RepuTex CARBON

MARKET UPDATE | September 2016

Framing Australia's 2030 energy & climate policy mix

The contribution of safeguard sectors to Australia's 2030 emissions reduction target

FRAMING AUSTRALIA'S 2030 ENERGY & CLIMATE POLICY MIX

The contribution of safeguard sectors to Australia's 2030 emissions reduction target

EXECUTIVE SUMMARY

- Under the Paris Agreement, Australia has committed to reduce its greenhouse gas (GHG) emissions by 26-28 per cent on 2005 levels by 2030, with a target review every five years in order to pursue efforts to limit global warming to below 1.5° Celsius (C).
- The Federal Government has outlined a range of indicative policies to achieve Australia's target, while in parallel, state governments have begun to take strong climate policy action, led by the Australian Capital Territory (ACT), Queensland, South Australia and Victoria.
- The implementation of a decentralised policy framework at the state level is not favoured by industry, with the design of a nationally integrated policy architecture gaining the support of the COAG Energy Council, triggered by rapid change in the Australian energy system.
- As policymakers and businesses begin to explore the best mechanism to enable policy reform, in this White Paper we present the RepuTex 2030 Energy & Climate Policy (ECP) Tool, which enables users to measure the size of Australia's abatement task to 2030, and construct their own pathway to meet Australia's emissions reduction target.
- Below, we apply the ECP Tool to provide illustrative analysis of Australia's progress to the 2030 emissions reduction target, including analysis of current policy and the possible allocation of emissions baselines to safeguard sectors.
- According to the Department of Environment's most recent 2014-15 emissions projections, Australia's abatement task between 2020 and 2030 is approximately 2,215 million tonnes (2 billion) of carbon dioxide equivalent (CO2-e).
- Applying updated assumptions for current policy and economic activity, we estimate Australia's 2030 abatement task to be closer to 1 billion tonnes CO2-e, a 55 per cent downgrade on the government's outlook. This is underpinned by our lower expectations for electricity consumption, land-clearing rates, and the inclusion of recent state and federal policy.
- We estimate that national emissions will need to be reduced by 8 to 9 million tonnes of CO2-e (Mt) annually to meet Australia's 26 per cent emissions reduction target by 2030.

- Should the government's indicative policy pathway be applied to meet the target, analysis indicates that aggressive policy settings would be required to achieve these reductions. This could include the tripling of funding for the Emissions Reduction Fund (ERF) and generation from rooftop photovoltaics (PV), while rates of electricity and vehicle efficiency would need to approximately double from current levels.
- Inversely, should industry be relied upon to deliver large-scale emissions reductions under the government's safeguard mechanism, we approximate an absolute baseline contraction after 2020 of 5.4 per cent per annum (p.a.), relative to current baselines, would be necessary for Australia to meet its 2030 target.
- While there is no wrong pathway to achieve Australia's 2030 target, the critical component of policy development will be the design of a durable policy architecture that is able to lay the foundation for long-term, scalable emissions reductions, without the need for regular review.

BACKGROUND

Under the Paris Agreement, Australia has committed to reduce its greenhouse gas (GHG) emissions by 26-28 per cent on 2005 levels by 2030, with a target review every five years in order to pursue efforts to limit global warming to below 1.5° Celsius (C). To meet its target, Australia will need to begin transforming its economy, with the integration of carbon and energy policy viewed as a critical step to achieving large-scale emissions reductions.

The federal Government has outlined a range of indicative policy options to achieve Australia's 2030 target, with the Emissions Reduction Fund (ERF) and safeguard mechanism at the core of its Direct Action Plan, supported by complementary policies including the National Energy Productivity Plan (NEPP). The government estimates indicative emissions reductions of approximately 900 million tonnes (Mt) from these sources between 2020-2030, with actual reductions dependant on final policy design, and the amount of emissions reductions required to meet Australia's 2030 target.[1]

In parallel, state governments have begun to take strong policy action, led by ambitious emissions reduction, energy efficiency, and renewable energy targets in the ACT, Queensland, South Australia, and Victoria. The design of regional trading mechanisms continues to gain momentum, with a state-based Emissions Intensity Scheme (EIS) for the electricity sector being explored as a first step toward a national trading mechanism.[2,3]

1. Australia's abatement task: tracking to 2020, Department of the Environment, 25/11/15 https://www.environment.gov.au/climate-change/publications/factsheet-emissions-projections-2015-16
2. SA Government to purchase 75 per cent of its long-term electricity needs, ABC News, 8/9/16, http://www.abc.net.au/news/2016-09-08/sa-government-to-purchase-75pc-of-electricity-needs/7825852
3. Xenophon calls for SA and Victoria to set up their own electricity emissions trading scheme, ABC News, 17/8/16, http://www.abc.net.au/news/2016-08-17/electricity-emissions-trading-scheme-plan-for-sa-and-victoria/7751324

A decentralised approach, whereby states develop their own trading mechanisms to meet unique emissions and renewable energy targets, is not favoured by industry, with concern that the development of patchwork regulation may create a complex operating environment. The design of a nationally integrated policy framework has gained the support of the COAG Energy Council, triggered by rapid change in the Australian energy system, with calls for the modernisation of the energy market to better respond to environmental and technological challenges.

Pressure on state and federal ministers to develop a cooperative national policy framework for energy and climate policy is expected to pave the way for larger policy reform, with the Federal Government's 2017 climate policy review representing the first major opportunity to reconcile state and federal energy and climate policy into a more integrated national architecture.

THE REPUTEX 2030 ENERGY & CLIMATE POLICY (ECP) TOOL

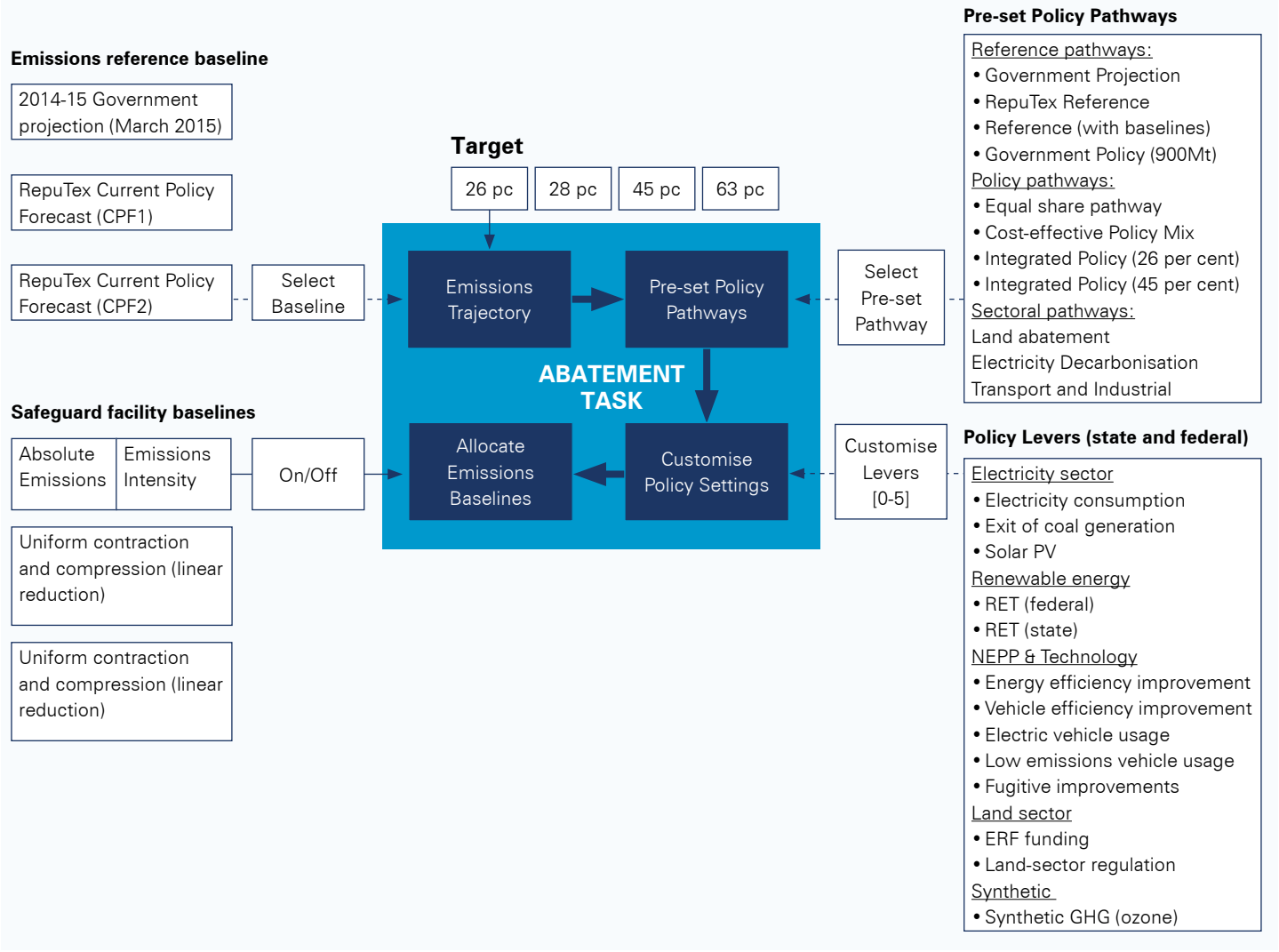
As policymakers and businesses begin to explore the best mechanism to enable policy reform, in this White Paper we present the RepuTex 2030 Energy & Climate Policy (ECP) Tool, which enables users to measure the size of Australia's abatement task to 2030, and construct their own pathway to meet Australia's emissions reduction target.

While many stakeholders understand the impact of policy on a single sector, such as the renewable energy target or state land clearing regulation, knowledge of the combined effect of state and federal policy at the national level is limited. This is largely due to low emissions data transparency, with national projections unreliable due to outdated economic and policy assumptions, while the contribution of state policy instruments is not considered.

In developing an integrated energy and climate policy architecture, policymakers and business therefore stand to benefit from a more detailed understanding of the long-term shape of Australia's emissions, and the interaction between state and federal policy levers, providing firms with a clearer understanding of how large-scale emissions reductions will be sourced to meet emissions targets, and how the abatement task will be distributed across economic sectors.

For this reason, the RepuTex ECP Tool enables users to construct their own pathway to meet Australia's emissions reduction target, with firms able to select an emissions reference trajectory from which to measure the size of Australia's abatement task, and then design a policy response to meet the target. The tool offers pre-built policy scenarios, plus the ability to customise underlying policy assumptions, scaling the strength of policy from 'little to no effort' to reduce emissions (level 0) to 'deeper decarbonisation' settings (level 5).

Figure 1: RepuTex ECP Tool Modelling Process



Coverage of the ECP Tool extends to both state and federal level policy instruments including renewable energy targets (state and federal), energy and vehicle productivity, the decarbonisation of the electricity sector, ERF funding, and state land clearing regulation. Users are also able to analyse the contribution of 'safeguard' and 'non-safeguard' sectors by adjusting policy and baseline settings under the government's safeguard mechanism, including the analysis of absolute or emissions intensity baselines, as well as the rate and shape of baseline decline.

Modelling results are published in dashboard format to support visual analysis, while users are also able to undertake quantitative scenario analysis by accessing detailed output reports, including the distribution of the emissions reduction effort at sub-industry level, emissions baseline allocation scenarios, and long-term policy scenarios.

For further information about the ECP Tool, please refer to Appendix 1.

ILLUSTRATIVE ANALYSIS – AUSTRALIA'S POLICY MIX TO 2030

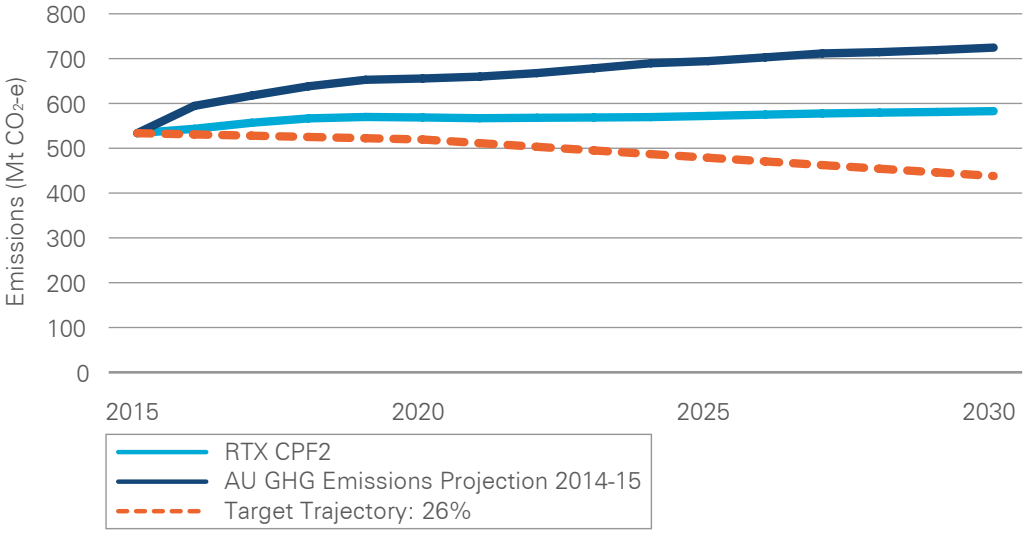
Below, we apply the ECP Tool to provide illustrative analysis of Australia's progress to the 2030 emissions reduction target, including the capacity for current policy to meet the target and the baseline decline rate necessary to fill any shortfall to the 2030 target.

Framing the Task – Australia's Emissions Trajectory to 2030

Australia's most recent official estimate of greenhouse gas (GHG) emissions to 2030, released in March 2015, projects a national emissions trajectory rising to 724 Mt in 2030,[4] an increase of 22 per cent above 2005 levels, or 36 percent from 2015. If we apply this emissions projection as the reference for calculating Australia's cumulative abatement task between 2020 and 2030 is approximately 2,215 million tonnes (2 billion) of carbon dioxide equivalent (CO2-e).

While this abatement task appears to be a significant effort, the scale of the task is largely a product of outdated economic forecasts and policy assumptions. The government's March 2015 projection assumes no emissions reductions from the ERF, or current state and federal renewable energy targets, while applying strong economic activity driven by high export sector demand (such as Coal and LNG) and growth in electricity consumption. Resultantly, reliance on this trajectory to form Australia's abatement task to 2030 leads to a "high" reference point, which we do not view as a credible reference scenario.

Figure 2: Australia's emissions projections 2014-15 versus RepuTex's Current Policy Forecast (CPF2) with Target Trajectory from 5 per cent below 2000 in 2020 to 26 per cent below 2005 levels in 2030.



4. Australia's emissions projection 2014-15: published March 2015 - http://www.environment.gov.au/climate-change/publications/emissions-projections-2014-15

For a more accurate emissions reference, we apply our current policy forecasts (CPF) derived from our Australia Energy and Emissions (A-EEM) model[5]. Our CPF forecasts are presented as comparative baseline trajectories, applying "medium" and "low" emissions growth trajectories in line with our current expectations for economic activity and our current policy settings.

Our CPF2 trajectory represents our current in-house estimate for emissions growth, which is applied as our reference case within the ECP Tool. Table 1 summarises the policy assumptions behind the Government Projection and the RepuTex Reference cases.

Table 1: Emissions Reference Policy Settings

Policy Setting	Government Projection case: 2014-15	RepuTex Reference case
Electricity consumption	Baseline scenario from the 2015 Electricity sector emissions report to Department of Environment	AEMO's Neutral electricity consumption forecast from the 2016 National Electricity Forecasting Report
Regulated Exit of Coal Generation	Mothballed coal-fired generators return to service as needed.	No extension of operating life of existing coal-fired power stations.
Distributed Solar PV	7% avg. annual increase	9% avg. annual increase in energy generation (approximately 8% consumption in 2030)
Federal RET	Downscaled Large-scale Renewable Energy Target (LRET) scheme to a 27,000 GWh by 2020.	Current LRET of 33 TWh by 2020 (approximately 38 TWh by 2030)
State-based targets	N/A	Inclusion of state-based renewable energy targets in ACT, QLD, SA and VIC
Energy Efficiency improvement	0 TWh by 2030	19 TWh by 2030 (AEMO 2016: Neutral case)
Vehicle Efficiency improvement	1.7% annual improvement after 2020.	2.1% improvement after 2020.
Electric Vehicle usage	<1% of passenger Vehicle Kilometres Travelled (VKT) are electric (2030)	4% of passenger VKT electric (2030)
Low Emissions Vehicles usage	14% of passenger VKT are hybrids (2030)	15% of passenger VKT are hybrids (2030)
Emissions Reduction Fund	N/A	$2.55B contracted

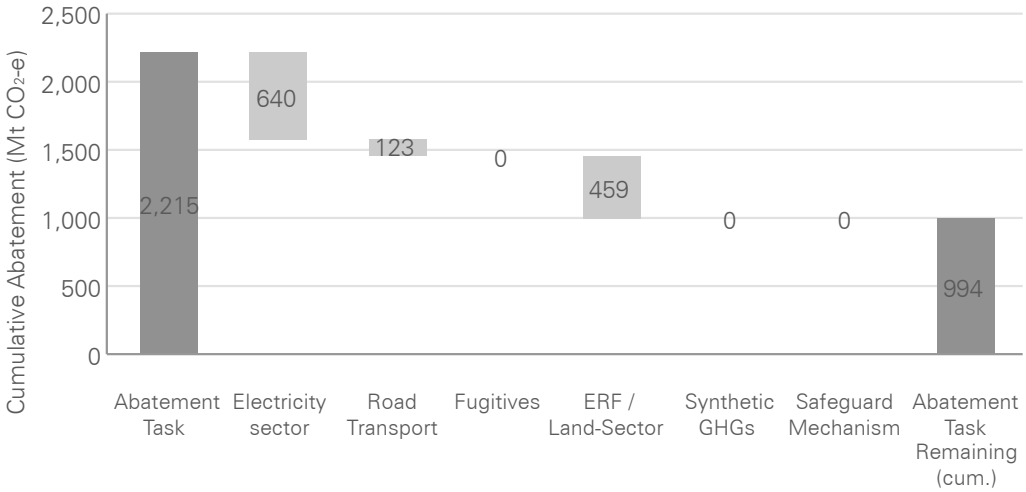
5. For further information about our A-EEM model refer to Appendix 1.

What is Australia's Abatement Task to the 2030 Target?

As noted in a number of forecasts published since 2013-14, we continue to estimate that Australia's cumulative international commitment between 2013 and 2020 will be met, however the absolute goal of reducing emission to 5 per cent below 2000 levels will not be achieved. Australian emissions will therefore not reach a target of minus 5 per cent on 2000 levels by 2020. Should Australian emissions exceed the 2020 target, as projected, this will make the post-2020 abatement task significantly larger than if emissions reductions had occurred earlier.

As above, the calculation of the abatement task depends heavily on the selected emissions reference. Figure 3 shows Australia's official abatement task of 2,215 Mt calculated from the government's 2014-15 projection (in bar 1), and the step down to RepuTex's Reference case in line with the settings outlined in Table 1.

Figure 3: Government abatement task versus RepuTex reference case



Applying updated assumptions for current policy and economic activity, we lower the 2021-30 abatement task to 994 Mt CO2-e, a 55 per cent downgrade on the government's official outlook. This is underpinned by a significant decrease in emissions due to lower electricity consumption, land-clearing rates, and the inclusion of current policy such as the ERF and current RET schemes.

While 994 Mt is a considerable downgrade in size, in the context of Australia's growing emissions trajectory, the projected abatement task is still a sizeable challenge to overcome. This is especially true given Australia's current policy framework, under which national emissions are forecast to continue to grow despite the large-scale contracting of Australian Carbon Credit Units (ACCUs) under the ERF and ambitious state based renewable energy targets.

The abatement task is also marginally larger than the government's "indicative emissions reductions" of 900 Mt presented to achieve Australia's 2030 target. This is largely due to differences in the projected growth in short-term emissions through to 2020. The government's analysis assumes Australia's 'absolute' 2020 target will be met, with the post-2020 period commencing from minus 5 per cent below 200 levels. As above, we continue to estimate that Australia's 2020 emission will be more than 5 per cent below 2000 levels.

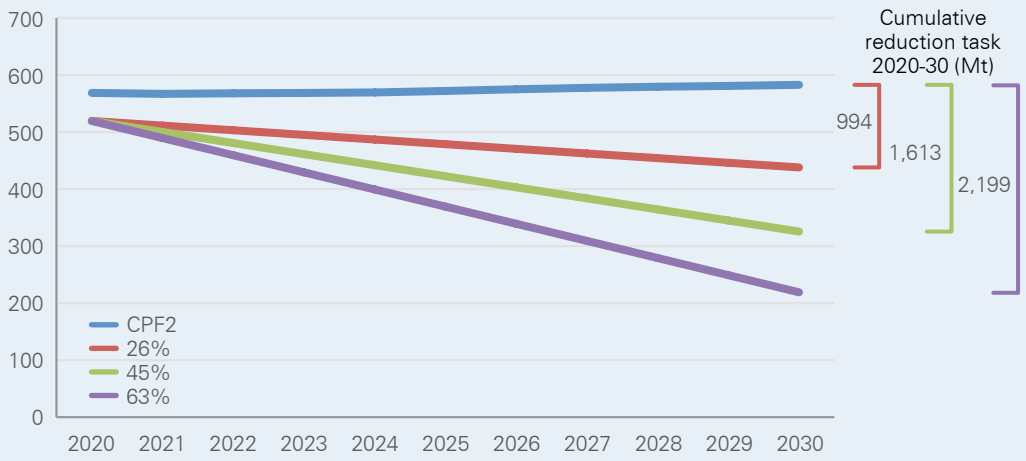
A scaled up emissions reduction target for Australia?

As a signatory to the Paris Agreement, Australia's abatement task is expected to grow should the 2030 emissions reduction target be scaled up in line with the objective of limiting global warming to 1.5-2 degrees C.

Australia's current emissions target is widely expected to be strengthened, with the Climate Change Authority (July 2015, CCA) recommending a 45-63 per cent target range on 2005 levels, reflecting Australia's upper and lower bounds for action consistent with the objective of limiting global warming to less than 2 degrees. In light of the high likelihood of the future ambition scale up of Australia's emissions reduction contribution, we also include the CCA's upper and lower bounds as comparative targets within the ECP Tool.

As shown in Figure 4, relative to our CPF2 forecast, a scaled up emissions target would increase Australia's abatement task to between 1,613 Mt or 2,264 Mt respectively.

Figure 4: RepuTex reference case versus 2030 target scenarios



Designing an Emissions Baseline Decline Consistent with Australia's 2030 Target

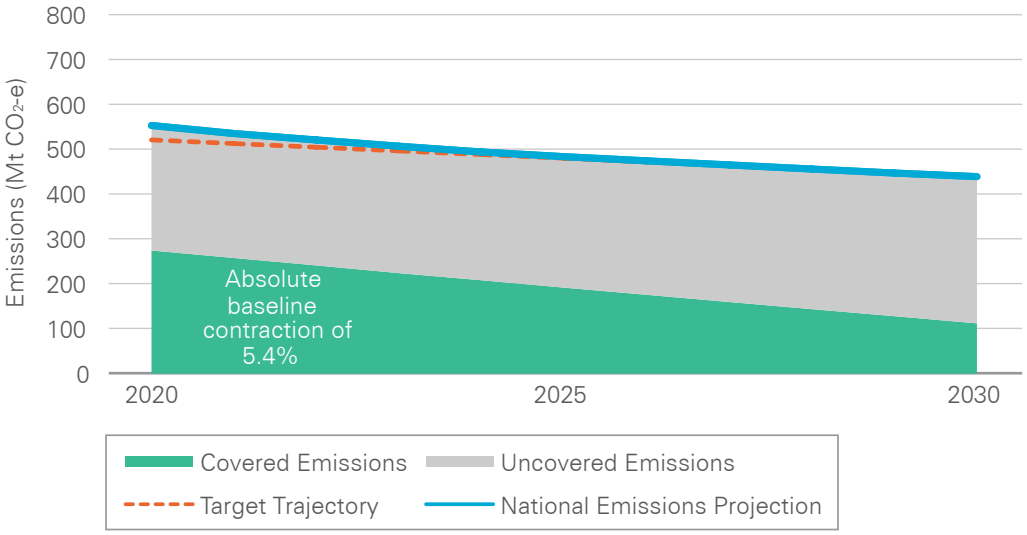
The Climate Change Authority's (CCA) recent Special Review of Australia's climate policies, "Towards a climate policy toolkit," recommended that a 'toolkit' of measures be implemented to meet Australia's Intended Nationally Determined Contribution (INDC), yet few quantitative recommendations were provided to guide the underlying strength of individual policy measures.

The CCA proposed that a number of changes be made to strengthen the government's safeguard mechanism including that baselines for covered facilities be set to decline at a uniform rate consistent with meeting Australia's INDC. While the CCA did not quantify what such a baseline rate of decline should be, it was argued that the commencement of emissions cuts from safeguard facilities was critical to position these sectors for further emissions reductions likely to be needed beyond 2030 under the Paris Agreement.[6]

6. Climate Change Authority, September 2016 - Towards a Climate Policy Toolkit: Special Review on Australia's Climate Goals and Policies.

Should short-term emissions grow through to 2020, as forecast, we estimate that national emissions will need to be reduced by 8 to 9 million tonnes of CO2-e (Mt) annually to meet Australia's 26 per cent emissions reduction target by 2030. Should industry be relied upon to contribute Australia's entire shortfall to the target under our Reference Case (CPF2), we approximate an absolute baseline contraction after 2020 of 5.4 per cent per annum (p.a.), relative to current "high point" baselines, would be necessary for Australia to meet its 2030 target.

Figure 5: Baselines for facilities covered under the safeguard mechanism would need to decline approximately 5.4 per cent in order for national emissions to be 26 per cent below 2005 levels by 2030.



Although uniform in the rate of reduction, the largest decline in baselines in absolute terms would come from the highest emitting facilities, predominately large coal-fired generators. In this case, electricity generations covered by the safeguard mechanism would be responsible for approximately 63 per cent of the total baseline reduction, proportional to their share of reported baselines.

This is not to say that electricity generation facilities would necessarily bear the greatest emissions reduction burden. Reported baselines for almost all covered electricity generators are higher than current emissions levels, with emissions from these facilities forecast to fall as a result of complimentary policy settings, such as increased renewable energy generation, and/or falling electricity consumption. As a result, while baselines may be set to decline over time, these facilities are unlikely to fall into a compliance position against their baselines.

Instead, accountability for emissions reductions under such a rate of decline is likely to fall on energy and transport facilities, notably those forecast to increase production. In this way, the design of an 'absolute linear reduction baseline scheme' would shift Australia's emissions reduction obligation onto growth sectors, with coal generation remaining a dominant part of Australia's energy mix.

For this reason a declining emissions intensity baseline (tCO2e/physical output) is likely to be supported by these sectors, allowing for emissions reductions via the improvement of the net intensity on a linear or convergence basis (i.e. to a variable point of best practice). In such an instance, the required rate of baseline decline is likely to be steeper, with a linear emissions intensity decline of approximately 6.8 per cent required to meet Australia's abatement task.[7]

This dynamic reflects the need for any enhanced safeguard mechanism framework to be integrated with current policy such as an the ERF, Renewable Energy Target, the National Energy Productivity Plan (NEPP), and be designed to work with direct regulation that may designed to achieve a specific strategic outcome, such as the exit of coal-fired generation, should such an outcome be sought.

Such an approach may enable the safeguard mechanism to be designed with more moderate baseline declines, while enabling industry to make a more equitable contribution to the national emission reduction effort.

Emissions intensity or absolute emissions baselines?

While emissions baselines are currently reported as absolute values, emissions intensity forms an integral part of the government's current safeguard mechanism, and is therefore a critical input for business and policymakers. Under the safeguard scheme, existing large facilities are subject to reported baselines. For new or significantly expanded facilities that exceed the coverage threshold of 100,000 t CO2e, the Clean Energy Regulator will apply an emissions intensity benchmark to make the facility's baseline determination.

The first baseline made for a facility using the emissions intensity benchmark is calculated on the basis of forecast production and is set out in a benchmark-emissions baseline determination. It expires three years after it comes into effect for new facilities, and five years after it comes into effect for large new facilities.

Subsequently, while baselines are currently reported as absolute values, it is possible for emissions intensity baselines to be applied under any enhanced safeguard scheme.

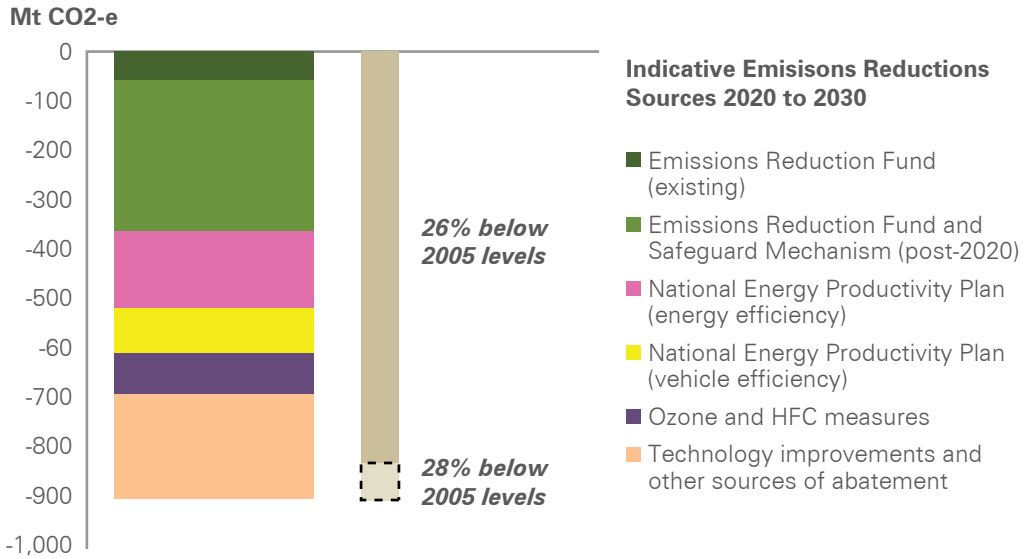
The Coalition's Indicative Policy Pathway

Rather than relying on the safeguard mechanism to meet the target, the federal government is expected to outline long-term policy framework to support Australia's emissions reductions through to 2030, delivering emissions reductions from a wider range of sources.

The Department of Environment has published indicative analysis showing the scale of emissions reductions that can potentially be achieved from sources between 2020 and 2030. These indicative sources include the ERF, National Energy Productivity Plan, the phase out of substitutes for ozone depleting substances, technology improvements and other sources of abatement.

7. The ECP tool outlines equivalent emissions intensity reduction on a production basis, as well as intensity convergence for each sector as a percentage of each sub-industry's current rage of facility emissions intensities. Refer to our ECP Tool for further detail.

Figure 5: Indicative emissions reductions sources, 2020 to 2030



Source: Department of the Environment; chart represents indicative estimates. Actual emissions reductions will depend on final policy design, and the amount of emissions reductions required to meet Australia's 2030 target will depend on future emissions trends.

Although the potential abatement from these emissions reductions sources are estimated to total 900 Mt, little detail is provided on the underlying settings associated with each of these policies. For example, no detail is provided on whether declining emissions baselines will deliver the majority of the ERF/Safeguard Mechanism contribution, or whether ERF funding will be extended.

Where Does the Government's 900 Mt Come From?

In applying the RepuTex ECP Tool, we are able to take a closer look at the order of magnitude being implied by each of the government's indicative emissions estimates.

At the core of the government's climate change policy framework is the ERF and safeguard mechanism. As of April 2016, approximately 75 per cent of the government's first tranche of ERF funding ($2.55B) had been contracted, predominately to land-sector projects that will sequester carbon dioxide from the atmosphere as bush is protected from clearing.

Cumulatively between 2021 and 2030, analysis indicates this may account for approximately 200 Mt of abatement, or just over half of the government's implied ERF/safeguard mechanism contribution (approximately 400 Mt in total). As shown in Table 2, another $2.5B tranche of funding for the ERF would therefore needed to unlock the remaining emissions reductions identified in the Government's analysis. Alternatively, this abatement may also be achieved by declining emissions baselines.

Similarly, analysis indicates that the implied rates of Australia's electricity efficiency, vehicle efficiency, and synthetic GHG emissions reductions would need to approximately double from current levels to achieve the government's implied 900Mt outcome, with generation from rooftop photovoltaics (PV) needing to increase by more than 300 per cent[8].

Table 2: RepuTex current policy forecast settings versus government implied policy pathway

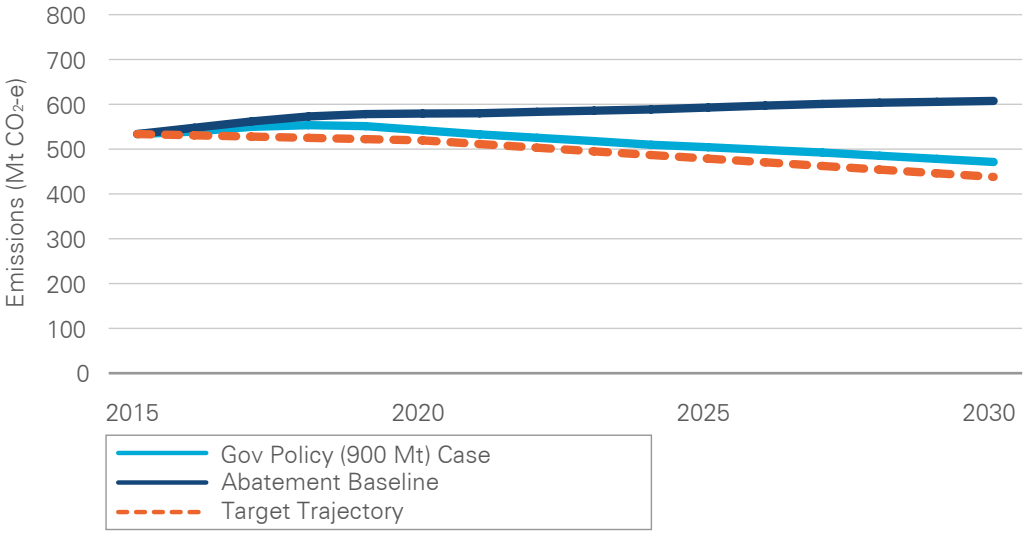
	RepuTex Reference case	Government Policy (900 Mt) case ^
Electricity Consumption	AEMO's Neutral electricity consumption forecast from the 2016 NERF	AEMO's Neutral electricity consumption forecast from the 2016 NERF
Exit of Coal Generation	No extensions of economic life for coal-fired generators.	No extensions of economic life for coal-fired generators.
Solar PV (Res. & Com.)	9% p.a. increase (avg.) in generation	19% p.a. increase (avg.) in generation
Federal RET	Current LRET of 33 TWh by 2020 (effectively 37 TWh by 2030)	Current LRET of 33 TWh by 2020 (effectively 37 TWh by 2030)
State-based targets	Inclusion of state-based renewable energy targets in ACT, QLD, SA and VIC	Inclusion of state-based renewable energy targets in ACT, QLD, SA and VIC
Electricity Efficiency	19 TWh by 2030 (AEMO assumption for Neutral 2016 NEFR)	38 TWh by 2030
Vehicle Efficiency	2.1% p.a. improvement 2020-30	4.2% pa improvement 2020-30
Electric vehicle Usage	4% of annual Vehicle Kilometres Travelled (VKT) by electric vehicles in 2030	4% of passenger (VKT) are electric (2030)
Low CO2 vehicle usage	15% of passenger VKT are hybrids (2030)	50% of passenger VKT are hybrids (2030)
Fugitive Improvements	CPF: 75% increase on 2000 levels	CPF: 75% increase on 2000 levels
Emissions Reduction Fund	$2.55B contracted	$5B contracted
Land-clearing (State)	CPF: LULUCF = 19 Mt source by 2030	CPF: LULUCF = 19 Mt source by 2030
HFC Phase-out	Current policy forecast	65% Reduction

^ Note: The Government Policy (900 Mt) case reflects RepuTex's estimate of possible policy settings to achieve the government's indicative reduction potential.

8. These settings reflect RepuTex estimates of the possible policy settings required to achieve the government's indicative (900Mt) reduction potential. Meeting the 2030 target would require policy settings to be aggressively scaled up to meet the 1 billion tonne abatement task identified in CPF2, such as the possible tripling of funding for the Emissions Reduction Fund (ERF) and generation from rooftop photovoltaics (PV), while rates of electricity and vehicle efficiency would need to approximately double from current levels.

While these settings are theoretically achievable, the government's desire to set policy ambition at such a level remains unclear, with little activity to suggest that the government plans to implement aggressive regulation of electricity and vehicle efficiency, or to double the funding for the ERF. In addition, two of Australia's most powerful and economically effective policies for decarbonising the economy - increasing renewable energy and/or regulating the exit of coal generation - are not considered in the government's indicative analysis.

Figure 6: National emissions projection vs Government Policy (900 Mt) case.



Irrespective of the mix of policy, as shown in Figure 6, applying the government's 900Mt trajectory does not necessarily result in the 2030 target being met. This is largely due to a higher start point for the government's trajectory in 2020, with RepuTex analysis assuming that Australia will not reach an absolute minus 5 per cent levels by 2020. This differs to the government's initial analysis, which relied on a modelled scenario where the minus 5 per cent reduction target was met.[9]

CONCLUSION - A DURABLE AND INTEGRATED POLICY ARCHITECTURE

As the above scenarios illustrate, whether policy employs descending baselines or is designed to implement aggressive regulation, a pathway can be calibrated to achieve Australia's 26 per cent reduction target. In this sense there is no 'wrong' policy pathway.

9. Energetics: May 2016, Modelling and analysis of Australia's abatement opportunities – Report to the Department of the Environment (https://www.environment.gov.au/climate-change/publications/modelling-and-analysis-australias-abatement-opportunities); Accessed Aug 2016.

While there may be no wrong policy pathway, the critical component of Australian policy development will be the design of a durable policy architecture that is able to lay the foundation for long-term, scalable emissions reductions, without the need for regular review, even if Australia's emissions reduction target changes.

While the Government Policy (900 Mt) case builds on existing policies, the pathway largely excludes strategic reform such as supply-side changes to the electricity generation sector via renewable energy increases and/or the regulation of coal-fired generation. As a result the framework is likely to be un-scalable under a more ambitious target. For example, achieving even a modestly more ambitious goal such as Australia's 28 per cent target would require considerable increases in ERF funding and more extreme energy and vehicle efficiency policy settings. Even higher policy settings are likely to become impractical for targets beyond 28 per cent.

Recognising that the overall objective of the Paris Agreement is to achieve deep decarbonisation of the economy within the next half century, a more durable and integrated policy framework may instead be designed to distribute the emissions reduction effort across the economy, positioning all sectors to contribute in the short-term while being scalable over the long-term as policy ambition changes. Such an approach would enable policy to begin to unlock emissions action in strategic sectors that may otherwise not be prioritised due to political or economic barriers.

For example, focusing solely on "least cost" abatement that targets efficiency and waste reductions, may lead to aggressive reform in the appliance and vehicle standards, however this may result in delayed investment in more "expensive" abatement sources that positively transition the country toward a low carbon economy, such as the land and renewable energy sectors.

Similarly, taking a 'set and forget' approach of simply declining baselines to meet a target, without the support of complimentary policy measures, also limits Australia's long-term transition to a low carbon economy. For example, employing baseline declines to achieve all the necessary reductions would place the heaviest burden on existing industries, yet in this scenario, the most emissions intensive coal-fired generators would continue to operate. The "cheapest" way to achieve the 2030 target may therefore not be the endgame, with more "expensive" abatement likely to represent a better investment should it transition Australia to a cleaner energy economy.

Subsequently, the design of a durable, integrated policy mix must balance the cost of emissions reductions with longer-term strategic outcomes, ensuring key sectors are positioned to deliver future cuts by balancing effort-sharing, and the unlocking the contribution of strategically important sectors such as electricity generation and land-use.

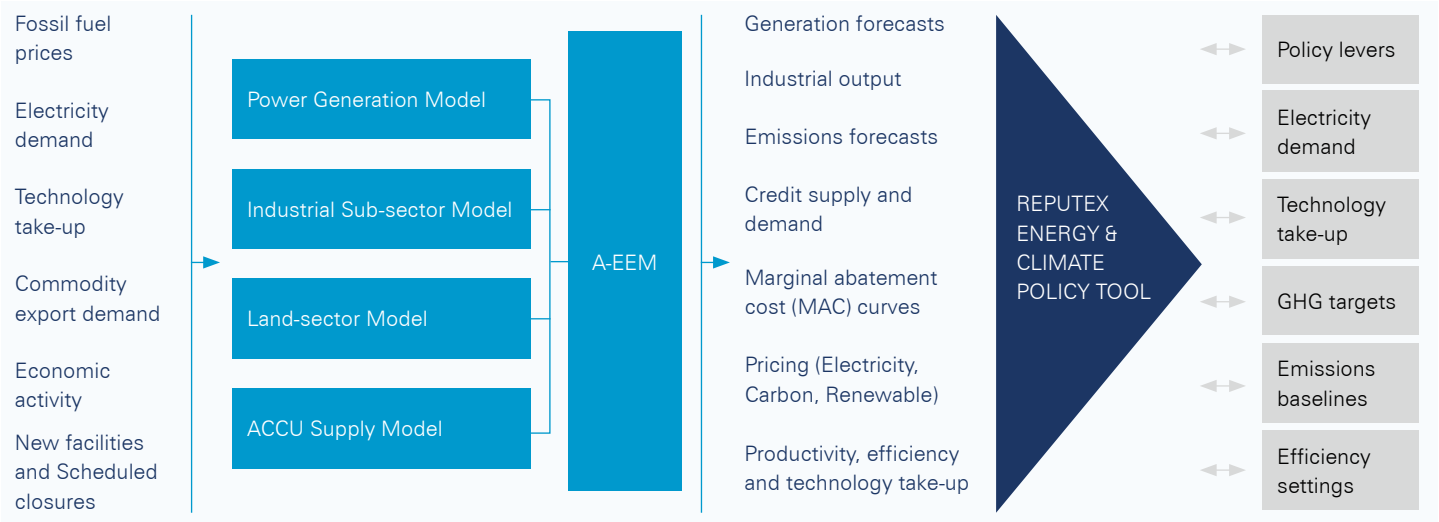
How a durable and integrated climate and energy policy is designed will depend on how state and federal policy instruments are set to interact. This remains the key question for policymakers as they begin to consult with business on the best mechanisms to enable reform. These factors, combined with the long-term shape of the Australian economy, will ultimately determine how large-scale emissions reductions will be sourced to meet Australia's emissions targets, and how the abatement task will be distributed across economic sectors.

APPENDIX

The RepuTex ECP Tool is underpinned by RepuTex's Australian Energy and Emissions Model (A-EEM), which is subject to ongoing updates and validation. A-EEM is comprised of three sub-sector models for the power, industrial, and land-use sectors, producing output and emissions forecasts for the Australian market through to 2030-50.

The RepuTex ECP Tool operates as a policy scenario interface for our A-EEM model, allowing the user to adjust underlying forecast assumptions in order to measure the distribution of the emissions reduction effort across the economy under a range of policy and market settings.

Diagram 1: RepuTex Australian Energy and Emissions Model (A-EEM) schematic



A-EEM produces a range of outputs including:

- Greenhouse gas (GHG) emissions projections
- Power generation and pricing projections
- Industrial production projections
- Supply and demand for carbon credits
- Credit export and import dynamics
- Marginal abatement cost (MAC) curves (etc.)

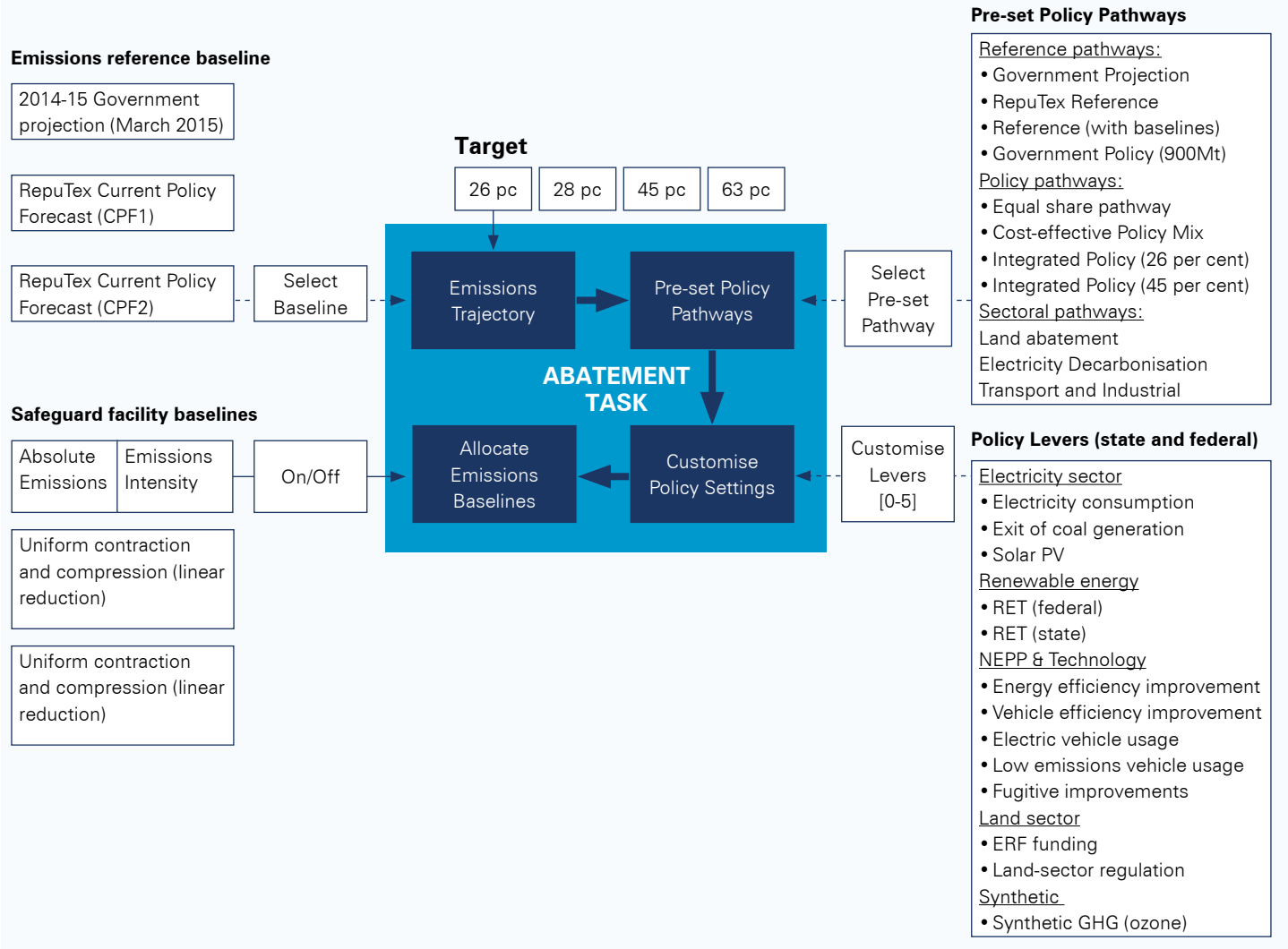
The A-EEM model is fully flexible to fit a range of policy and market design parameters, including Emissions Trading Schemes, emissions intensity or baseline and credit frameworks, linear or non-linear caps and decay rates, or individual sector schemes. The A-EEM model is economy wide, covering emissions from all sectors of the Australian economy to sub-industry and activity level. Policy coverage extends to energy and climate instruments at the state and federal level.

Tool Structure

The RepuTex ECP Tool is available in four versions, available online:

1. **Free ECP Tool:** Analyse our illustrative reference pathways for Australian policy and greenhouse gas emissions through to 2030.
2. **ECP-Viewer:** Create a customised policy pathway and view results in our dashboard reports.
3. **ECP-Interactive:** Access underlying output reports and data tables for each modelled scenario including emissions baselines by industry (absolute and intensity) and detailed projections by sub-sector and policy instrument.
4. **ECP-Enterprise:** License our underpinning A-EEM Model with regular data updates and model review.

Figure 1: RepuTex ECP Tool Modelling Process



Pre-set policy scenarios

The ECP Tool offers 11 pre-set policy cases, providing users with the ability to analyse government and RepuTex reference pathways, along with and scenarios designed to 'solve' for a specific policy objective, such as 'equal share', 'cost-effective,' or sector specific cases. Pre-set pathways include:

Table 1: Pre-set policy pathways within ECP Tool

Emissions reference pathways	Policy pathways	Sectoral pathways
Government emissions projection (March, 2015)	Equal share pathway	Electricity Decarbonisation
RepuTex reference	Cost-effective policy mix	Land abatement
RepuTex reference (with baselines)	Integrated Policy (26 per cent)	Transport and industrial
Government policy (900Mt)	Integrated Policy (45 per cent)	

Customise Policy Settings

The ECP Tool also enables users to construct their own policy pathway to meet Australia's emissions reduction targets. For each policy measure, the ECP Tool sets out six levels for the strength of policy action undertaken, ranging from little to no effort to reduce emissions (level 0) to deeper decarbonisation policy settings (level 5). The settings are therefore reflective of progressively higher ambition and effort to reduce emissions and transition to a low-carbon economy.

Policy instruments are grouped into 'non-safeguard' (i.e. the electricity sector, energy productivity, land-sector, and synthetic emissions, etc) and 'safeguard' sector policies (i.e. baseline allocations) enabling the user to set effort sharing between 'traded' and 'non-traded' sectors. For a full list of policy settings, please refer to our ECP Tool Documentation.

Emissions baseline allocations

Following the distribution of emissions to the safeguard sectors, the ECP Tool allows users to model multiple baseline reduction types, including absolute or emissions intensity baselines, along with linear (uniform across the market) and convergence (e.g. to the best 10 percent) baseline allocation methods.. For a full list of baseline allocation methods, please refer to our ECP Tool Documentation.

ADDITIONAL DOCUMENTATION

To access our full ECP Tool documentation, including our User Guide, Modelling Process and Assumptions, please refer the RepuTex website or contact our Client Services team.

REPUTEX MARKET UPDATE

SEPTEMBER 2016

AUSTRALIA

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ABOUT REPUTEX

With customers across over 150 firms, RepuTex is Australia's largest provider of energy and emissions market analysis. We work with a wide range of public and private sector customers in Australia and Asia-Pacific, with subscribers across high emitting Power, Energy, Metals & Mining and Industrial companies, Aggregators & Project Developers, Professional Services, Financials and Government.

RepuTex has offices in Melbourne and Hong Kong, supported by a team of analysts with backgrounds in economics, commodities, policy and energy markets.

The company was the 2012 winner of the China Light and Power-Australia China Business Award for excellence across Australia-Pacific.

RepuTex has a depth of expertise in energy & climate policy and market analysis, utilising our proprietary models to help opinion leaders understand the economic and market impacts of policy design, while assisting businesses to analyse the impact of policy on cost and supply dynamics.

We cover key energy and emissions markets in Australia, including the National Electricity Market (NEM) and the Renewable Energy Target (RET), and the Emissions Reduction Fund (ERF) and Safeguard Mechanism. Our coverage also extends to complimentary state and federal policies including the National Energy Productivity Plan (NEPP) and state-based initiatives such as state renewable energy targets and state based land-clearing regulation.

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