Commerce Commission

Capital expenditure modelling

Nick Russ, James Marshall

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Overview

We will discuss the options for using capital expenditure modelling as part of the regulation of network businesses

- Why the performance of the downstream energy sector matters
- Our role in monitoring and influencing the performance of electricity network businesses
- Importance of asset management
- Examples of capital expenditure models
- Capital expenditure models in the New Zealand context
- Summary
- Questions

Why the performance of the downstream energy sector matters

Power prices heating up again

The average Hawke's Bay/Wairarapa power bill jumped more than $108 in the last year — $36 above the national average rise.

Grey Power warns the latest price increases will make life even tougher for local residents struggling on fixed income pensions.

based on an average household using 8000kWh per annum — close to the nationwide average residential consumption.

The general increase

they can't pay their

Despite

insulated heating, and not the day, r own nth —

Power price set to rise even mor

New Zealanders face power bills up t

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Gloria Ruru, from Nelson, said her family's monthly power bill now up to $500. That was the budget.

from the University of Housing and Health Res Programme found that the ber of New Zealanders expe ing "fuel poverty" rose cent in 2003 to

Power drives inflation rate

Rise of 5.2% in electricity prices largely blame cost of transmission and distribution

Brian Fallow economics editor
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Electricity prices were a c spicuous exception subdued infla reported

As mea price

Power struggle

Power bill jumps by $107

Average household's

making record profits

their bills so

LAUGESEN

By Teuila Fuatai
news@hbtoday.co.nz

The average Hawke's Bay pow bill jumped by $107 this year — some households are forking $250 more than in 2011.

Power price rises have chilling effect

By Teuila Fuatai, Brendan Manning and Matthew Theunissen

People are suffering from "energy poverty" and switching off their electricity to save money as new figures reveal power bills have risen an average of $65 in the past year.

The Ministry of Business, Innovation and Employment's Quarterly Survey of Domestic

of power retailer Powershop, said the increases were being driven in large part

Electricity prices still on way up

consumers urged to shop around

The big chill

Electricity prices are having a chilling effect on vulnerable consumers.

Power price increase likely for most regions

Matthew Backhouse

Auckland

Aucklanders will a year on their po other regions coul monopoly prices Commission.

The regulator decision on pri quality stan

Mike Watson
TAUPO

by 3%, or an estimated saving of $2.10 a or $25.20 a year.

by 10 per cent next year, with a further price adjustment in 2014.

The company and seven other parties are appealing before a High Court judge independent experts through a

Holiday-home owners get bolt from bill

owners hit with line-charging and devious ver sunsets has

and applied to each month throughout the year.

"I don't understand how they have done it but the company had taken the highest reading

said the rate was not accurate for calculating peak consu

"It's unfair

Power bills give aged cold

By Cassandra Mason

Northland pensioners face a grim winter of hardship after average power bills jumped $66 the last year — and the region the biggest power price rises the past five years — Grey warns.

Power is trying to negonational deal for cheaper for its 64,000 members ports some elderly are ing their homes because pensive.

Ministry of Business, and Employment's Survey of Domestic shows residential in all regions the year to May, Dunedin to $182.36

secretary Dorothea Johnson said the outlook for Northland's elderly was grim.

"You have to look at power prices alongside everything else that's going up, like petrol," Mrs Johnson said. "It's being compounded all the time and we've just had one hit after another."

Power companies were putting a lot of pressure on Northland's elderly to change suppliers, and most offered deals that were not "honest", she said. But the proposed discount power deal would mean lower prices for all Grey Power members.

"It is difficult for all us elderly. It makes you watch

the last year. ity chief exec said more pe power comp greater awar from retailers

Grey Powe project is hea office, which bers to avoid term contract the deal. Nati Reid said the commercially was unable t company inv make an ann next few days

Mr Reid s time Grey P negotiations

Feeling the chill

Some households may be forced to go without power this winter.

REPORT: JESSICA WILSON

Over 40,000 households had their electricity cut off last year, almost a third more than in 2011. Some of these households may find it hard to get back on the grid. Electricity companies can refuse to supply customers who've had difficulty paying their power bills and some companies are doing just that.

Electricity and Gas Complaints Commissioner Judi Jones says her office is aware of cases where companies have refused to supply consumers who've had past payment problems. Legally, the companies aren't doing anything wrong because they have no obligation to supply.

– just over one percent of its domestic customer base – between July and September 2012.

Pulse Utilities, majority-owned by Buller Electricity, had the highest rate of disconnections with three percent of its customers cut off (see our Table).

Some households facing disconnection are likely to end up on pre-pay meters. These meters can help with budgeting but pre-pay rates are usually more expensive than standard rates and customers can pay hundreds of dollars more each year for their power.

In areas where pre-pay meters aren't

Rural customers would be hard hit by electricity line charge increase

Electricity lines charge increases would hurt rural customers says Rural Women

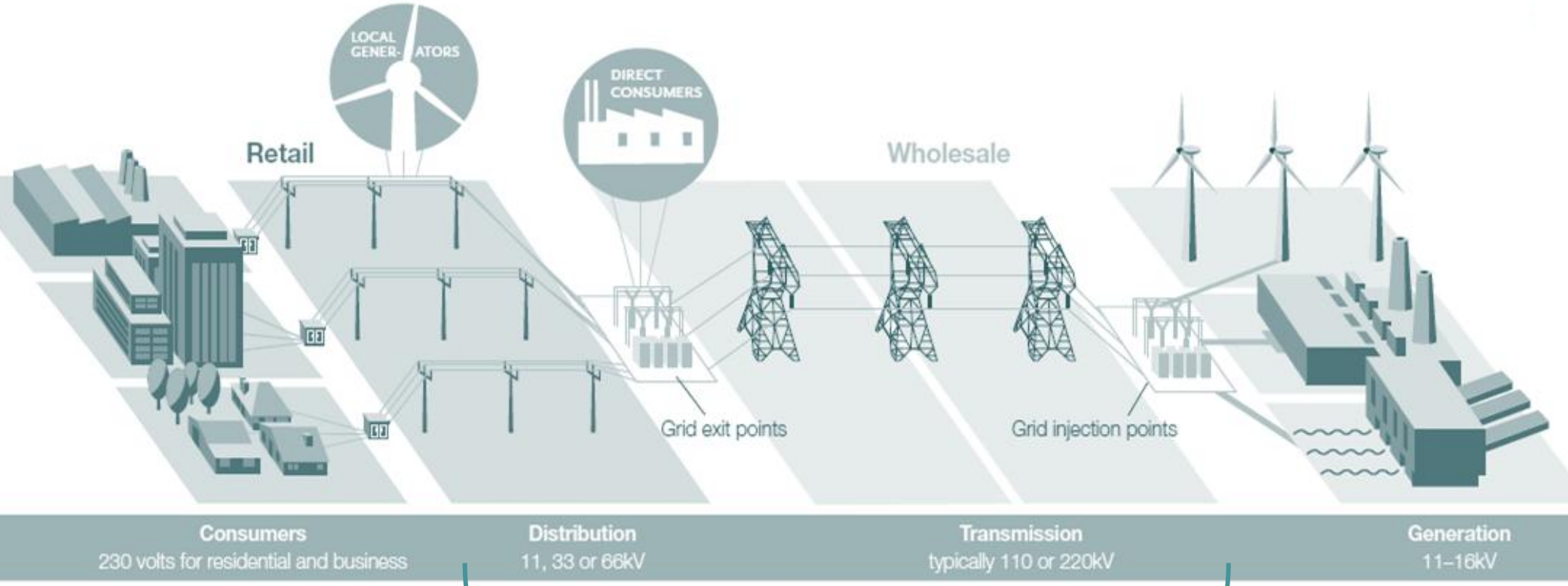
by as much as 15 percent next year, with further rises down the track."

Any increases would have an even greater impact in rural areas.

"Rural householders are disadvantaged because of live and work."

to be watchful for any announcement that their lines company intends to consult on its price path, as this could signal they wish to raise prices above what the Commerce Commission determined.

"Lines companies are allowed to request that the Commission sets a "custom price path" if they think be allowed to higher. But



29 electricity distributors and **1** transmission business

31% of the average domestic electricity bill

$13.6b assets

$3.0b revenue

Major gas leak cuts supplies

Power grid security strategy not yet proved

JASON KRUPP

THE auditor-general says Tra
power's efforts to bolster the sec
electricity g

Power cut

ctricity was knocked out to
out 70 homes at Otaki Beach la
ht after a fault in a high-voltage
cable. Volunteer firefighters
attended a small brush fire on
uru Rd near a power pole at
by resident said he
caused b

Huntly power cut culprit foun

James Weir

THE cause of a mystery fault that surged to a peak of $20,000 a mega-
cut electricity to more than 200,000 watt hour on the day, that only
across the North Island plied to a half-hour period in
onth has been identified area, and prices came
cording to national grid from that level qu
spower. said. The Elec
ut to homes and busi- The
orthland to Lower the wh
r 13 and the North rem
n seconds of total

Power cut to Wellington

aken a $3.8 billion upgrade,
ed on a "security of supply work, mane
m". The grid design and Tran- in terms of cos
lanning had now reduced and
isk of failure, Scott

Fury at 'unnotified' power cut

head of the
formance Audit Group,
said the firm had com
since a damning 2011
That investigatic
while Transpower manage
porate risks well, it found poor p
tices when it came to managing the
condition of grid assets.
of a n
which manages However

Power outage leaves businesses in the dark

Maui gas outage threatens North and industry

POWERLESS

The Storm of 2013 reduced Wellingtonians to despair last week – but for about 200 homes it isn't over yet. Today they're still sitting in cold houses, food defrosting in freezers and unable to turn on the lights. **Alex Fensome** and **Katie Chapman** investigate why it's taking so long to restore electricity to every home in the capital city.

YOU'D think they'd never seen street lights before. This week, Wellington residents who'd spent days without power danced in their streets with

taking longer than anyone would like – but he also says compensation for those worst affected is unlikely, and even suggests people might want to look at buying generators, rather than relying on the infrastructure to get them through.

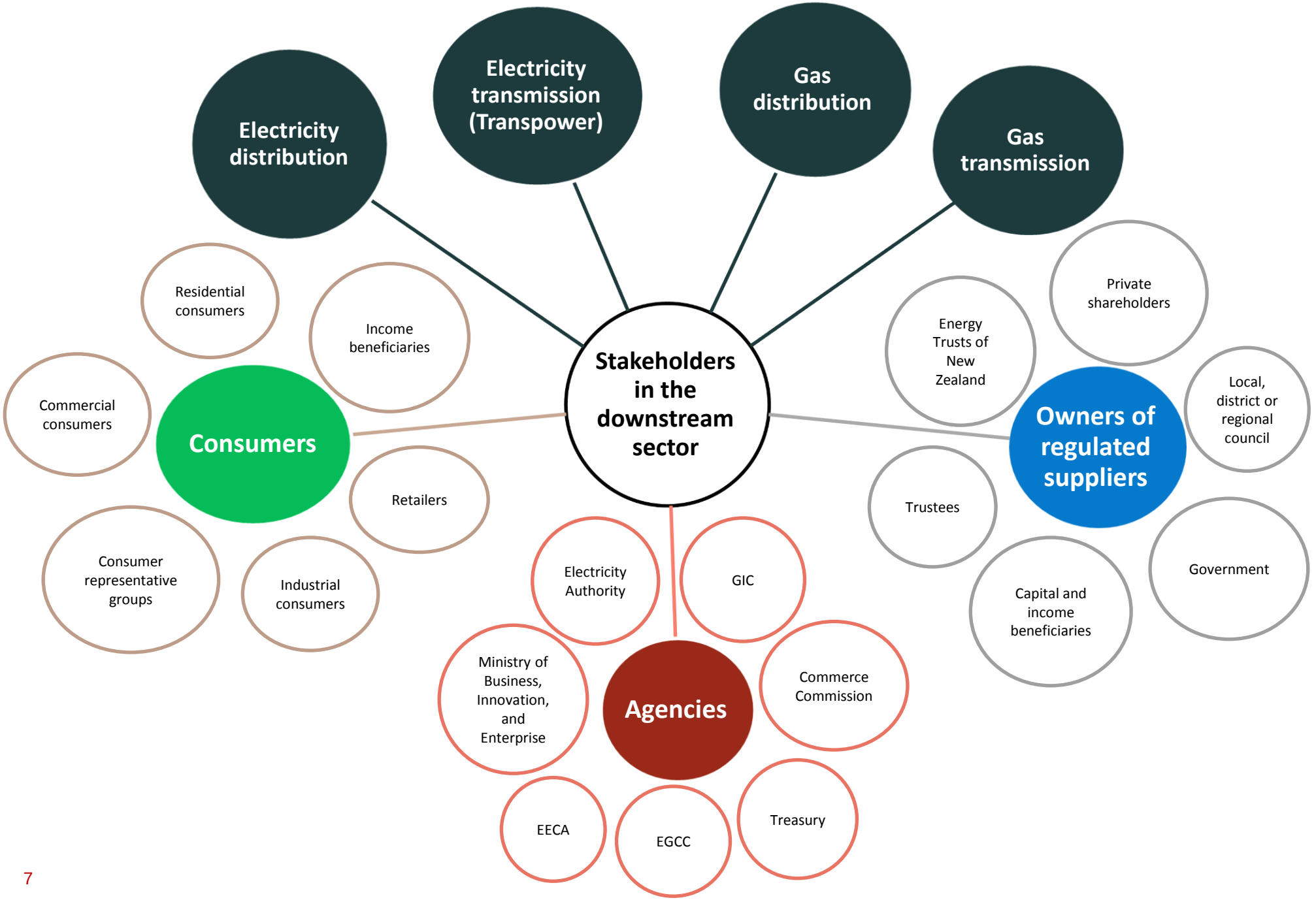
Electricity explained that it can handle winds between 100 and 120kmh, but when they start getting higher, the network begins to struggle.

While single gusts were bad, in this storm the maximum 10-minute average gale-force winds at Wellington Airport were

700 still without power in Taranaki

WANGANUI — Powerco has restored power to another 600 properties, despite

conditions and Powerco greatly appreciated the efforts.


Electricity distribution
Electricity transmission (Transpower)
Gas distribution
Gas transmission
Stakeholders in the downstream sector
Consumers
Residential consumers
Income beneficiaries
Commercial consumers
Retailers
Consumer representative groups
Industrial consumers
Owners of regulated suppliers
Private shareholders
Energy Trusts of New Zealand
Local, district or regional council
Trustees
Government
Capital and income beneficiaries
Agencies
Electricity Authority
GIC
Ministry of Business, Innovation, and Enterprise
Commerce Commission
EECA
EGCC
Treasury

Our role in monitoring and influencing performance of electricity network businesses

Our role in influencing performance

Role of regulation is to promote the long-term benefit of consumers of regulated services

- Needed in markets with little or no competition, for example natural monopolies

Regulation used to create incentives designed to promote performance consistent with the interests of consumers

- This is consistent with outcomes in competitive markets

Tools for creating incentives

Price-quality regulation

- Individual price-quality path (IPP) for Transpower
- Default/customised price-quality paths (DPP/CPP) for other suppliers

Monitoring and reporting on sector performance

- Information disclosure (ID)
- Summary and analysis

Compliance activities

- Price-quality regulation
- Information disclosure regulation

Understanding performance

Performance is a complex, multi-dimensional concept:
there is no single measure

- Challenging task to develop suite of overall performance measures
- Any performance measures need to reflect what consumers value
- Our view is that performance is strongly impacted by suppliers' asset management capability

Our priorities

Developing a shared understanding of performance

- One objective is a suite of high-level performance measures
- Starting point is information disclosure

Continuing to focus on targeted areas

- What are the biggest knowledge gaps or concerns about specific areas of performance

Are there knowledge gaps or concerns about the past and/or forecast levels of investment?

Importance of asset management – the right investment at the right time?

A key aspect of performance is asset management

Efficient investment is one of the key aims of asset management

- The right investment at the right time?
- Which companies investment requirements are expected to increase compared to recent history? (wall of wire)
- Has past investment been too high or too low?
- Has investment been undertaken in the right areas? (risk based)
- What are the available options for monitoring investment efficiency?
- What can we learn from other countries?

How do stakeholders know efficient investment is taking place

Options for evaluating performance include:

- Monitor performance (i.e. lagging indicators)
  - Analysis of performance data from information disclosure
- Review of processes
  - AMMAT scores under information disclosure
  - Balanced Scorecard approach
- Modelling approaches
  - Birthday models
  - Age-based survivor models (AER)
  - Augmentation models (AER)
  - CBRM (EA Technology)
  - Transform model (UK)

Examples of capital expenditure models

Overview of capex models.

- Capex models developed and used by a number of regulators internationally
  - Most commonly used as part of the price setting process

- Number of ways in which they are developed and applied
  - Set capex allowance directly
  - Used to set a threshold for further review
  - In both cases, usually applied alongside technical (engineering) advice

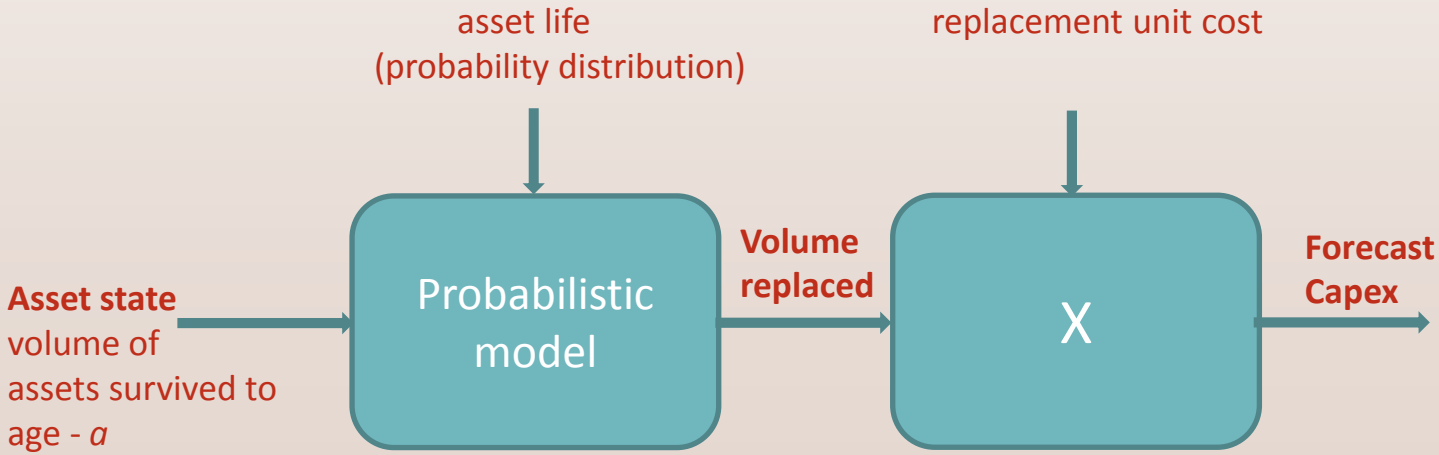
- Can also be used to simply assess forecasts
  - In NZ, likely to be used for summary and analysis in the first instance

Choice of techniques

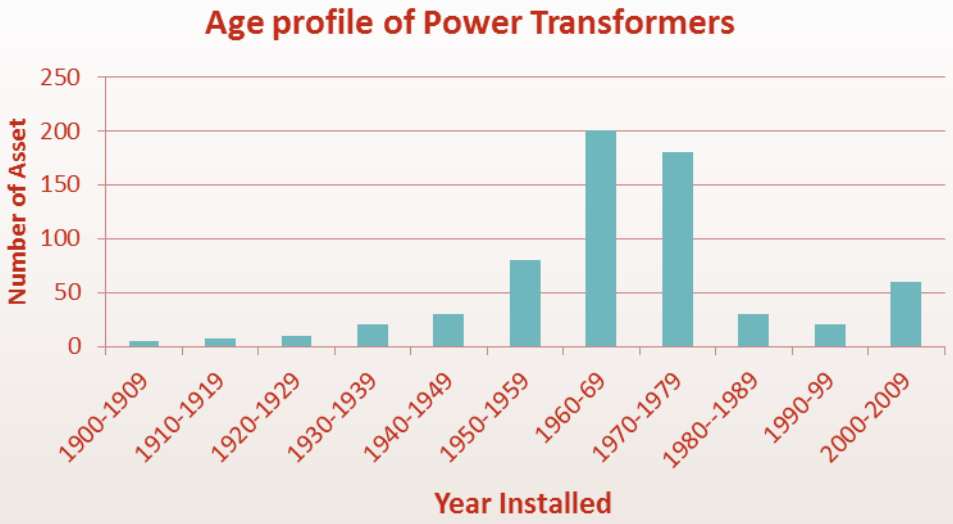
- Usually expenditure disaggregated
  - Load related/non-load related expenditure
- Simple high-level models
  - Steady recurring expenditure/run rate analysis
  - Simple forecast volume * unit cost
- Bespoke models for high value activities
  - Asset replacement & renewal (usually age-based survivor models)
  - System growth (capacity models)
- Type of modelling and analytical technique depends on a number of factors
  - Materiality of the expenditure
  - Data availability and quality
  - Ability to benchmark
  - Resources and time available to the regulator
  - Previous approaches (ie at past resets)
  - Maturity of the regime

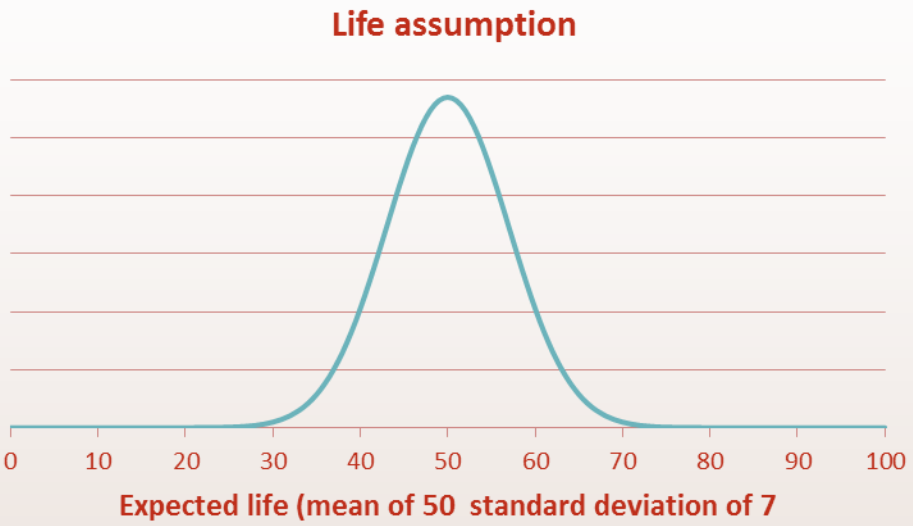
Age-based survivor model

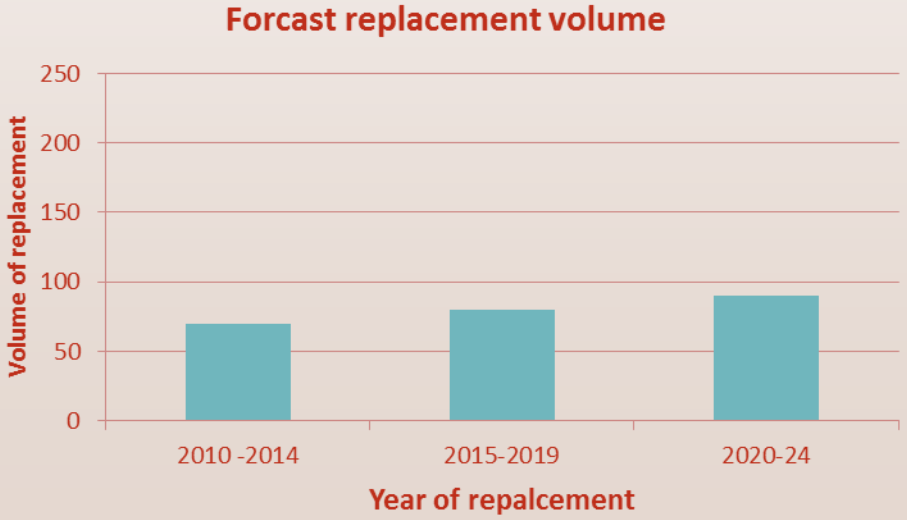
- Has been used by both AER (Australia) and Ofgem (UK) when forecasting asset replacement & renewal
  - Age-based model but not as simple as a 'birthday model'
  - To account for variations in lives, a probabilistic asset replacement life is used
  - Tuned to historic expenditure and volumes

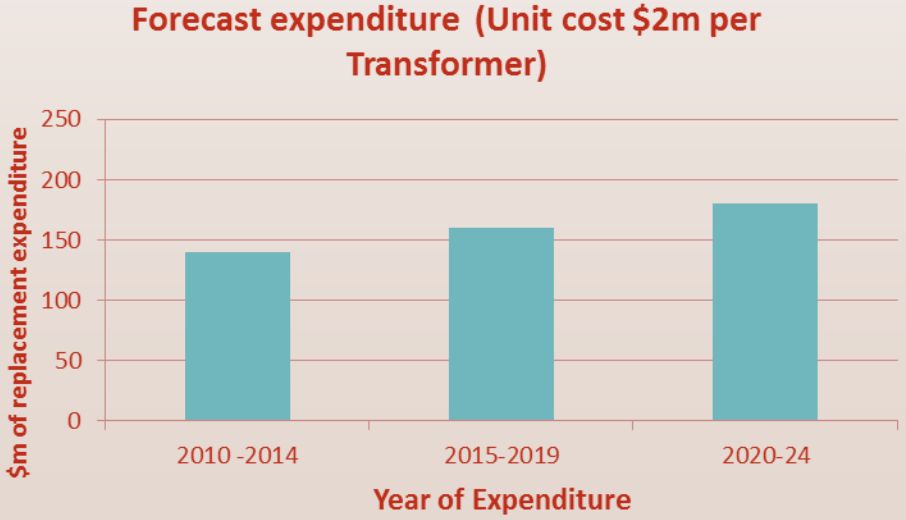


Age-based survivor model









Capital expenditure models in the New Zealand context

Development of capex models in New Zealand

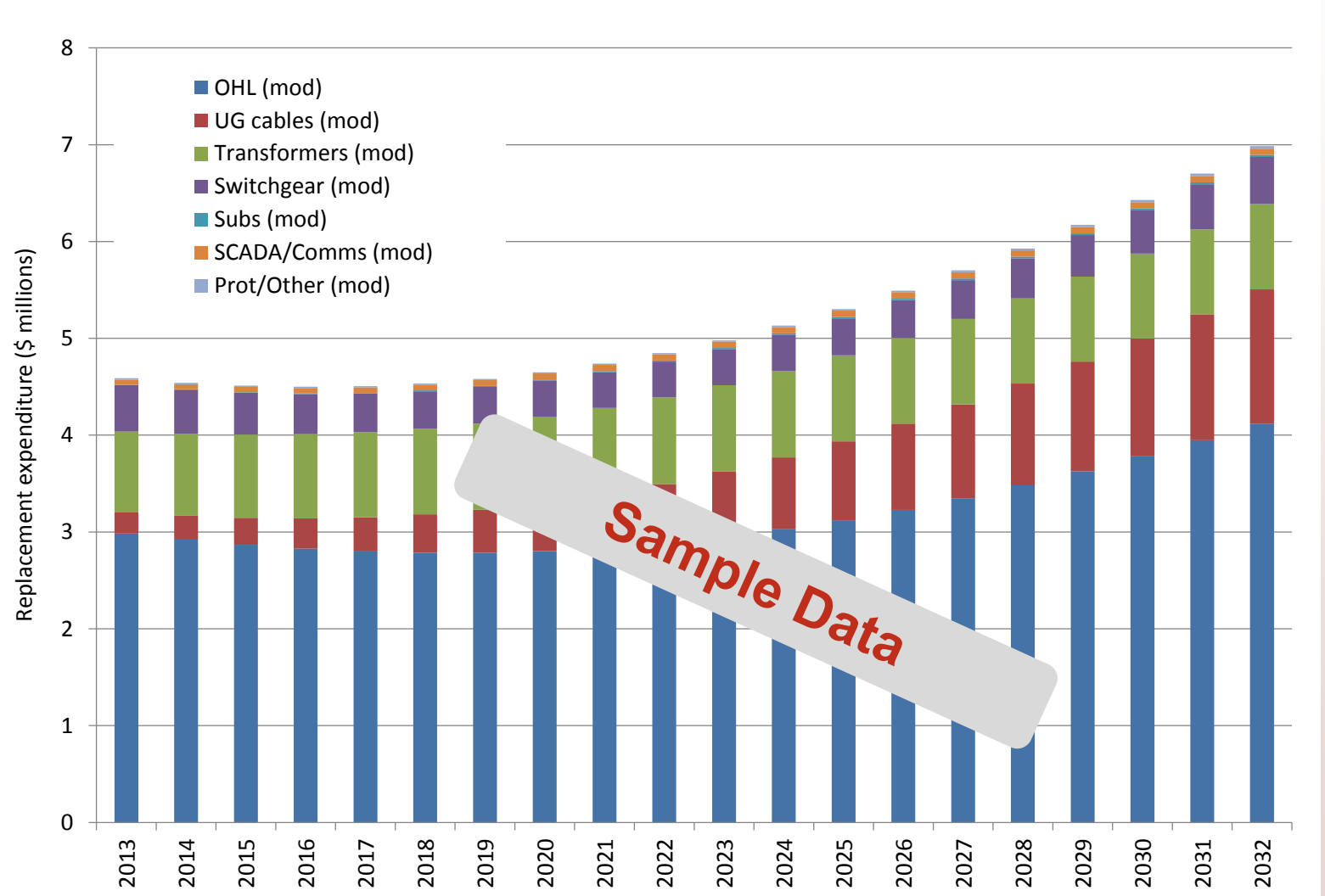
Context of a low-cost regulatory regime

- Simplistic approach
- Is not intended to replicate detailed bottom-up engineering forecasting
- One element of the regulatory toolkit at our disposal
- Part of summary and analysis in the first instance
- Ultimate intention is to use it in DPP price-setting process
- Also helpful for other stakeholders?

New Zealand current status (age-based survivor model)

- Area of current focus
- Largest element of capital expenditure is on asset replacement and renewal
- Some modelling undertaken for the Commission in 2007 by Farrier Swier – high level conclusions
- Intention to use the AER published 'repex' model for any further analysis
- Data issues will be the main constraint
  - Asset age profiles and unit costs
  - Some data available under ID
  - Further information from EDBs would improve accuracy
  - Refined over time

Age-based survivor model (example)



New Zealand current status (other modelling techniques)

- Augmentation model
  - Comparing utilisation thresholds of individual assets with forecasts of maximum demand growth in order to identify areas of a network that are expected to require reinforcement
  - AER has developed augmentation model – use in New Zealand would require greater accuracy in utilisation data
- Condition Based Risk Management (CBRM)
  - Uses asset condition data to optimise replacement
  - Model available commercially from EA technology
  - Model of this type is a longer-term goal
- Transform model
  - Developed in UK as an investment model to determine benefits of smart technologies
  - Identified by NZ Smart Grid Forum as modelling tool to estimate optimal cost solutions for future network development

All modelling approaches would require input from suppliers

- Collaborative effort
  - We are keen to work with EDBs and use available expertise
  - Development of an appropriate modelling approach would benefit all parties

- EDBs can assist by:
  - Sharing expertise in network modelling that could be used at a high level by a regulator
  - Providing appropriate data that improves modelling accuracy

- Stakeholder impact is vital for successful development of capital expenditure models

Summary

Improved understanding of performance could be helped by undertaking capital expenditure modelling

- The Commission has an important role in monitoring and influencing EDB performance
- Capex models can help in evaluating asset management performance and ensuring appropriate investment decisions
- Age-based survivor model in the first instance
- Appropriate level of detail for its role as a regulatory tool
- More sophisticated techniques may follow
- Stakeholder input is vital
- May also be useful for other stakeholders

Questions?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Car Wash
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