

## ATTACHMENT A

### OUTCOME: AFFORDABLE ENERGY AND SATISFIED CONSUMERS

#### Energy is increasingly affordable for all consumers, supported by adequate consumer protections and access to dispute resolution

<i>Draft metrics</i>	<i>Source</i>	<i>Notes</i>
Representative domestic retail tariffs in each NEM-region	<i>AER Annual report on compliance and performance of the retail energy market and AEMC Residential Electricity Price Trends Report</i>	<p>Provides estimated standing and market offer for 'representative' consumer in each NEM-region. Trend over time gives some indication of change in affordability.</p> <p>AER reports on estimated annual electricity and gas costs by region. Average electricity consumption and median offers (standing offer and market offer) are reported.</p> <p>AEMC reports on estimated tariffs and annual bills based on representative customers in each region and presents forward estimates for tariffs.</p>
Energy spend as a % of household disposable income	<i>AER Annual report on compliance and performance of the retail energy market</i>  <i>ABS Household Expenditure Survey (when available)</i>	<p>Gives a high-level picture of affordability – i.e. cost relative to households' ability to pay.</p> <p>AER reports annually on energy spend as % household disposable income. Estimates presented for median market offer and median standing offer for low middle and high income households, for each NEM-region.</p> <p><i>ABS Household Expenditure Survey (HES)</i> reports income, dwelling type, and expenditure on electricity, gas and other fuels. HES is only undertaken ~every 6 years. Last published results 2015-16, next expected 2021-22.</p> <p>Energy spend does not include expenditure on distributed energy resources such as rooftop solar PV. All else equal, increasing rooftop PV capacity is expected to reduce household expenditure on electricity. This should be considered in analysis and discussion.</p>
Customer perceived value for money	<i>ECA Energy Consumer Sentiment Survey</i>	Reflects consumer sentiment which provides a perspective which may be missed by aggregated or 'representative' values
Number of consumer disputes/complaints to retailers and ombudsman schemes	<i>State ombudsman reporting; AER Annual report on compliance and performance of the retail energy market</i>	Provides insight into customer satisfaction and need to access dispute resolution

## OUTCOME: AFFORDABLE ENERGY AND SATISFIED CONSUMERS

<p>Low-income high-cost: Number of households with income below poverty line (or alternatively lowest income quintile) which spend above the median level on energy.</p>	<p>Department of Social Services <i>Household Income and Labour Dynamics in Australia</i> (HILDA)</p>	<p>Intended to capture a measure of ‘energy stress’, as above metrics do not adequately capture experience of consumers with vulnerabilities. Noted that using ‘energy needs’ over actual energy consumption is preferable as actual energy consumption does not capture households which forego consumption due to cost. An appropriate methodology for determining ‘energy needs’ would need to be developed and agreed.</p> <p>HILDA survey also includes questions on difficulty paying electricity and gas bills and difficulty heating, which should be included in assessment. Difficulty cooling is also relevant and could be requested to be added to the HILDA survey.</p>
<p>Representative C&amp;I energy prices. Comparison with international counterparts</p>	<p>Work with large C&amp;I customers to develop benchmarks and survey required to report against this metric.  International Energy Agency database</p>	<p>Shows how energy costs as an input to business activity changes over time. This metric is particularly important for assessing the competitiveness of industries which are energy-intensive and trade-exposed.</p> <p>Understood that there is large variation in C&amp;I energy prices, particularly between transmission connected and other C&amp;I customers. Separate benchmarks to be developed for these two categories to the extent possible.</p>

## Consumers are empowered to manage their demand and can access distributed energy and energy efficiency solutions

<b>Draft metrics</b>	<b>Source</b>	<b>Notes</b>
<p>% customers with smart meters</p>	<p>AER</p>	<p>Smart meter installed may be a pre-requisite to energy management systems. Gives an indication of the extent to which consumers have the ability to access demand management technologies and cost reflective tariffs. However, smart meter technology could be leap-frogged. Is there a better metric?</p>
<p>Ratio of demand response MWs available/annual peak demand</p>	<p>AEMO – e.g. registered with AEMO demand response portal</p>	<p>Intended to capture the extent to which consumers are participating in demand response.</p> <p>Demand response from industrial users (e.g. aluminium smelters) to be excluded as the objective relates to empowering consumers.</p>
<p>Economy wide energy intensity: energy consumption/GDP</p>	<p>ABS Energy Account</p>	<p>Trend shows whether energy productivity of the economy is improving over time.</p> <p>Noted by stakeholders that caution required in analysing whole of economy intensity figures.</p> <p>Two year reporting lag on ABS Energy Account.</p>

## OUTCOME: AFFORDABLE ENERGY AND SATISFIED CONSUMERS

### Consumers are able to easily identify and secure the best deal for their circumstances

<b>Draft metrics</b>	<b>Source</b>	<b>Notes</b>
Consumer confidence in ability to make choices about energy products and services	ECA Consumer sentiment survey	Currently reported by ECA, but does not specifically go to use of tools or data as the metric was initially intended.
% customers on best three market offers by retailer	Request data from retailers	Intended to indicate whether customers are engaging in the market to secure good/best deals. Noted that which deal is 'best' may vary depending on customer usage.  AER reports % on standard vs market offers, but there is a wide spread of market offers.
# unique hits on government supported energy comparison websites and number of visitors that complete a search plan.	AER and state website operators	Measure of how actively consumers are engaging in the retail market.
How easy it is to switch (e.g. 'customers can switch in 5 clicks or less'). Most appropriate metric TBD.	Energy Charter reporting	Customer friction/switching metric is a measure of how easy it is for a customer to switch retailers if they are unhappy with their service. Low barriers to switching is desirable to ensure effective competition in the retail market.

### Vulnerable consumers are on suitable pricing plans, receiving concessions when needed, and can benefit from distributed energy and energy efficiency schemes

<b>Draft primary-metrics</b>	<b>Source</b>	<b>Notes</b>
% hardship customers on best market contracts	Request data from individual retailers	AER reports number of customers on hardship and average level of debt upon entering hardship scheme.
% people who are eligible for concessions on concessions	TBD	NSW have recently done this analysis (reportedly a big job) but unlikely to be available from every state every year.
% public housing with access to energy efficiency, solar and/or storage programs.	Department of the Environment and Energy	This metric has overlap with Finkel recommendation 6.6: <i>COAG Energy Council should engage with relevant portfolio areas including housing, and with state, territory and local governments, to identify ways to improve access to DER and energy efficiency for low income households.</i>  Department of the Environment and Energy is undertaking gap analysis and planning for future work in this space.

## OUTCOME: SECURE ELECTRICITY AND GAS SYSTEM

### Markets operate safely, securely and efficiently, under full range of operating conditions, with minimal intervention

<b>Draft metrics</b>	<b>Source</b>	<b>Notes</b>
Number and nature of electricity supply interruptions due to system security concerns	AEMO/ Reliability Panel <i>Annual Market Performance Report</i>	Measures supply interruptions due to system security, which are distinct from interruptions due to inadequate generation capacity (considered under reliability)
Number, duration and reason for electricity system interventions by AEMO in each NEM-region	AEMO	System interventions indicate market is operating outside a secure state and AEMO intervention necessary to maintain security. Gives a picture of system stability.  Need to consider
Hours high pressure gas pipeline not operational (available NSW only).	NSW Planning and Environment <i>Licensed Pipelines Performance Report</i>	Metrics currently reported vary considerably by state.  Suggested that AEMO's Gas Bulletin Board reports gas availability on a daily basis – needs further investigation.

### System planning and development is informed by clear and transparent rules

<b>Draft metrics</b>	<b>Source</b>	<b>Notes</b>
Progress towards developing and maintaining a roadmap which identifies emerging system and market issues.	Qualitative discussion	Intended to capture work underway to address emerging system security challenges.  Requires confirmation that a roadmap (or similar) will be developed and maintained.
Cyber-Security Framework implementation for high and medium risk participants within established timeframes	AEMO	Intended to measure system planning in place to address future cyber security threats.
Number of adaptation processes in place to upgrade energy infrastructure to deal with	AEMO	Intended to measure system planning in place to address future climate-related security threats.

## **OUTCOME: SECURE ELECTRICITY AND GAS SYSTEM**

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increasingly severe weather events and  
cyber-security risks

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## OUTCOME: RELIABLE AND LOW EMISSIONS ELECTRICITY AND GAS SUPPLY

### Electricity and gas sectors efficiently deliver at least their share of emissions reduction target/s while ensuring reliable supply

<b>Draft metrics</b>	<b>Source</b>	<b>Notes</b>
Electricity and gas sector emissions as a proportion of national emissions.  Compare sectoral emission reduction with economy wide target/s	Department of the Environment and Energy <i>National Greenhouse Gas Inventory</i>	Indicates electricity and gas sector contribution to economy wide emission abatement task. Requires flexibility to accommodate any process the Government may follow to set emissions reduction targets.  Also important that electricity sector emissions are considered in context, as electrification of transport or other industry may increase sectoral emissions in absolute terms.
Amount of unserved energy (with reference to reliability standard)	AEMO/ Reliability Panel <i>Annual Market Performance Report</i>	Measure of reliability which indicates whether generation capacity was adequate to meet reliability standard in a given year.
Amount of RERT capacity procured by type (long notice vs medium notice vs short notice) and number of times deployed	AEMO	Indicates the extent to which available capacity was not considered adequate to meet the reliability standard.
Total cost of RERT (\$)	AEMO	Indicates the cost at which reserve capacity was procured.

### Investors efficiently manage risk to support investment, operation, retirement and innovation decisions

<b>Draft metrics</b>	<b>Source</b>	<b>Notes</b>
Mean percentage error of AEMO annual operational consumption forecast vs actual	AEMO	Intended as a measure of the accuracy of AEMO's forecasts, which are an important input to planning and investment decisions.  Assessment of accuracy of annual operational consumption forecast is an existing metric which is publicly reported. Accuracy of peak demand may be more pertinent. AER is currently working with AEMO to develop forecasting accuracy reporting, as per recommendation of the AEMC's <i>Reliability Frameworks Review</i> .

## OUTCOME: RELIABLE AND LOW EMISSIONS ELECTRICITY AND GAS SUPPLY

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% announced closures by scheduled and semi-scheduled generators made with at least three years' notice.	AEMO	Notice of closure rule will be an important input to planning and investment decisions. Compliance with three year' notice of closure indicates adequate time for replacement investment decisions to be made by investors.
Committed investment in electricity generation capacity by region and forecast supply adequacy	AEMO	Gives an indication of whether forecast capacity is expected to be adequate to meet forecast demand in the short to medium term.  Important to consider that there is a disconnect in timeframe and degree of uncertainty between committed investment (typically 1-3 years, lower uncertainty) and long-term supply adequacy forecast (e.g. ESOO is over 10 years, higher uncertainty)
Investment in domestic gas resources and forecast gas supply adequacy	AEMO	Gives an indication whether gas supply is expected to be adequate to meet demand.

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## OUTCOME: EFFECTIVE DEVELOPMENT OF OPEN AND COMPETITIVE MARKETS

### Wholesale and retail markets are competitive and deliver efficient outcomes for consumers

<i>Draft metrics</i>	<i>Source</i>	<i>Notes</i>
Average forward swap and cap contract prices for electricity in line with LRMC of new entrant, by region where available	ASX data Publicly available LRMC estimates by e.g. CSIRO	Forward prices significantly above LRMC suggest opportunities for new entrant generators. Lack of new entrants under these conditions may indicate the presence of additional barriers to entry.
Retail and wholesale contract gas prices reflect netback/export parity plus transport and other relevant costs.	ACCC	Contracted prices for gas are expected to be set with reference to opportunity of exporting to international markets. Sustained prices significantly above netback, where that netback is in turn above the cost of the marginal source of supply, could indicate factors which require attention. (Spot gas prices may vary according to other short-term factors like the price in the National Electricity Market).  As reported by ACCC at the Wallumbilla Gas Supply Hub until March 2020.
Extent to which competition in the wholesale electricity and gas markets is identified as an issue by the AER.	AER	Extent of competition in wholesale electricity and gas markets has implications for consumer outcomes.  The AER monitors and reports on competition in wholesale markets. Important factors could include: concentration in retail and generation ownership, participant conduct, bidding trends, offers over time.

### Deep, liquid and transparent financial markets for electricity and gas and related services

<i>Draft metrics</i>	<i>Source</i>	<i>Notes</i>
Ratio of contract volume (both volumes traded and open interest) to demand for electricity and gas	ASX/AFMA	Assessed on a region-by-region basis. Gives an indication of contract market liquidity in the electricity market which is important for availability of contracts at an efficient price.

## OUTCOME: EFFECTIVE DEVELOPMENT OF OPEN AND COMPETITIVE MARKETS

Gas trading volumes for commodity and transportation	Gas Supply Hub, Gas Bulletin Board, Exchanges	Gives an indication of liquidity in the gas market which is important for availability of gas at an efficient price.
Liquidity of east coast gas pipeline capacity	Gas Bulletin Board, Exchanges	Intended to track the east coast pipeline capacity trading arrangements. Pipeline capacity available, liquidity of secondary pipeline capacity trading markets, prices of pipeline capacity also relevant considerations.

### Access to efficiently priced fuel and transport

<i>Draft metrics</i>	<i>Source</i>	<i>Notes</i>
Transparency of fuel reserves and prices (coal, gas, hydro) for market participants	Qualitative assessment	Transparency of fuel reserves and prices is important for efficient and accurate decision making of market participants. While most generators are expected to be exposed to international coal price at the margin, many are also contracted under long-term arrangements which are an important determinant of generator fuel costs.  Issue is currently under consideration through the joint ACCC/Gas Market Reform Group report process.
Coal costs competitive with international spot price less shipping	Newcastle 5,500 NAR coal price  May also require consideration of coal costs of individual generators (at least at aggregate level). Source TBD but may require new data collection.	Intended to assess whether fuel costs are comparable to net-back prices (i.e. expected to be set in line with opportunity cost of export).  Newcastle 5,500 NAR coal gives the export price for the type of thermal coal used in electricity generation.

### Innovation is incentivised and enables value from new technologies

<i>Draft metrics</i>	<i>Source</i>	<i>Notes</i>
Value of system security markets (e.g. FCAS)	AEMO	Gives an indication of the size of the market available and therefore the incentive to create innovative, low-cost ways to provide system security services. These markets are expected

## OUTCOME: EFFECTIVE DEVELOPMENT OF OPEN AND COMPETITIVE MARKETS

to become more important as the proportion of synchronous generation decreases in the NEM. Level of participation in market also an important consideration.

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Proportion of energy and system security services provided by DR and DER

AEMO/AER

Indicates the extent to which new technological approaches to delivering energy and system security are being applied in the NEM.

FCAS markets only ancillary service market which DR and DER participate in at this stage.

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Number of projects and amount of funding for RD&D by governments

ARENA Annual Report

State based RD&D initiatives

Intended to capture the extent to which knowledge sharing from proof of concept trials is occurring.

ARENA currently reports number of projects and amount of funding across: Research and Development, Study, Demonstration, Deployment in their Annual Report.

Limitation is that this metric does not capture all private sector RD&D – but many private sector initiatives are co-funded with government.

Consideration to be given as to whether this should be narrowed to focus only on energy system – e.g. spending on hydrogen export industry potentially not included.

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## OUTCOME: EFFICIENT AND TIMELY INVESTMENT IN NETWORKS

### Investment solutions are optimal across all resources

<i>Draft metrics</i>	<i>Source</i>	<i>Notes</i>
Congestion levels on electricity transmission/distribution networks and gas pipelines	AEMO/AER	High congestion could indicate that network capacity is insufficient.  AEMO to report on congestion in transmission network.  AER to report on utilisation data in distribution network (AER does not have access to congestion data in distribution network, but utilisation data is indicative).
Extent to which congestion is being examined through RIT-T/Ds	AER	Indicates whether congestion issues are being addressed.  Note that constraints can be addressed by local generation which do not go through RIT-T/D process.
Cost of inter- and intra-regional constraints	AER	High cost of constraints could indicate insufficient network capacity, noting that not all constraints are related to insufficient network capacity.  Important to consider whether ISP/RIT-T processes are driving efficient inter-regional investment in the interests of consumers.
% customers with retailer exposed to cost reflective network tariff	AER	Retailers which are exposed to cost reflective network tariffs have incentive to offer innovative solutions to help consumers manage their demand and costs. Network prices do not necessarily need to be passed directly onto customers, therefore the most relevant metric to assess is the proportion of retailers which are exposed to cost reflective network tariffs.
Average generation connection time from project commencement	AEMO	Can be an indication of the timeliness of the connection process, which is important for economic efficiency as well as security and reliability.  Need to consider definition of project commencement and to account for other factors that influence timeliness of connection.

## OUTCOME: EFFICIENT AND TIMELY INVESTMENT IN NETWORKS

### Efficient regulation of monopoly infrastructure

<i><b>Draft metrics</b></i>	<i><b>Source</b></i>	<i><b>Notes</b></i>
Regulated rate of return for new network investments relative to other regulated industries and risk free rate of return (e.g. 10 year Commonwealth Government security yield)	AER Rate of Return Instrument Statement	Intended to assess whether regulated return in electricity/gas sectors is comparable to other regulated industries. Also relevant to assess change over time to reflect changes in debt funding costs.
Network productivity, utilisation, and reliability	AER	Poor productivity and utilisation could suggest there are untapped opportunities for greater system efficiency.
Customer engagement of network service providers	Qualitative discussion. Sources could include:  ENA-ECA Customer Engagement Awards  AER evaluation based on network determination process	Quantitative assessment not preferable as it may unintentionally promote a compliance based approach which may limit innovation in this area.

### Networks incentivised to be efficient platforms for energy services

<i><b>Draft metrics</b></i>	<i><b>Source</b></i>	<i><b>Notes</b></i>
Extent to which DER is able to participate in relevant markets – wholesale, ancillary services, deferral in network investment	Qualitative discussion	Qualitative discussion of any challenges or barriers to participation from DER in relevant markets.
Progress towards implementing a DER coordination framework	AEMO and Energy Networks Australia Open Energy Networks program	Qualitative discussion of progress towards implementing DER coordination framework.  AEMO and Energy Networks Australia Open Energy Networks program is primary vehicle for progressing this work at present.

**OUTCOME: EFFICIENT AND TIMELY INVESTMENT IN NETWORKS**

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Time taken to assess network investment proposals in line with best practice international regulatory processes.

AER/qualitative discussion

Intended to assess whether NEM is in line with international best practice.

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## OUTCOME: STRONG BUT AGILE GOVERNANCE

Governance arrangements support the achievement of the national energy objectives, and emerging issues are addressed in a coordinated, timely and consultative manner.

<i>Draft metrics</i>	<i>Source</i>	<i>Notes</i>
Energy market institutions have published and co-ordinated priorities, work programs and outcomes	Market bodies	Assesses transparency and accountability of market bodies' actions.
Market bodies' outcomes in line with their statements of expectations	Qualitative assessment	Assess whether market bodies' actions align with goals.
Rule change requests processed within standard timeframes	AEMC	Assesses whether rule changes are assessed and made in an acceptably timely manner.
Number of regulatory sandboxes utilised to trial new regulatory approaches.	AEMC	Assesses the extent to which new policies and regulations are piloted. Note that sandbox process not yet in place (AEMC consultation paper released 20 December 2018).