Draft 2021 gas consumption forecasts

27 January 2021 FRG Meeting

energy.forecasting@aemo.com.au

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Background and purpose

Timing	Stage of GSOO	Responsible
Jan 2020	Last time this topic was discussed	AEMO
Sept 2020	Gas consumption forecast methodology update	AEMO
Today	**Draft gas consumption forecasts**	**AEMO**
March 2021	2021 GSOO released	AEMO

The purpose of today's presentation is to discuss the draft gas consumption forecasts for the 2021 GSOO for eastern and south-eastern Australia

Agenda includes:

- 2021 GSOO scenario drivers
- Key changes and updates
- Draft forecasts by sector: Tariff V, Tariff D and LNG
- Draft forecasts by region
- Appendix: Model inputs by region

2021 GSOO scenario drivers

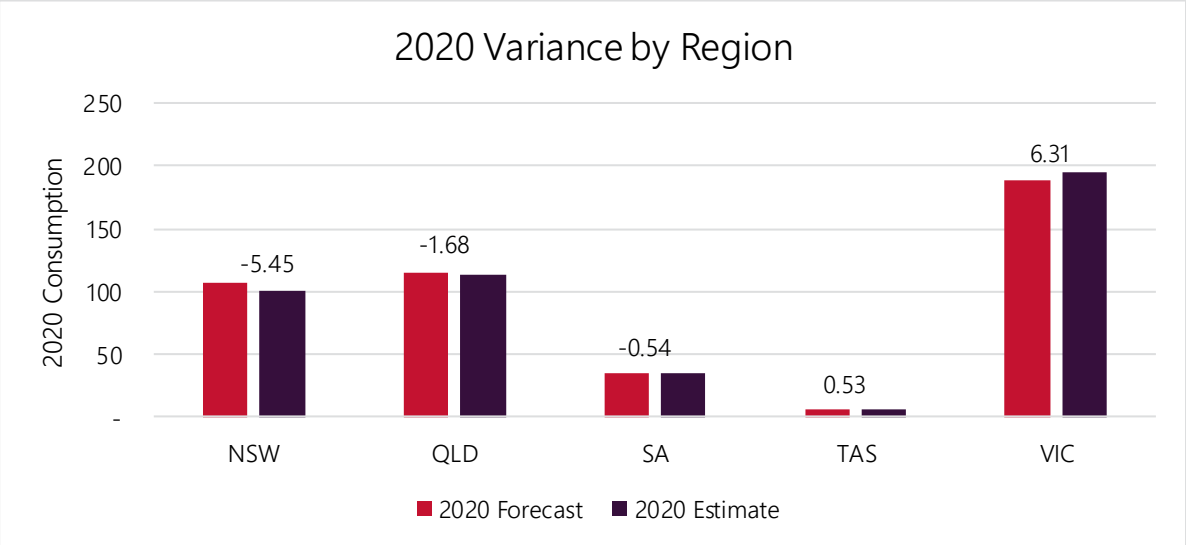
Driver	Slow Change	Central	Hydrogen	Gas Price Sensitivity
Economic & population growth	Slower growth	Central	Higher growth	Central
Energy efficiency improvement	Low	Moderate	High	Moderate
Residential fuel switching	Low	Moderate	High	Low
COVID-19 Recovery	Slow	Moderate	Quick	Moderate
Gas prices	High	Moderate	Moderate (Hydrogen)	Gas-led
Coal prices	Slow	Neutral	Fast	Neutral
Hydrogen adoption	None	None	High	None
Relative Concentration Pathway (avg. temp rise)	RCP 8.5	RCP 7.0	RCP 1.9	RCP 7.0

Key changes and updates

2020 Forecast Accuracy

- Assessment of GSOO 2020 model shows good performance (<3%).
- Weather (in particularly Victoria from a cool winter) was the largest variance.
- Enhancement of data collection (through GBB and surveys) improved the Tariff D data quality that was not available at time of the 2020 forecast.
- Covid-19 saw some reduction in industrial activity though not a large contributor to the variance.
- Insights from variance analysis have led to key changes in this year's method (discussed on following slides)

GSOO2020 Forecast Assessment	Tariff V	Tariff D	Tariff D+Tariff V
GSOO 2020 Forecast (PJ)	190.8	261.7	452.6
2020 Consumption Estimate (PJ)	195.3	256.4	451.7
Variance (PJ)	*4.5*	*- 5.4*	*- 0.8*
Variance (%actuals)	*2.3%*	*-2.1%*	*-0.2%*
Weather Impact (PJ)	2.0		
Variance: Weather Adjusted(PJ)	2.5	- 5.4	-2.9
Weather Adjusted Variance (%actuals)	*1.3%*	*-2.1%*	*-0.6%*



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Key changes

1. All input drivers reviewed and updated
2. Short-term COVID-19 impacts examined
3. Scenarios aligned with core ISP scenarios most relevant to the gas sector, including additional scenarios and sensitivities:
   - Hydrogen: Gas blending in distribution network (37 PJ by 2040) along with transmission connected ammonia, steel and oil industries conversion to 100% hydrogen during this period (starting from 2025).
   - Gas Price Sensitivity: Lower gas prices with more resilient local gas users.

Key changes

4. Process and modelling improvements:
   - Transition from using data obtained from Transmission Networks to the Gas Bulletin Board (GBB) enabling real-time insights for most gas users (previously only available by survey, once a year)
   - Tariff D (industrial) short-term model updated to monthly piecewise regression model at GSOO zone/system withdrawal zone (SWZ) level (compared to annual last year) and takes into account seasonality, short-term trend and measurable COVID-19 impact
   - Tariff V (residential/commercial) short-term model uses a 95% confidence interval between the scenarios to allow for dispersion in the first forecast year. This dispersion is spread between the Slow Change and the Hydrogen scenarios.

Updates to model inputs

Sector	Input Driver	Changes since GSOO 2020
Residential/ Small commercial (Tariff V)	1. Connections forecast	Revised stock model and national meter identifier (NMI) forecast generally driving stronger growth in meter installation registration number (MIRN) connections. Updated residential business split from survey information provided by distribution network service providers.
	2. Energy efficiency and fuel switching	Updated residential stock model, rebased forecasts and updated data for state-based energy efficiency policies
	3. Retail prices	Updated wholesale gas price projections
Large commercial and industrial (Tariff D)	1. Economic forecasts	Updated economic projections accounting for COVID-19
	2. Retail prices	Updated wholesale gas price projections, including Gas-price sensitivity
	3. Actuals data	Transitioned from Transmission surveys to GBB data for actuals
	4. Large industrial load forecasts	Updated outlook based on industrial surveys and interviews

Draft forecasts by sector

Tariff V: Residential and small commercial consumers, metered bi-monthly

Tariff D: Large commercial and industrial consumers, metered daily

LNG: Liquified Natural Gas industry, metered daily

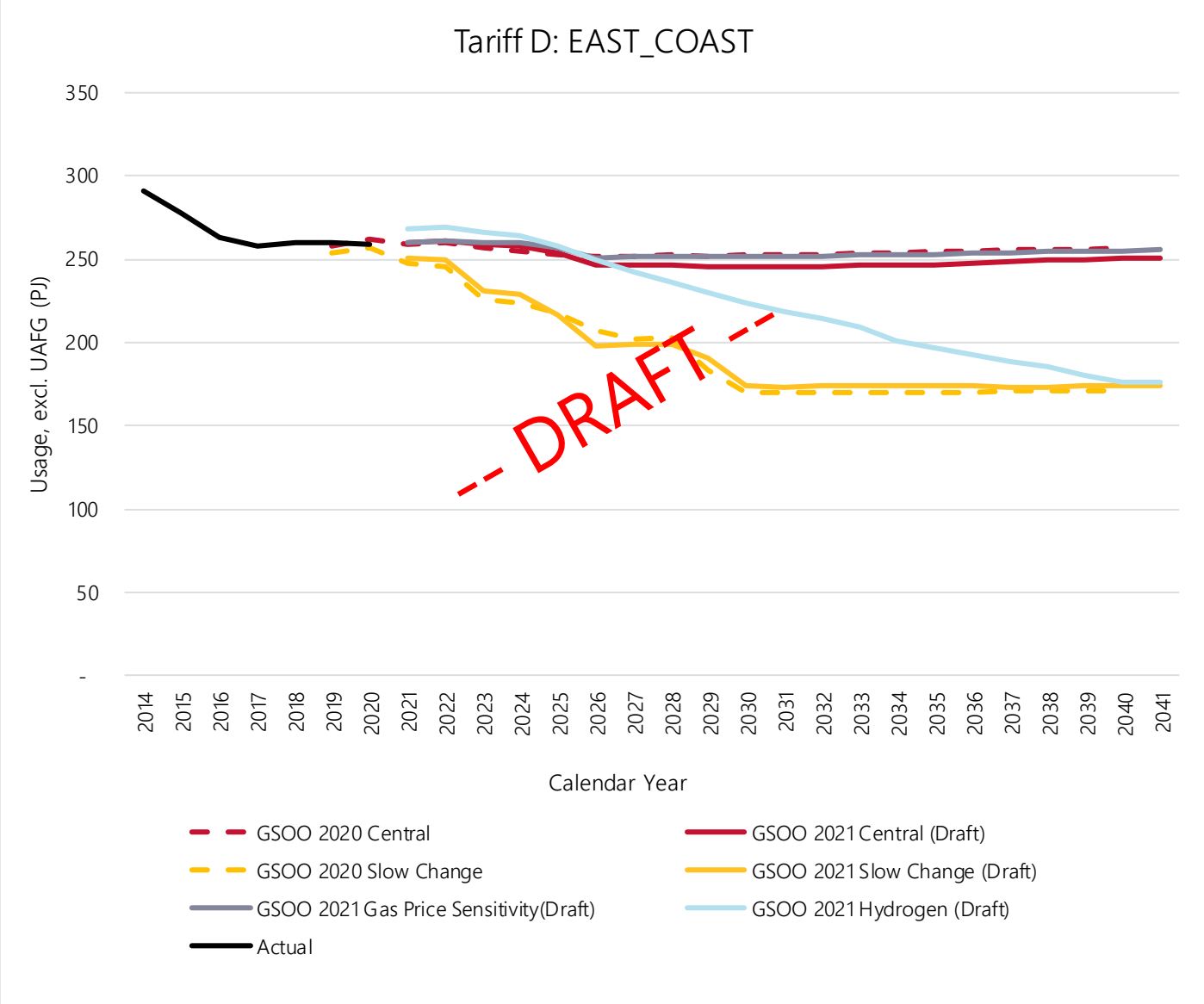
Tariff D

Marginal increase in short term due to new identification of transmission-connected load (via GBB) and more accurate LIL data, partially offset by lower economic growth.

From early 2020s, declining usage in the Central and Hydrogen scenarios largely due to Victorian policies. The decline in Hydrogen scenario also driven by hydrogen blending offset and the phasing out of gas in some LIL industries.

The Slow Change scenario is similar to the 2020 GSOO, with changes due to LIL closure assumptions during the forecast period.

Lower gas prices give a slightly higher gas forecast in the Gas Price Sensitivity than in the Central scenario.



Tariff V

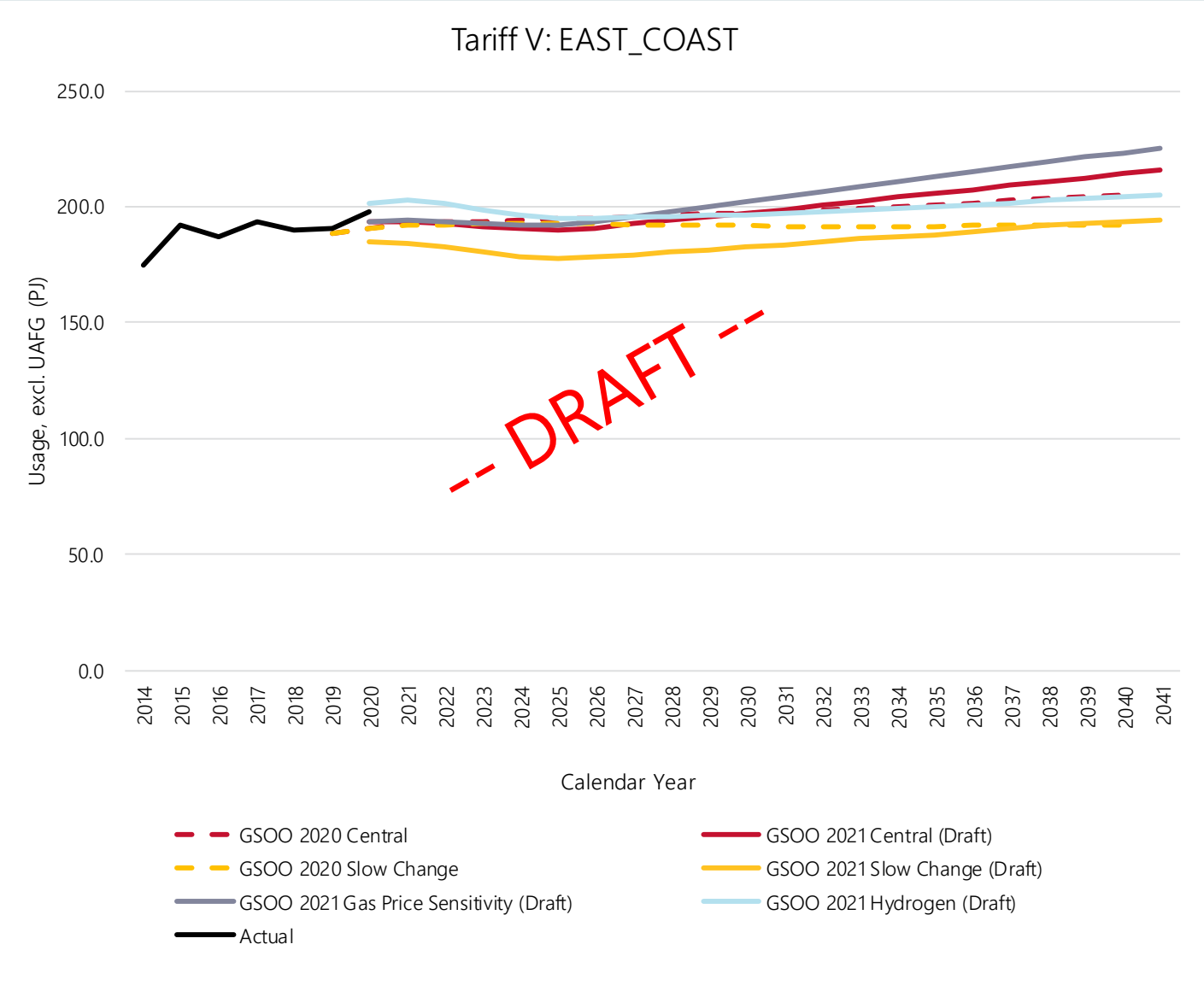
Decline in consumption in all scenarios observed through to mid 2020s, predominantly due to Victorian policies (VEU Program and 2020-21 budget policies).

Stronger gas connections forecast relative to last year offset savings from energy efficiency (EE) and drive growth beyond 2025.

Greater spread between scenarios due to the introduction of a 95 % confidence interval.

The Hydrogen scenario sees higher prices, stronger EE improvements, paired with hydrogen blending. These drivers offset stronger economic growth assumptions, leading to a relatively flat long term forecast.

Lower gas prices increase demand in the Gas Price Sensitivity relative to the Central scenario.



Tariff V and D combined chart and Hydrogen Scenario drivers

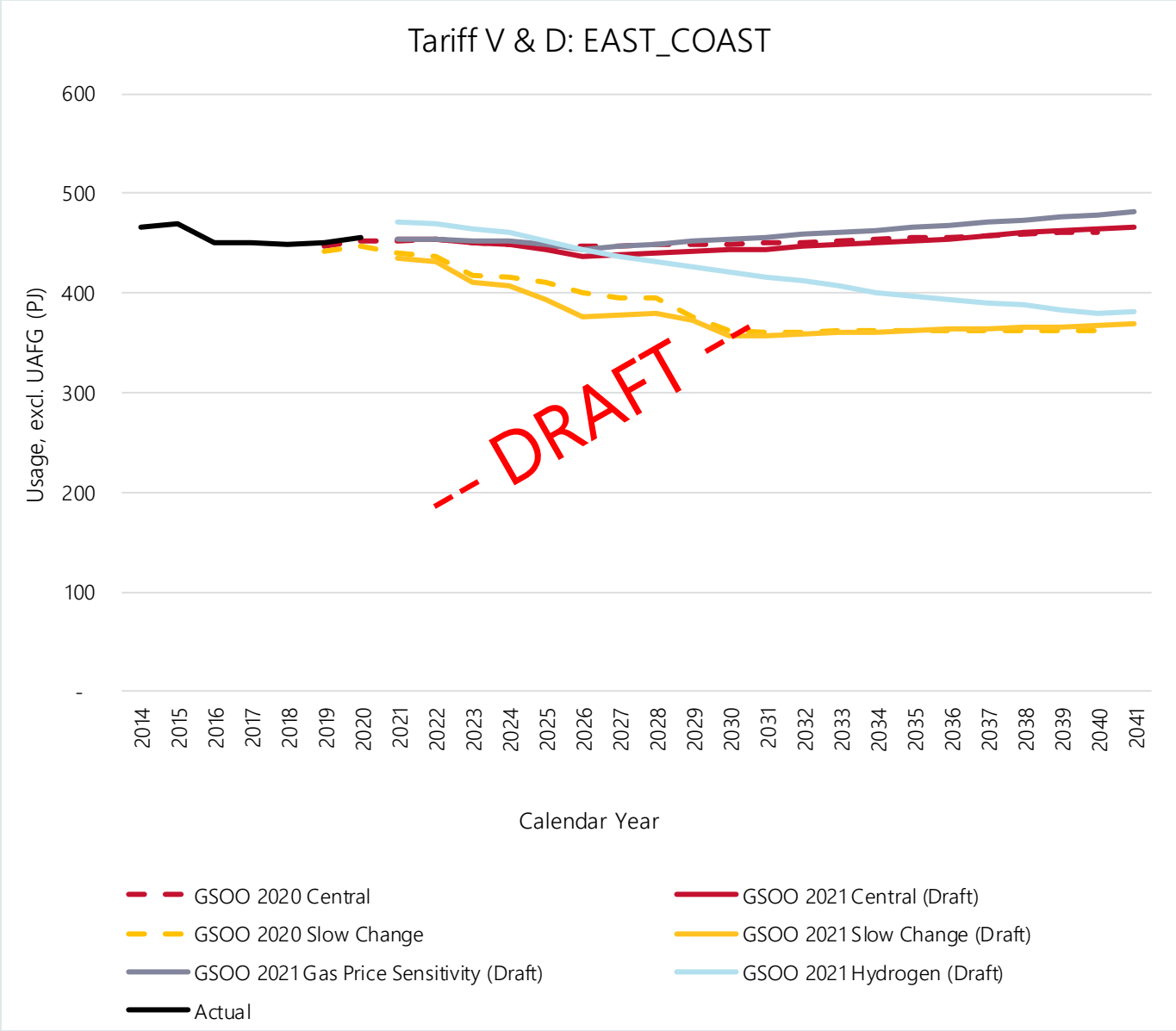
Assumptions regarding gas blending of hydrogen into the distribution network in the Hydrogen scenario are projected to offset:

- 19 PJ of natural gas by 2030
- 37 PJ of natural gas by 2040

In addition, the assumed conversion from gas to hydrogen for LILs in the ammonia, steel and oil industries (starting from 2025) is projected to offset:

- 24 PJ of natural gas by 2030
- 71 PJ of natural gas by 2040

The Hydrogen scenario also decreases consumption, driven by stronger fuel switching (gas to electric), and energy efficiency.

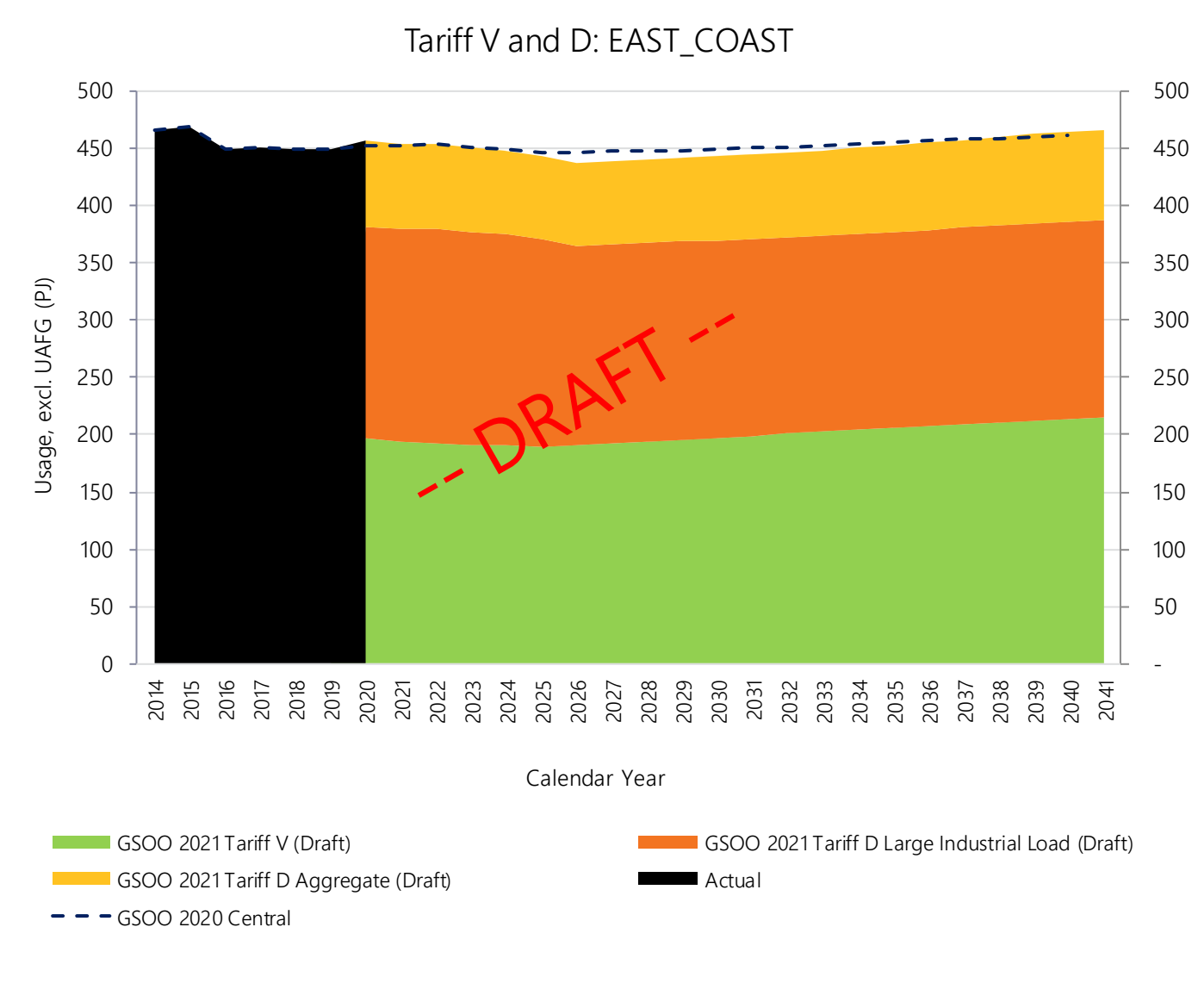


Tariff V and D (Central) detail

The majority of the modest growth forecast is from Tariff V.

Large industrial loads (> 500 TJ/a, approx. 70% of Tariff D total consumption), are forecast considering insights from direct interviews/surveys. This segment is forecast to decline slightly.

The smaller, more numerous aggregate (<500 TJ a year) users are expected to grow slightly.



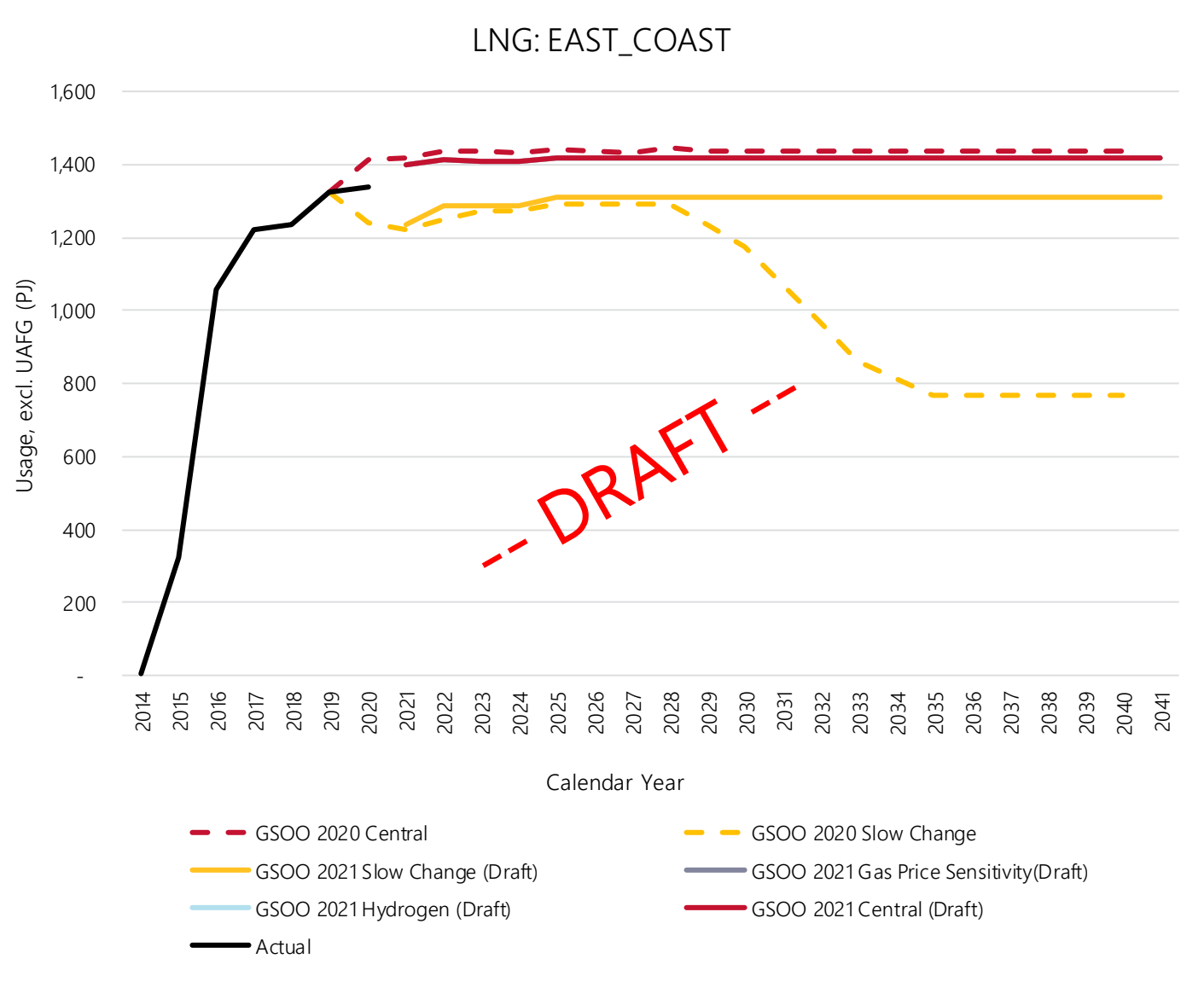
LNG

Compared to the 2020 GSOO there is lower forecast consumption in the draft 2021 GSOO due to:

- Lower gas prices, making investment decisions challenging
- Reliance on ongoing development of new CSG wells

It is estimated that COVID-19 had very little impact on 2020 LNG demand

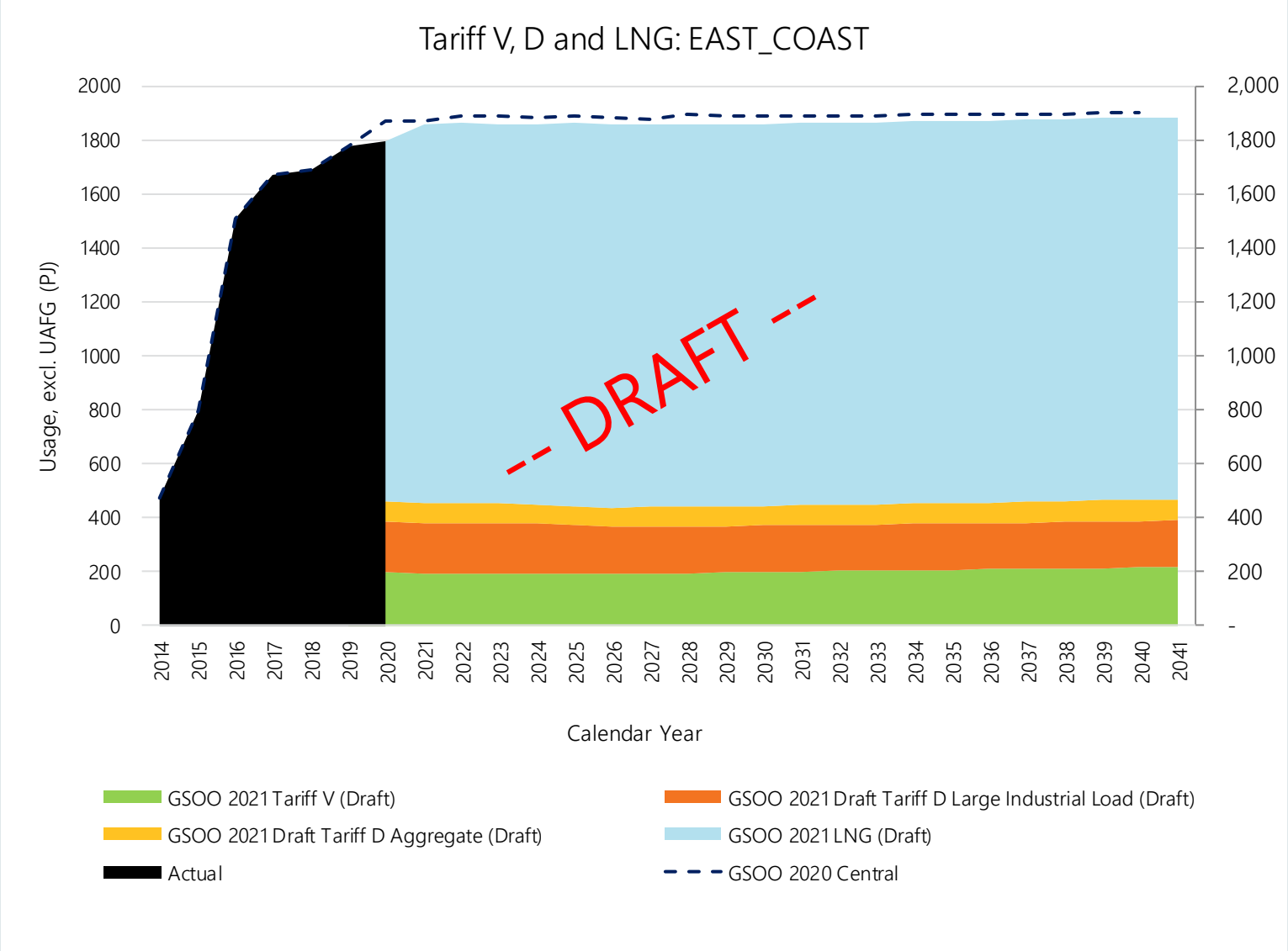
Upwards revision of 2021 Slow Change scenario based on AEMO's view that facilities will continue to seek out replacement LNG contracts, thereby maintaining high gas demand in the future



Note: The 2021 Gas Price Sensitivity, Hydrogen and Central scenarios all use the same LNG forecast

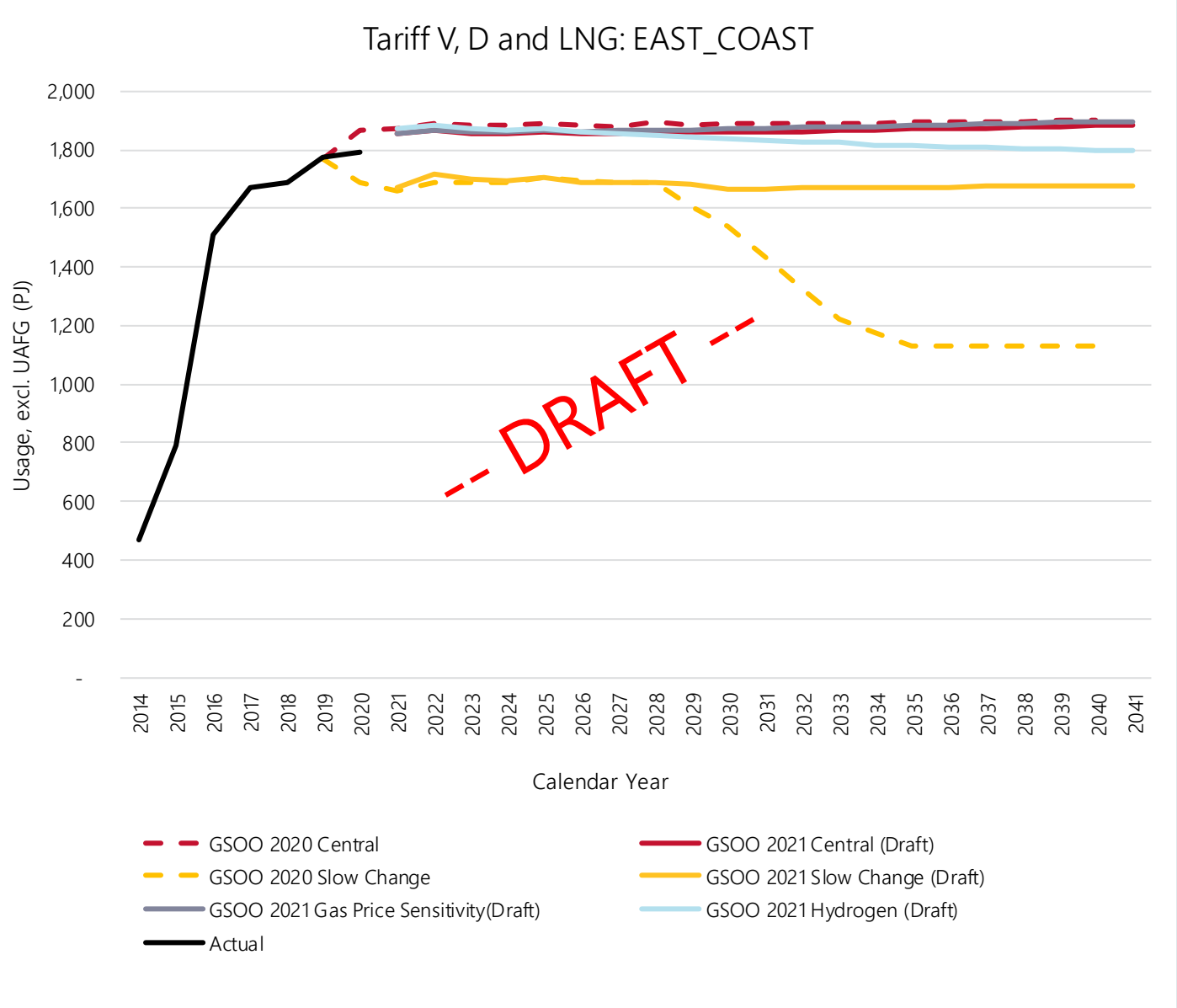
Tariff V and D with LNG (Central)

Lower LNG volumes result in lower usage in 2020 and a slightly lower long-term outlook, compared to the GSOO 2020 forecast.



Tariff V and D with LNG by scenario

Excludes gas power generation (GPG)



Draft forecasts by region

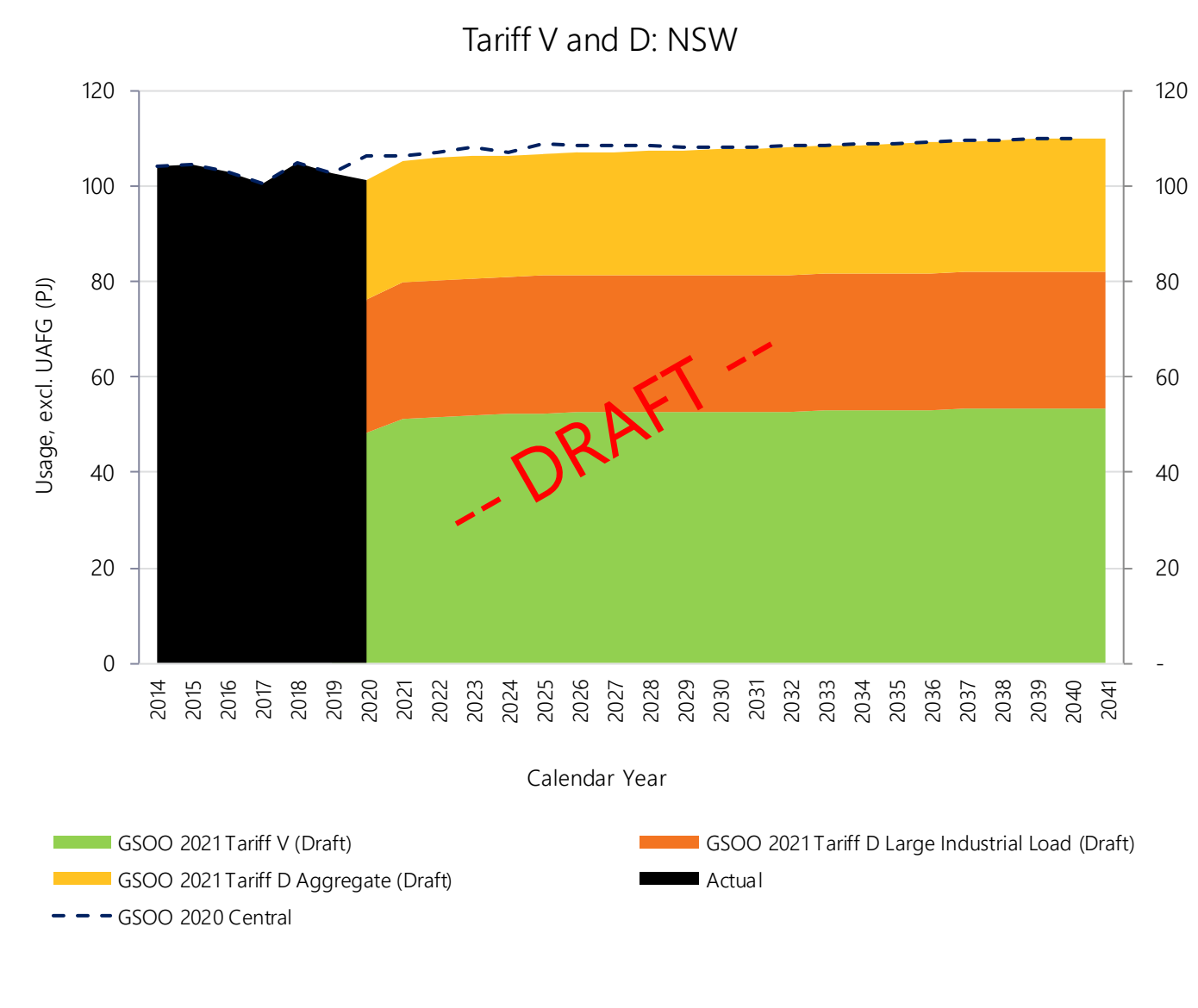
NSW Central scenario by segment

NSW had lower 2020 consumption due to a milder winter.

Slightly stronger connections growth and revised state based energy efficiency forecasts (which in some cases encourage gas use) lead to higher long term Tariff V growth relative to last year.

Slightly lower Tariff D forecast due to updated economic assumptions and improved model trending the Aggregate forecast down slightly.

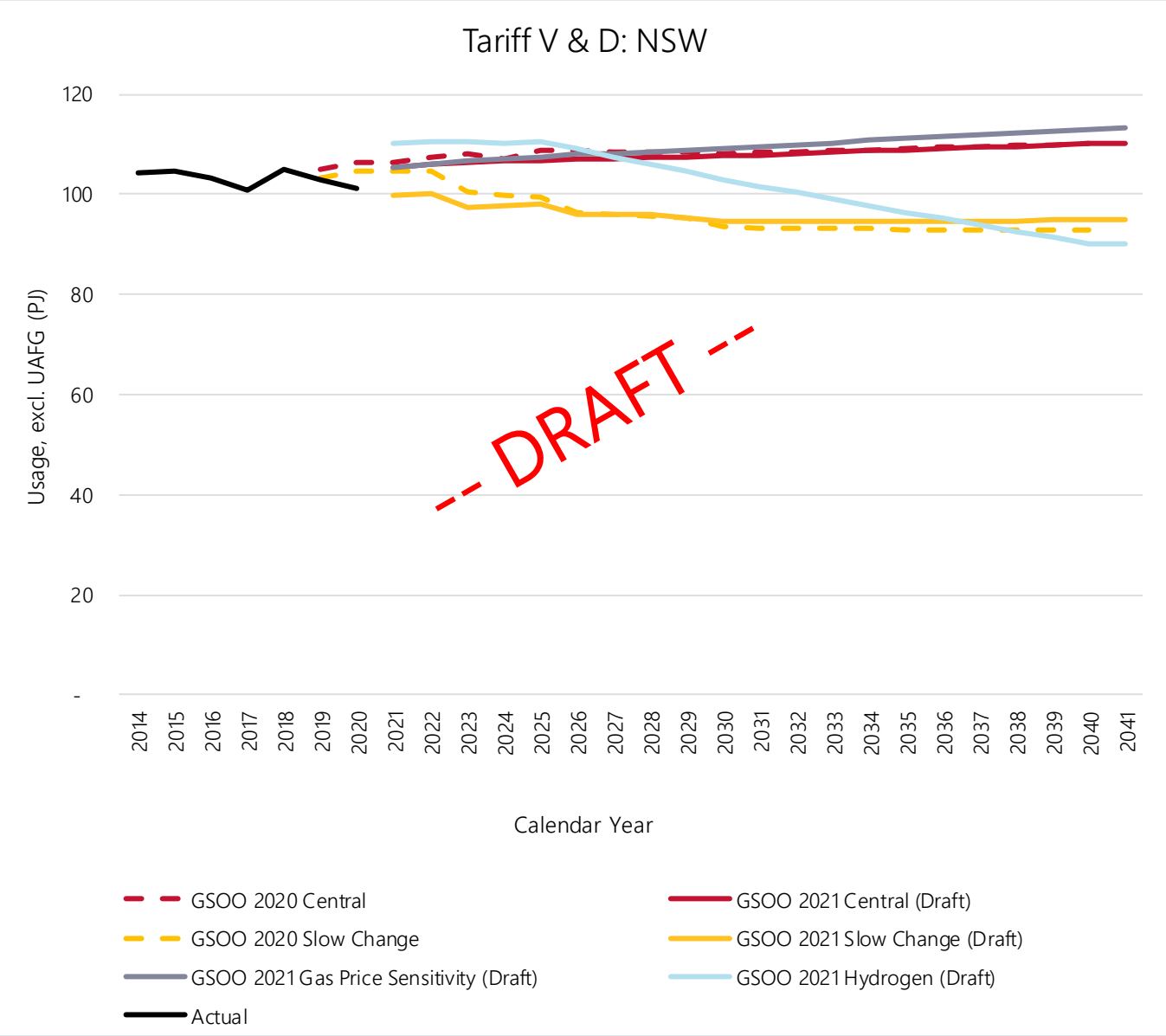
These factors are balanced in the long-term resulting in a similar forecast to the 2020 GSOO.



NSW all scenarios

Tariff V: Higher forecast largely driven by increase in connections forecast and weaker state based EE (in some cases encouraging gas)

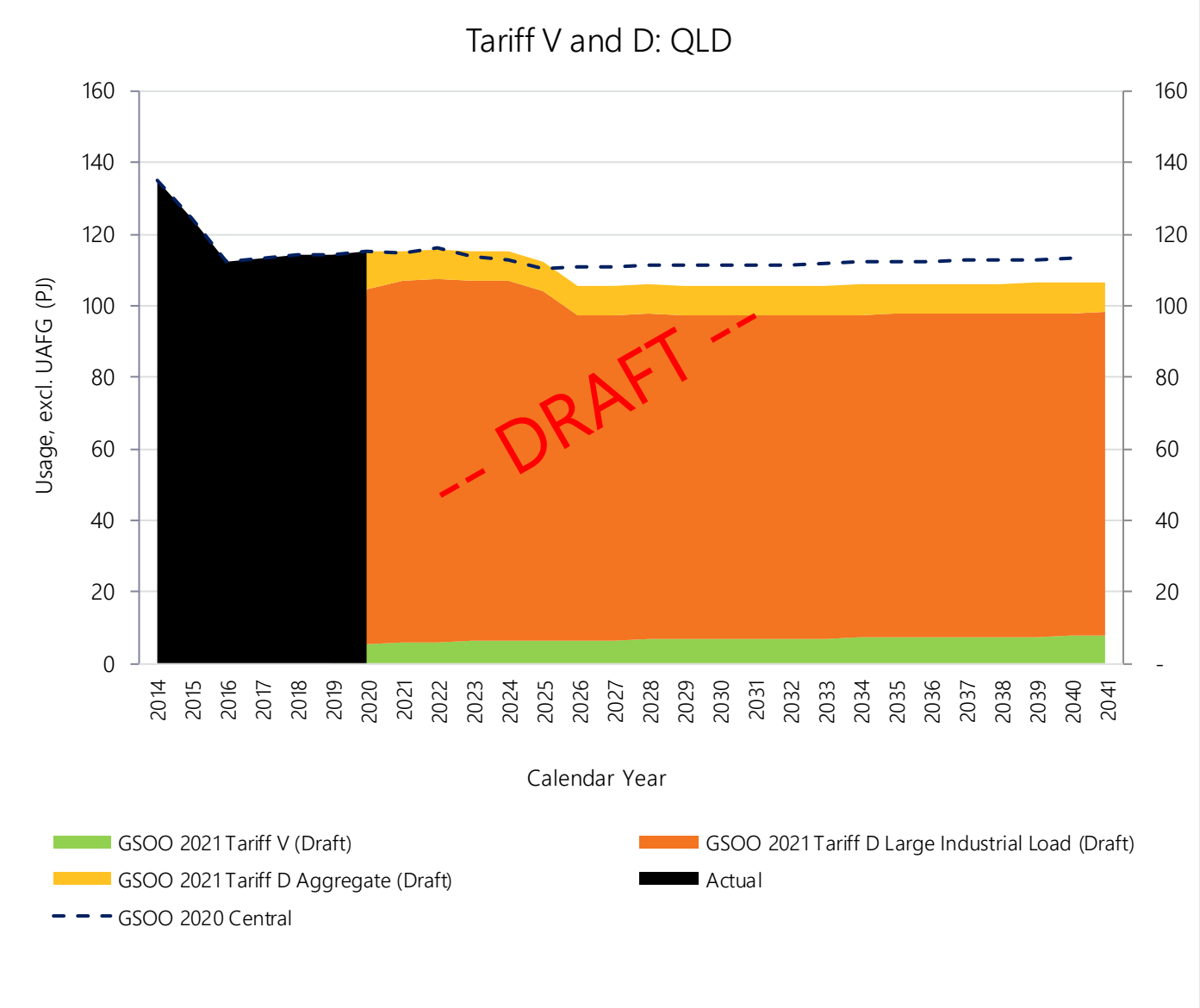
Tariff D: Minor changes in large industrial load closure assumptions forecast to reduce short term consumption for Slow Change scenario compared to the 2020 GSOO.



QLD Central scenario by segment

Tariff D: The large industrial forecast increases slightly in the short-term due to the inclusion of newly identified sites. In the medium- to long-term, the forecast fell compared to last year due to updated economic assumptions and improved short-term model for the Aggregate component and change in future operations from large industrial load usage.

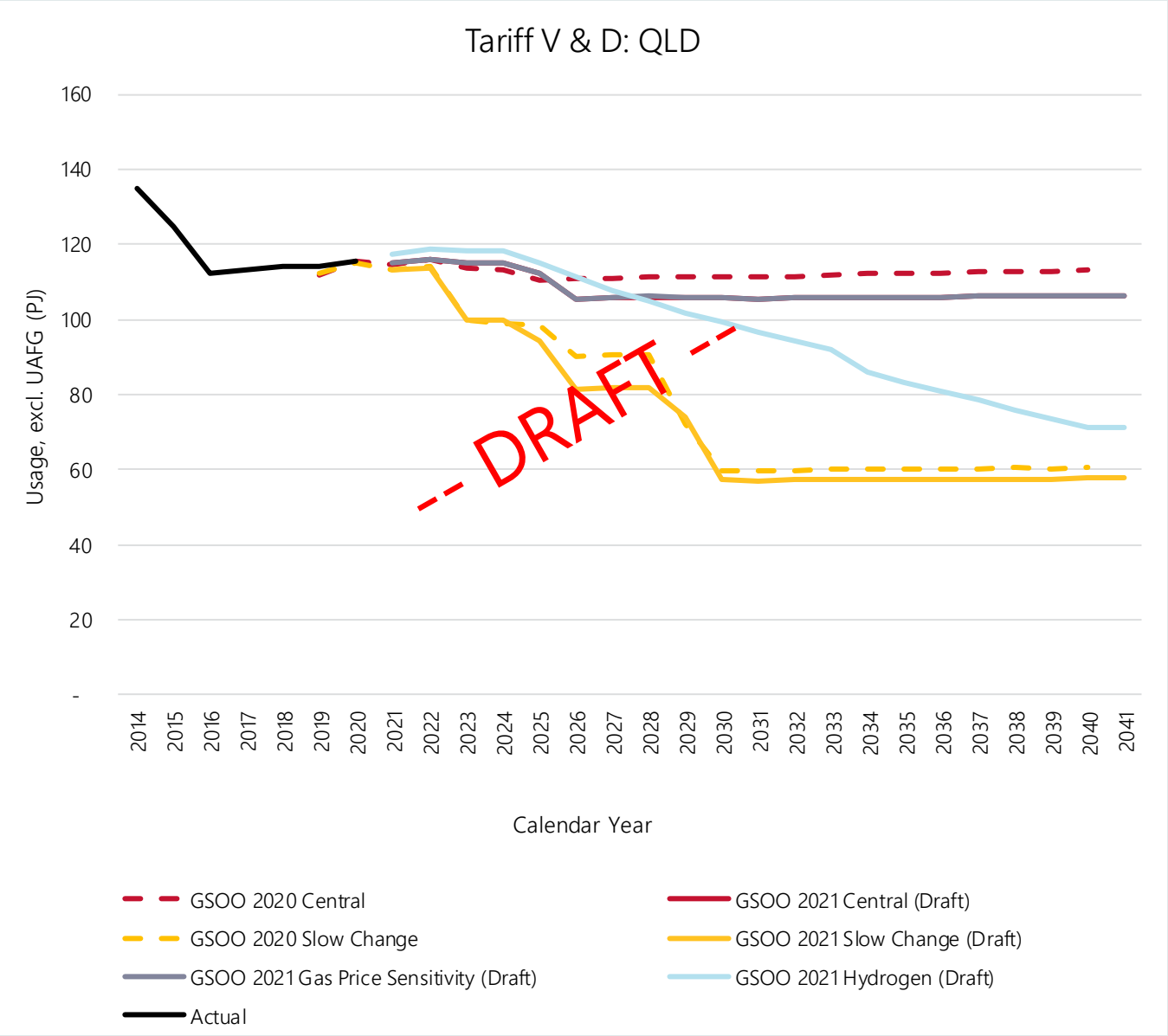
Tariff V: Lower central connections forecast applied in short-term lead to lower TV growth, however as TV makes up around 5% of combined TV and TD in QLD the impact of this is small.



QLD all scenarios

Updates of expected large industrial load closures assumptions along with an enhanced short-term trend model has resulted in all scenarios falling below the 2020 GSOO forecast in the long term

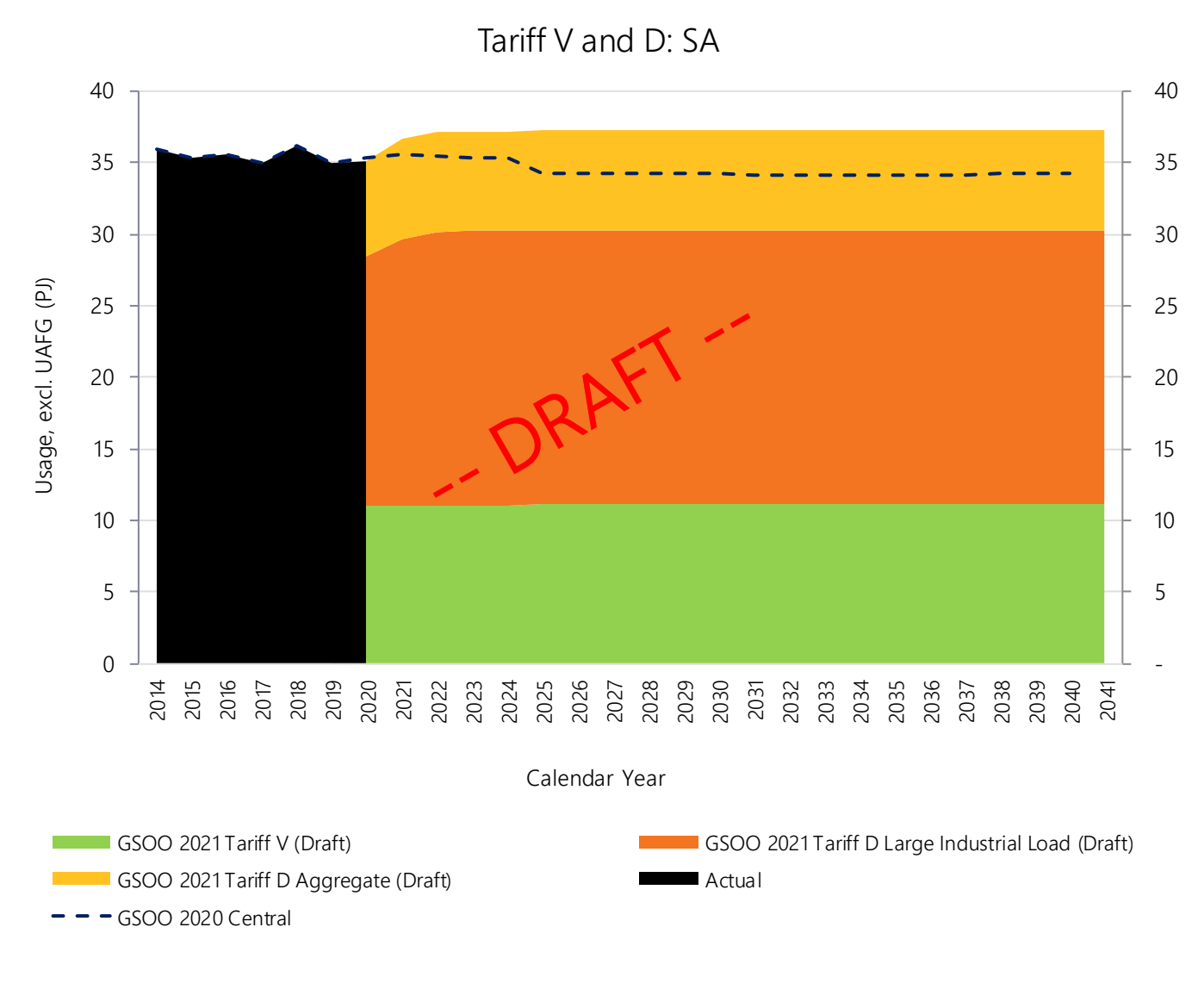
The Hydrogen scenario shows a rapid decline in gas usage compared to other scenarios due to blending of Hydrogen into the distribution network and fuel substitution by some large industrial loads.



SA Central scenario stacked

Tariff V: Slightly stronger connections forecast drives slightly stronger growth along with weaker state based energy efficiency scheme contribution in the long-term

Tariff D: Increased forecast driven by the inclusion of a few additional sites identified in the GBB data, and increased LIL consumption based on survey responses.

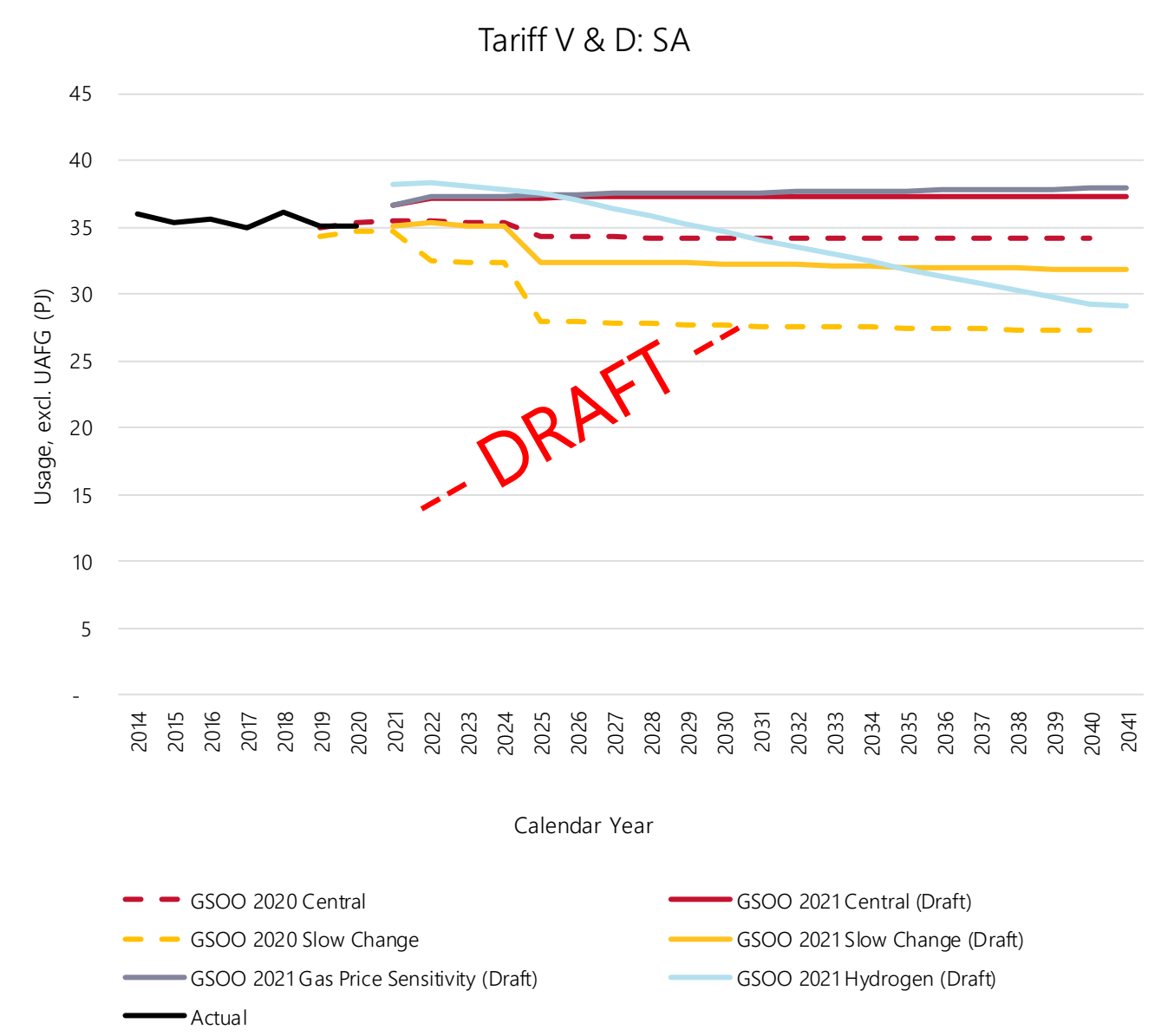


SA all scenarios

A short-term increase from 2020 consumption is due to an increase in expected consumption from a large industrial user. The Slow Change scenario revises the outlook for a large industrial that has a more favourable outlook.

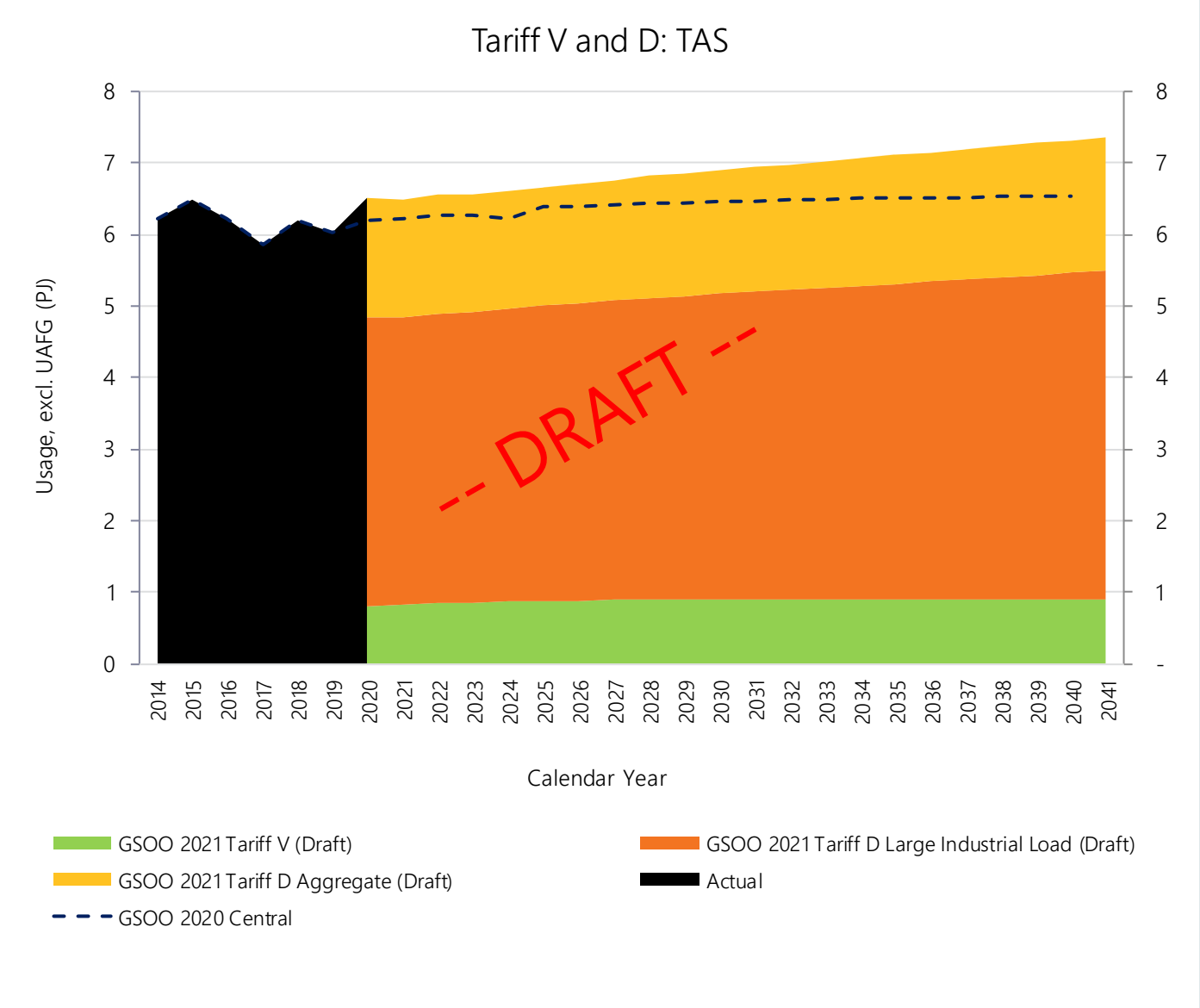
SA consumption is expected to remain relatively flat in the Central scenario following modest economic activity and energy efficiency and fuel switching impacts balancing out growth in connections.

The Hydrogen scenario in the long-term shows a more rapid decline in gas usage due to gas blending, energy efficiency and fuel switching reductions outweighing connections growth.



TAS Central scenario stacked

The increase in Tasmania's forecast is largely due to a greater coverage of consumers within completed surveys compared to the 2020 GSOO. This captured recent consumption increases at some sites that wasn't observable in previous trends.



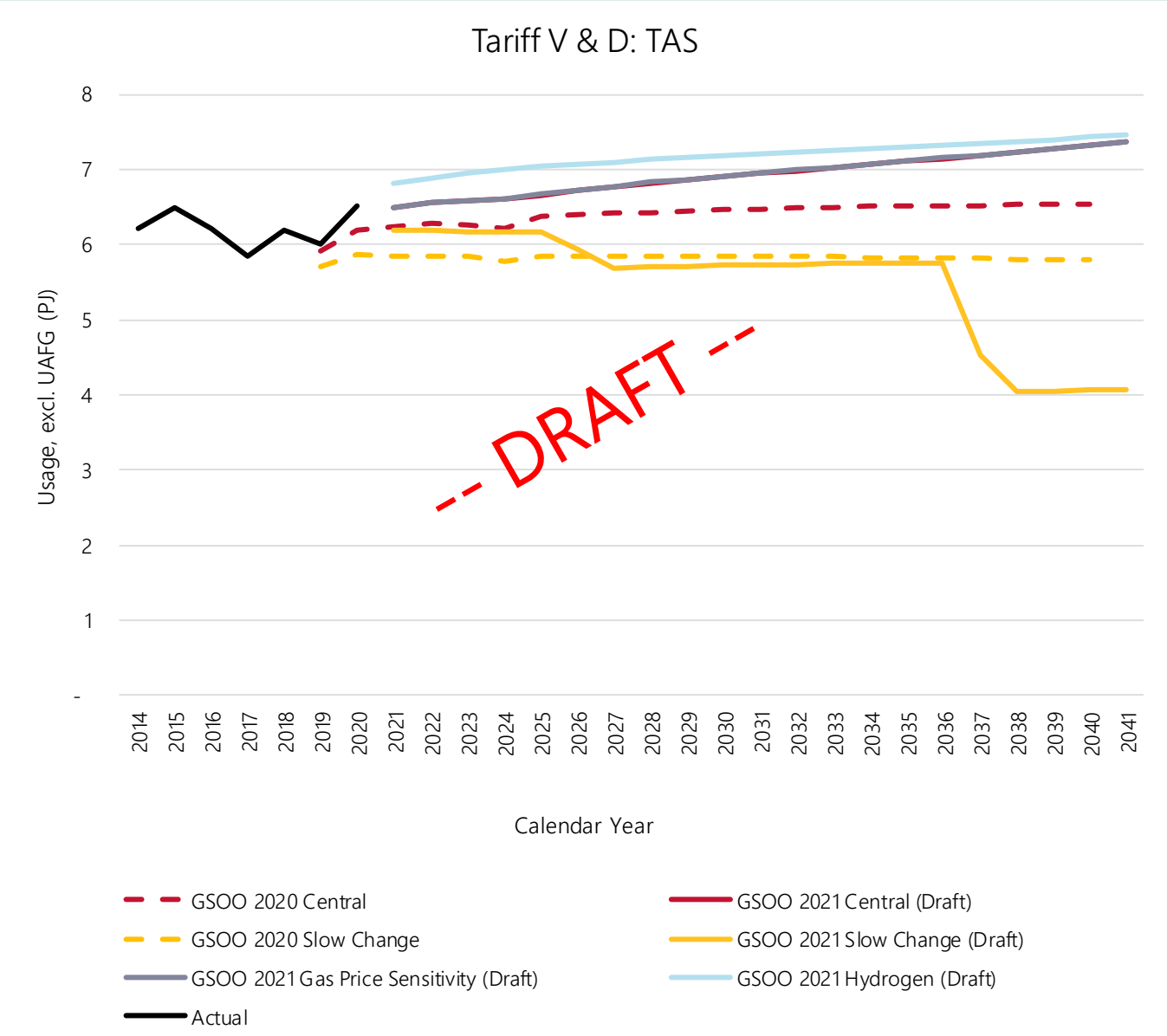
TAS all scenarios

The draft 2021 Central forecast remains similar to the 2020 GSOO Central forecast.

Updates have resulted in changes to large industrial load closure assumptions, driving negative growth in the Slow Change.

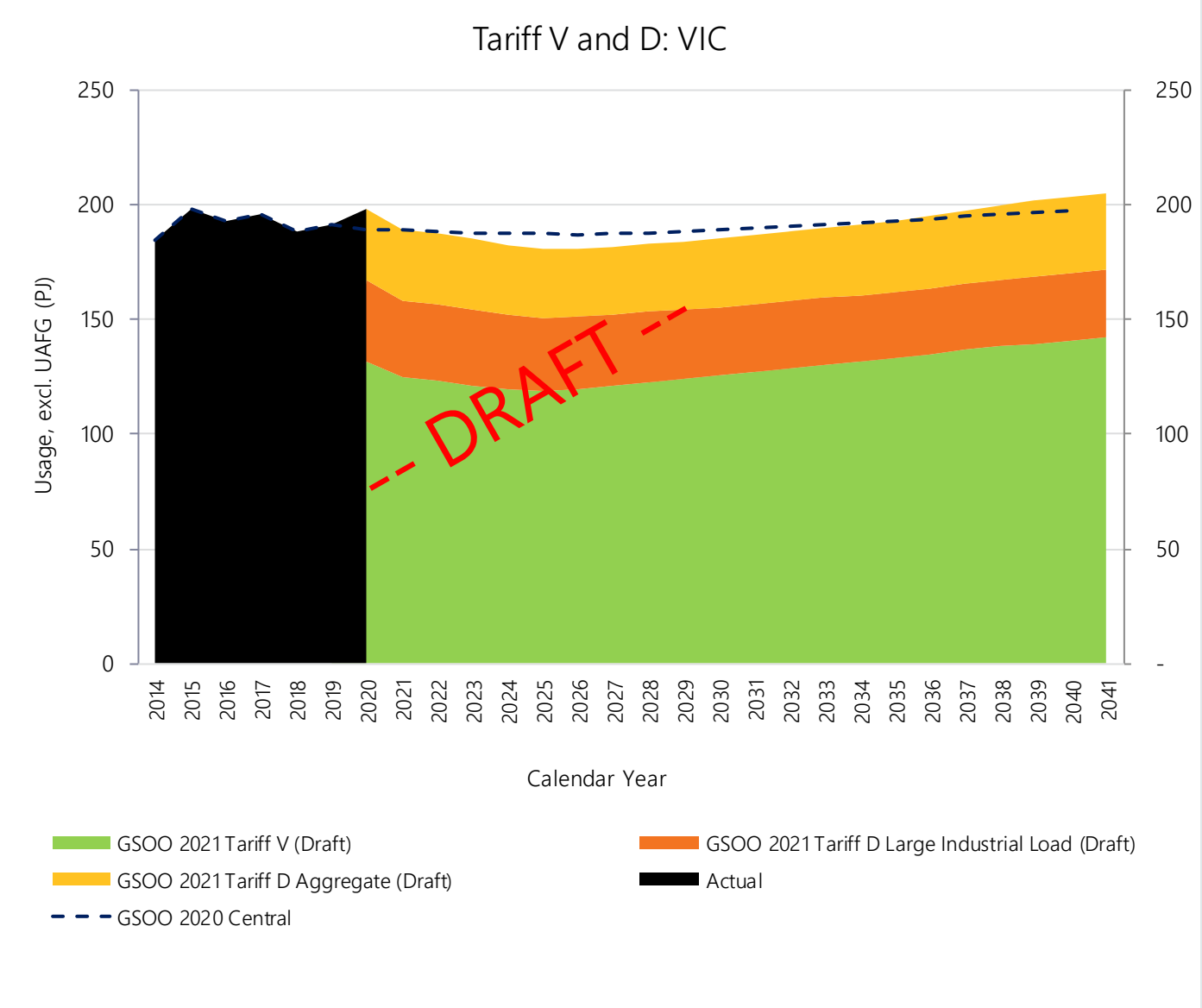
Lower Hydrogen impact in Tasmania compared to other regions due to:

- lesser amounts of gas consumption in the distribution network that would use hydrogen-blended gas,
- limited opportunities for fuel switching identified for transmission connected facilities.



VIC Central scenario stacked

An update to the state energy efficiency scheme projections for the draft 2021 forecasts impacts both the Tariff V and Tariff D forecasts with a larger decline in gas usage expected in the mid 2020s compared to the 2020 GSOO.



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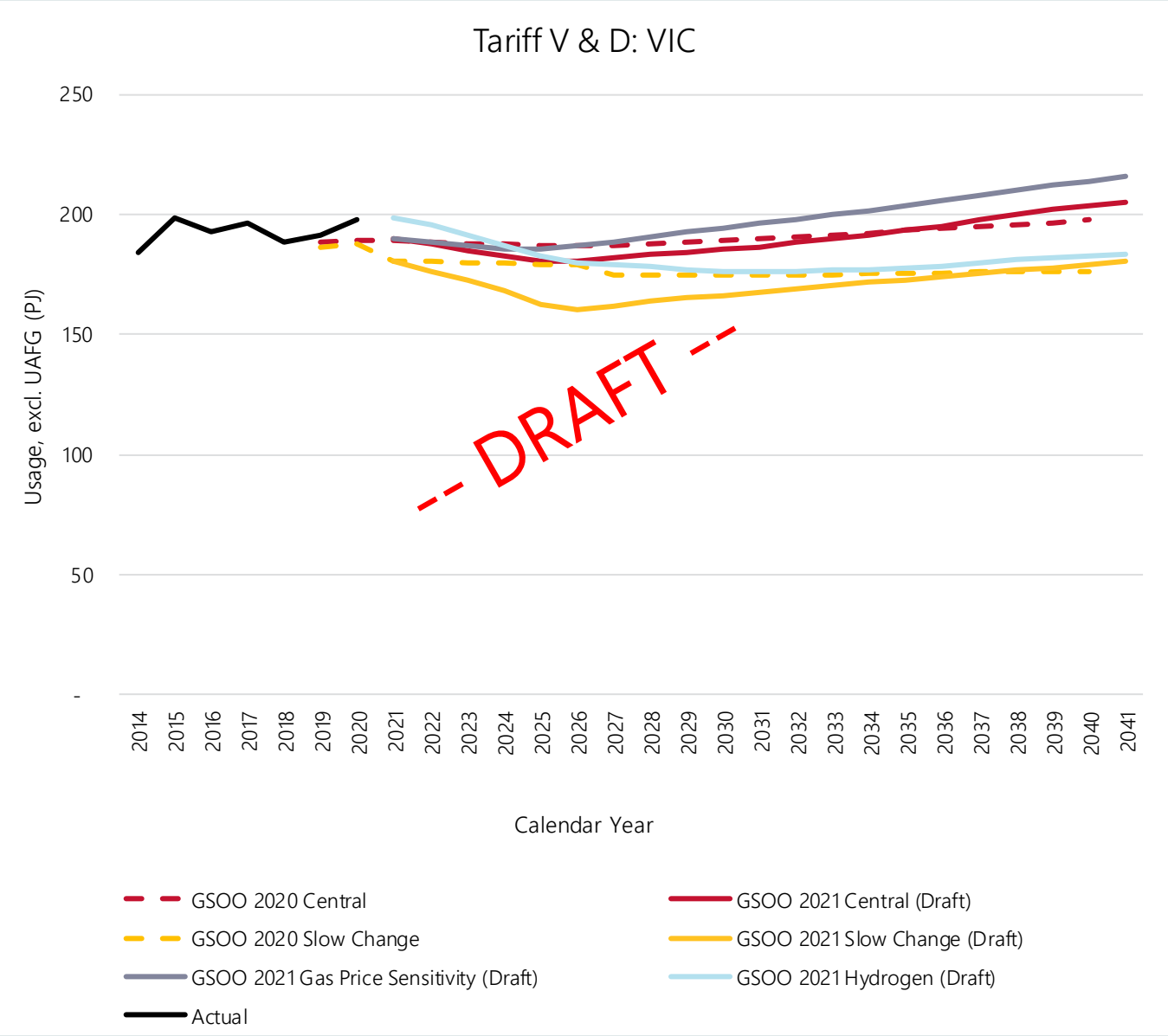
VIC all scenarios

State energy efficiency schemes for both Tariff V and D result in negative growth over the next 5 years across all scenarios with the Hydrogen scenario seeing the greatest impact.

Afterwards, increased growth in the mid- to long- term is expected as projected energy efficiency savings slow across Central and Hydrogen scenarios. Tariff V shows stronger year on year growth in the long-term relative to last years forecast due to updated connections forecasts.

The Hydrogen scenario sees flat growth beyond the mid 2020s due to blending of hydrogen into the distribution network offsetting connections growth.



Appendix: Model inputs by region

1. Tariff V: Connections
2. Tariff V: Energy efficiency (excl TAS Residential)
3. Tariff V: Fuel switching (excl QLD)
4. Tariff V: Retail price forecast
5. Tariff D: Economic forecast

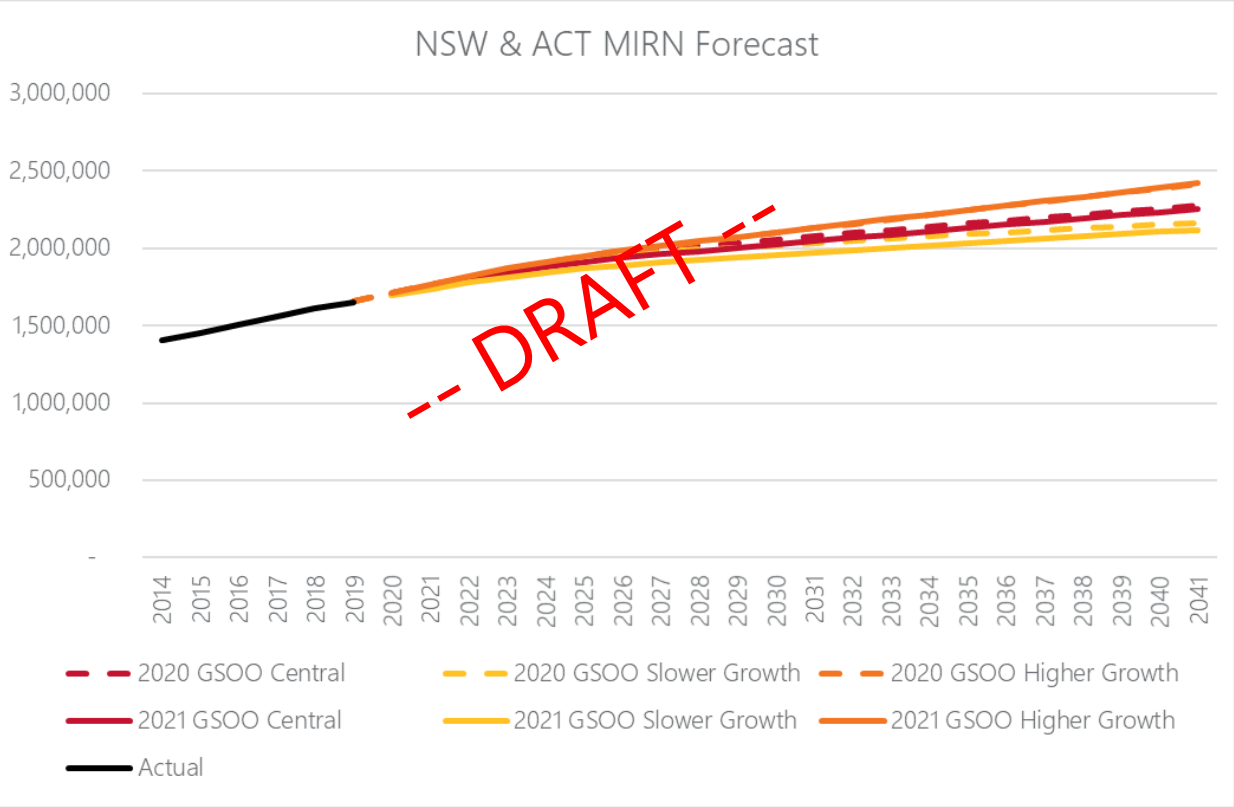
New South Wales

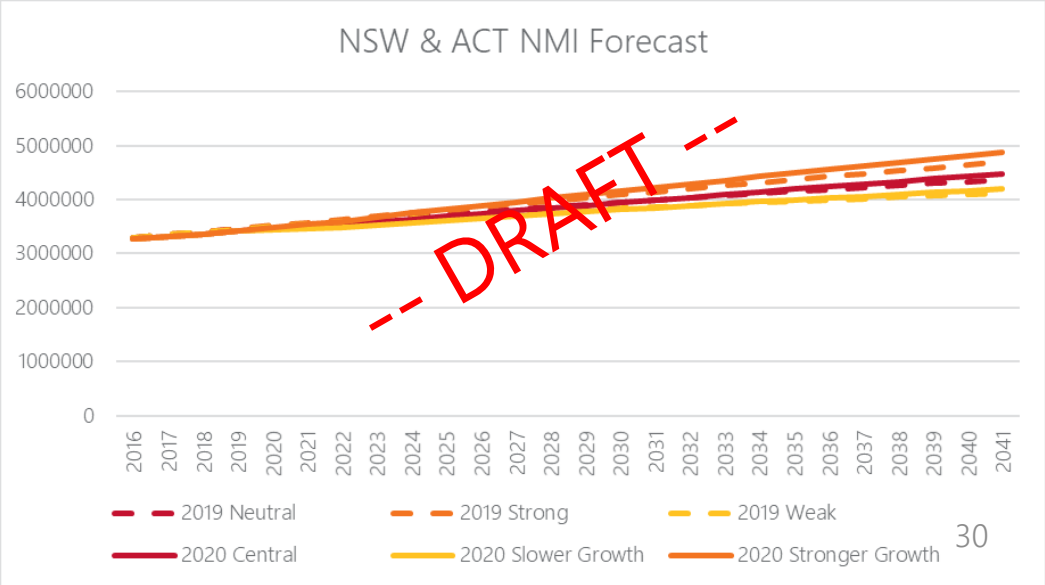
Connections lower than 2020 GSOO

The ACT govt has committed to legislating the banning of new gas mains network connections to future stages of residential greenfield sites in 2021-22.

MIRN forecast assumes no new residential connections in 2023 for the ACT, slightly slowing the regional forecast.

Linking to NMI growth in the long term leads to stronger growth





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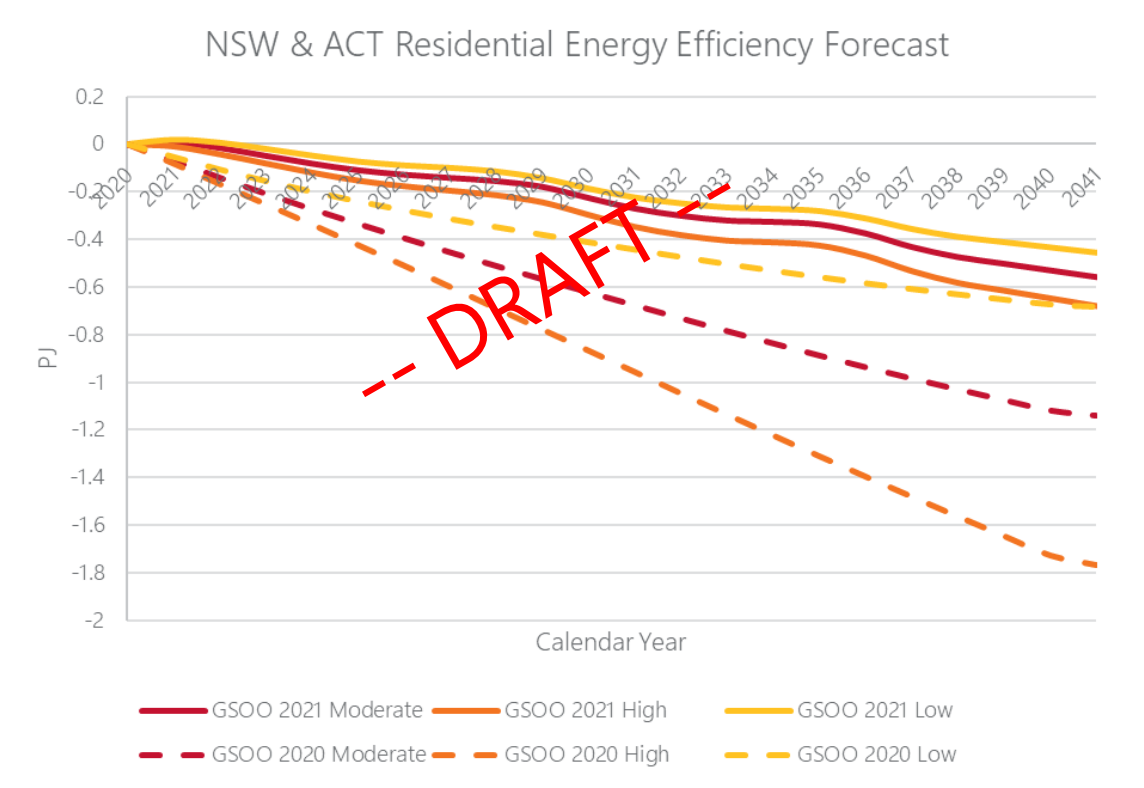
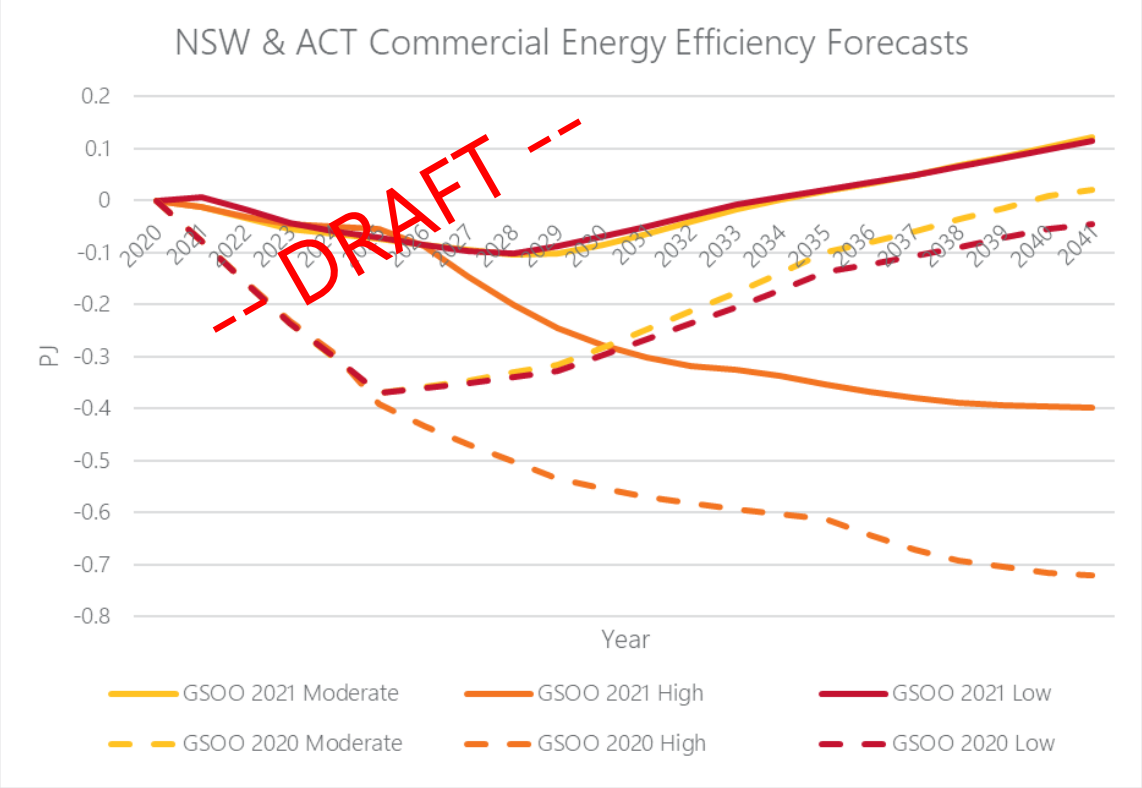
Energy Efficiency

Residential



Commercial



Residential: Revised forecast for NSW state-based scheme, resulting in slightly lower EE forecasts (incentive to switch to efficient gas water heaters), and hence lesser reduction to the Tariff V forecast. Revised residential stock model.

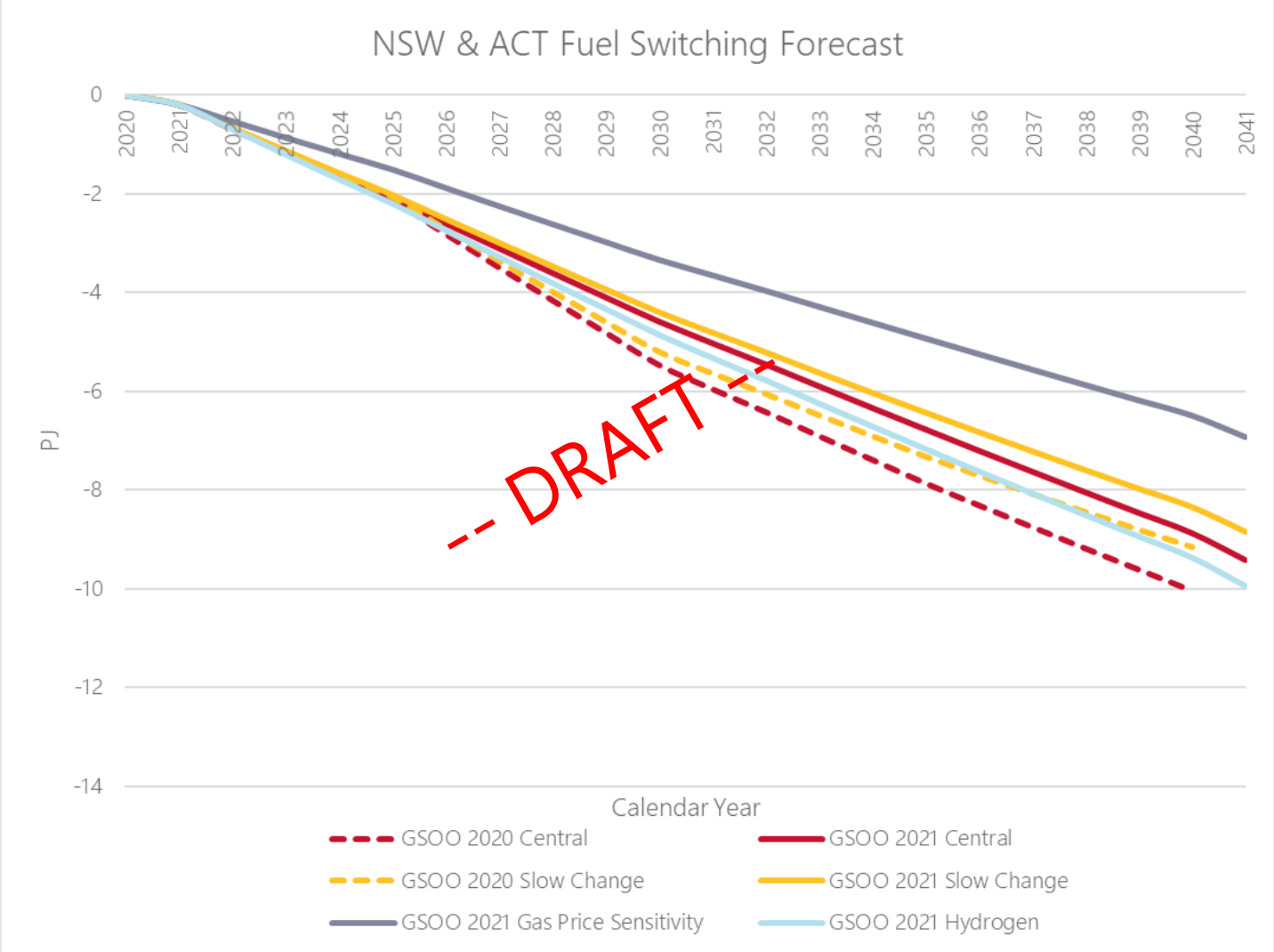
Commercial: Updated forecast for state-based scheme, revised heat base split*

*Note: *Heating load (temperature-sensitive) is separated from Base load (temperature insensitive) in order to track these components separately, due to having different drivers*

Fuel switching lower than 2020 GSOO

Differences due to an updated residential stock model that underpins the electricity and gas connection forecasts, and limiting fuel switching in the ACT to existing appliances, beyond 2023.

Policies relate to residential water heating and space heating.



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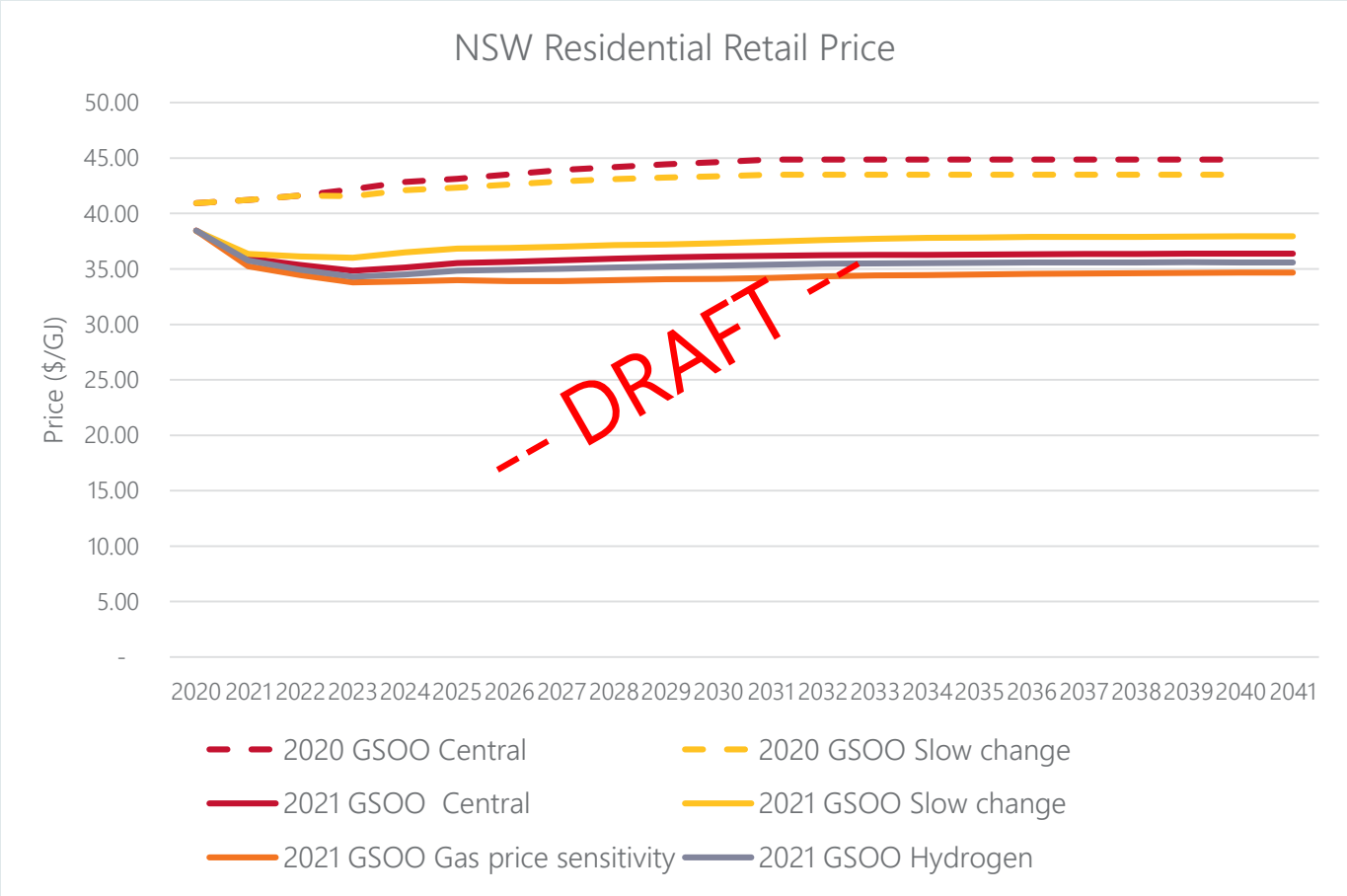
Residential retail price forecast

Lower retail prices are the result of lower wholesale prices, distribution costs (AER's 2020-25 determination for Jemena) and retail margin (2021 contract rates).



Commercial retail price forecast

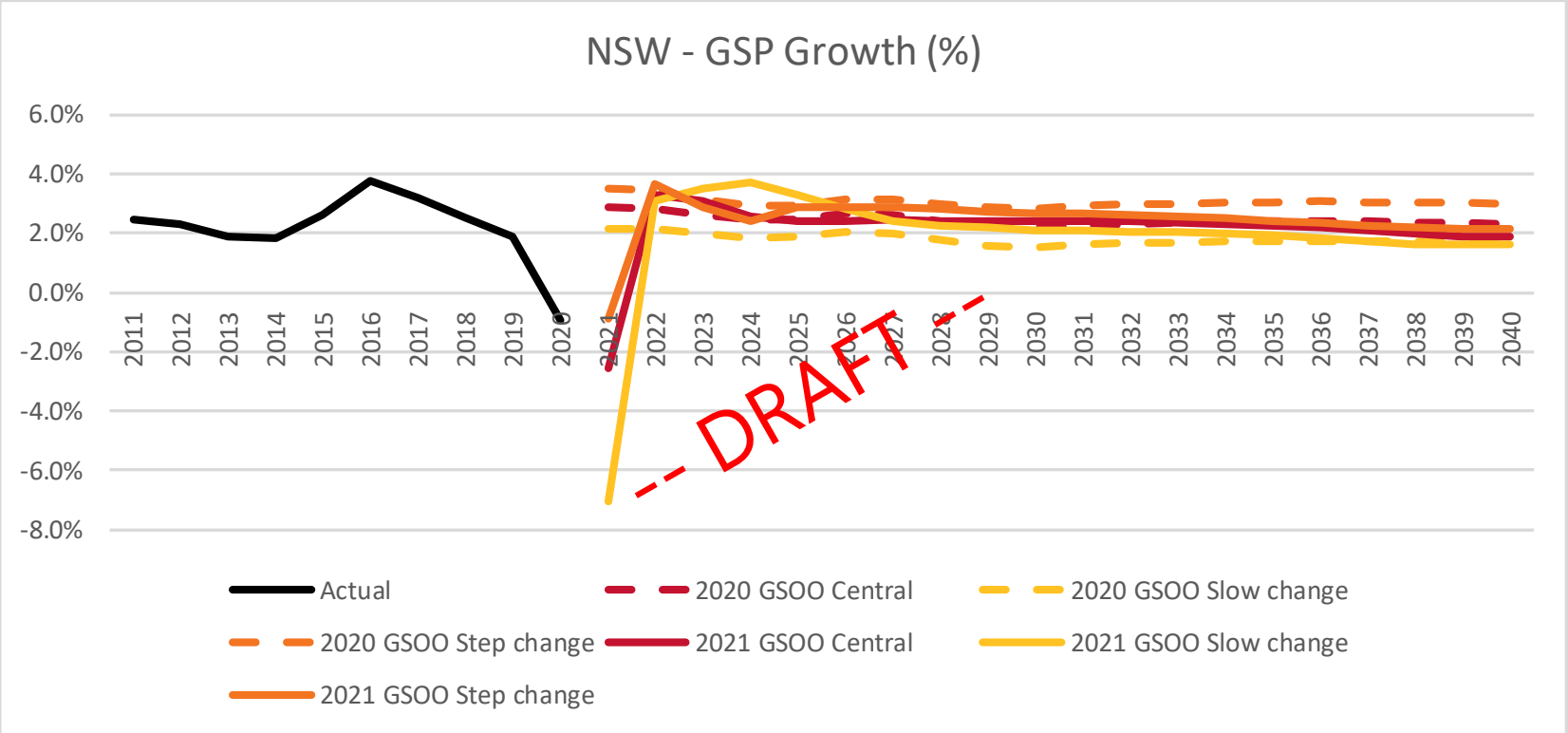
Lower retail prices are the result of lower wholesale prices and distribution costs

In the 2020 GSOO, the slow change scenario was based on low prices; central scenario was based on medium prices

Economic forecasts

GSP growth in NSW has been dramatically impacted by COVID-19, with a 1.0% contraction projected for FY21.

BIS Oxford anticipate the recovery will be prolonged, not reaching trend until the mid-2020s and GDP will be permanently lower than forecast in GSOO 2020



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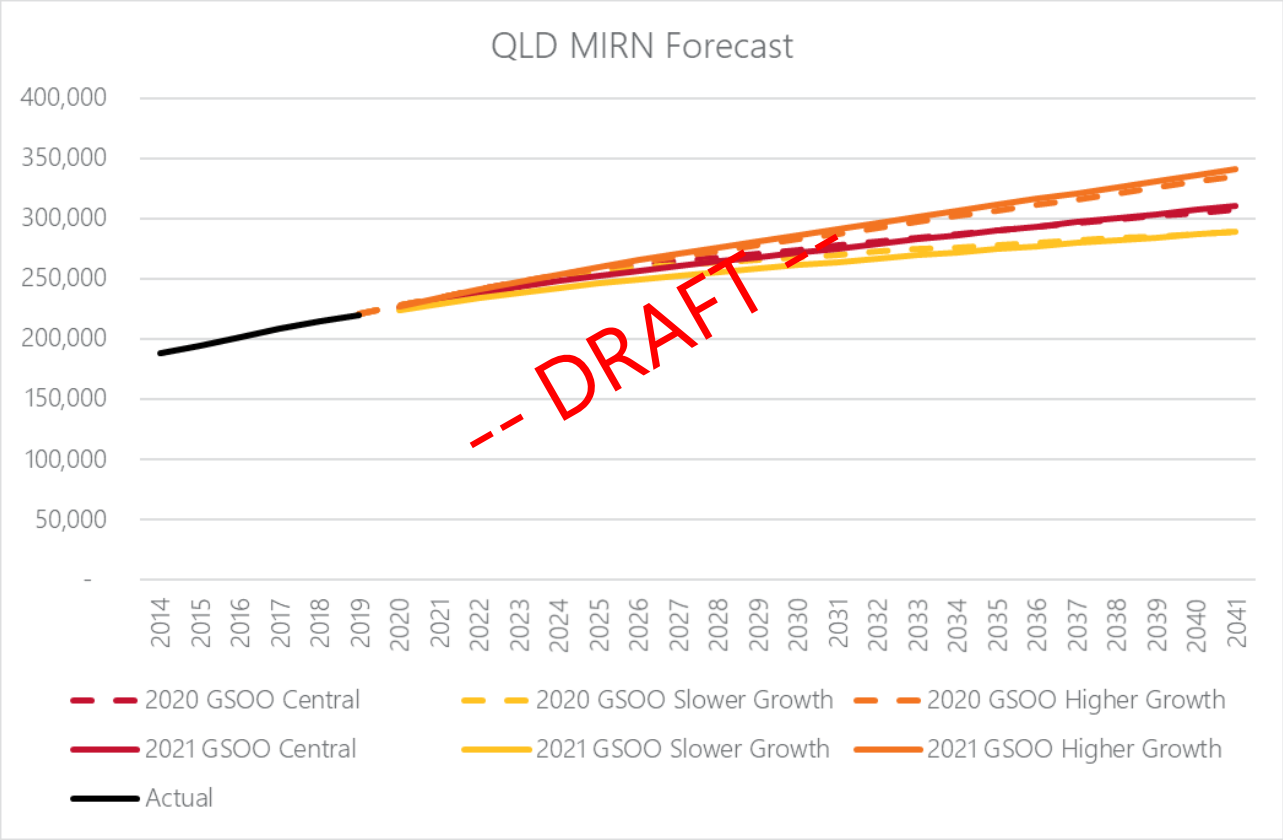
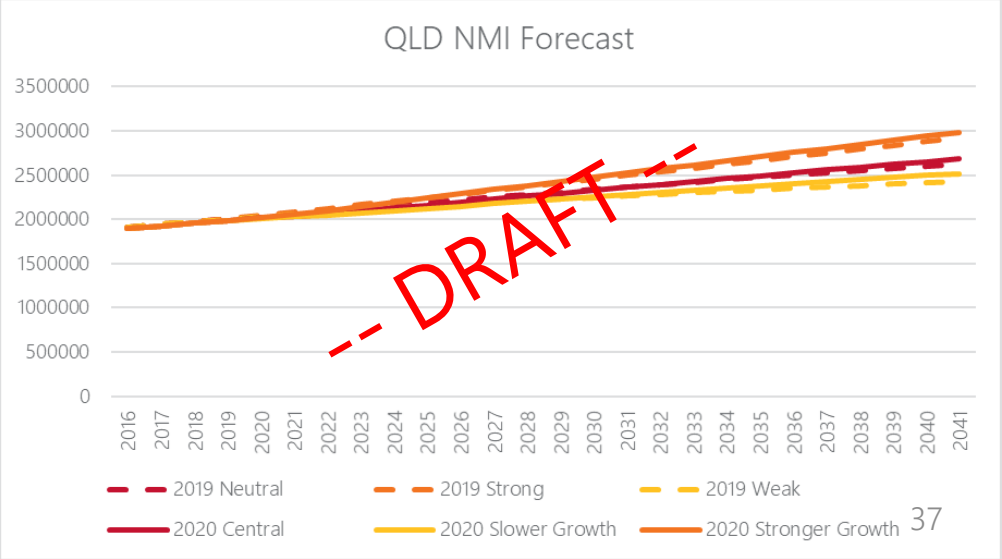
Queensland

Connections similar to 2020 GSOO

Stronger NMI forecast is tempered in the MIRN forecast for Slow Change and Central scenarios, because of updated historical growth trend in MIRN connections in the early years.





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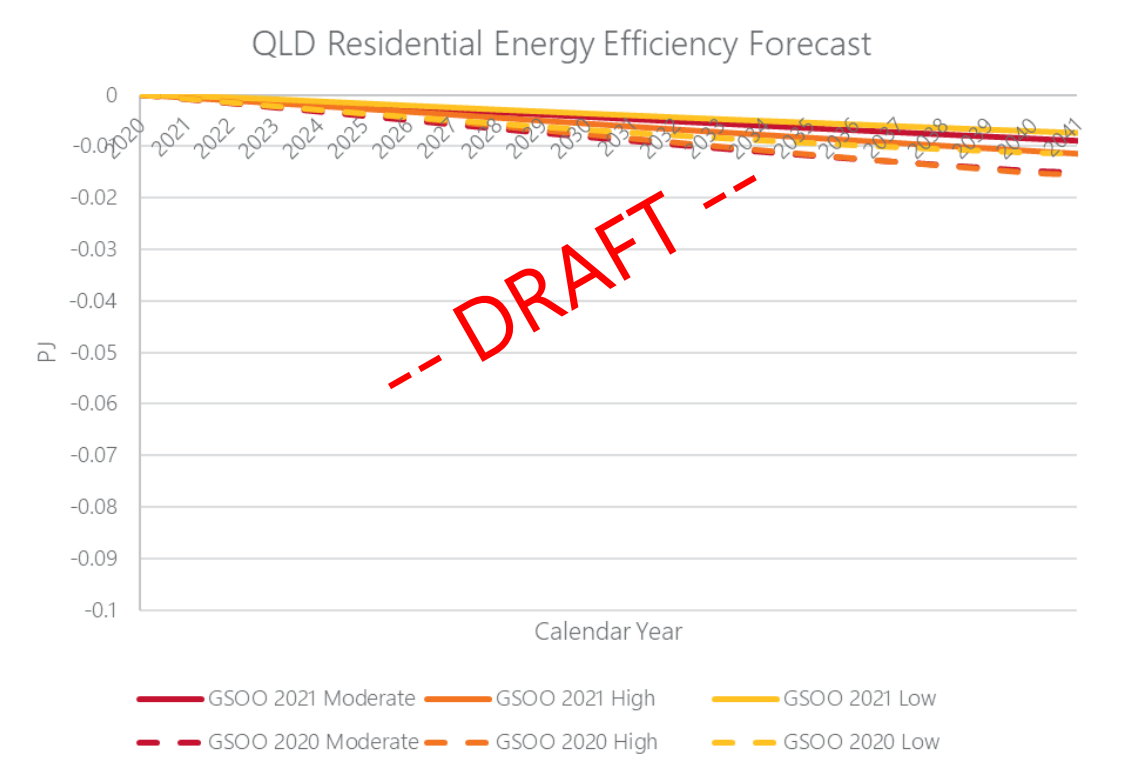
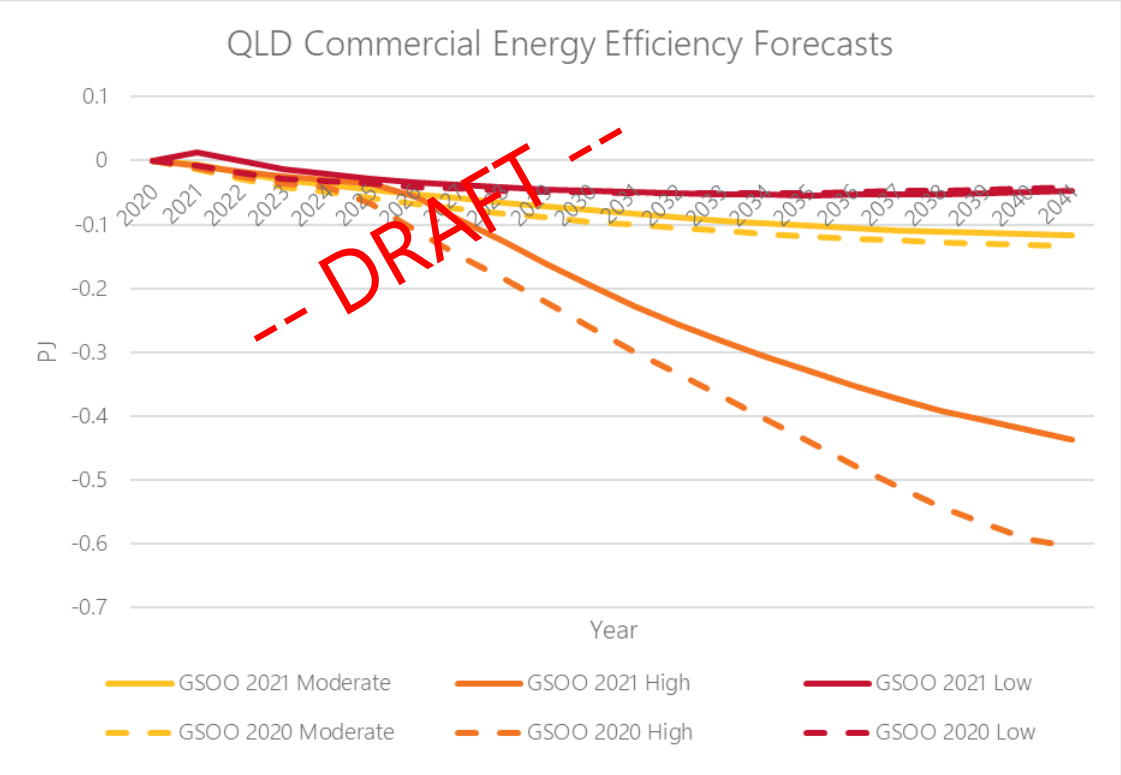
Energy Efficiency

Residential



Commercial



Residential: Revised residential stock model; and updated heat base split

Commercial: updated heat base split and rebased for 2020

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Residential retail price forecast

Lower retail prices are the result of lower wholesale prices, distribution costs and retail margin.

In the 2020 GSOO, the slow change scenario was based on low prices; central scenario was based on medium prices

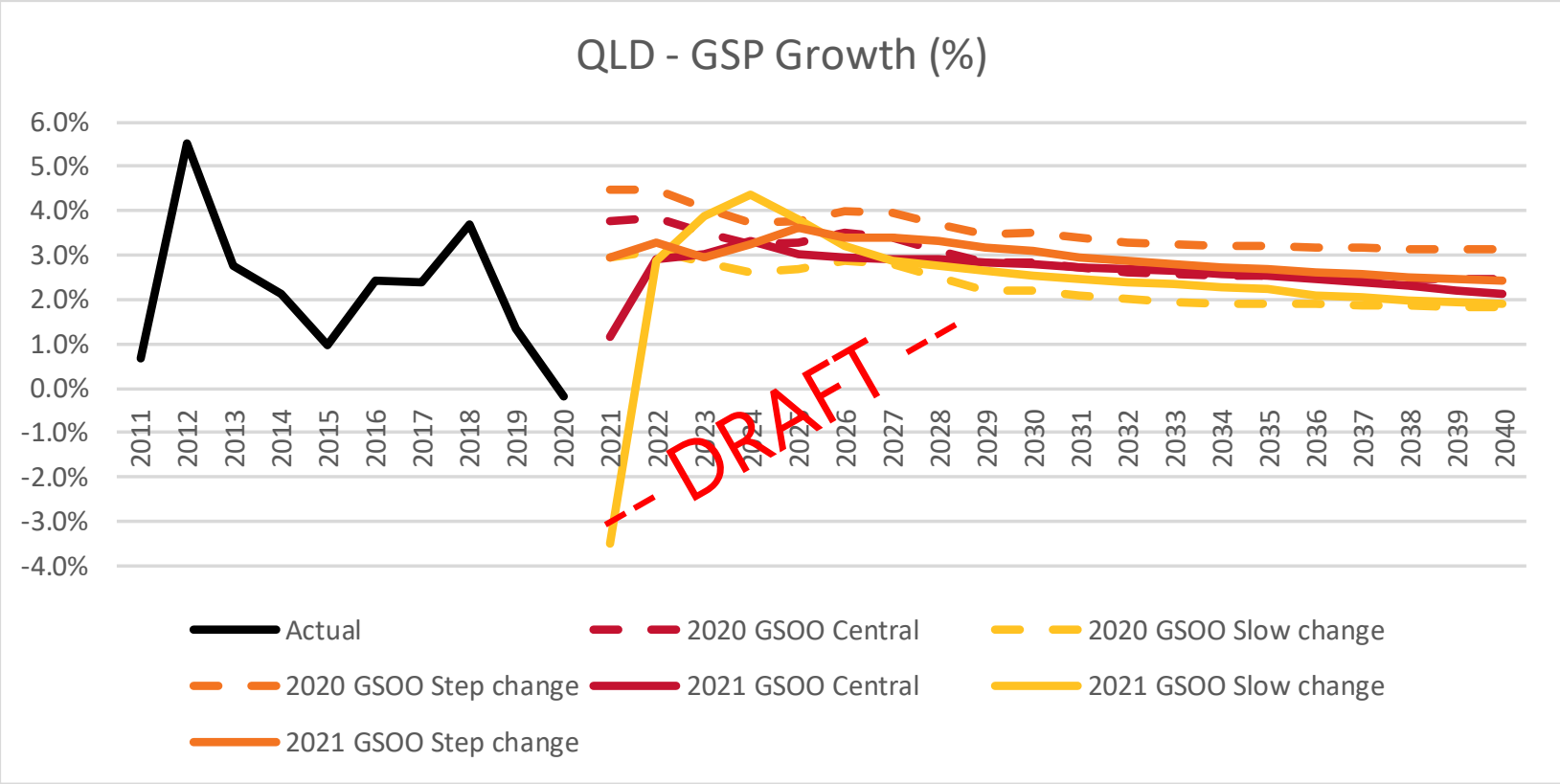
Commercial retail price forecast

Lower retail prices are the result of lower wholesale prices and retail margin

In the 2020 GSOO, the slow change scenario was based on low prices; central scenario was based on medium prices

Economic forecasts

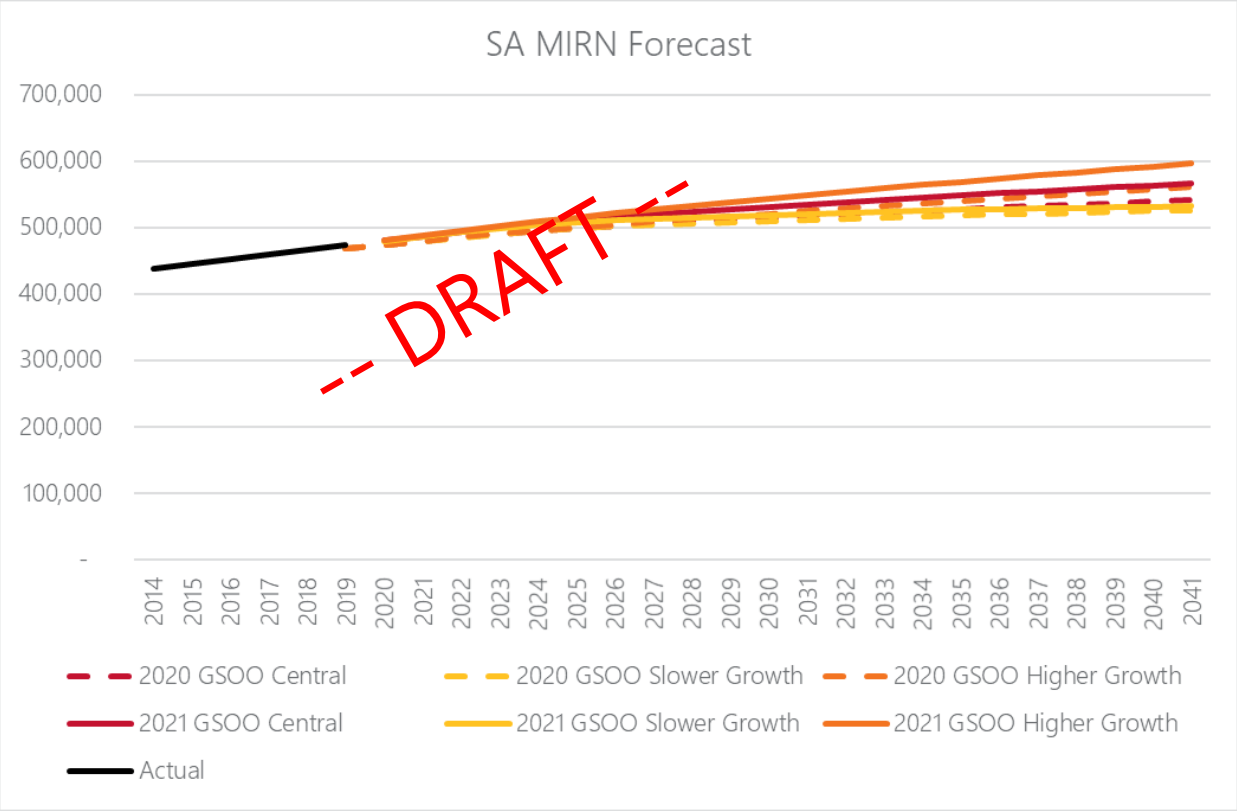
Qld's GSOO 2021 Central GSP growth exhibits a similar long-term trajectory as the GSOO 2020 Central due to the successful containment of the virus resulting in a quicker recovery and less permanent scarring

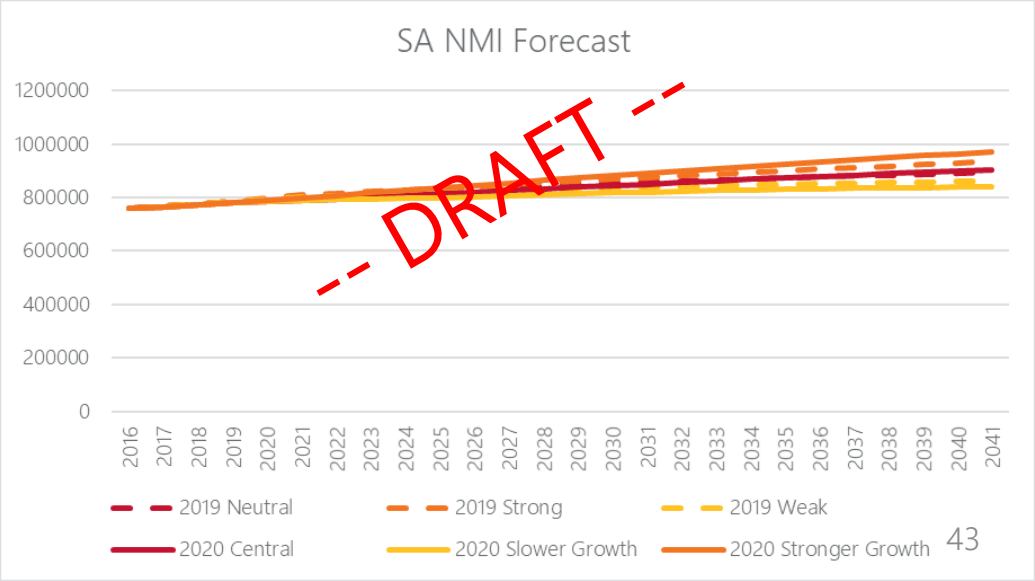


South Australia

Connections

Greater spread plus stronger central and higher growth due updated NMI forecast and updated historical trend data





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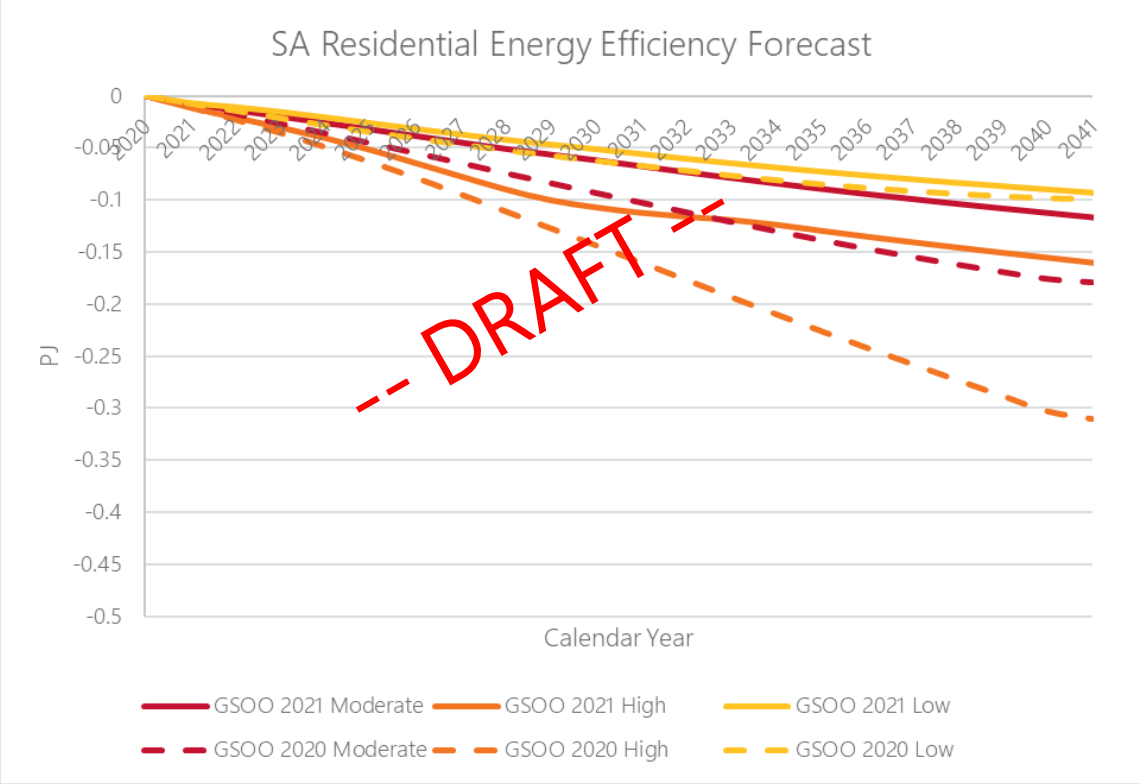
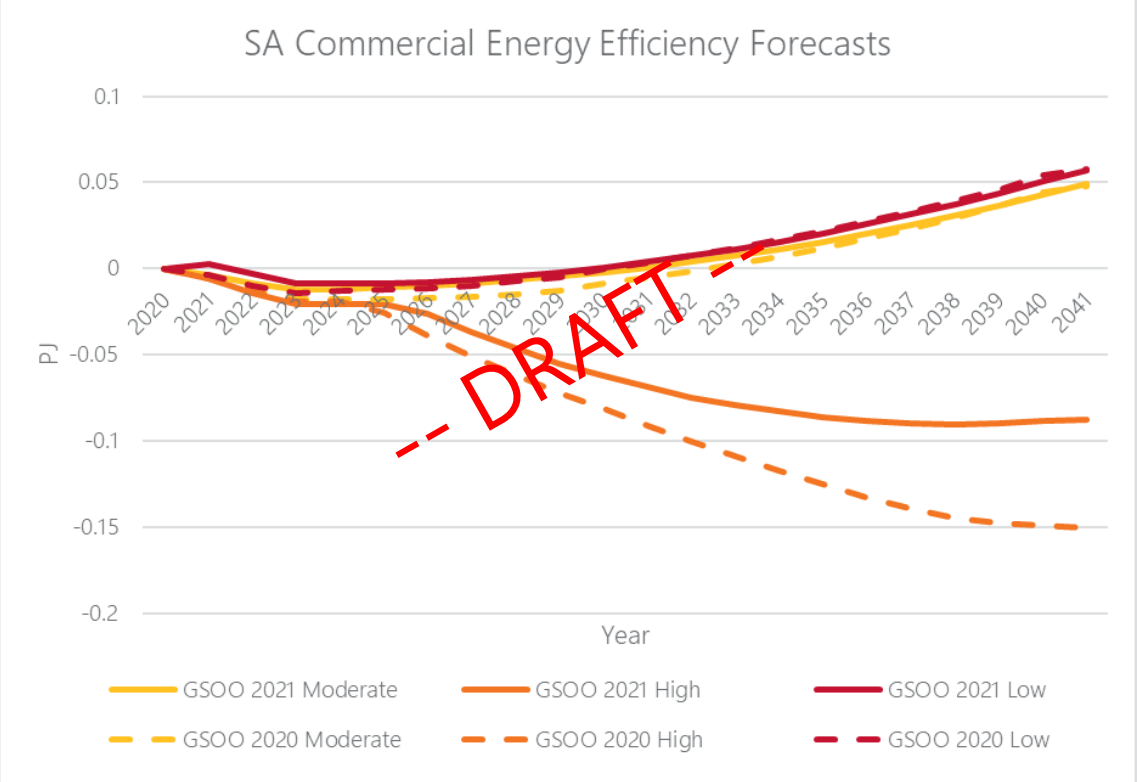
Energy Efficiency

Residential



Commercial

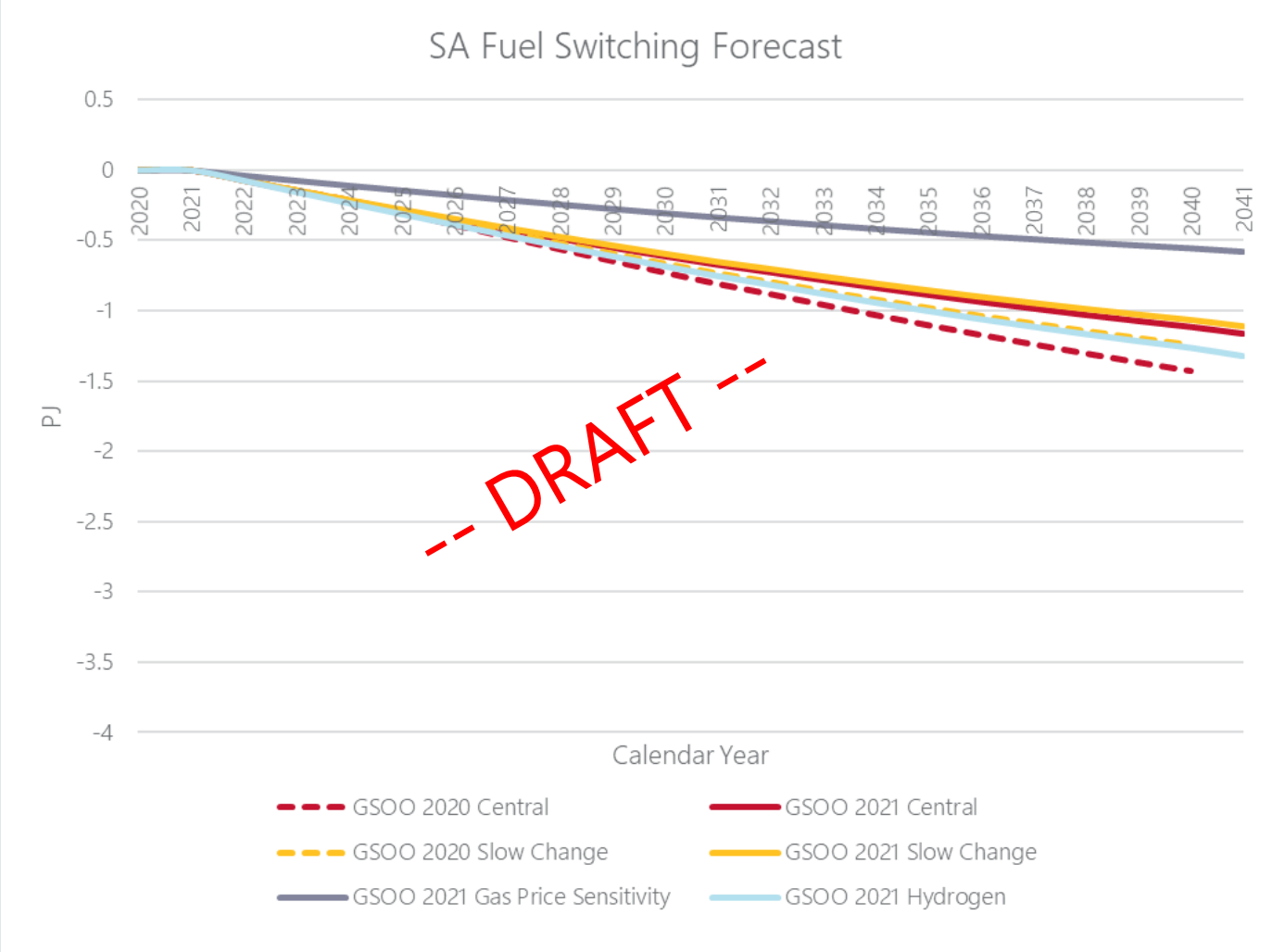


Residential: Revised forecast for SA state-based scheme leads to reduced EE savings in the high scenario; 75% of savings continue beyond deeming period; revised residential stock model; and updated heat base split.
Commercial: Revised state scheme information resulting is lower forecast along with model rebase and revised heat base split

Fuel switching lower than 2020 GSOO

Differences due to updated residential stock model underpinning the electricity and gas connections forecasts and revisions to fuel switching model for SA.

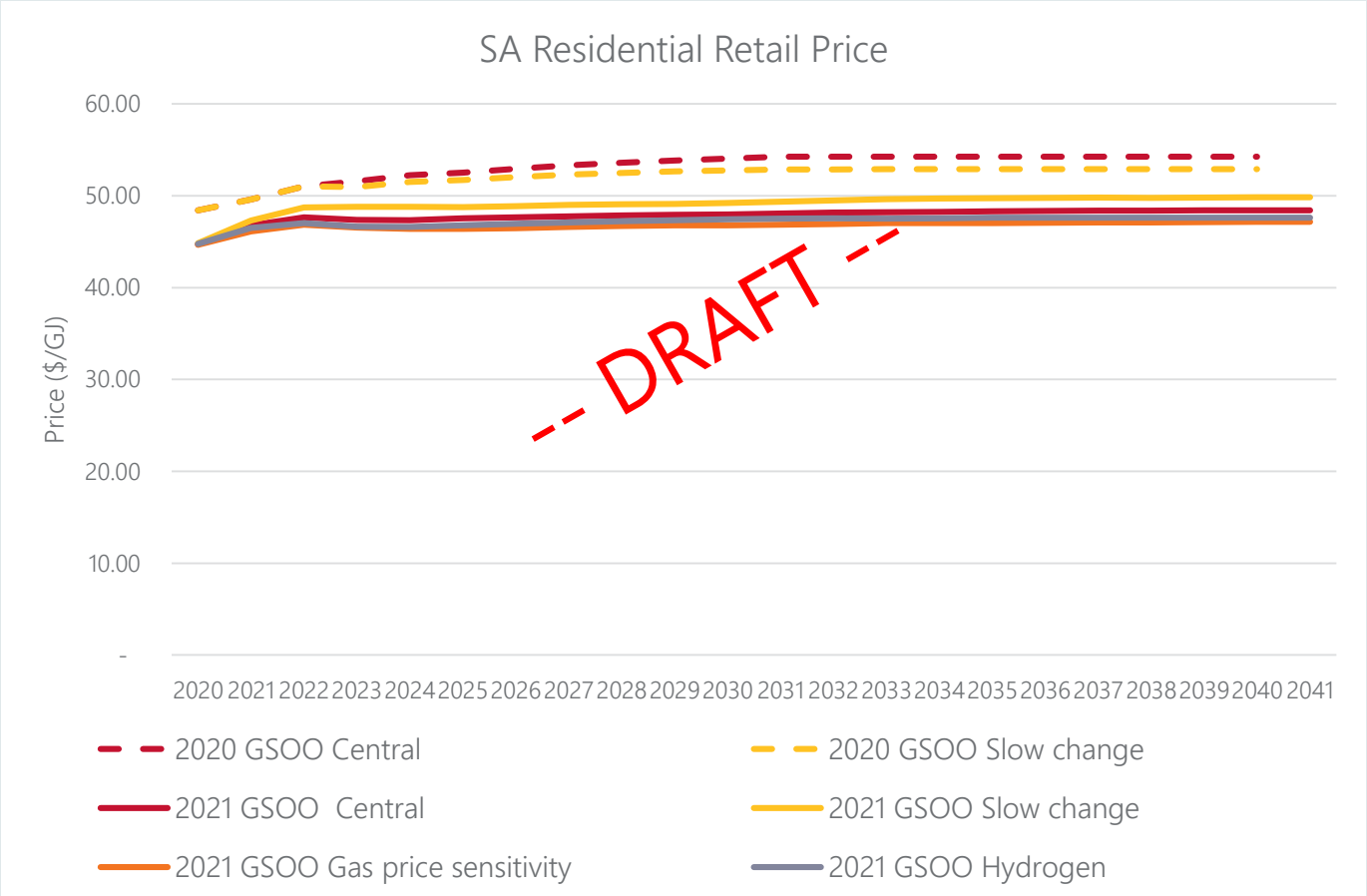
Policies relate to residential water heating and space heating.



Residential retail price forecast

Lower retail prices are the result of lower wholesale prices and retail margins

In the 2020 GSOO, the slow change scenario was based on low prices; central scenario was based on medium prices.



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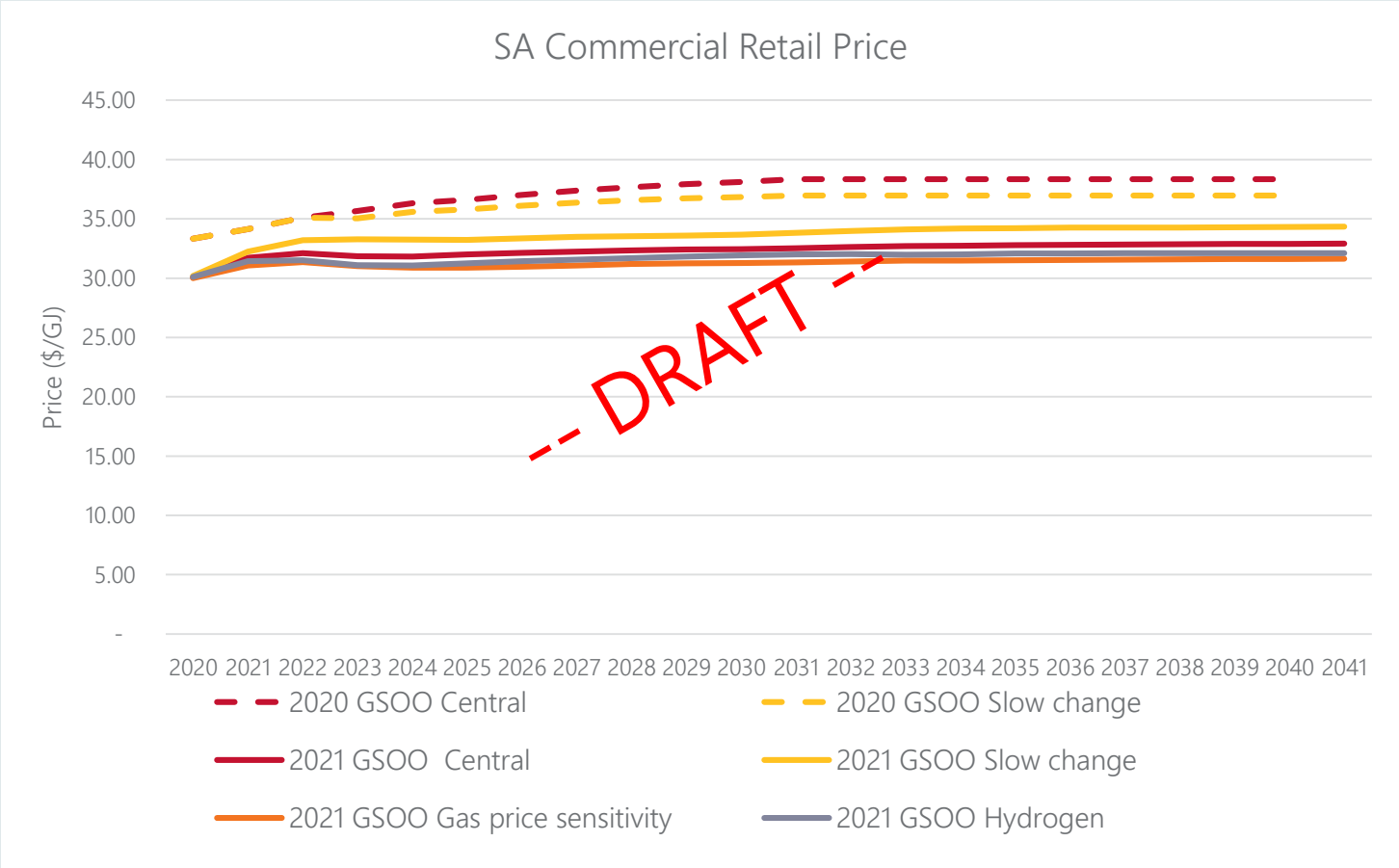
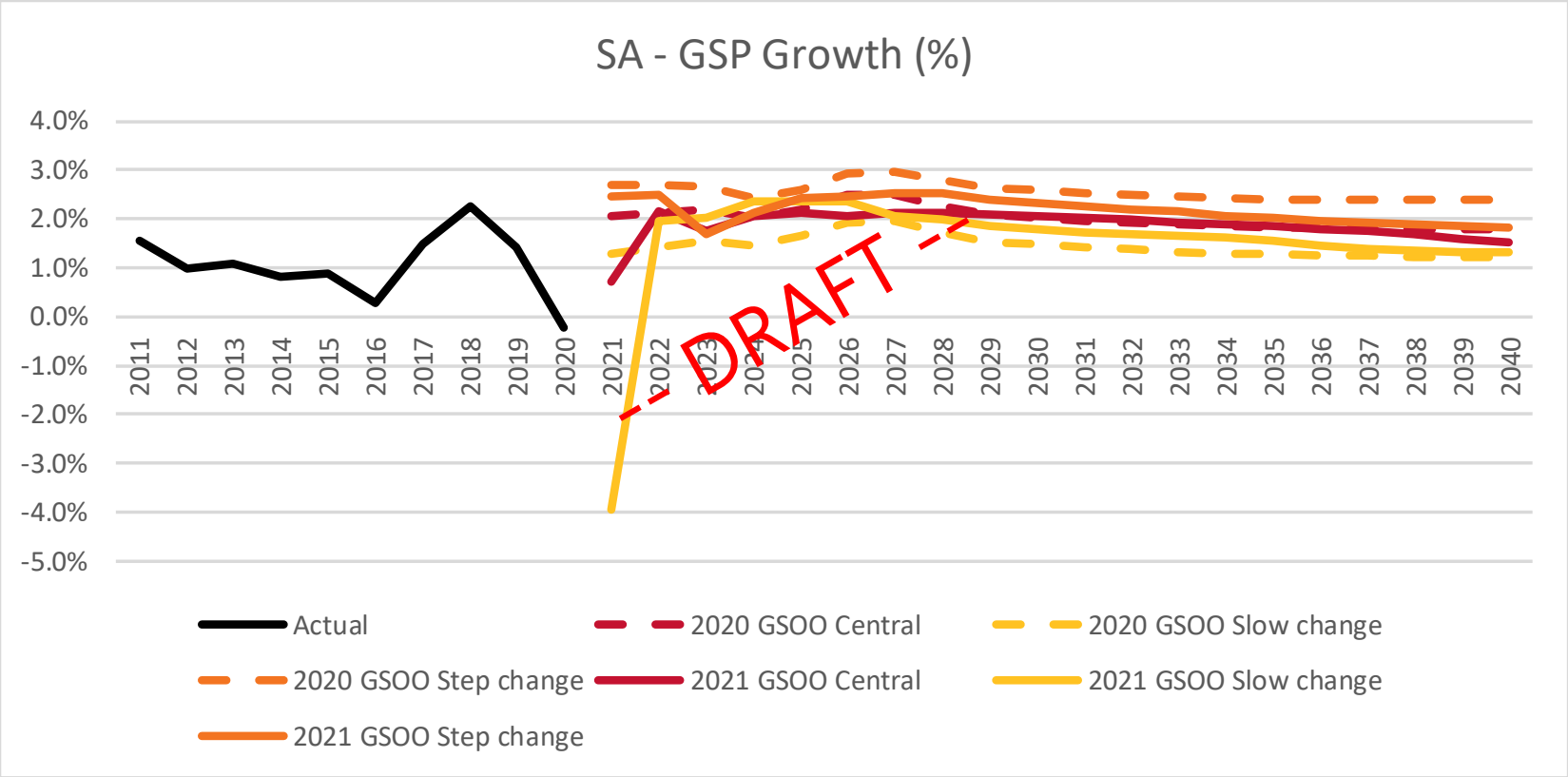


Economic forecasts

SA has not been as significantly impacted by COVID-19 as other regions due to a faster rebound in activity, and strong support from public spending, with a number of defence programs based in Adelaide.

Over the long-term however, BIS Oxford expects SA's economy to underperform against the other regions, due to the state's demographic outlook



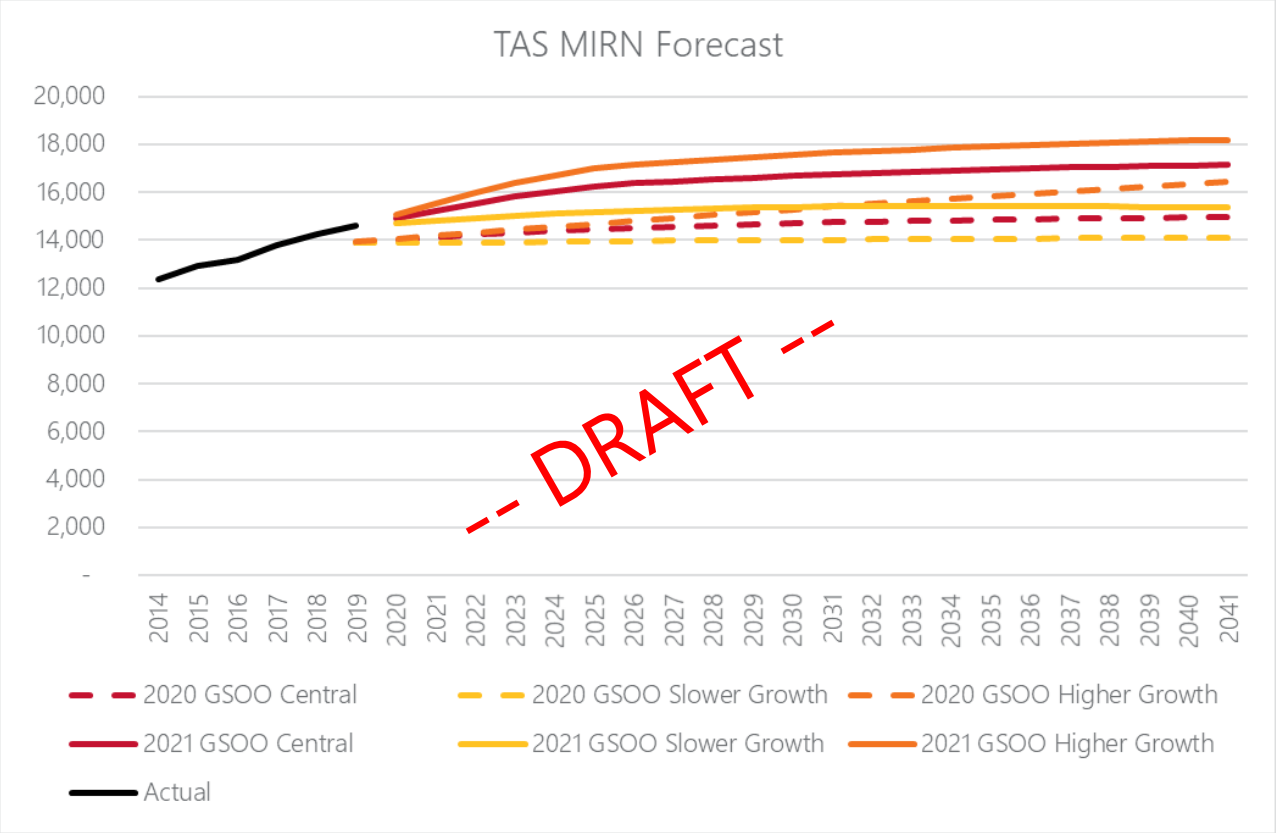
Tasmania

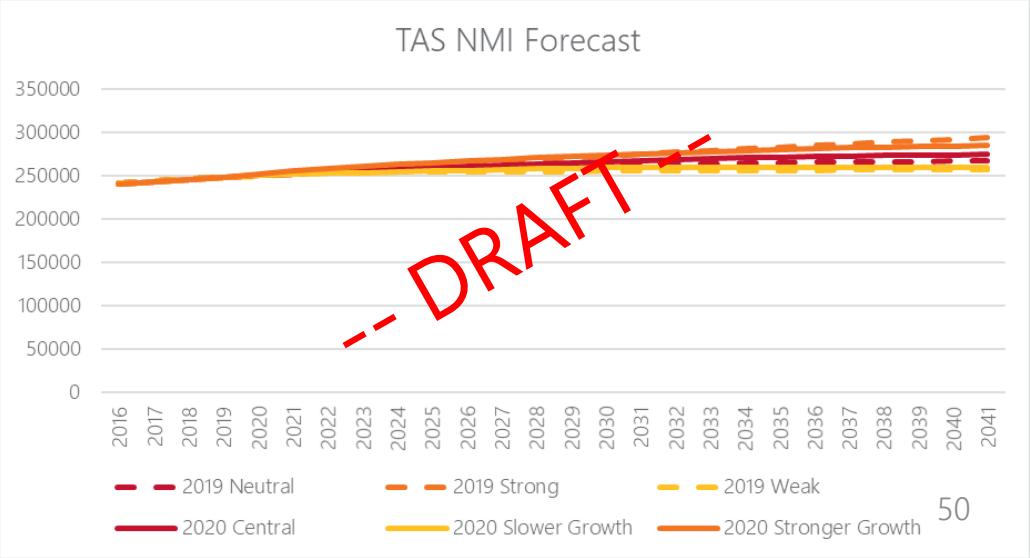
Connections

Short term historical trend forecast (based on data provided by TasGas and the regulator) gives stronger growth in short to medium term

NMI forecast gives slightly weaker growth beyond this

Updated survey data suggested a higher historical actuals count this year, hence the step up between actuals and the 2020 GSOO forecast.





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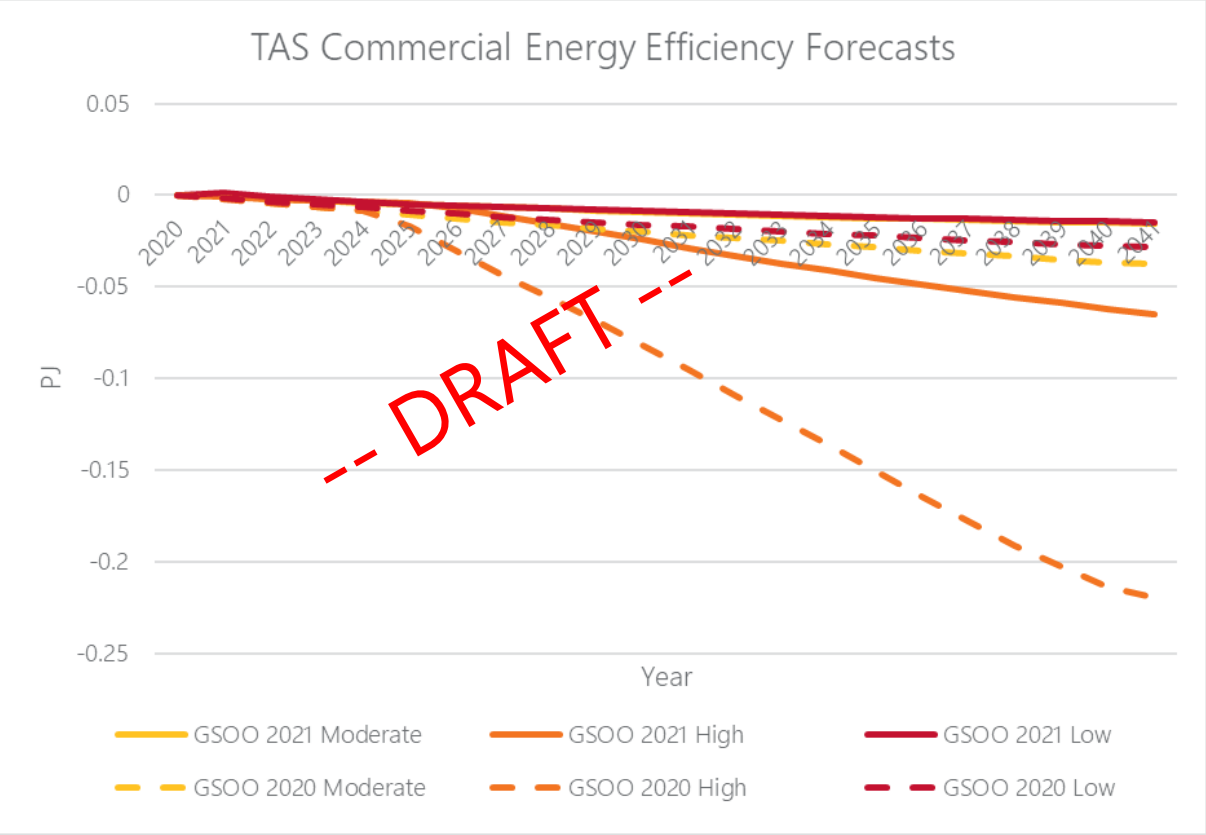
Energy Efficiency

Commercial



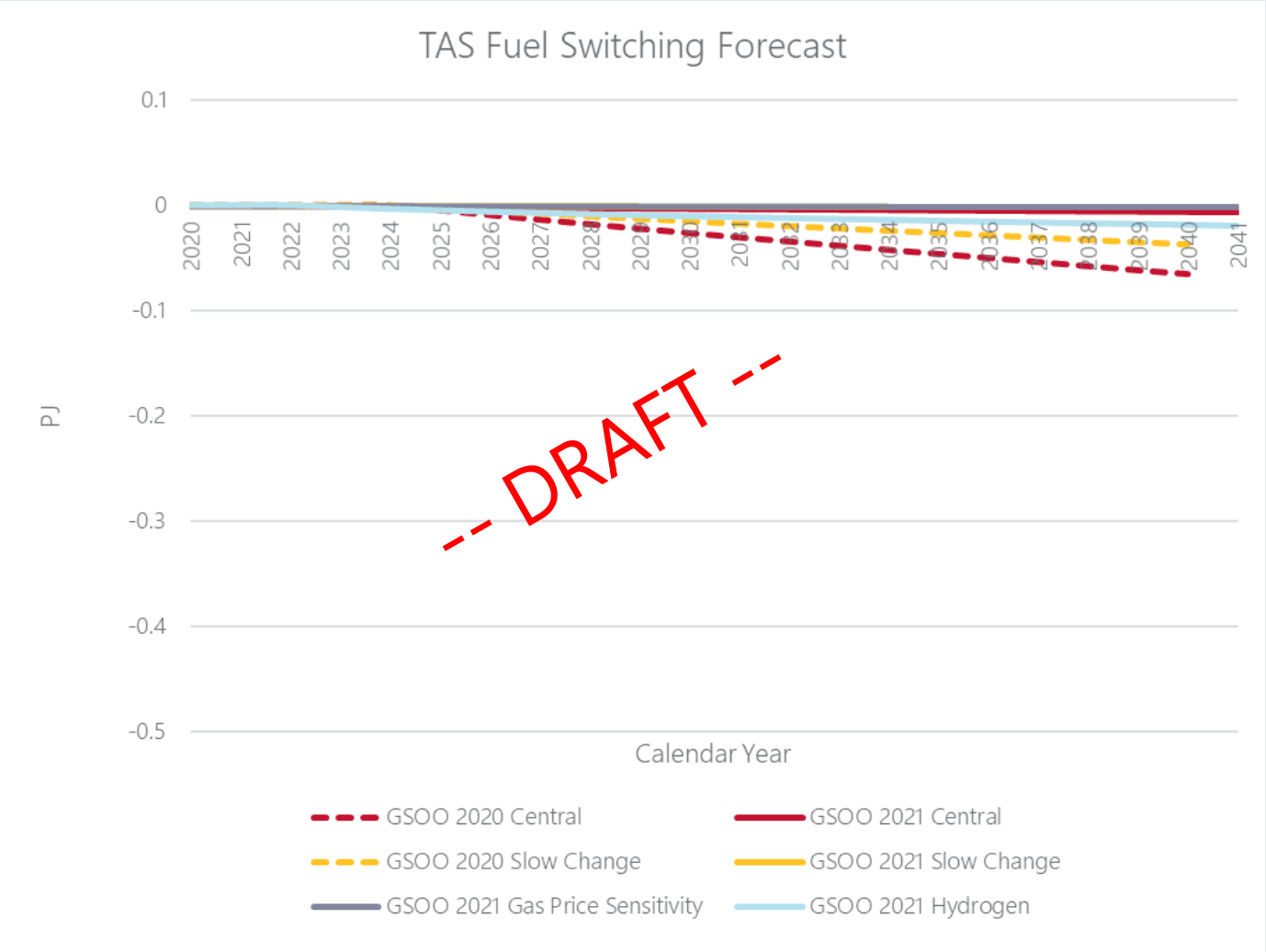
No Residential EE forecast, inline with previous GSOOs

Commercial rebased to 2020 and revised heat-base split

Fuel switching limited in 2021GSOO

Differences compared to 2020 GSOO due to updated residential stock model and revisions to fuel switching model for TAS.

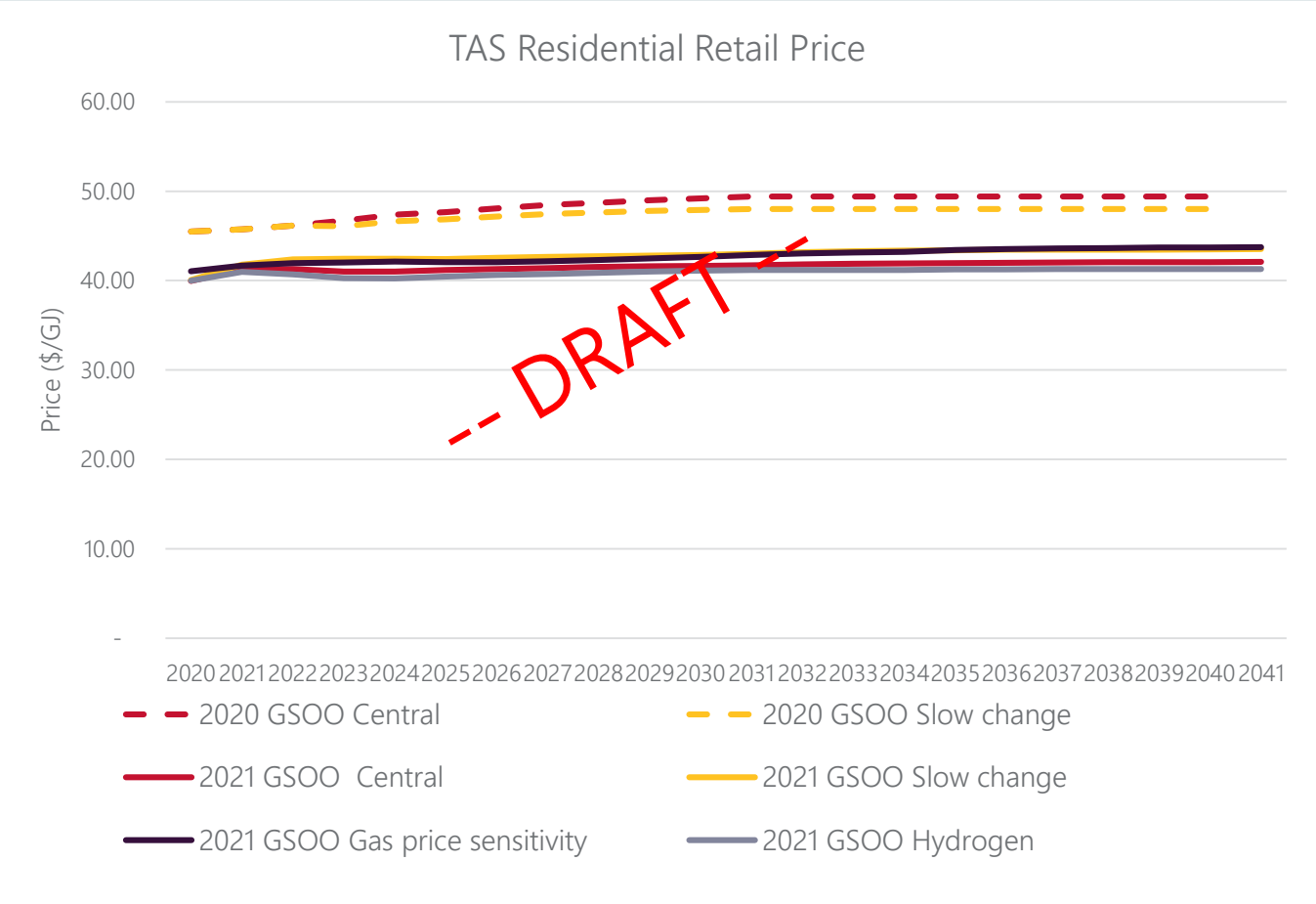
Policies relate to residential water heating and space heating.



Residential retail price forecast

Lower retail prices are the result of lower wholesale prices and distribution costs (which were based on Vic costs as Tas does not publish tariffs).

In the 2020 GSOO, the slow change scenario was based on low prices; central scenario was based on medium prices.



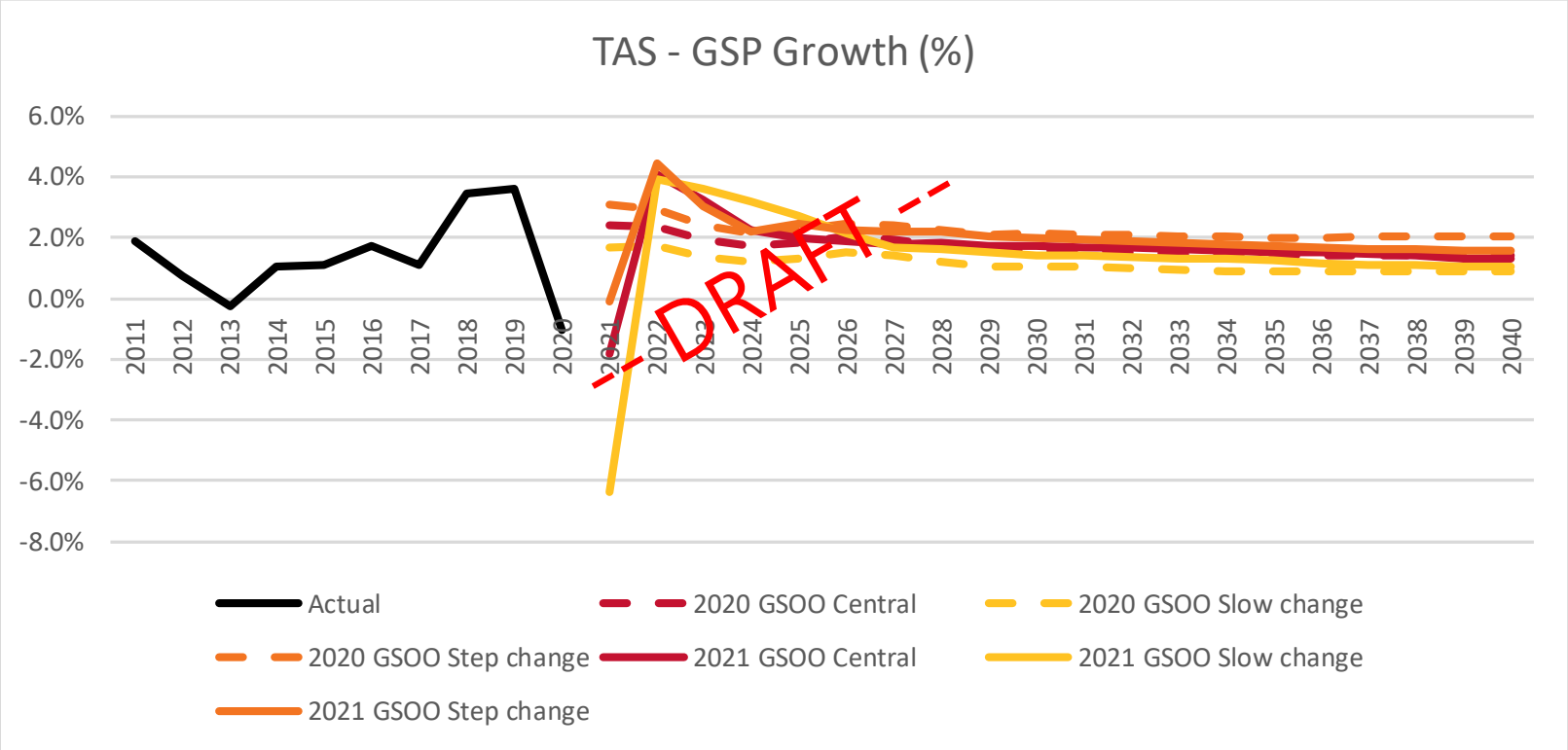
Commercial retail price forecast

Lower retail prices are the result of lower wholesale prices and distribution costs (which were based on Vic costs as Tas does not publish tariffs).

In the 2020 GSOO, the slow change scenario was based on low prices; central scenario was based on medium prices.

Economic forecasts

Tasmania's economy is exposed to the impact of COVID-19 because of its reliance on tourism and international students.

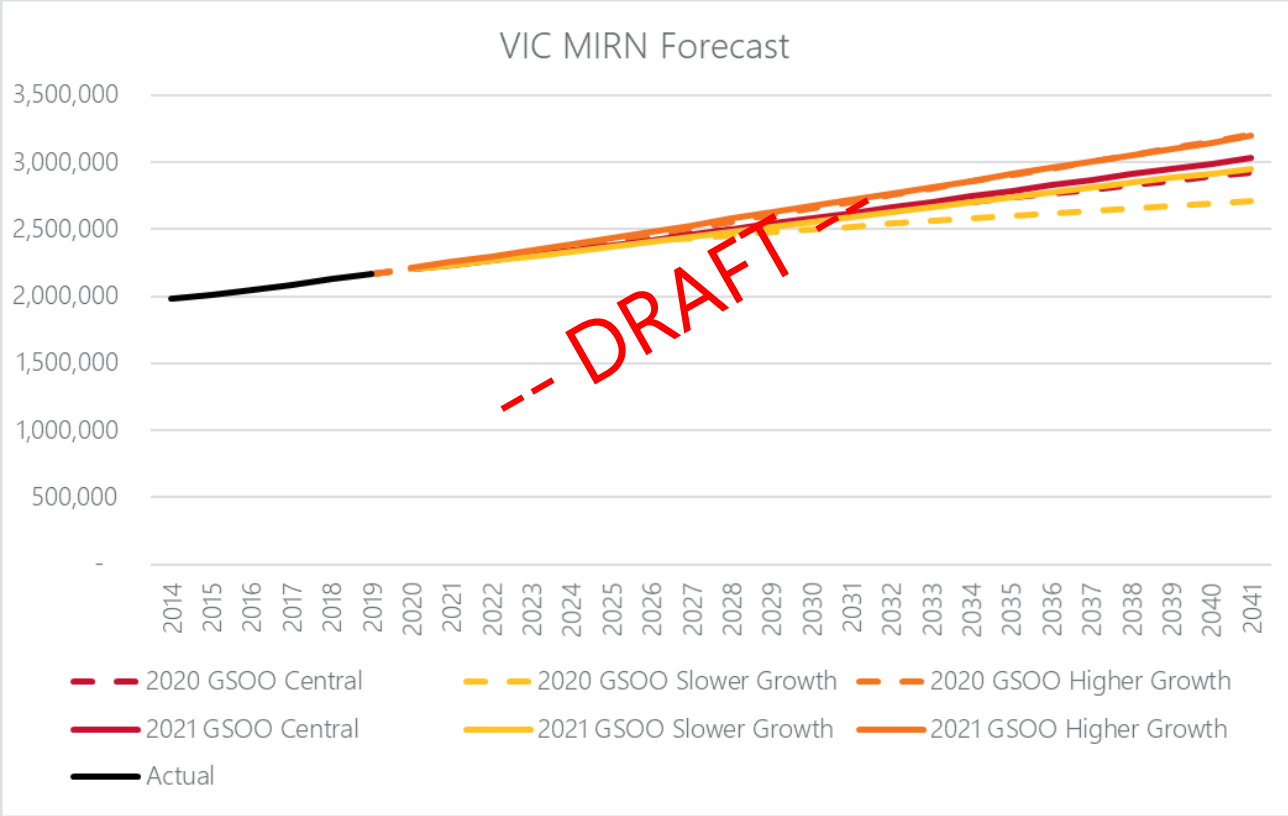


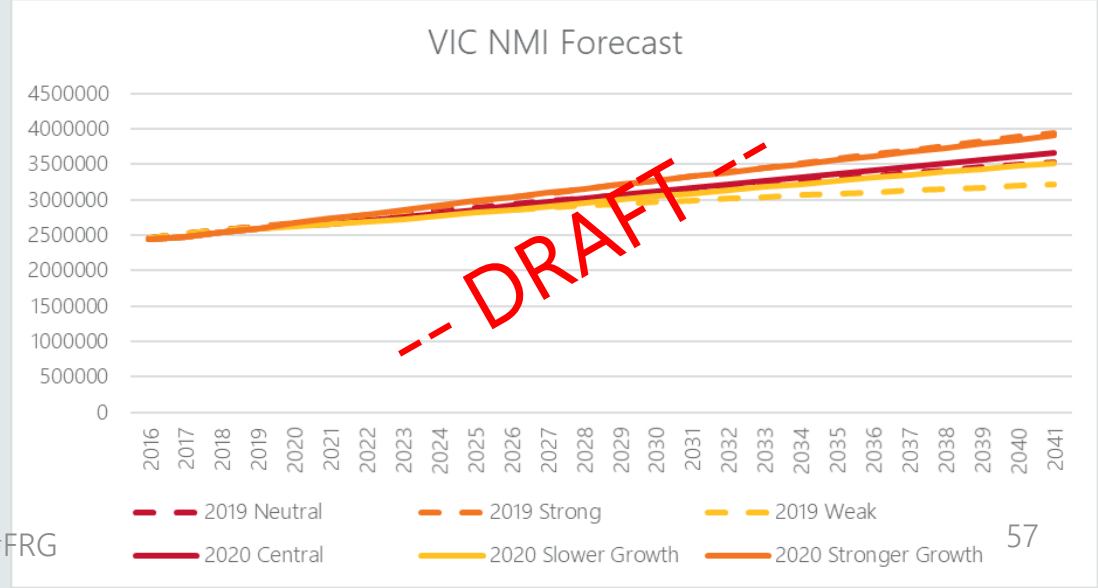
Victoria

Connections

Updated NMI forecast

Stable trend of 8 out of 10 houses connected to gas in the last 6 years. MIRN forecast reflects this

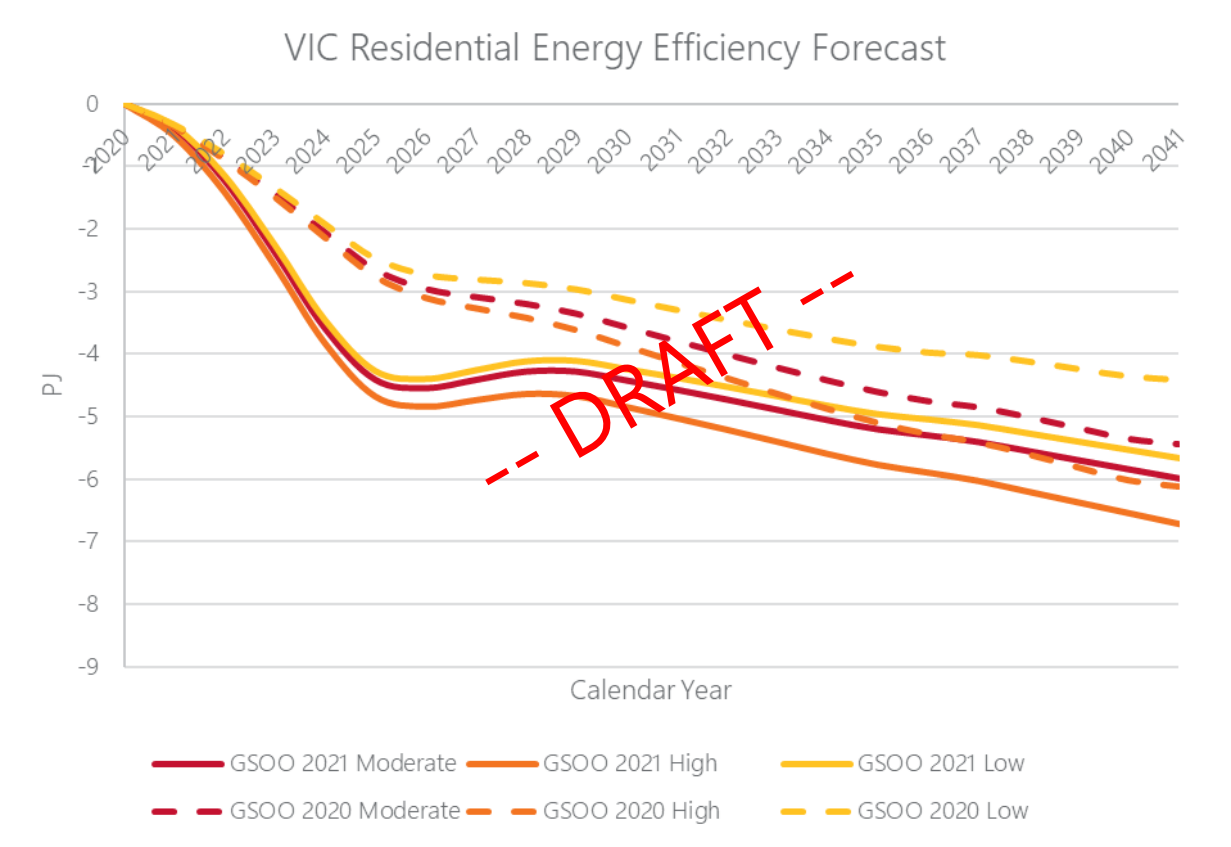




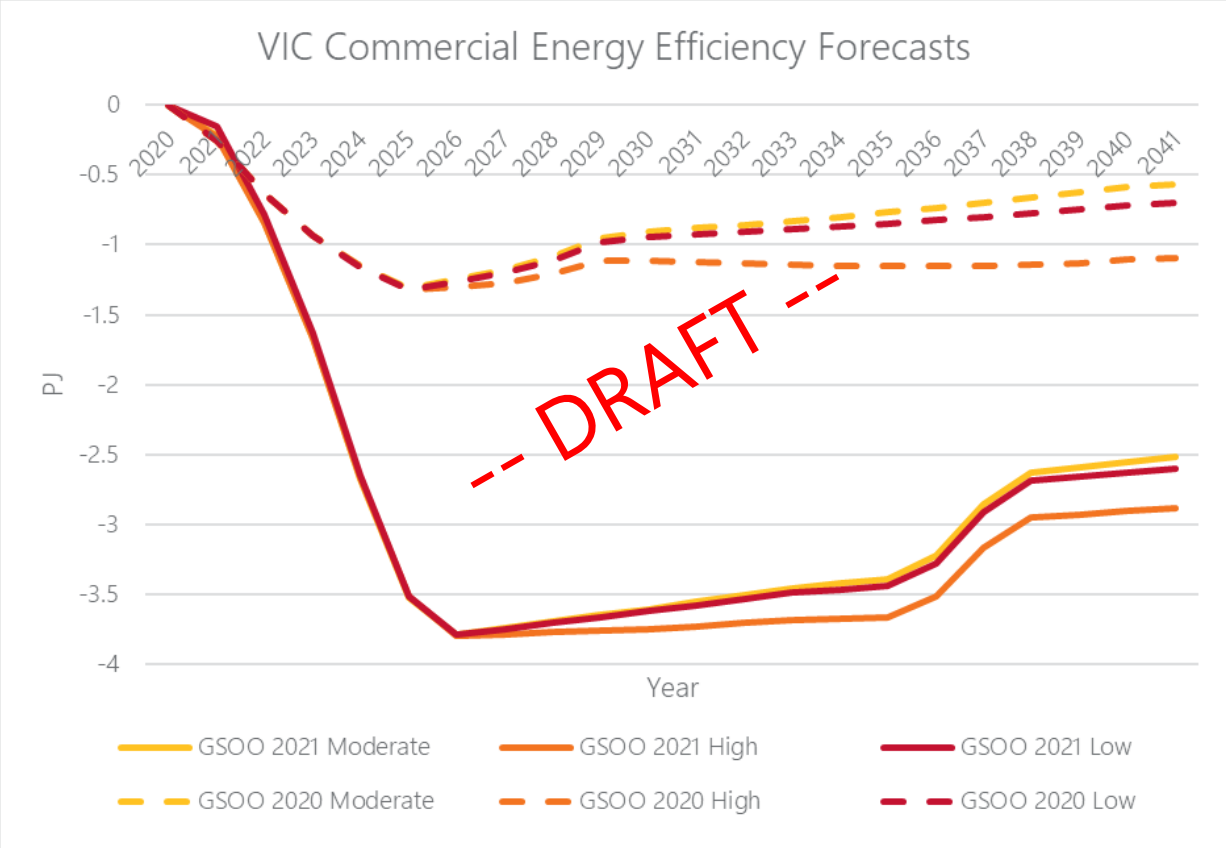
AEMO
AUSTRALIAN ENERGY MARKET OPERATOR

Energy Efficiency

Residential



Commercial



Residential: Revised forecast to 2025 for VIC state-based scheme, resulting in higher EE forecast savings for activities; 75% savings continue beyond deeming period. Revised residential stock model and updated heat base split.

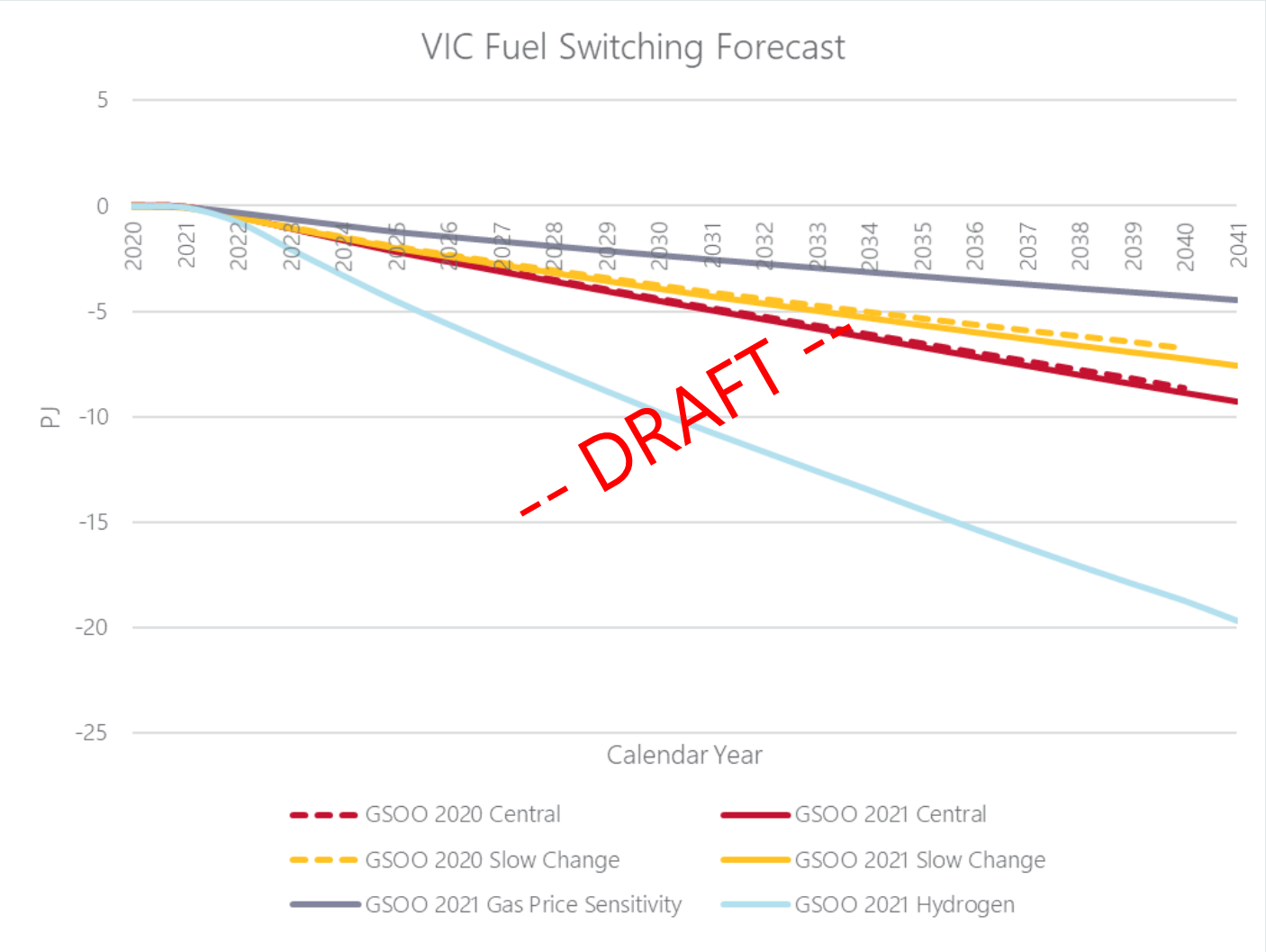
Commercial: Revised state based scheme and updated heat base split

To contribute, see: www.Sli.do Event code #FRG

Fuel switching similar to 2020 GSOO

Differences in the Central and Slow Change scenarios due to an updated residential stock model that underpins the electricity and gas connections forecasts.

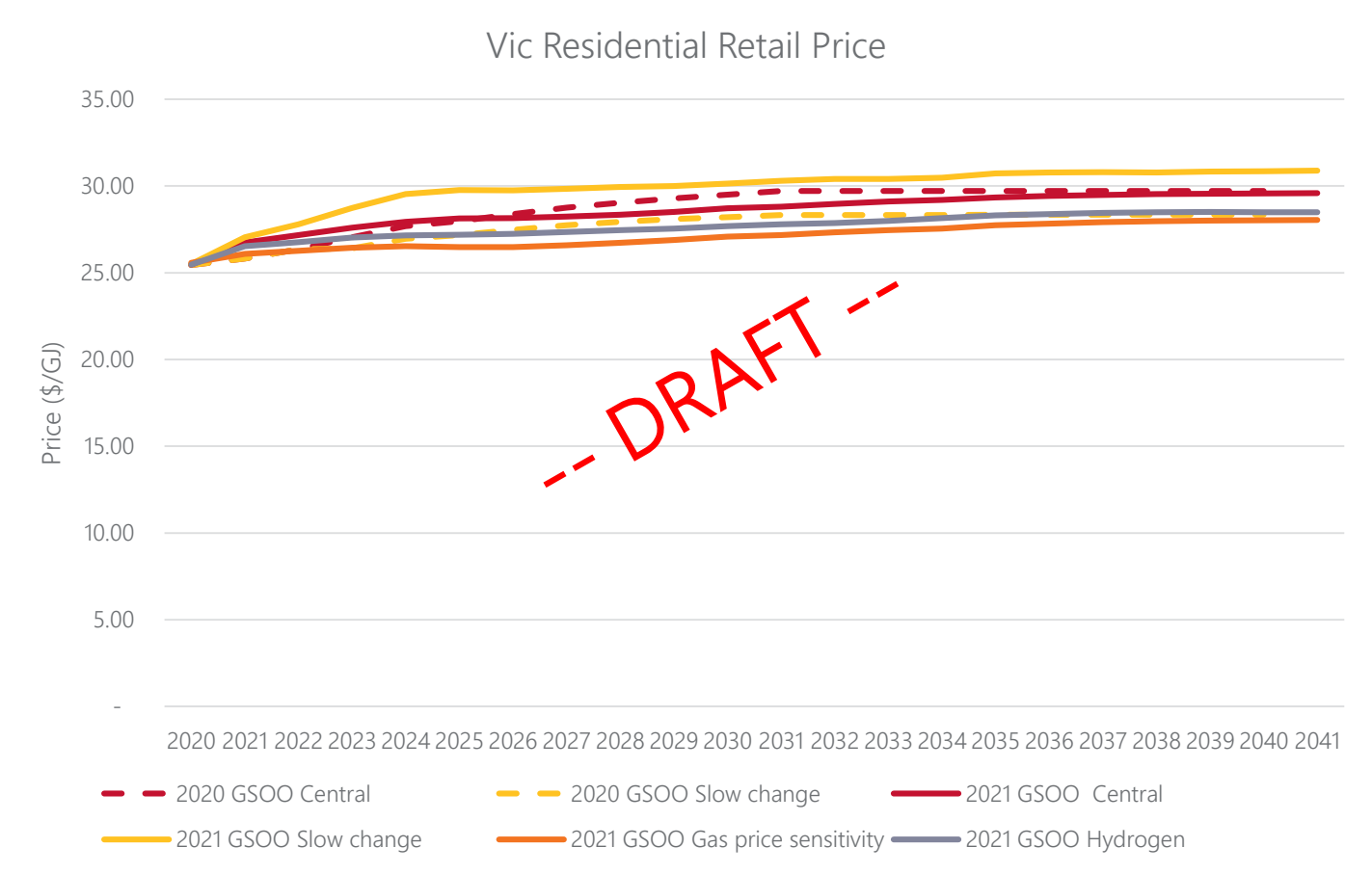
Policies relate to residential water heating and space heating.



Residential retail price forecast

Marginally lower retail prices in the central scenario are the result of lower wholesale prices and distribution costs

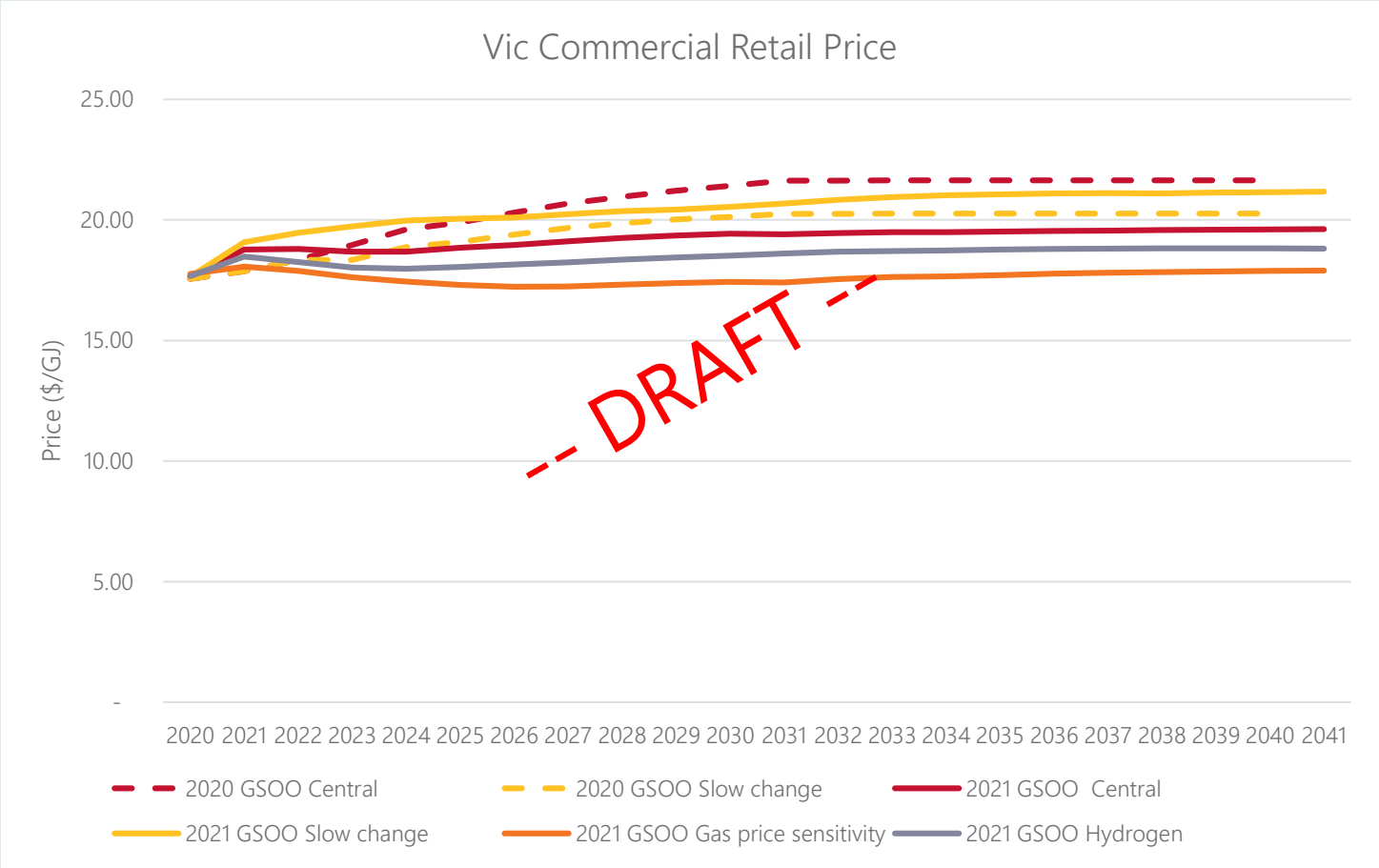
In the 2020 GSOO, the slow change scenario was based on low wholesale prices; central scenario was based on medium wholesale prices



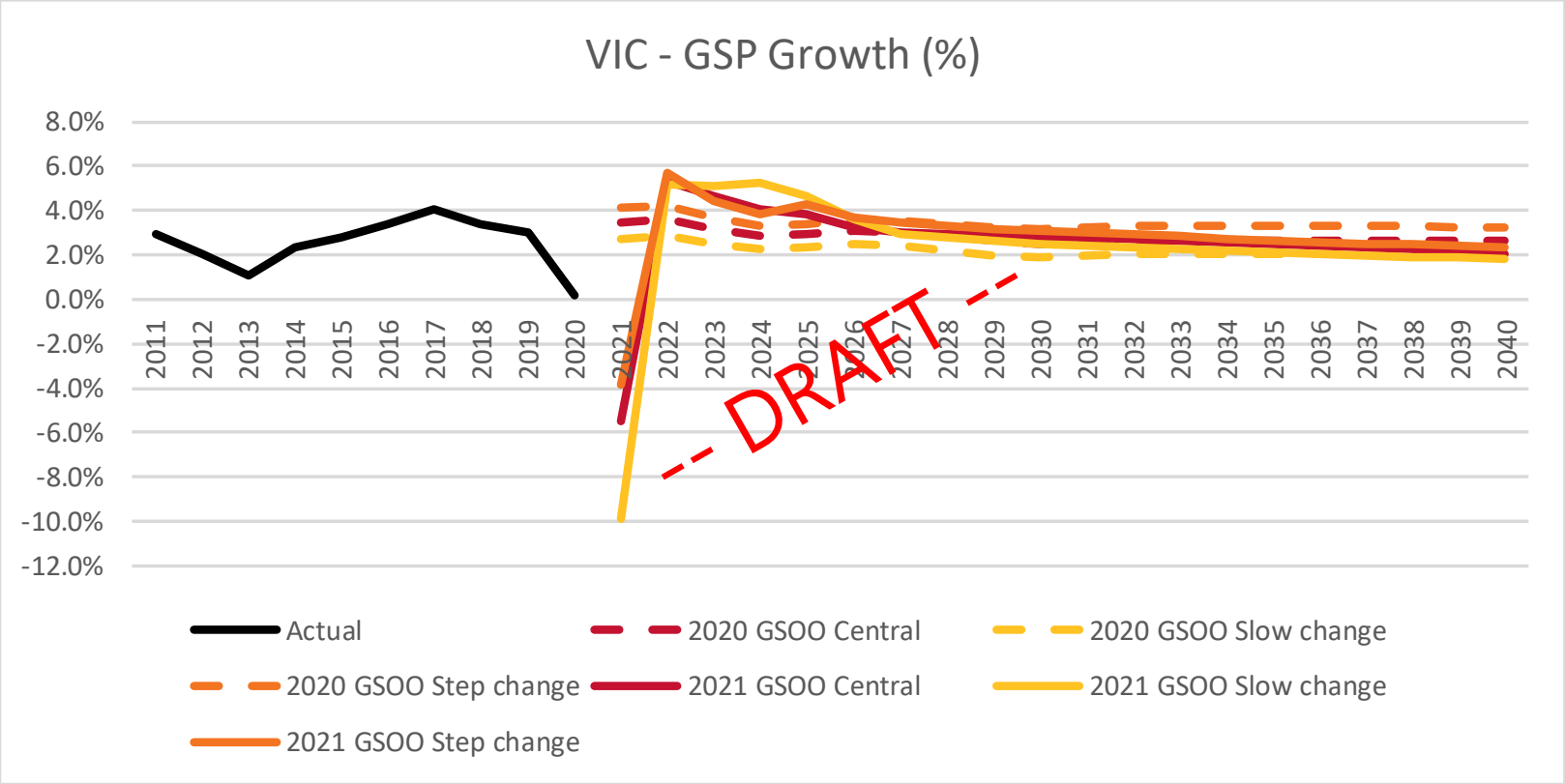
Commercial retail price forecast

Lower retail prices in the central scenario are the result of lower wholesale prices

In the 2020 GSOO, the slow change scenario was based on low wholesale prices; central scenario was based on medium wholesale prices



Economic forecasts

GSP growth in VIC has been dramatically impacted by COVID-19 in the 2021 GSOO due to the combination of a second wave and the state's structural exposure to the most impacted sectors (international students and visitors).

The state's economy is expected to recover in 2021 but normalization will be a gradual process, with some long-term loss of output as a result of the pandemic.