite common. Much of the USA, and in Asia, Hong Kong, was electrified by giving private companies geographical concessions
- How does this work?
 - A company is given a concession to electrify a region
 - They build the infrastructure – raising the debt and equity required
 - They make a return over many years by having a regulated tariff that allows these costs to be recovered using defined formulae or regulatory contract

Can this well-defined structure work in Myanmar?

Private sector electrification is not without issues

- The ability to recover costs will be critical to the private sector company
- Tariffs typically require electricity to be sold – if fewer people want to connect and/or use electricity, the revenues may not cover the costs
- There may be some guarantees required about either the demand growth, or about how the tariffs can be raised if the demand is lower than expected
- The tariffs may not be cheap – they would need to recover all the costs, including the costs of the debt and the equity
- And remember – distribution only moves electricity around. It does not create that electricity. If there are shortages of actual generation so that demand cannot be met – who bears this risk?

There may be a useful role for the development banks in helping to structure these processes or provide certain guarantees

And there are now risks that might not have existed when historical Investor Owned Utilities were set up

- Stranding risk
 - The transformational technologies discussed yesterday create a risk that the grid (transmission and/ or distribution) may be stranded
 - That is, consumers may choose to leave the grid and generate their own electricity
 - This is a risk existing transmission companies in the developed world are currently facing and one of their biggest current concerns
- Stranding risk are not just in remote regions
 - Large industry has a long history of building its own onsite generation to bypass transmission costs (and co-generation is efficient and environmentally sustainable too)
 - Household solar and batteries are becoming much more common and cost effective
 - This leaves the “rest” of the consumers to pick up all the costs – places which are too small for their own power station but too large for a rooftop solar solution

Many regulatory frameworks are put in place to prevent stranding
– but this also prevents least cost development if distributed solutions are cheaper than the grid!

Some risks are typically managed using tariff strategies

- Stranding risks are managed by having a higher fixed component of the tariff – that is, a part you pay even if you do not use much electricity
 - It pays for the “backup” component of the grid rather than the optional use component
- The risk of getting a return on investment is lower the quicker the investment is recovered. However, recovering fixed costs over a short period of time means the tariffs are higher
 - Higher tariffs increase stranding risks – the higher the cost of grid-electricity, the easier it is for alternatives to compete

Tariff design, and the regulation of tariffs, is a key component of a successful and fair electrification strategy

There may be a disconnect between an efficiently sized network for the long term and the short term

- It is often cheaper in the long run to build a network capable of supporting larger loads than actually exist at present
- This is to allow for load growth without having to do the grid investment a second time
- However, load growth risk is substantially greater going from a zero load (no electricity) than for solutions that already have some electricity and thus a better idea of the actual final load

Is a “future-proof” sized grid one that allows for load growth, or one that expects grid disconnection eventually?

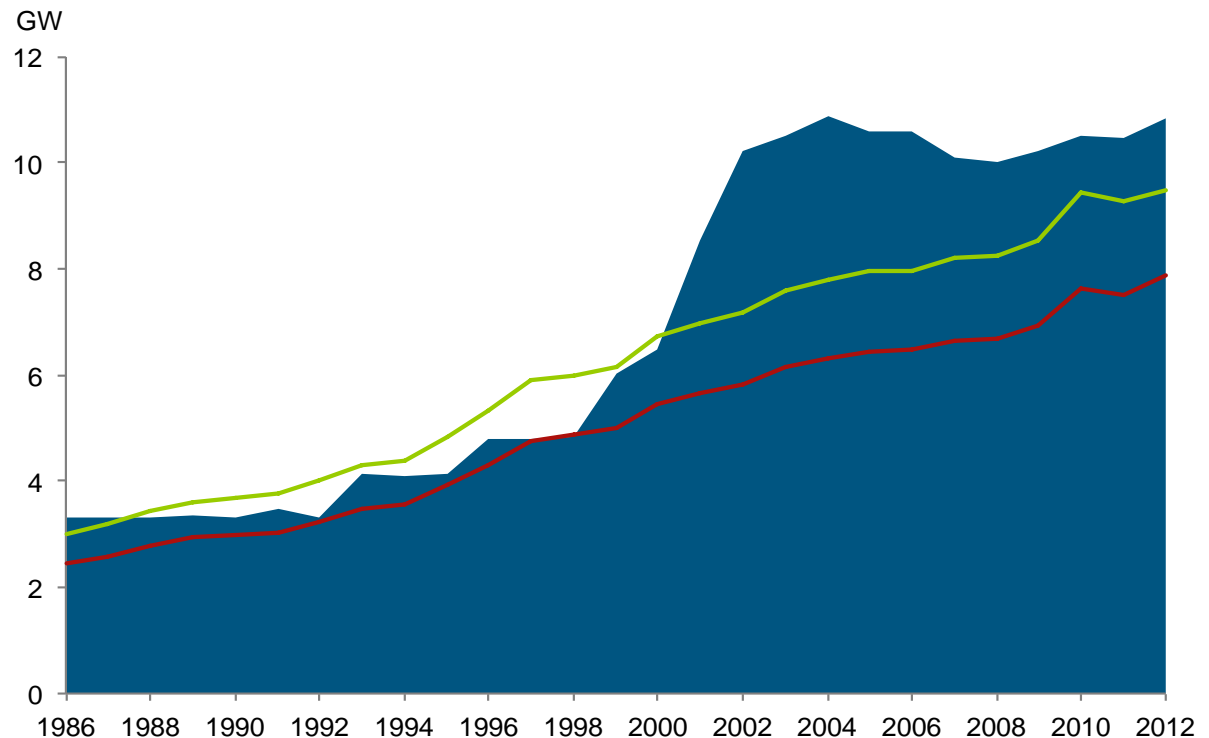
And the best outcomes are when there is some competition... which is difficult in networks

- The risk of stranding is itself competition, but it's a difficult competition for an incumbent to win if they are required to build grids
 - The structure needs to leave some of this risk to ensure the right kinds of connection are built
 - But not too much, or nobody will come!
- There is also the question of whether the utility builds the most efficient grid
- Competition between utilities can help here
 - Competition can be at the start of the process, a competition for the right to the franchise area (as in a tender process for the right to the franchise)
 - And during the period between tariffs – using regulatory approaches that benchmark tariffs to the most efficient utility
- Again, too much competition will deter investment

A balance is needed between the needs of the investor and the needs of the people

And you CAN have too much of a good thing.....

- A key risk of finding a financing solution that works, is that you may end up with too much of it
- Examples include:
 - **Independent power in Philippines:** As I showed yesterday, too much power was procured leading to a very large over capacity that has cost consumers dearly
 - **Renewable policies in a number of countries:** The incentive schemes that were necessary to make “uneconomic” renewables attractive were too generous. Leading to excessive renewable build and high costs for these economies.



“Be careful what you wish for”

Electrification – and the funding of electrification - is not a novel concept: Electrification in an environment of stranding risk is

- To achieve an optimal mix of grid and off-grid development, new thinking will be required and old paradigms updated
- The framework must be designed to allow home-installations; mini-grids, and grid based solutions to compete on a level playing field, such that each area gets the economic development best suited to its situation
- Regulatory and policy frameworks need to be designed so that private sector funding can be recovered but that poorly chosen investments can be excluded from future tariffs, if those investments did not gain prior regulatory approval
- The limited initial funding needs to be focussed on setting up these frameworks and on pilot schemes and/or guarantee schemes to allow innovative new solutions to be created – this is where the ADB and World Bank can help

People power in electrification can also go wrong

- Philippines used a structure of very small co-operatives to electrify
 - Good at the initial level because communities were involved in the electrification process
- However, now those co-operatives are often mis-managed
 - Issues of corruption and skimming funds
 - Poor decision making processes
 - Lack of skills in the individual co-operatives because none of them is large enough to hire skilled staff
- It is very hard to solve these problems because of the way the co-operatives were set up
 - A sensible solution now would be for the co-operatives to merge into larger utilities, but their constitutions make this hard to achieve
 - Their “not-for-profit” nature makes it hard for them to invest in new technology as they are not allowed to raise tariffs higher than costs

Structure that work now may not work for all time

Example of one structure that **may** work: Scheme of Control in Hong Kong

- CLP and HKE each have a franchise area. They are required to supply electricity to everyone in that area and are allowed to charge tariffs that give them a set return on their assets invested
- The key to an SOC type arrangement is that there be the money collectable from consumers to pay for the investment.
- For Hong Kong, with high density of customers, it was relatively easy to build out substantial network on a remunerative basis. Very few parts of HK (outlying islands) have micro-grid solutions but the tariff is the same for all, thus a form of cross-subsidy
- The utility focusses not on individual tariffs but on the sum of what all customers pay to cover the allowed return.
- They have an incentive to identify investments that "make sense" -- the government then approves them and the tariff that goes with them.
- Investment plans are also agreed in advance, so that includes such things as the governments plans for "new town developments" which need advance infrastructure

But any regulatory framework like a Scheme of Control needs to be adapted to the Myanmar situation

- The advantage of the SoC is that it enforced the discipline that electricity adds huge value and that, by and large, a society ought to be able to cover the cost of electricity without gross subsidy, though there may be cross subsidies.
- For Myanmar, care would be needed to define the regions correctly.
 - A private sector company may prefer only to deal with “rich” or “less risky” locations, but everyone needs power. Mixing “good” and “riskier” locations together in franchise areas may allow a balanced tariff across these regions
 - Having multiple private sector providers allows a wider range of capital to be accessed - and it allows for tariff benchmarking - but may also mean different tariffs in different locations if one company has a more efficient approach than another. In Hong Kong, for example, HKE charges much higher tariffs than CLP!
- And a strong, skilled regulator is also needed
 - “Cost plus” regulatory strategies require the regulator to agree that an investment is necessary and approve the costs
 - Without clear frameworks there is a risk of unnecessarily expensive investments being proposed just to earn the allowed return

In summary

- Electrification, whether by grid or off-grid solutions, is not cheap
- Only a small portion of the funding is already in place
- Solutions to fund the rest will ultimately rely on the customer paying
- Those solutions need to be carefully designed to take into account the new stranding risks associated with distributed generation technologies
- Both the private sector and local co-operatives are options, but each has issues and would need to be carefully thought through
- Adopting structures that are identical to other countries is a good place to start, but they need to be adapted for the new environment and the Myanmar context
- To make any strategy work, good policy and a strong regulator are essential. Capacity building and training are therefore needed before the start to get the right outcomes.