Defining service as a foundation for transmission investment

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Presentation Overview

- Framework of an efficient market
- Historic Service Definitions
- Benchmarking
- Problems in contracting for new investment
- Design of new Industry Rules
- Proposed Service Definition
- Transpower obligations
- Next Steps
- The Service Delivery Plan
- Issues for further development
Framework for an efficient market

- Co-ordinated spot market
- Bid-based, security-constrained economic dispatch with nodal prices
- Financial transmission rights
- Bilateral schedules at nodal price differences
- Non-distortionary access charges
- Market-driven investment

Framework for efficient investment

- Industry governance with a public good objective
- Efficient marginal cost pricing (nodal prices)
- Non-distortionary sunk cost recovery
- Property rights
- Industry processes & rules must not conflict with public good objective
- Legislative framework
- Industry rulebook
- Price signals
- Industry structure
- Competition where contestable
- Incentives for agents to act in interest of consumers
- Aligned and integrated: SOE Act, Valuation, Price control, Environmental...
Market failures in efficient investment

- Grid owner penalised for efficient investments
- Potential investors may not represent consumer interests
- Industry governance with a public good objective
- Beneficiaries wait for backstop grid investor to build and spread costs
- Cannot Define Service nor allocate property rights in open access grid

Historic Service Definitions

- **1982-98** The “dead grid” model:
  - bundled services - provision of assets
  - very little risk taking
- **1999 onwards:**
  - unbundling of services into Transmission Asset Owner and System Operator elements but no further
  - customer connection contracts deal with provision of an interconnected network, with capability specified at Grid Exit points
  - System Operator services specified in service provider agreements with NZ Electricity Market
Benchmarking

Looked at service aspects of nine international subjects:

- Transmission service is resolved into a number of broad elements:
  - ancillary services, dispatch and other system operator services
  - interconnection
  - connection
- The service definition of those elements often results from wider regulatory obligations
- Performance obligations are broadly limited to “Good Industry Practice” or similar
- Liability limited to direct losses from negligence
Design of New Rules - Part F

- Agree service definitions, measures, & levels for existing transmission service
  - unified definition of terms
  - measures and levels to be incorporated into transmission contracts
  - transmission pricing follows separate, parallel process
- New framework for agreeing changes in service
  - provides structure for multi-lateral agreement where appropriate
  - voting structure prevents “holding out”

Part F can be seen conceptually as a means of delivering market-led investments
Part F of the Proposed Rulebook

• Defines processes to
  – Agree service definitions
  – Set the current level of service against the definitions
  – Provide a delivery plan for system investment to continue to meet the current service levels
  – Agree a change to the existing service levels
    • Increase or decrease in transmission service
    • Install a transmission substitute
    • 75% vote wins the day
    • Public good backstop for unacceptable decreases in service
  – Determine pricing methodologies

Sections 1 and II of Part F works like this:

Section 1

Define and measure current service

Section 2

Deliver current service

Change current service

Payment for current service

Payment for new service
**Process for Agreeing Service Levels**

1. Customers & Transpower agree meaningful service definitions and measures
2. Customers & Transpower negotiate menu of service measures to include in contracts
3. Transpower assesses current service levels against agreed menu of service measures
4. Service component of transmission contract agreed (where contract exists and parties agree or PT&C)
5. Disagree → Referred to EGB for arbitration

**Agreeing Expenditure to meet Service Levels**

1. Transpower publishes draft service delivery plan, including Statement of Investment Opportunities - with underlying assumptions
2. Customers comment on the underlying assumptions of the draft service delivery plan
3. Customers and potential suppliers engage with Transpower on investment opportunities
4. Transpower publishes final service delivery plan
5. Transpower implements service delivery plan, investments protected from ODV bypass risk for 5 years
Service Definition Structure

- Transmission services may be described as a set of service definitions, with associated service measures
  - e.g. for power quality, “Transpower will use reasonable endeavours to achieve service levels which relate to power quality at a point of service”
- For each service measure there will be one or more measurable quantities
  - e.g. deviations outside voltage range during steady state
- Each measurable quantity can have service levels established
  - e.g. +/-2.5%

Proposed Grid Owner Service Definitions

- Connection
- Transport
  - Reliability
  - Power Quality
  - Capacity
  - Security
  - Meet Offtake Demand
- Management of Outages
- Additional Services
Connection

Permit customer’s assets to be connected
• may include SCADA system interconnection

Transport - Reliability

The degree of continuity of the conveyance of electricity at a point of service
• extent of planned and unplanned interruptions
• extent of unserved energy (%) over a year
• extent of momentary interruptions
• provision of information about reliability performance
Transport - Power Quality

Voltage magnitude and waveform shape
- Deviations of voltage magnitude outside operating range
- Step changes
- Momentary voltage fluctuations
- Voltage flicker and harmonics
- Voltage imbalance
- Provision of information about power quality

Transport - Capacity

The maximum rate of energy transfer of assets at the point of service
- Linked to historic service, and valuation process
- Presently dimensioned in MW @ given power factor
- Defined for “normal conditions”
  - all relevant plant in service
  - generation available to be dispatched
- NB: Does not necessarily consider the capacity of the interconnected grid
Transport - Security

The expected ability of the grid assets to convey energy to or from a point of service under various contingencies

- Design redundancy level at point of service
- Extent of planned outages of specified assets
- Extent of unplanned outages of specified assets
- Provision of information about security

Transport - Meet Offtake Demand

Meet demand, while maintaining agreed redundancy and voltage range

- Extent to which:
  - demand is met
  - redundancy levels are met
  - voltage range objective is achieved
- Provision of information about meeting offtake demand
Management of Outages

• Publication of Outage Protocol
• Manage outages in accordance with the Protocol
• Consult with customers before making material changes to the Protocol

Additional Services

• Provision of Special Information
  – power system investigation, analysis & reporting services
• Provision of metering (Part D of Rules)
• Financial products
Transpower’s Obligations

• Covered by general exclusions from liability
• Achieving levels is subject to contract
  – for current services, standard is generally “reasonable endeavours”
  – no provision under current service for compensation for failure to meet levels
• Obligations to achieve Service levels is subject to
  – Transpower’s actions as transmission provider only. It excludes any services Transpower provides it provides as System Operator

Example - exclusions from Reliability service measures

• Factors outside Transpower’s control including:
  – Insufficient generation
  – customer’s power factor
  – rule changes
  – conflict with rules and service level
  – connected parties failing to comply with obligations
  – connected party failing to provide correct information
  – plant or equipment managed by other parties not being available
  – de-energisation under contract or rules
  – lack of local quality agreement.
Service Delivery Plan

- Service Delivery Plan provides a proposed TP strategy for maintaining current service levels over a 10 year period
- Will include TP forecast peak demands by point of service, and other key planning assumptions
- Formulate the plan as a combination of:
  - Forecasting the ability of the grid to meet 10 years of load growth
  - Assessing the ability of the grid to maintain other agreed existing service levels by comparing quality and performance statistics against contracted service levels at Points of Service.

Service Delivery Plan (cont’d)

<table>
<thead>
<tr>
<th>Quality</th>
<th>10 Year Security</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performance Forecast</td>
<td>Forecast</td>
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Service Level and Measure

System Adequacy Guidelines

Service Delivery Plan

Regional Plans A to Z

Adequacy Issues:
- capacity
- security levels

Quality and Security Issues:
- voltage
- interruptions
Service Delivery Plan (cont’d)

• Process to Develop the Service Delivery Plan:
  – Segment NZ into regions (either geographical or electrical)
  – Write a plan for each region & publish for consultation
  – Include a statement of opportunities for each region setting out
    required investments to meet identified deficiencies:
    • Transpower’s preferred option
    • Estimated cost of preferred option
    • Estimated transmission pricing for preferred option
    • Date for committal to preferred option
  – Transpower receives 5 year valuation shield for investments
    committed in accordance with this process

Issues for further development

• Develop measurements and levels for aspects of the service
  for which there are no current measures and/or levels defined
• Respond to customer requests for a “point-to-point”
  transmission service
• Respond to customer requests to move beyond the
  “reasonable endeavours” standard, and for compensation for
  failure to meet service levels
• Develop the Service Delivery Plan process in accordance
  with the Rules
• Develop pricing methodology for current and new services
Current Status

• Multi-headed regulation on transmission service standards is looking probable.
• Industry Rules to be put to referendum (not likely to succeed).
• Government impatience with the industry is significant.
• Government may move to appoint crown governance board.
• Crown governance board likely to adopt operational areas of the proposed rules (includes Part F).
• Work on service definitions is on hold pending resolution of governance structure.