



SPREE Seminar

Dr Rob Nicholls

Never Stand Still

Business School

Regulatory issues facing community PV and lessons learned from telecommunications

Agenda

- Motivation
- Access issues in community PV
- The telecommunications environment
- Other access models
- Incumbents' pleas
- Conclusions

Motivation

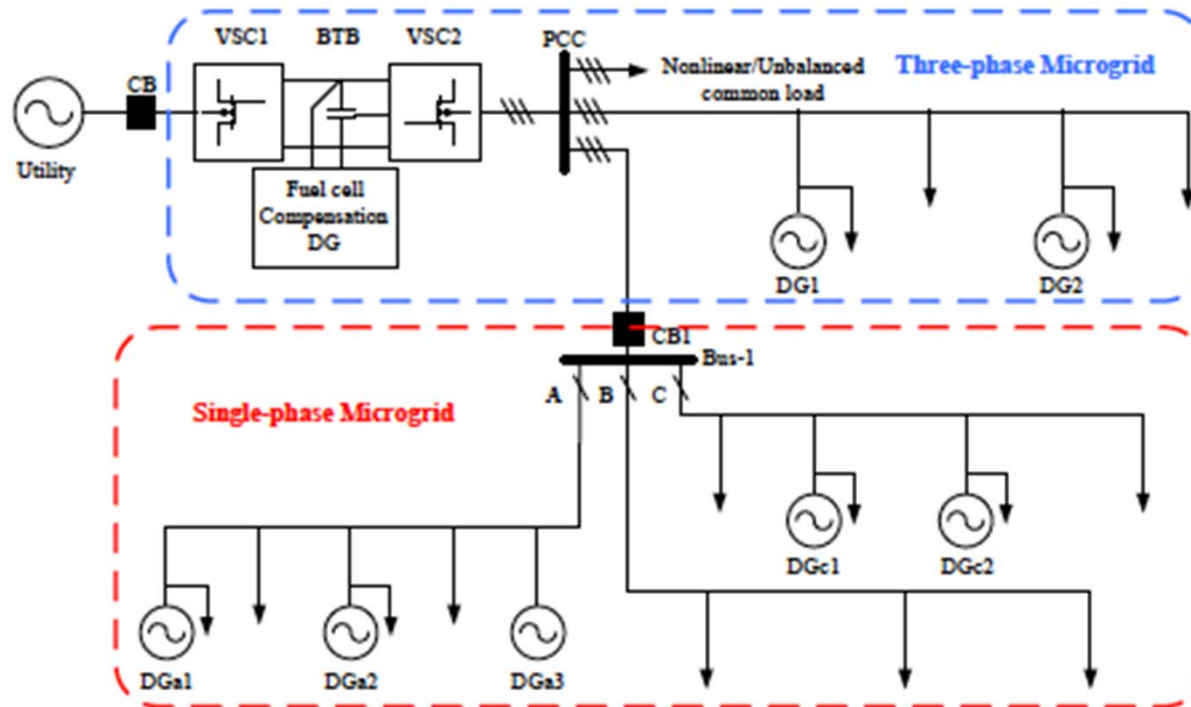
- Storage!
- The very odd assumption by energy companies that feed-in tariffs should be on a per premises basis
- That retail contestability is based purely on services and not infrastructure
- My electricity bill and my community



Access issues in community PV

Concept

- Two forms of microgrid:
 - Single phase
 - Three phase
- Storage distribution:
 - Central
 - Per premises



Q. Sun, J. Zhou, J. M. Guerrero and H. Zhang, "Hybrid Three-Phase/Single-Phase Microgrid Architecture With Power Management Capabilities," in *IEEE Transactions on Power Electronics*, vol. 30, no. 10, pp. 5964-5977, Oct. 2015.

Issues

- Load balancing by phase
- **Closed and open microgrids**
- Reticulation (potentially) of both AC and DC
- All require access to the LV distribution infrastructure
- May require new interconnectors downstream of the sub-station

Regulatory issues

- Current regulatory settings make assumptions about generation, transmission and distribution that centralise generation. That is, a core network is assumed.
- Connectivity on a per premises basis is also assumed (often phase per premises)
- Compare to historical position in telecommunications
- How do you change these settings?

The telco environment

What's the problem?

- Telecommunications networks (like other networked industries) have bottlenecks
- Example is the mobile phone
- Other networked industries include utilities, rail, ports and airports
- Previously government owned as considered a public good and have 'natural monopoly' characteristics
- Issue now is how to get 'workable competition'

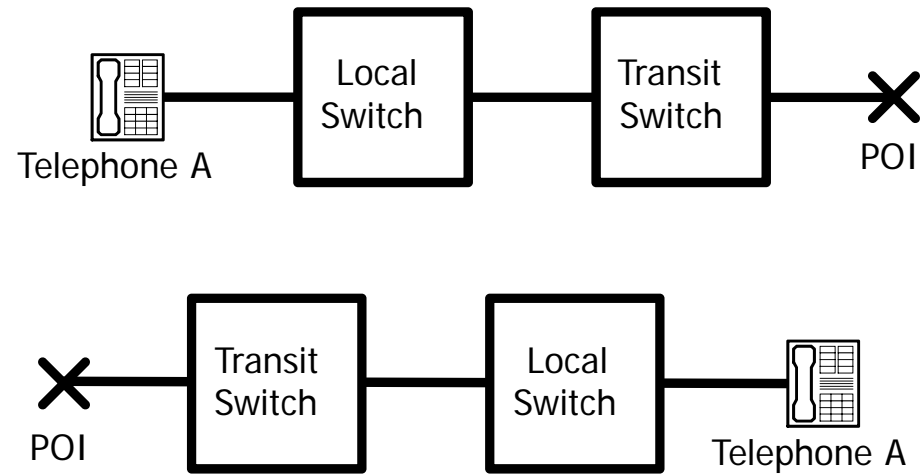
What's the solution?

- Allow potential competitors to get access to the bottleneck infrastructure at a price that allows provider to make a normal rate of return
- In Australian telecommunications, this is done by the ACCC 'declaring' the service under Part XIC of the *Competition and Consumer Act 2010* (Cth)
- In other countries there are reference interconnection offers (c.f. special Access Undertaking in Australia)

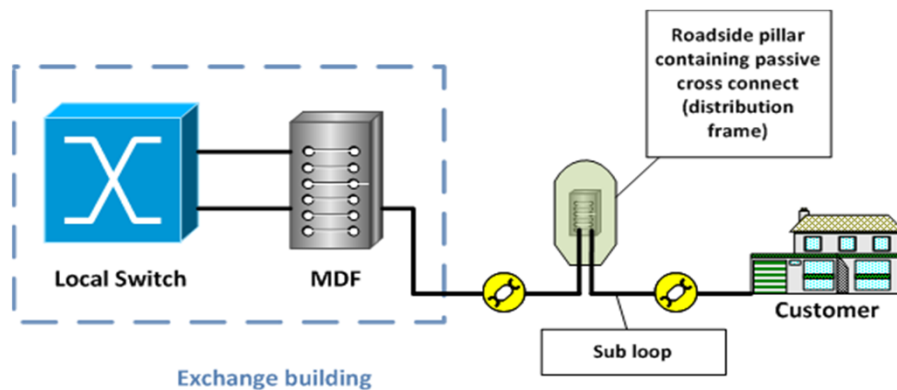
Interconnection in telco

- Definition: Linking of two or more telecommunications units, such as systems, networks, links, nodes, equipment, circuits, and devices that allows for the carriage of traffic across those communication units

PSTN origination and termination



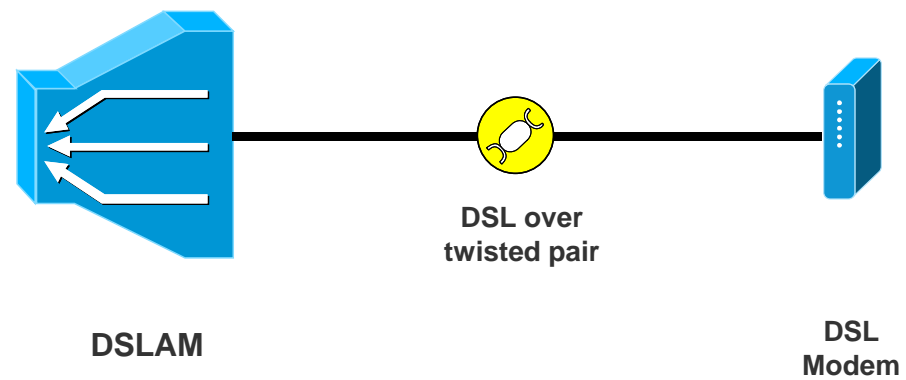
The local loop



Exchange building



DSL, DSLAMs and DSL modems



Cable Modems – Architecture

- HFC – Hybrid Fibre Coax
- Fibre to the node – powered cabinet in the neighbourhood. Coax from the node passes each home and connect homes share access
- For NBN each node typically serves 50 homes (Telstra target was 500 homes passed and Optus 2,000)

Passive Optical Networks

- At the node, downstream wavelength carrying 2.4 Gbit/s is split to homes using a 32 way power divider
- At the node, upstream wavelength at 1.2 Gbit/s is combined from the same split
- The dividers and combiners are passive, not requiring any electronics or power
- Fibre from the splitter to the home

Key issue

- Access regime provides access to either:
 - Services at layer two (end points are physical); and
 - Infrastructure
- The same regulatory regime is used for both

Long-term interest of end-users

- Promote competition
- Ensure any-to-any connectivity
- Encourage economically efficient use of, and investment in, infrastructure
- If a service is declared then carriers must comply with standard access obligations

Other access models

Other access models

- Part IIIA of the *Competition and Consumer Act 2010* (Cth)
- Rail
- Ports
- Airports
- Pipelines

Incumbents' pleas

Incumbent arguments

- The concept of natural monopoly is usually regarded as history in access regimes
- Network safety or network integrity
- Services not infrastructure

Most access regimes in networked industries have gone through these arguments and emerged on the other side – the sky has not fallen in!

Conclusions

Conclusions – tentative

- Designing an access regime to facilitate microgrid deployment is not a novel challenge
- Most of the detailed work, including rising to incumbents' challenges has been rehearsed
- There are specific challenges arising from load balancing – these can be solved at a technical level



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