Transmission 2040
Grid Development Strategy

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GM Grid Development

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Contents

- The planning process - general
- Long term transmission planning
- Objectives of today
- Next steps

Planning

- Everyone is doing it – or should be
  - Councils
  - Government
  - gas
  - water ……
  - we also do it for the ***transmission grid***

Planning assumptions

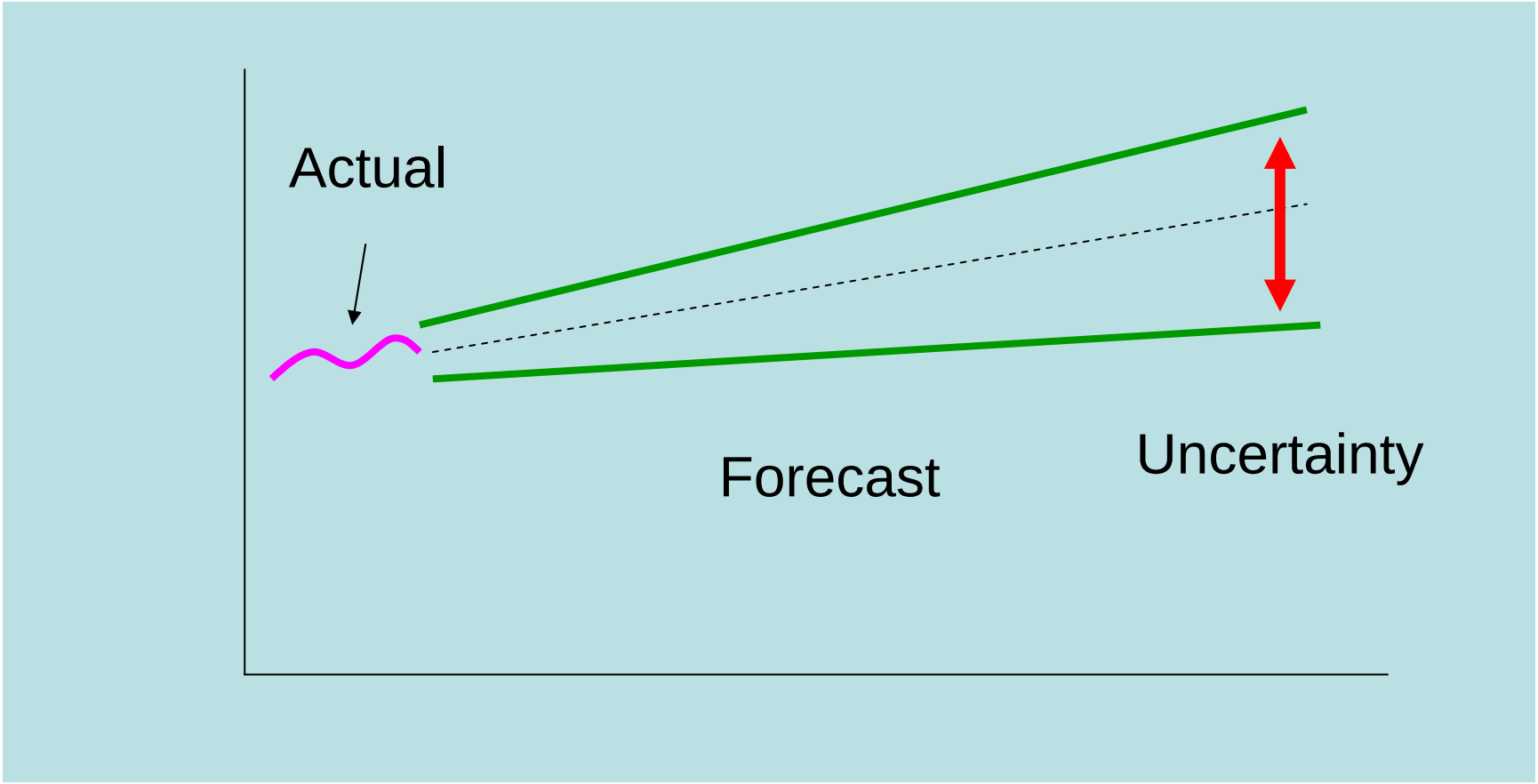
- Forward plans are based on forecasts
  - Forecasting entails ***uncertainty***
- Scenarios are used manage uncertainty
  - Population growth
  - Economic out-turns
  - Technology change
- Make the best decisions on available data
  - Worst outcome is to make ***no decision***

Time frames

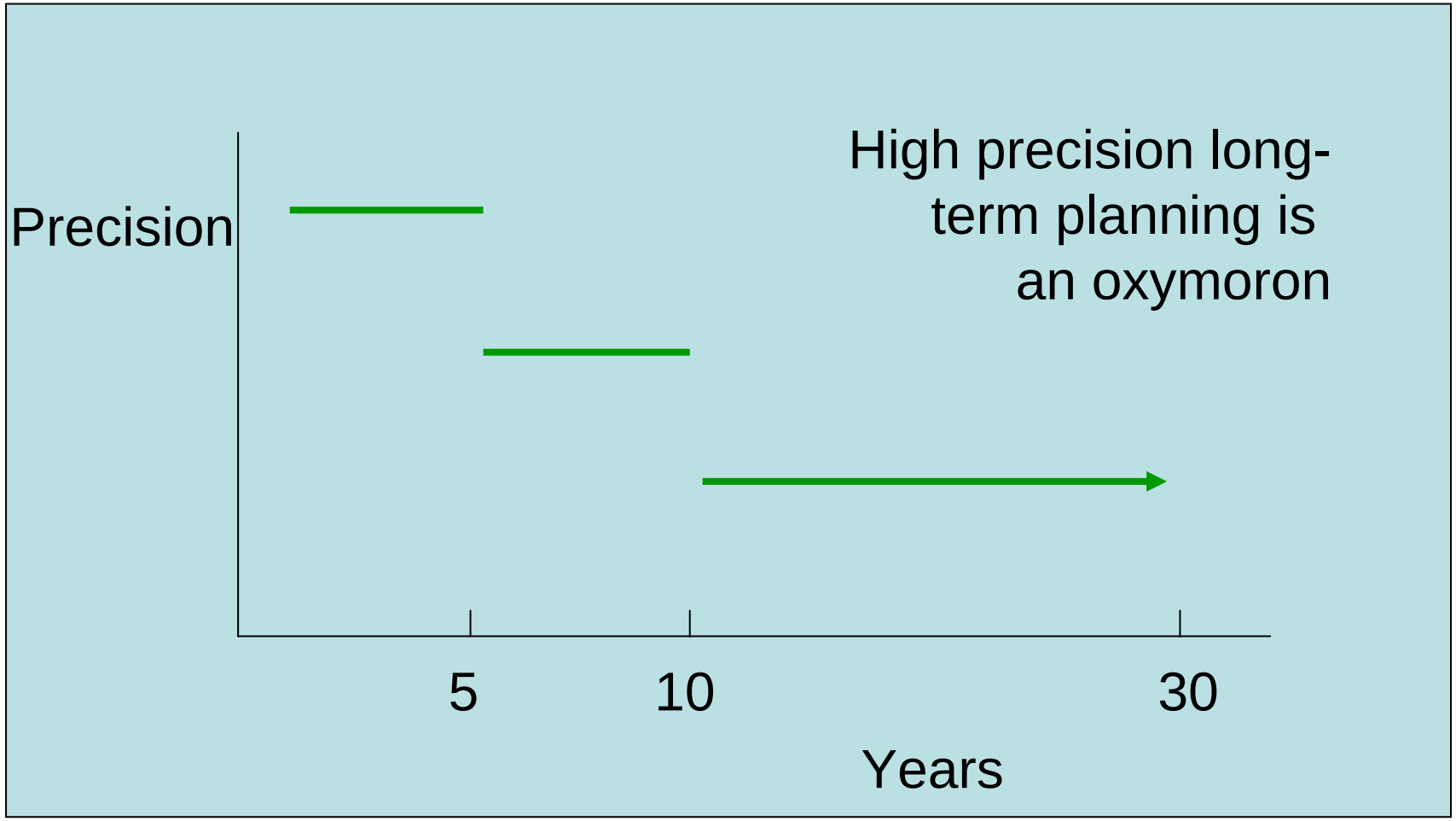
- Takes time to build infrastructure
  - Roads – decades
  - New transmission lines – 5 to 8 years
  - Transmission upgrades – 2 to 4 years

- Usually develop a suite of plans:
  - Short-term – next couple of years
  - Medium-term – 5 to 10 years
  - Long-term – 10 to 30 years or more

Planning horizons



Planning detail



Planning issues

- BANANAs and NIMBYism
  - Infrastructure often comes at a cost
  - Not everyone will be happy
- Net benefit trade-offs
  - Economic benefits outweigh costs
- Trends and hypotheticals
  - ‘past performance is no guarantee of future ..’
  - Distributed generation will solve all of our problems …
- Markets ……..

Transmission planning

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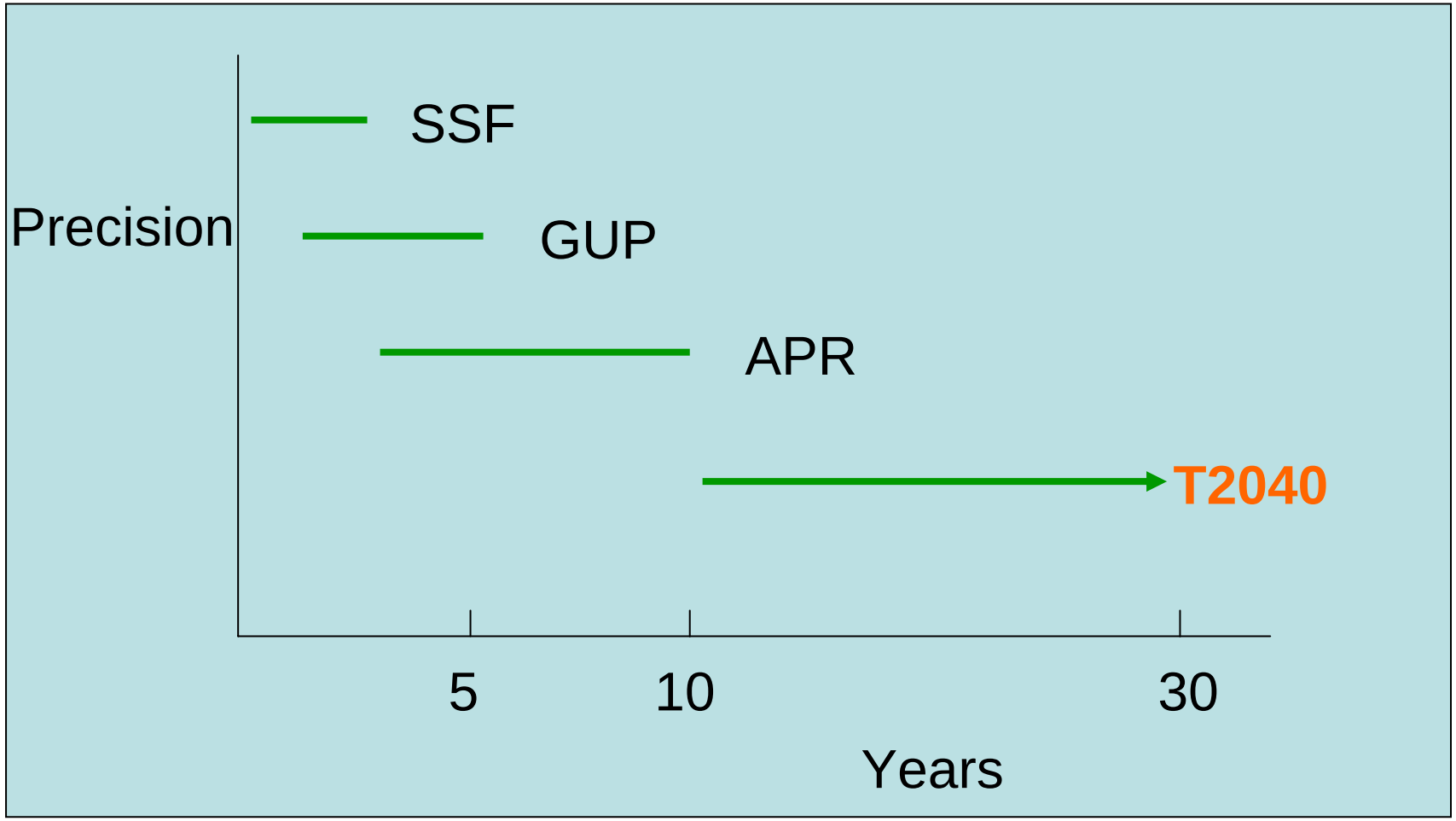
Transmission planning processes

Short, Medium and Long-range Planning:

- 0 to 3 years – **System Security Forecast**
  - System Operator's plans to manage existing system
- 2 to 5 years – **Grid upgrade Plan**
  - Several projects submitted each year
- Up to 10 years – **Annual Planning Report**
  - Issued annually
- Up to 30+ years – **Long term plan – T2040**
  - About every 5 years

Planning phases

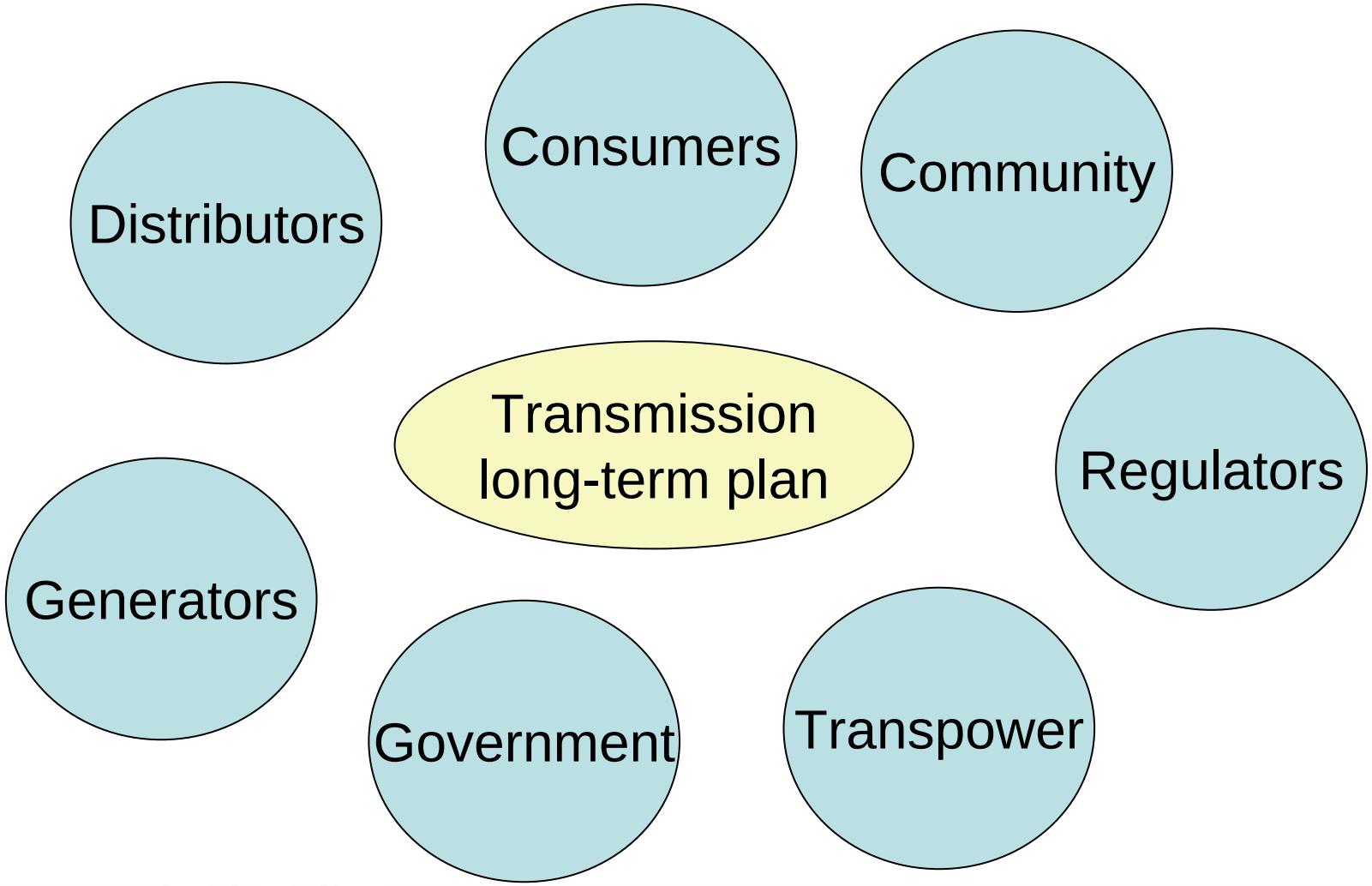


T2040 Objective

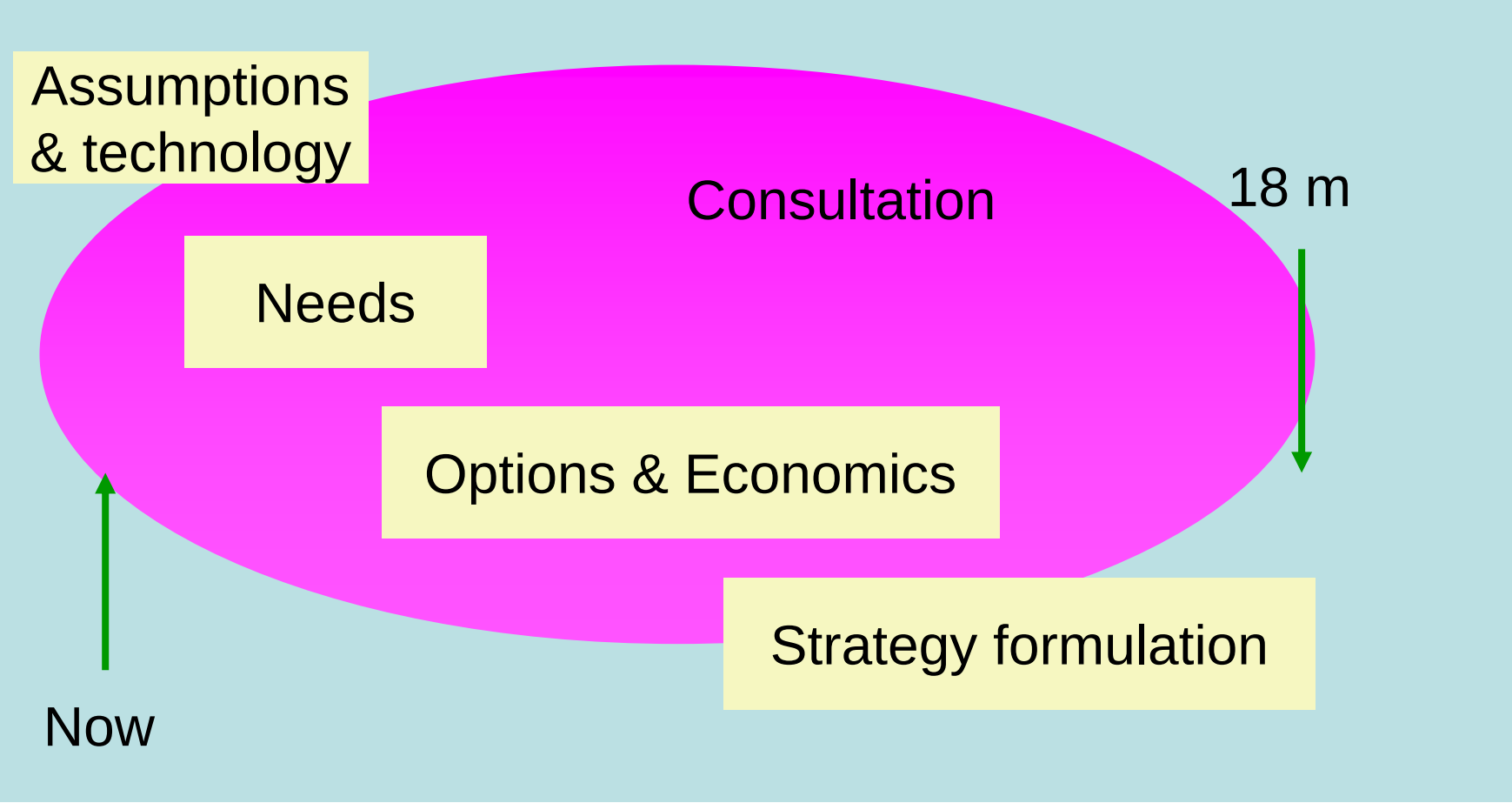
Form a ***long-term transmission plan*** taking into account:

- recent forecasts and scenarios;
- long-term technology trends; and
- New Zealand's future social, environmental and economic requirements.

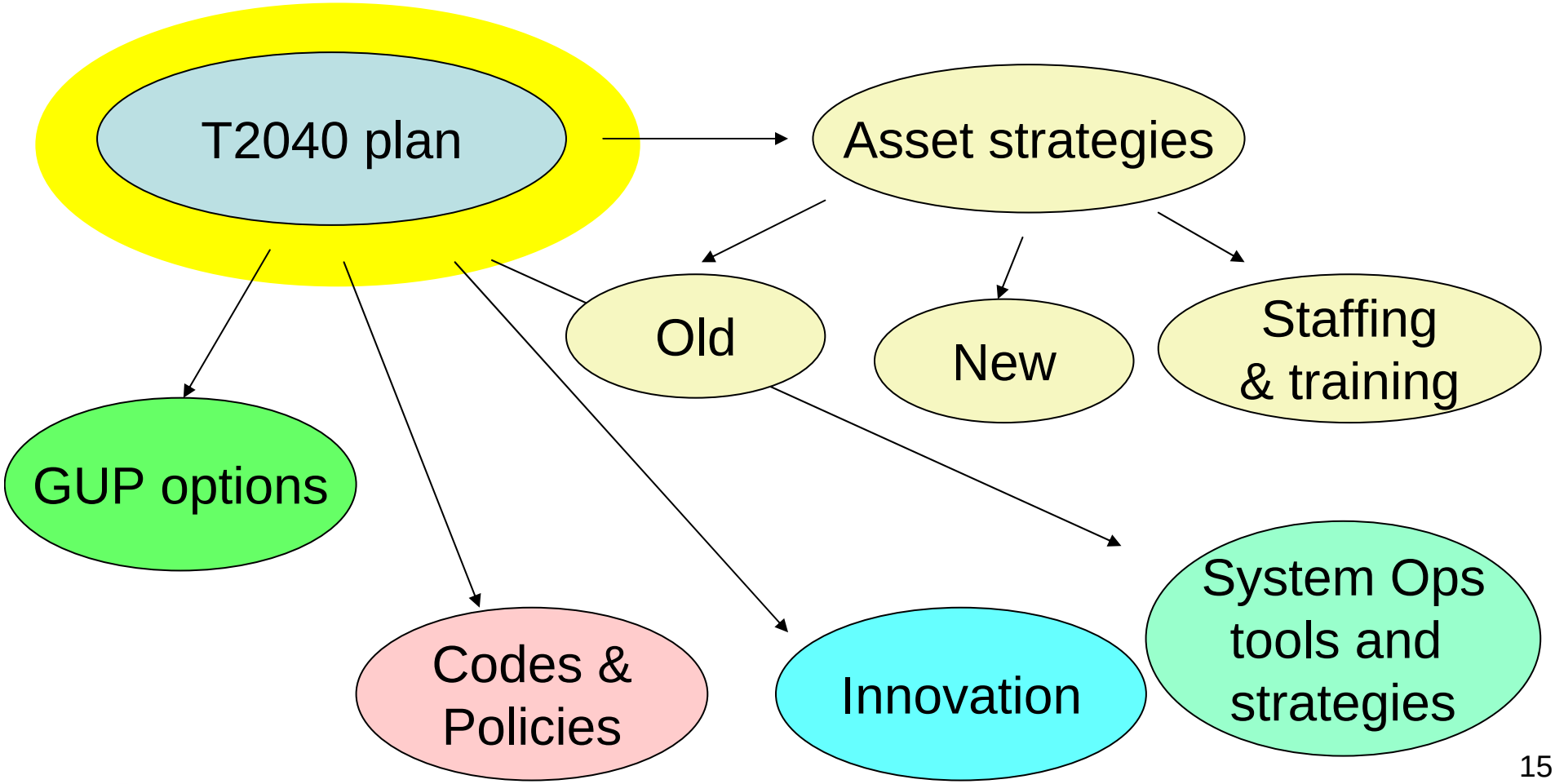
Beneficiaries



Program


Assumptions
& technology
Consultation
18 m
Needs
Options & Economics
Strategy formulation
Now

Using the T2040 plan



Contents of the T2040 Document

The T2040 document will provide a roadmap to the future	
Chapter	**Description**
1	Introduction
2	Demand and Generation Scenarios (SoO alternative)
3	Technology
4	Transmission Needs
5	Maximising the Utilisation of Existing Assets
6	Maintaining and Operating the Future Grid
7	Looking after Societies and Environment
8	Our resources – Our People
9	Conclusion

Year	**2009-2020**	**2020-2030**	**2030-2050**
	Firm	Fluid	Fuzzy

Objective of This Workshop

- Transmission 2040 - Grid Plans are developed in consultation with stakeholders and will guide the New Zealand electricity infrastructure development in the long term

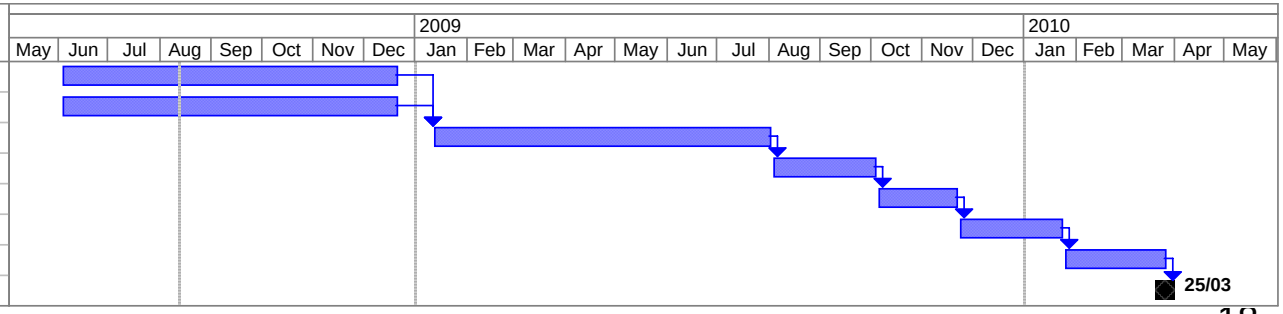
- It is important to review and understand the factors which drive grid investment sufficiently into the future

- **In this workshop, we seek your views on future electricity generation, demand, technology and the expected reliability of grid assets.**

Next Steps

- Consolidate stakeholder inputs and confirm the grid planning assumptions
- Develop long term grid plans for four generation-demand scenarios, taking into account the costs – benefits in high level
- Next stakeholder consultation workshop – Mid 2009
- High level project plan:

ID	Task Name
1	Develop planning assumptions and criteria
2	Future technology development
3	Transmission needs assessment
4	Forming options
5	Testing options against criteria
6	Formulate grid development strategy
7	Compile documentation
8	Publish 2008 Grid Development Plans



Your Input is Important

- Transpower encourages its stakeholders to get involved in the process
- Register your interest by using the form on www.gridnewzealand.co.nz
- You can contribute through this workshop as well as after the workshop in the form of written submissions

Discussion

Transmission 2040 – Work Packages (7-12)

Work Package #	Title	Description
7	Grid Planning Studies	…uses the outputs from work packages 1-6 to assess the system over the 30-40 year strategy period and determine appropriate transmission options
8	Engineering Feasibility and Costing	…uses the outputs from work package 7 to determine high level costs for the transmission options
9	Transmission Solution Integration	…reviews the transmission options identified through work packages 7-8 to determine an appropriate grid development strategy for the National Grid.
10	High Level Environmental Impact Assessment	…assesses at a high level the environmental influences on transmission options as an input into work packages 7-9.
11	High Level Property Impact Assessment	…assesses at a high level the property influences on transmission options as an input into work packages 7-9.
12	Economic Benefit Assessment	…assesses from an economics perspective the transmission options identified in work package 7 to provide input into work package 9.

Transmission 2040 – Work Packages (1-6)

Work Package #	Title	Description
1	Generation and Demand Scenarios	…a mix of scenario development and forecasting to determine a set of generation and demand futures and quantitative data for each of the next 30-40 years.
2	Grid Planning Guidelines	…defines the planning guidelines, criteria and assumptions to enable planning studies to be performed.
3	Asset Reliability	…forecasts asset condition and existing asset make-up against customer reliability requirements and target reliabilities
4	HVAC Line and Substation Strategy	…determines the appropriate strategy for upgrading/building or decommissioning of GXPs and transmission lines together with the appropriate transmission technology roadmap
5	HVDC Transmission Strategy	…determines the strategic use of HVDC for enhancing transmission capacity over the next 30-40 years.
6	Grid Communications Control and Protection Technology	…determines the future use and development of protection and automation technology for economically enhancing grid capacity