Methodology discussion

Better integrating economic and energy data

29 September 2021 FRG Meeting

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Background and Purpose

This presentation's purpose is to discuss the better integration of economic projections into energy forecasts. Stakeholder feedback will inform AEMO's starting point for formal consultation.

Engagement timeline:

Timing	Details	Responsible
Feb 2021	FRG Consultation - Macroeconomic forecasts	AEMO, BIS OE
Dec 2020 - May 2021	Electricity Demand Forecast Methodology consultation	AEMO & Stakeholders
Aug 2021	Forecasting research initiatives	AEMO
Today	**Methodology discussion**	**AEMO**
Oct 2021	2021 Forecast Accuracy Report with draft Forecast Improvement Plan	AEMO

Today's agenda:

- Why current energy forecasting must evolve to:
  - address the diverging relationship between energy and GDP
  - capture sectoral insights via aligned data granularity
  - support long-term evolution to richer dynamic models
- How energy and economic data might be aligned with improved granularity in key sectors
- What conversations do we want to have?

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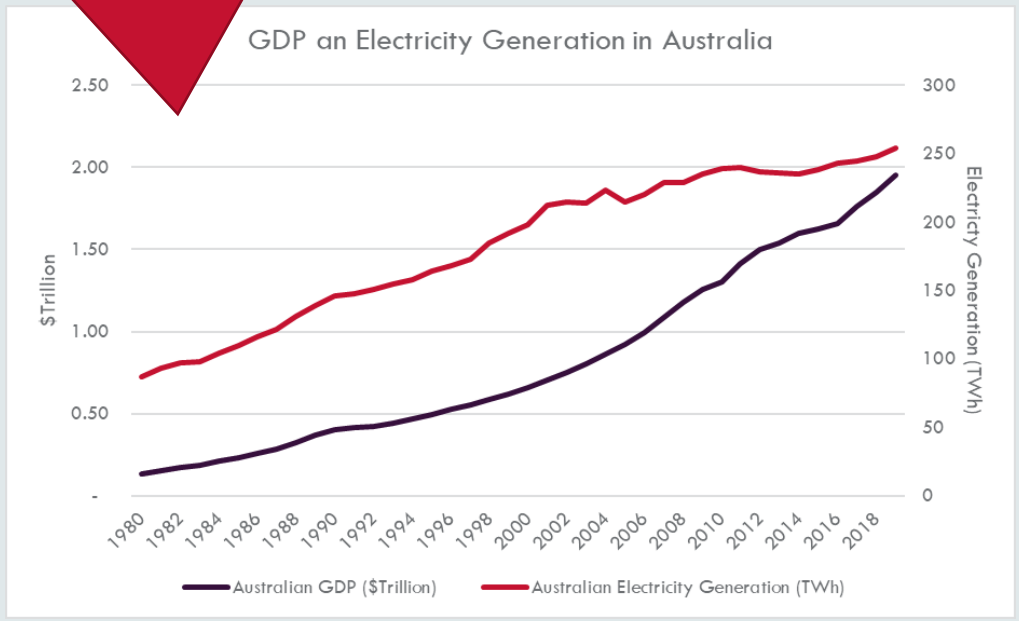
The Why (1): GDP and Energy are decoupling, with individual sectors changing at different rates

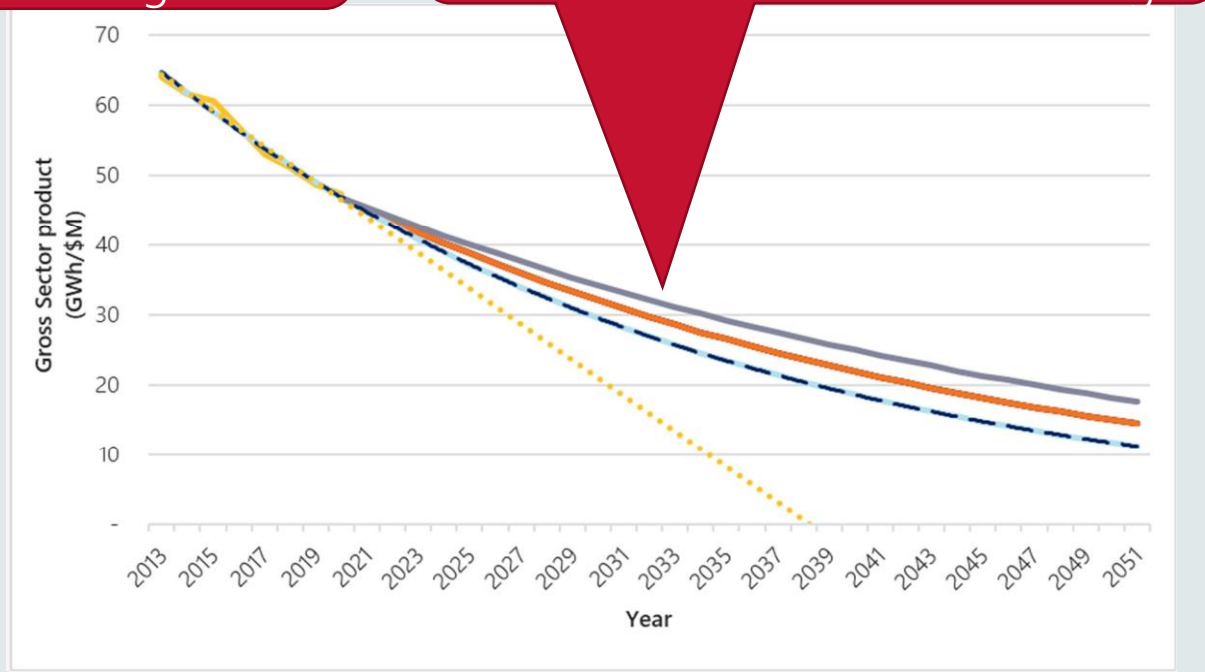
For the overall economy, the coupling between energy use and GDP is less strong than before…

… so it's inappropriate to expect energy use to simply grow in proportion to economic growth…

… but there are clear trends in sector-specific Energy Intensity that can be harnessed for forecasting



Source: Electricity data from the IEA
GDP data from BIS Oxford



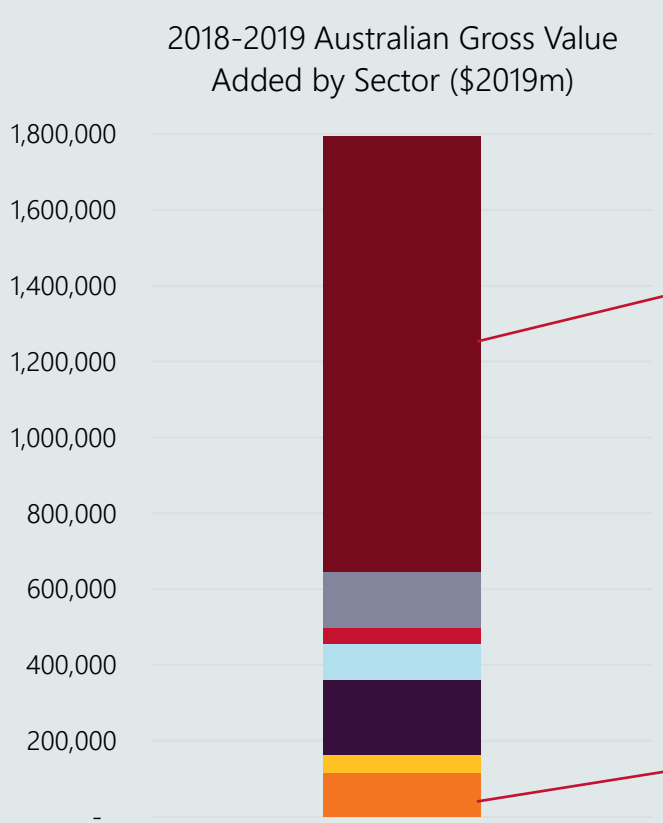
Sector specific drivers for this decoupling include:

- Efficiency and activity changes
- Trade and Import substitution
- Future electrification

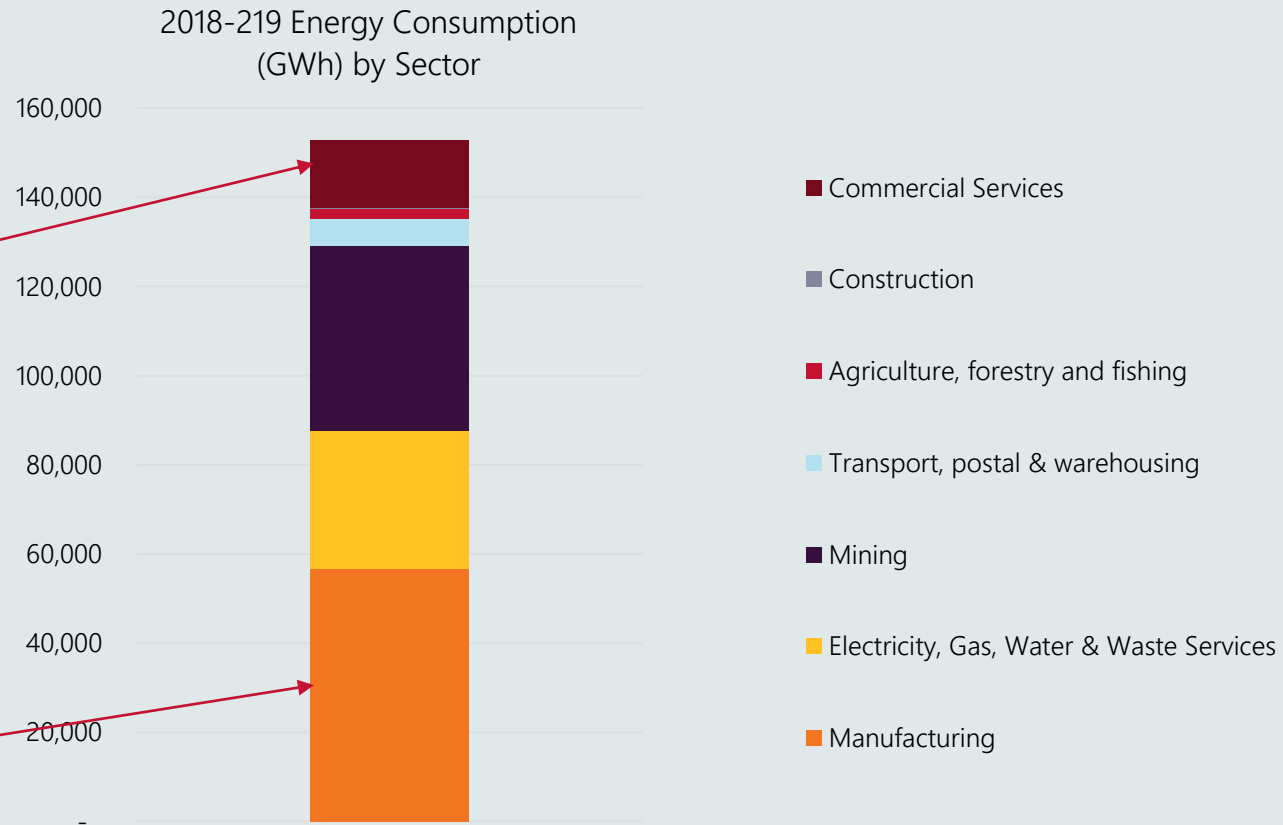
Therefore

More granular forecasts can be more insightful than aggregate forecasts

The Why (1 Cont.): Sectorial decomposition shows differing ratios of energy and economic value



Source: GVA by Sector (BIS Oxford)

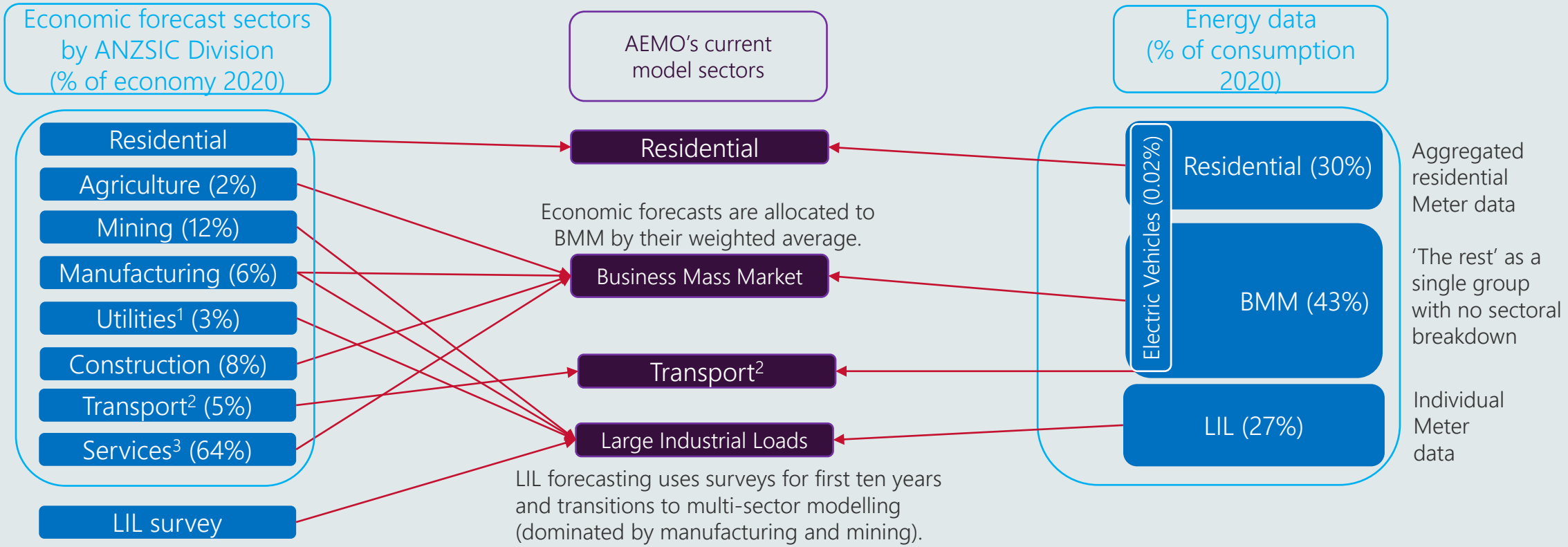


Source: Energy Consumption by Sector (Australian Energy Data Statistics)

Differing ratios of energy and economic value warrants forecasting efforts being directed towards key sectors

The Why (2): Opportunity to obtain sectorial insights via aligning data granularity

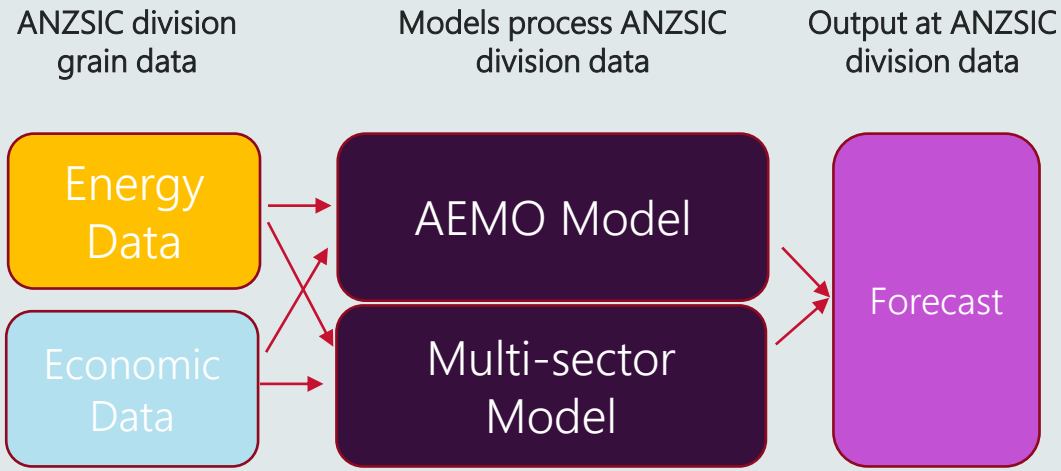
Currently misaligned data granularity between economic input forecasts and energy data force AEMO's models to a 'lowest common denominator', limiting AEMO's ability to receive and provide sector level insights.



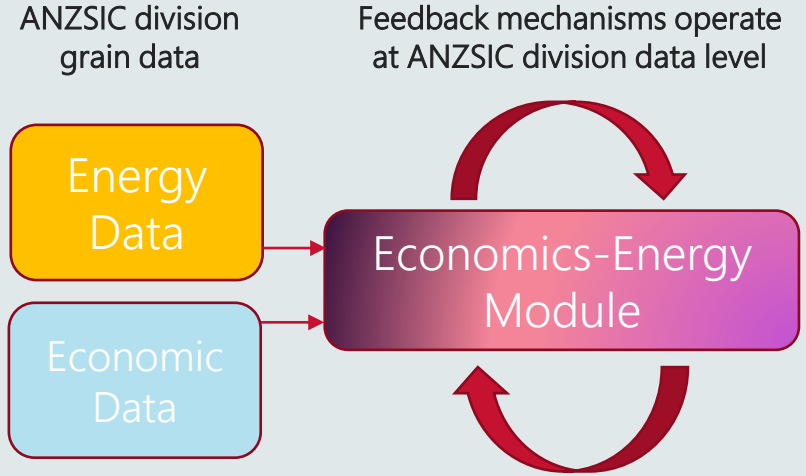
[1] Utilities figures are adjusted to reflect losses, auxiliaries etc
[2] Transport includes airports, roadways, train systems, harbours. EV's are reflected in their respective end use groups
[3] Services encompasses ANZSIC divisions F, G, H, J, K, L, M, N, O, P, Q, R, S

The Why (3): To support long-term evolution to richer dynamic models

Stage 1: Harmonise data and model granularity



Stage 2: Evolve model structure*



* Candidates include:
- Input-Output and Structural Decomposition Analysis
- Integrated Assessment Modelling

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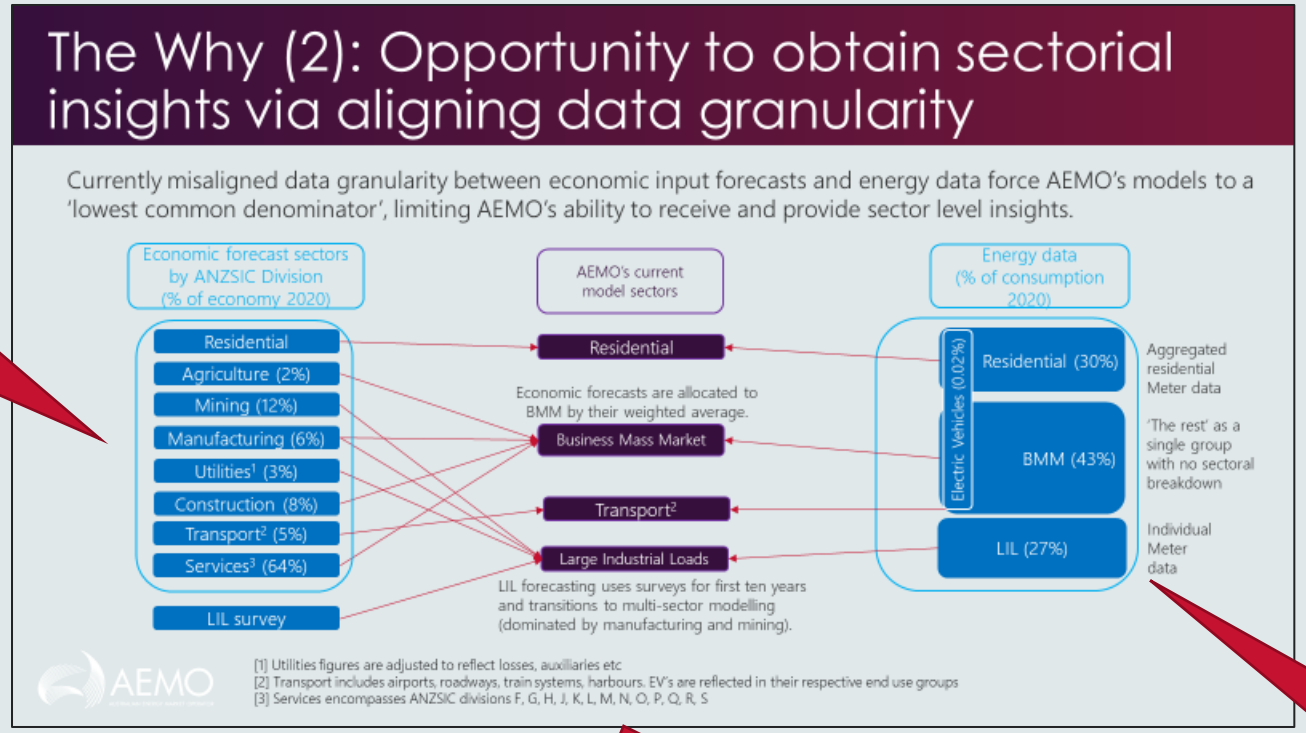
But transforming forecast granularity includes challenges and constraints

Economic impacts differ substantially from energy impacts, so not as simple as exactly copying economic forecast structure



Difficulty in reconciling with Australian Energy Statistics Table F

Opportunity cost of transformation efforts relative to other Forecast Improvement Plan initiatives

Costs in identifying ANZSIC sector for each site

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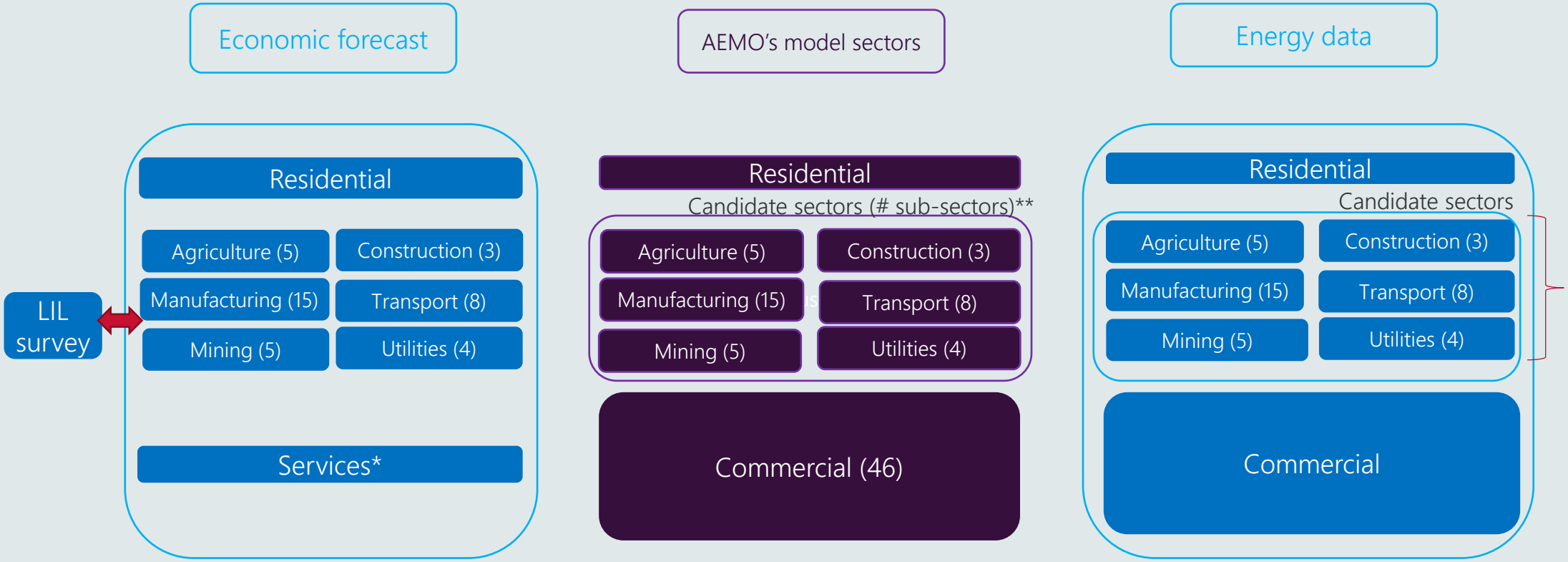
How energy and economic data might be aligned with improved granularity in key sectors…

Redevelopment of energy data sources allows finer-grain modelling of key energy use sectors

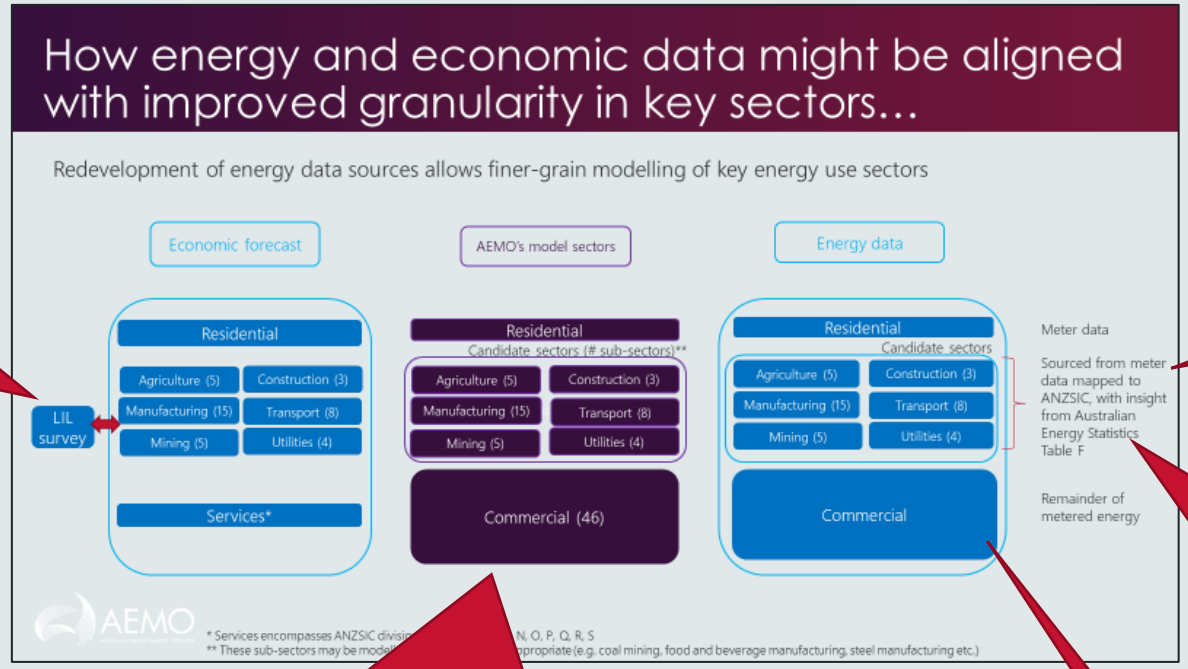


* Services encompasses ANZSIC divisions F, G, H, J, K, L, M, N, O, P, Q, R, S

** These sub-sectors may be modelled individually where appropriate (e.g. coal mining, food and beverage manufacturing, steel manufacturing etc.)

… with more homogenous groups and better reference points to improve forecast accuracy

LIL surveys and economic forecasts can be compared



Commercial replaces BMM as a forecast sector which includes:

- sectors with relatively lower and comparable energy use
- smaller customers within key energy use sectors

Leverage research opportunities to:

Increase alignment between Table F and meter data, providing better validation

Expand meter data classification, providing better visibility at large customer end…

… resulting in greater homogeneity within the remaining commercial segment

Initially, the sub-sectors will be populated by classified LIL's, but in the long-term AEMO seeks suitable data to map all sites to their industries

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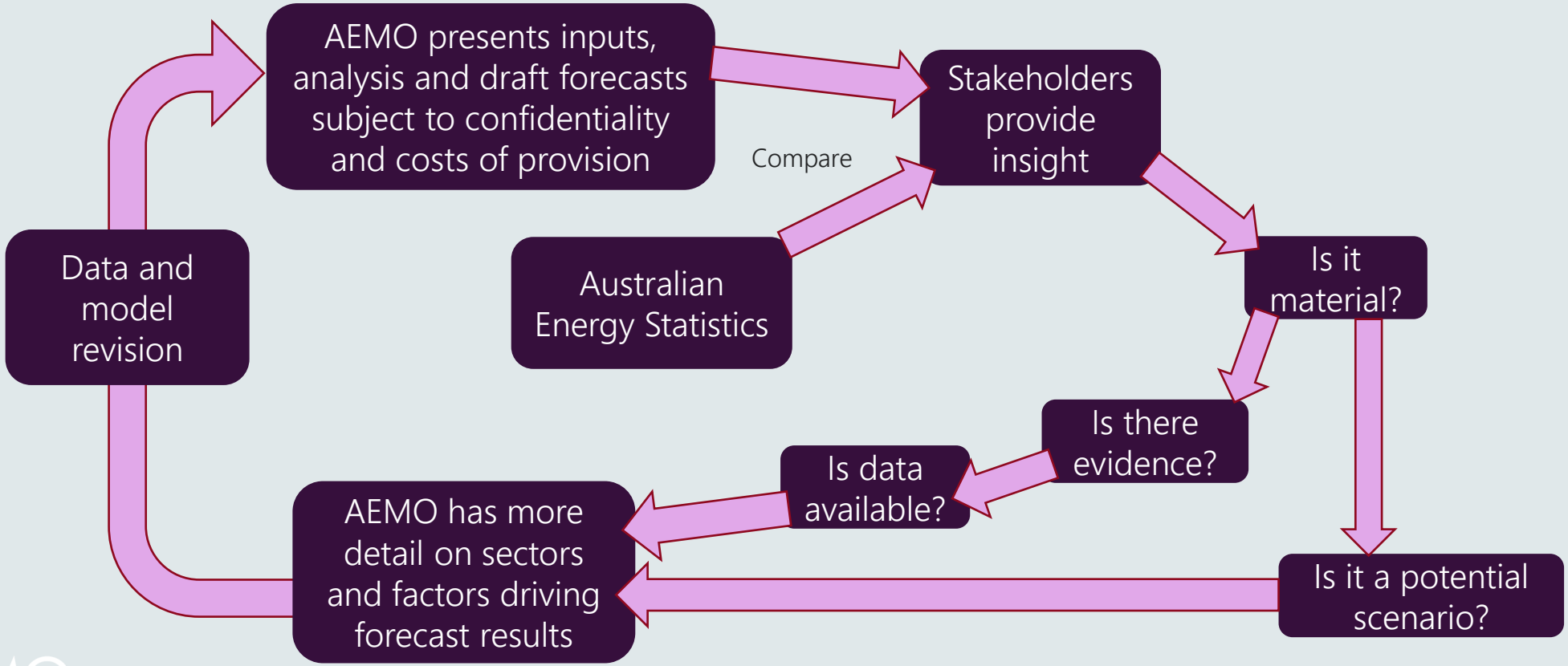
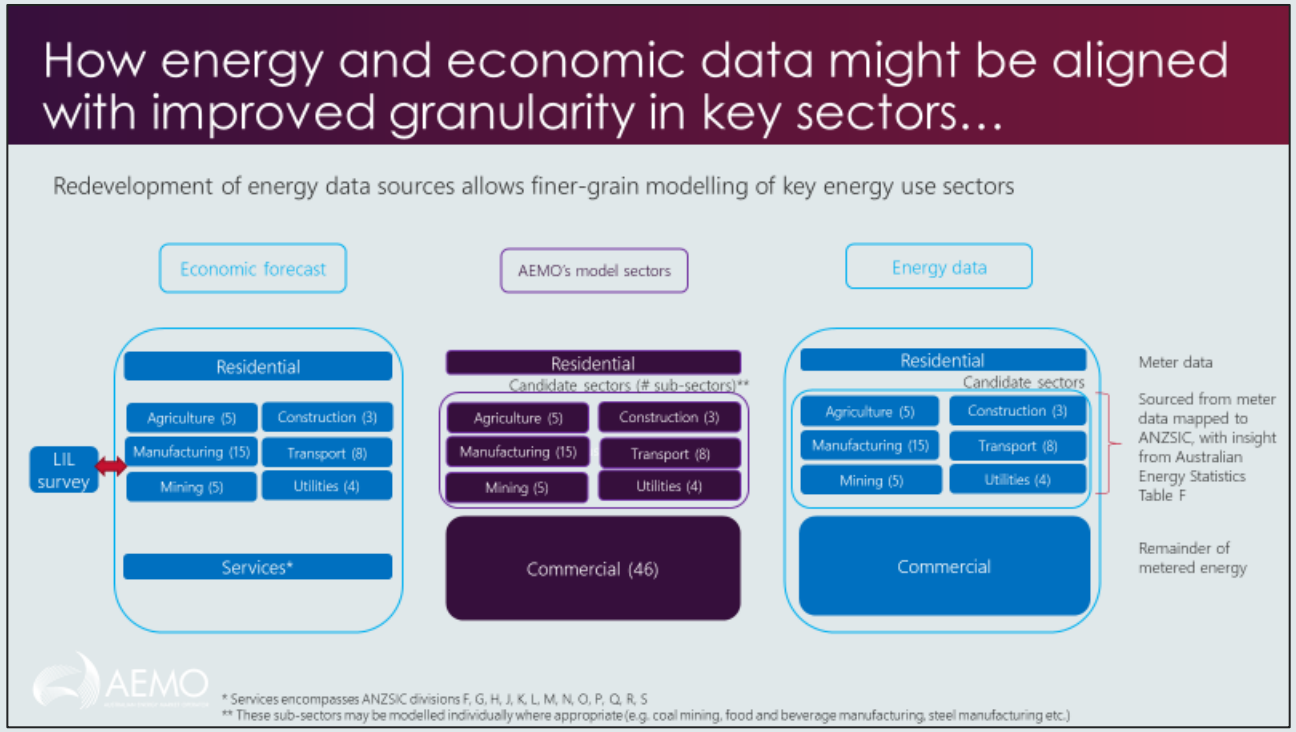
What conversations do we want to have?

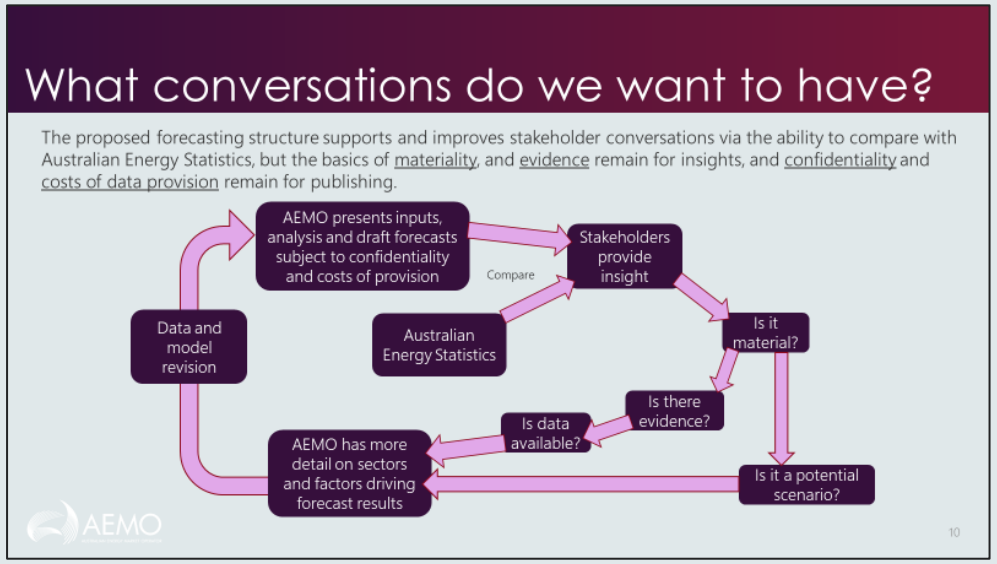
The proposed forecasting structure supports and improves stakeholder conversations via the ability to compare with Australian Energy Statistics, but the basics of materiality, and evidence remain for insights, and confidentiality and costs of data provision remain for publishing.



Discussion



What feedback does the FRG have on the proposed shift to increasing forecast granularity?



What are priorities as the energy consumption models are evolved?

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Appendix

Disaggregating the Energy Picture into further ANZSIC sub-divisions

Table F data for Australia sub-sector energy composition shows high granularity for different sectors.