Integrating high penetrations of renewables into the Myanmar electricity industry – possible lessons from Australia

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Our 2030 destination

- Ensure universal access to affordable, reliable and modern energy services
- Increase substantially the share of renewables in the global energy mix
- Double the global rate of improvement in energy efficiency
- Enhance international cooperation to facilitate access to clean energy research and technology, and promote investment in energy infrastructure and clean energy technology
- Expand infrastructure and upgrade technology for supplying modern and sustainable energy services for all in developing countries, in particular least developed countries.

(United Nations Sustainable Development Goals, 2015)
Our challenge – the energy trilemma
Choose any two? …. but you may get none

Balancing the ‘Energy Trilemma’

**Energy Security**
The effective management of primary energy supply from domestic and external sources, the reliability of energy infrastructure, and the ability of energy providers to meet current and future demand.

**Energy Equity**
Accessibility and affordability of energy supply across the population.

**Environmental Sustainability**
Encompasses the achievement of supply and demand-side energy efficiencies and the development of energy supply from renewable and other low-carbon sources.

(World Energy Council, The Energy Trilemma, 2016)
The opportunity of renewables

- Still modest contribution to global electricity capacity
- ..but growing rapidly, particularly ‘ex large hydro’
… particularly wind & solar PV

- Falling costs
- Wide suitability wrt resource, societal acceptance

*Possible lessons for RE integration in Myanmar from the Australian experience* (IEA, Renewables Market Report, 2017)

*IRENA, Renewables Sharply falling generation costs, 2017*

*IEA, Renewables Market Report, 2017*
Myanmar & Australian electricity sectors - an ‘order of magnitude’ world apart

Possible lessons for RE integration in Myanmar from the Australian experience
Electricity sector governance too

Possible lessons for RE integration in Myanmar from the Australian experience

(IEA, Reforming Power Markets, 2016)
…but some shared opportunities and challenges, opportunities for learning

- Both old + new energy pathway options
  - Significant fossil fuel resources – coal, gas
  - Excellent renewable energy options, including solar

- Challenges of delivering energy services to remote communities

- For Australia, variable RE penetrations still modest, but focussed
  - South Australian Wind
  - Household PV
  - Off-grid systems

Possible lessons for RE integration in Myanmar from the Australian experience
Facilitating utility-scale variable RE

- Transmission interconnection
- Value of complementary resources – gas, hydro
- Integrated power system operation
- Integrated power system planning
- Support for new players

Possible lessons for RE integration in Myanmar from the

RE support policy – from FiT and Green Certificate Markets to (State govt) auctions

Possible lessons for RE integration in Myanmar from the Australian experience
Residential PV

- Driven by falling PV costs, retail electricity price rises, social change, rejection of existing retail arrangements
- Facilitated by:
  - Early targeted policy FiT
  - Regulatory environment limiting power of incumbent network, retail businesses
  - Present volumetric tariffs that cross-subsidise PV
  - New business entry that reduced ‘soft’ costs of PV
  - ‘Best practice’ technical stnd

Possible lessons for RE integration in Myanmar from the Australian experience
Our energy future – how centralised or distributed? democratised or privatised?

- Some trends towards greater community involvement
  - Embedded networks
  - Community funded projects
  - Solar Citizens political advocacy

- …yet other trends towards greater private participation
  - Greatest PV deployment at individual household
  - Improving options for leaving the grid entirely

Possible lessons for RE integration in Myanmar from the Australian experience
Off-grid supply

- Generally highly subsidised
- PV’s now increasingly competitive as ‘fuel saver’ on diesel grids
- Opportunities for 100% renewables (+storage) on remote grids
- Mini-grids implemented, operated by utilities
  - Growing interest, capability in RE and RE integration although still much to learn

Possible lessons for RE integration in Myanmar from the Australian experience

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(AECOM/ARENA, Australia’s off-grid clean energy market, 2014)
Where next for the fringe of grid?

- Large cross subsidies between urban and rural areas
- Growing interest in opportunities to actually reduce the fringe of grid given improving RE options – both stand-alone and mini-grid
- Potential risks for investment in low density rural dx networks

Possible lessons for RE integration in Myanmar from the Australian experience
Solar home systems

- A key role on mini-grids and off-grid, particularly for ‘access for all’ where additional ‘access’ mostly solar driven


(BNEF, off-grid solar market trends, 2016)

**Figure 2.5** Cumulative population gaining access to electricity and cumulative investment in the New Policies Scenario, 2017-2030

- Grid: 334 billion
- Mini-grid: 29% of total
- Off-grid: 37% of total

*IEA, Energy Access Outlook 2017*
Possible lessons for renewables integration

RE a growing opportunity to address all of our energy objectives

- Utility-scale opportunities - facilitating new entry likely key
  - Resource mapping, relevant electricity industry information, high but transparent and independently assessable connection requirements
  - Value of large geographical tx network and complementary resources
  - Effective integration into power system operation and planning

- Small-scale opportunities – new entry inevitable
  - Regulatory frameworks that restrict controlling power of incumbents
  - Options to increase community participation and leadership

- Off-grid systems – more or less coordinated pathway possible
  - Cross-subsidies represent financial flow that can be redirected to reducing societal costs of delivering energy services to the vulnerable
  - Risk management frameworks have key role
Where next?

"The best way to predict your future is to create it!"

Abraham Lincoln

“It depends…”