



Low Carbon Growth Plan for Australia

www.climateworksaustralia.org





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Introducing ClimateWorks Australia



ClimateWorks Australia is a new non-profit organisation created through a partnership between The Myer Foundation & Monash University. It's focus is enabling practical projects to deliver emissions reductions in Australia



THE MYER
FOUNDATION



MONASH University

Affiliations:



ClimateWorks



Introducing Low Carbon Growth Plans

- Low Carbon Growth Plans (LCGPs) are an internationally recognised tool for integrating nationwide actions to reduce emissions alongside economic growth
- All national leaders at the Major Economies Forum in Italy, July 2009 agreed to prepare LCGPs
- ClimateWorks Australia's Low Carbon Growth Plan is the first comprehensive economy-wide LCGP for Australia
- ClimateWorks Foundation has supported LCGPs around the world, including:
 - Indonesia
 - Mexico
 - Korea

The Low Carbon Growth Plan has been built on the following principles:

1. Establish a comprehensive fact base
2. Examine GHG emissions reduction opportunities from both a societal and business perspective
3. Identify the lowest cost means to reduce GHG emissions
4. Understand barriers to GHG emissions reduction and develop measures to overcome them
5. Build momentum for collaborative action

Key Findings

- ▶ Australia has the potential to achieve GHG emissions reductions of 249 MtCO₂e (25% below 2000 levels) at a low average cost by 2020
- ▶ Reducing GHG emissions can be profitable for businesses
- ▶ A combination of a carbon price and targeted actions is required to achieve Australia's full potential of low cost emissions reductions
- ▶ A portfolio of prompt action is required



Meg Argyriou
Project Officer, ClimateWorks Australia



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- ▶ The Opportunity
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Our methodology

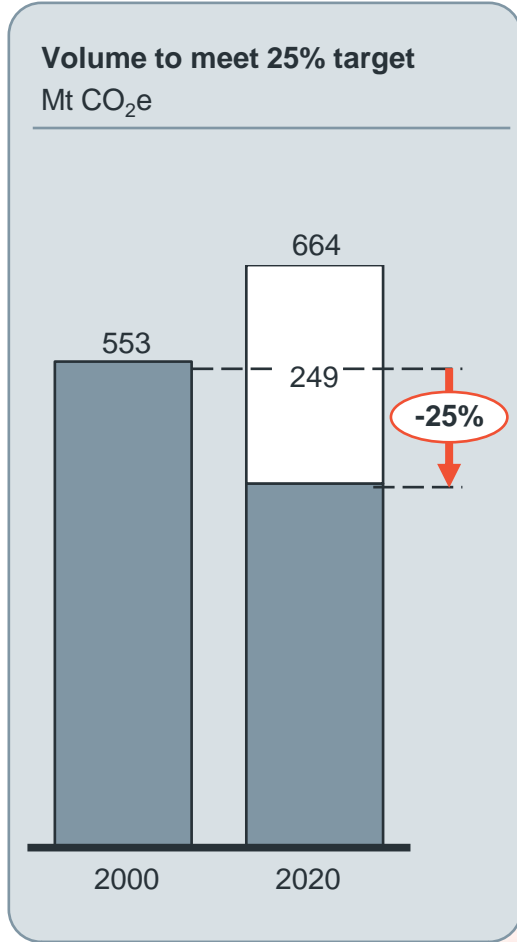
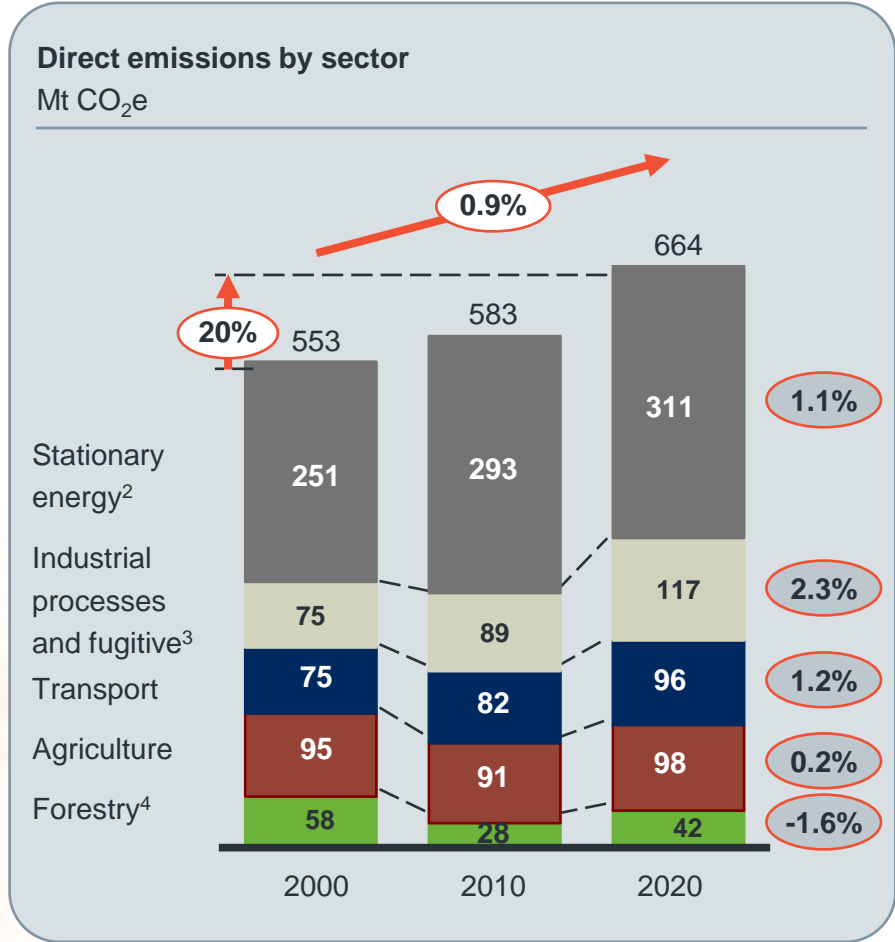
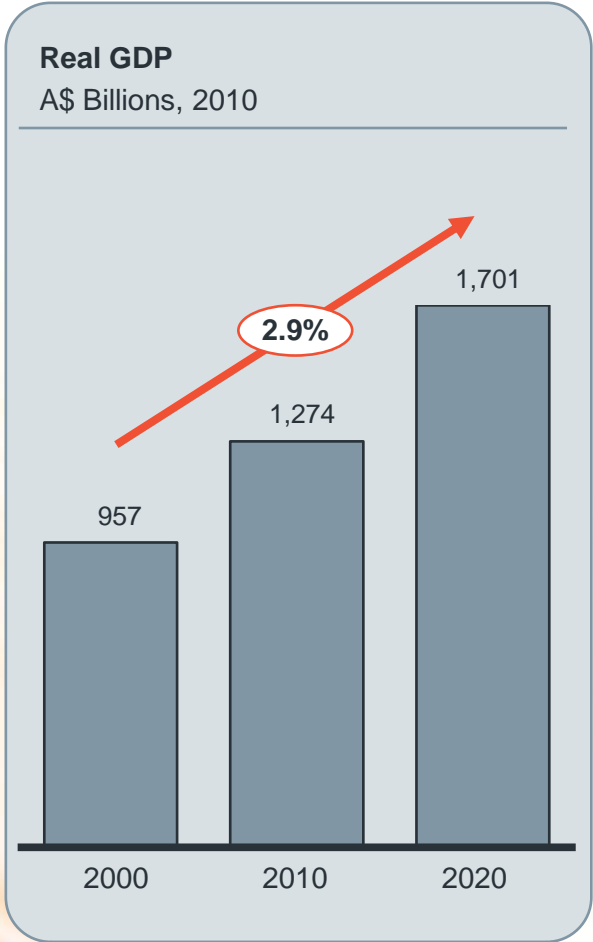
Four stages:

1. Updated the Australian cost curve using McKinsey methodology
2. Translated to investor perspective
3. Examined barriers to implementation, in particular in four focus areas
4. Developed a roadmap

Our rationale

- Understand the lowest cost opportunities to reduce emissions
- Take account of private cost of capital and taxes & subsidies
- Recognise that cost is not the only relevant factor affecting the ability to implement the opportunities
- Specify the opportunities in practical detail, and integrate them into a roadmap according to their ease of implementation and risk of emissions lock-in

Business-as-usual emissions are forecast to grow by 20%



1 Compound Annual Growth Rate per annum, 2000–20

2 Direct emissions from the power sector can also be regarded as indirect emissions from downstream power-consuming activities (e.g. power use in the building and industry sectors)

3 Includes fugitive emissions, industrial process emissions and waste emissions

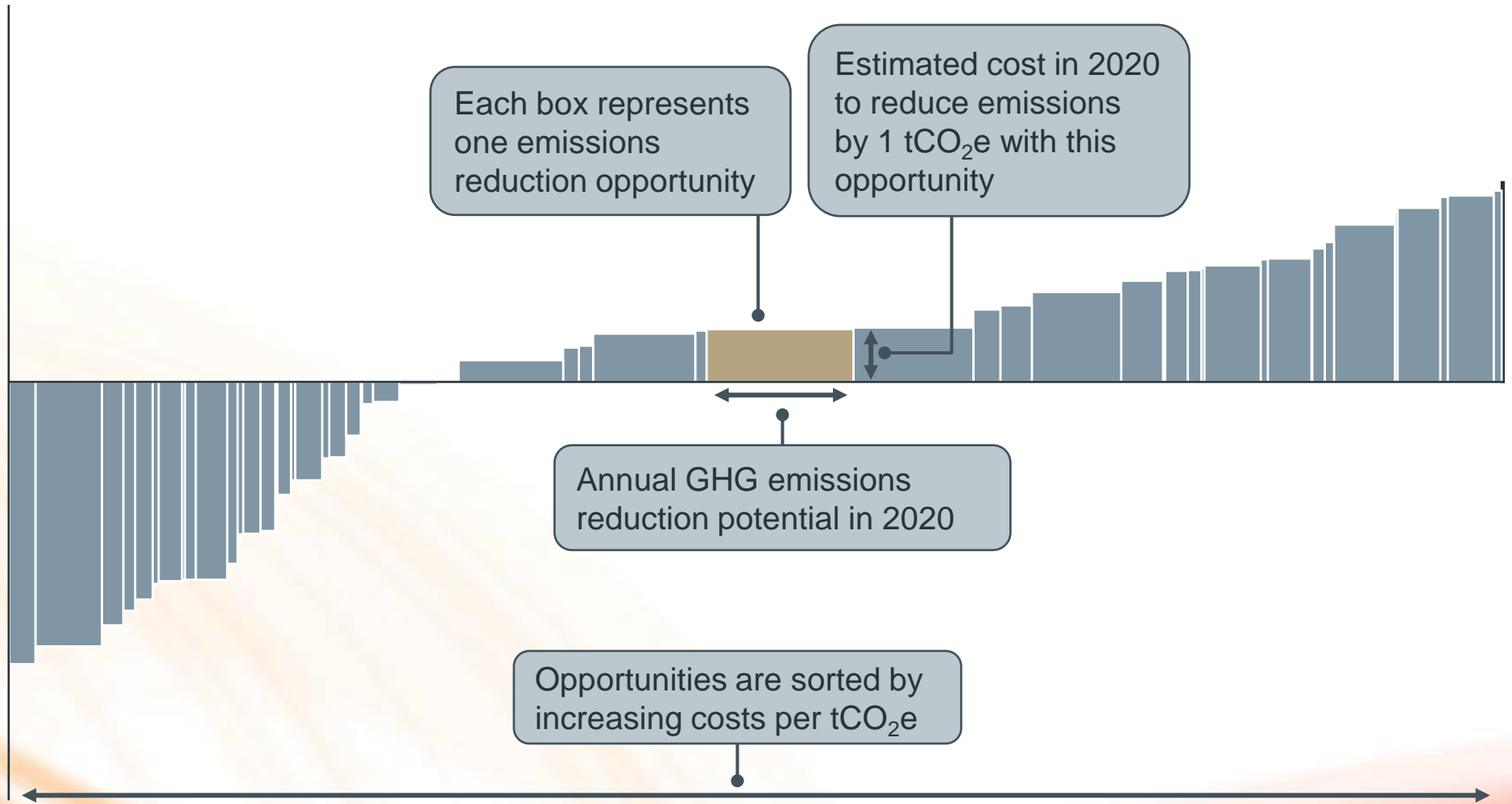
4 Net emissions after subtracting growth in carbon sinks (e.g. new plantations) from emissions due to land clearing; Kyoto accounting method used

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How to read an emissions reduction cost curve



Included

- Opportunities for which technology is commercially available
- Some opportunities that are outside Australia's Kyoto obligations
- The realistic potential, rather than the full technical potential for each opportunity
- Only opportunities available in Australia

Excluded

- Opportunities expected to occur under current policies
- A carbon price
- Changes in business mix
- Lifestyle changes
- Taxes and subsidies (when estimating costs from a societal perspective).
- Transaction and program costs
- Value of co-benefits, such as improved health or reduced congestion

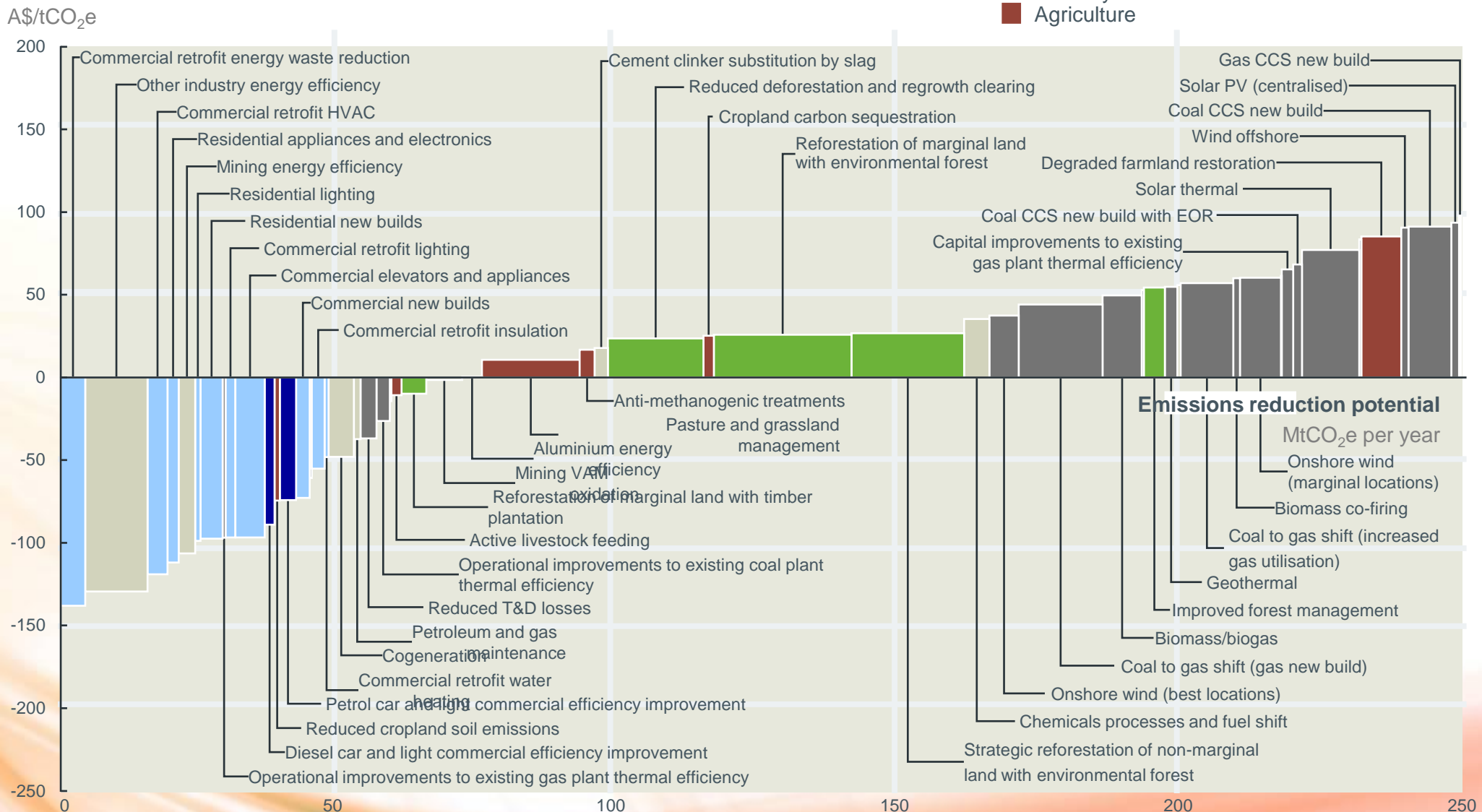
2020 GHG emissions reduction societal cost curve

Lowest cost opportunities to reduce emissions by 249 Mt CO₂e¹



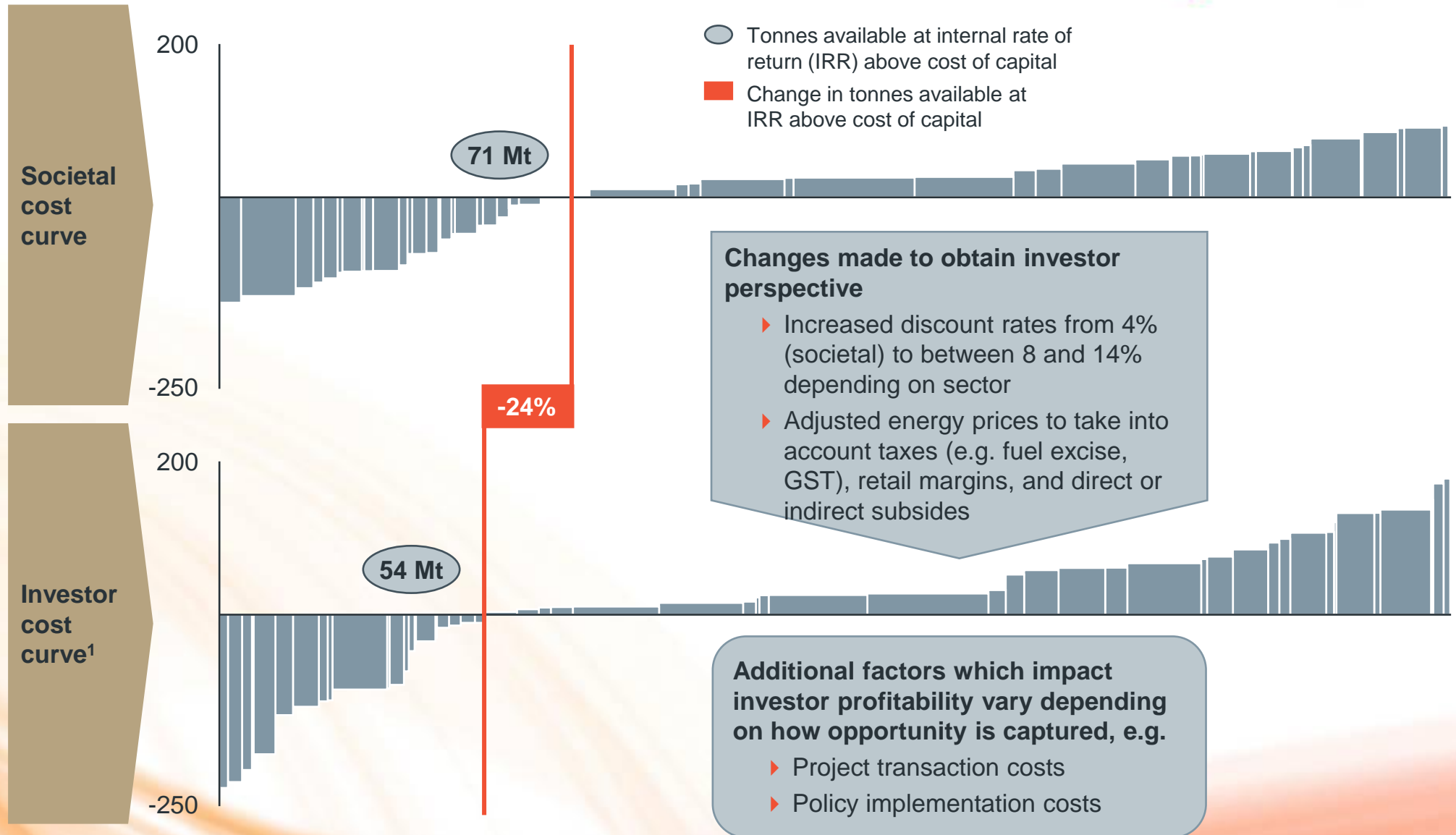
- Power
- Industry
- Transport
- Buildings
- Forestry
- Agriculture

Cost to society



¹ Includes only opportunities required to reach emission reduction target of 249 Mtpa (25% reduction on 2000 emissions); excludes opportunities involving a significant lifestyle element or consumption decision, changes in business/activity mix, and opportunities with a high degree of speculation or technological uncertainty

Conversion of societal to investor cost curve



¹ Does not include the impact of a carbon price

Key investor cost curve metrics



- Percent of total opportunity
- GHG reduction, MtCO₂e
- Average cost, A\$/tCO₂e
- Power
- Industry
- Transport
- Buildings
- Forestry
- Agriculture

Cost to an investor

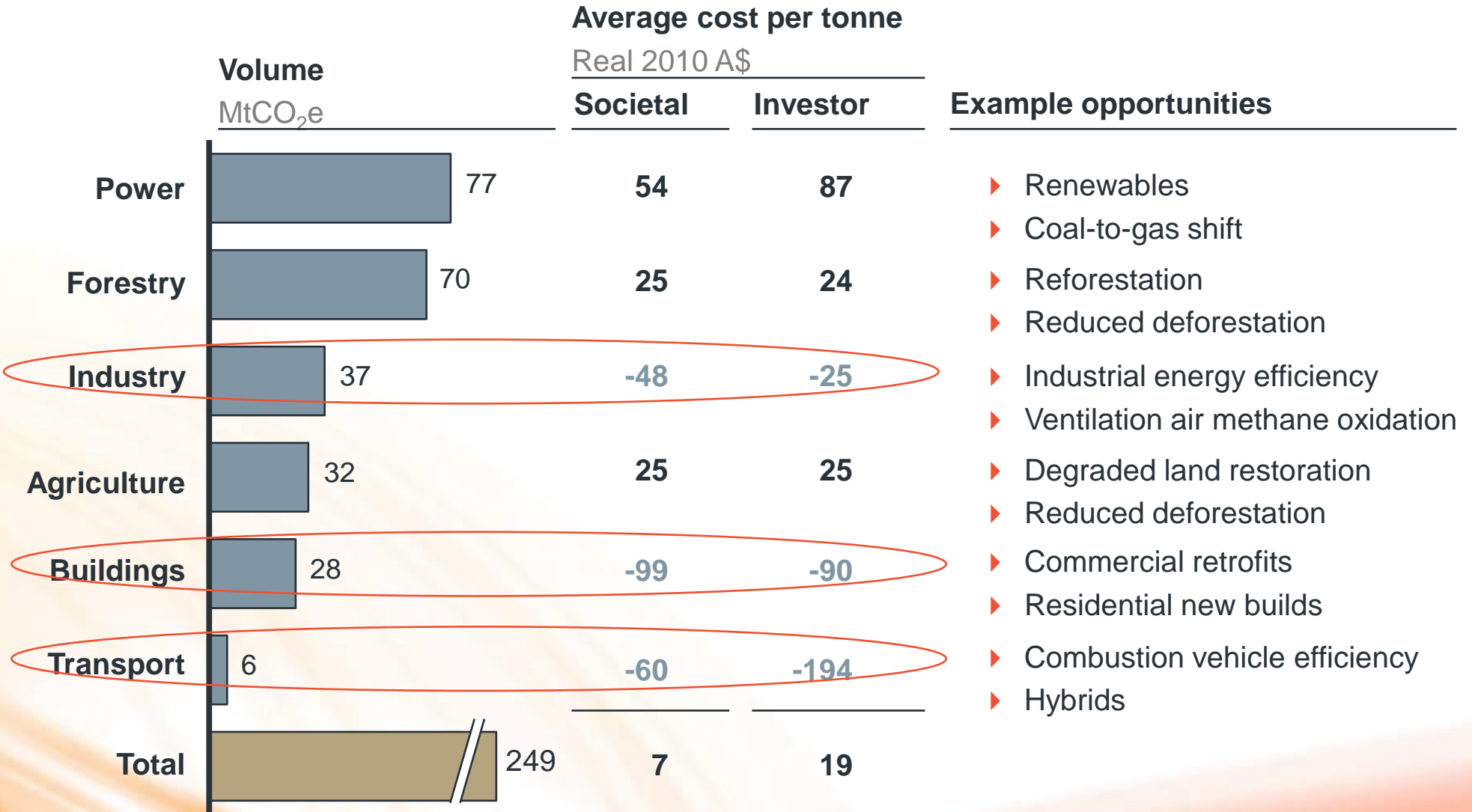
A\$/tCO₂e



¹ In this report, profitable is defined as positive return on incremental invested capital and operating expense (excluding transaction or policy implementation costs)

SOURCE: ClimateWorks team analysis, derived from 2020 GHG emissions reduction cost curve (exhibit 4)

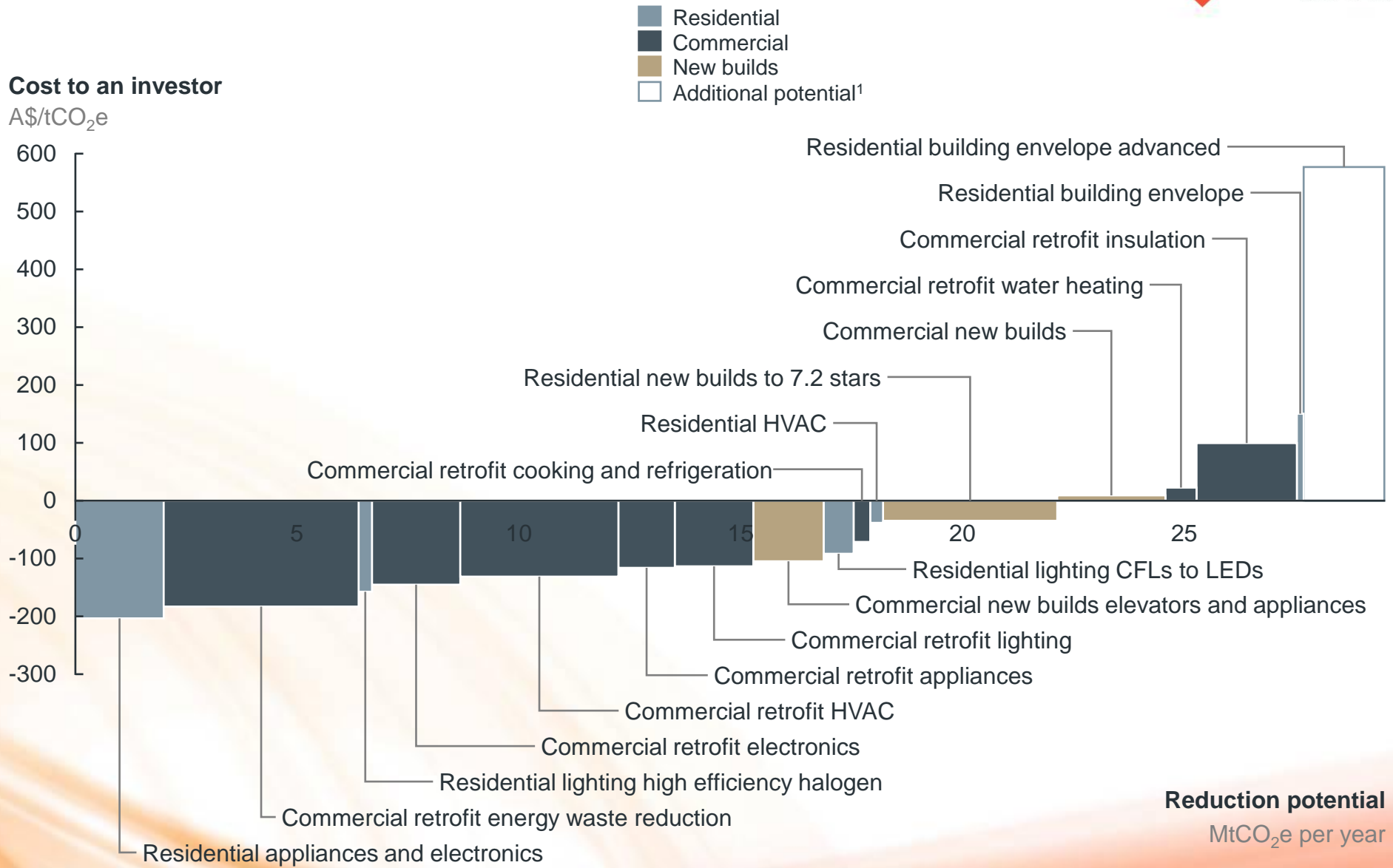
Australian 2020 emissions reduction potential by sector¹



¹ Includes all emission reduction opportunities required to achieve 249Mtpa

SOURCE: ClimateWorks team analysis, derived from 2020 GHG emissions reduction cost curve (exhibit 4)

2020 Buildings GHG emissions reduction *investor cost curve*

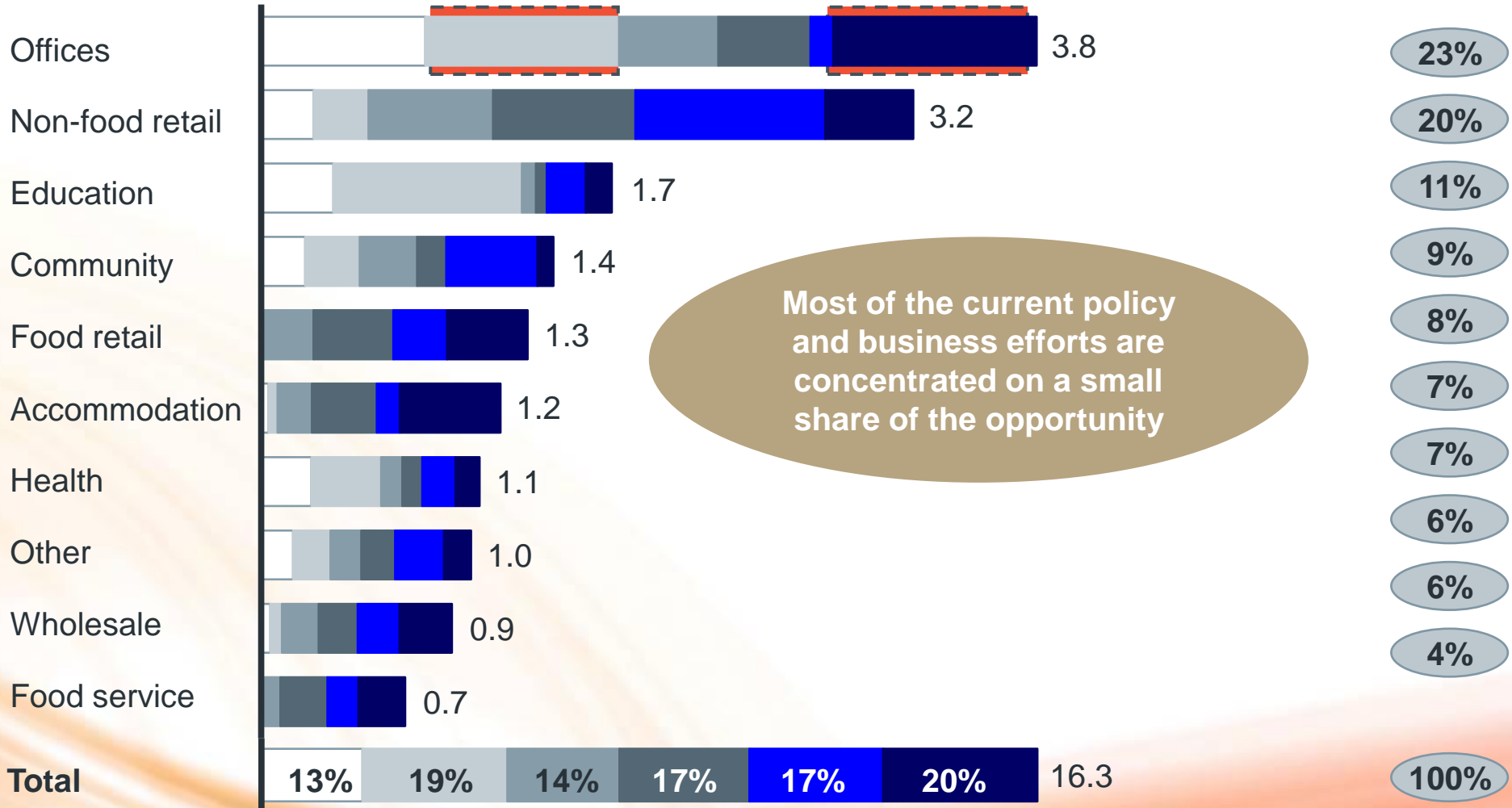


¹ Higher cost opportunities not required to meet target emissions of 25% below 2000 levels

Further breakdown of the emissions reduction opportunity in commercial buildings shows we must focus on more than offices

Percent of total, 2020 estimates

- Tenanted large private business
- Owner-occupied large private business
- Tenanted small private business
- Owner-occupied small private business
- Large public organisation
- Small public organisation
- Focus of current policies: large offices



Most of the current policy and business efforts are concentrated on a small share of the opportunity

SOURCE: Australian Bureau of Statistics (2001 and 2008); Tertiary Education Facilities Management Association (2004); Australian Institute of Health and Welfare (2008); ClimateWorks team analysis

Additional opportunities to reduce emissions through lifestyle and behaviour change – some examples

Categories	% of personal carbon footprint	Example opportunities	2020 emissions reduction potential	
			Volume MtCO ₂ e	Net savings A\$/tCO ₂ e
Passenger transport	44%	▶ Avoid 25% of business flights on high traffic routes through increased videoconferencing	0.4	200
		▶ Switch 15% of total urban car trips under 3 km to walking or cycling	1.1	6
		▶ Reduce total urban car travel by 5% through increased use of public transport	1.6	6
		▶ Shifting car occupancy rates from 1.4 to 1.6 persons per car	2.8	150
Building and household energy	36%	▶ Reduce required home temperature by 2 C	1.1	56
		▶ Reduce required commercial temperature change by 2 C	1.6	92
		▶ Switch key home appliances from standby to off when not in use	0.2	56
Consumables	20%	▶ Switch 50% of bottled water drunk in Australia to tap water	0.1	200

SOURCE: BITRE/CSIRO (2008); Australian Institute of Petroleum (2009); Ovum (2008); ABS (2009 and 2010); DEWHA (2008); Hackett et al (2009); Australasian Bottled Water Institute (2009); Econometrica (2009); ClimateWorks team analysis

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A range of barriers currently hinder the capture of emission reduction opportunities

Specific barriers

Investor profitability

- ▶ Positive cost
- ▶ Non-market pricing (fixed fees, negotiated rates)
- ▶ Scientific or technical uncertainty

Capital availability/priorities

- ▶ Finite access to capital
- ▶ Payback periods
- ▶ Investment hurdle rate > cost of capital

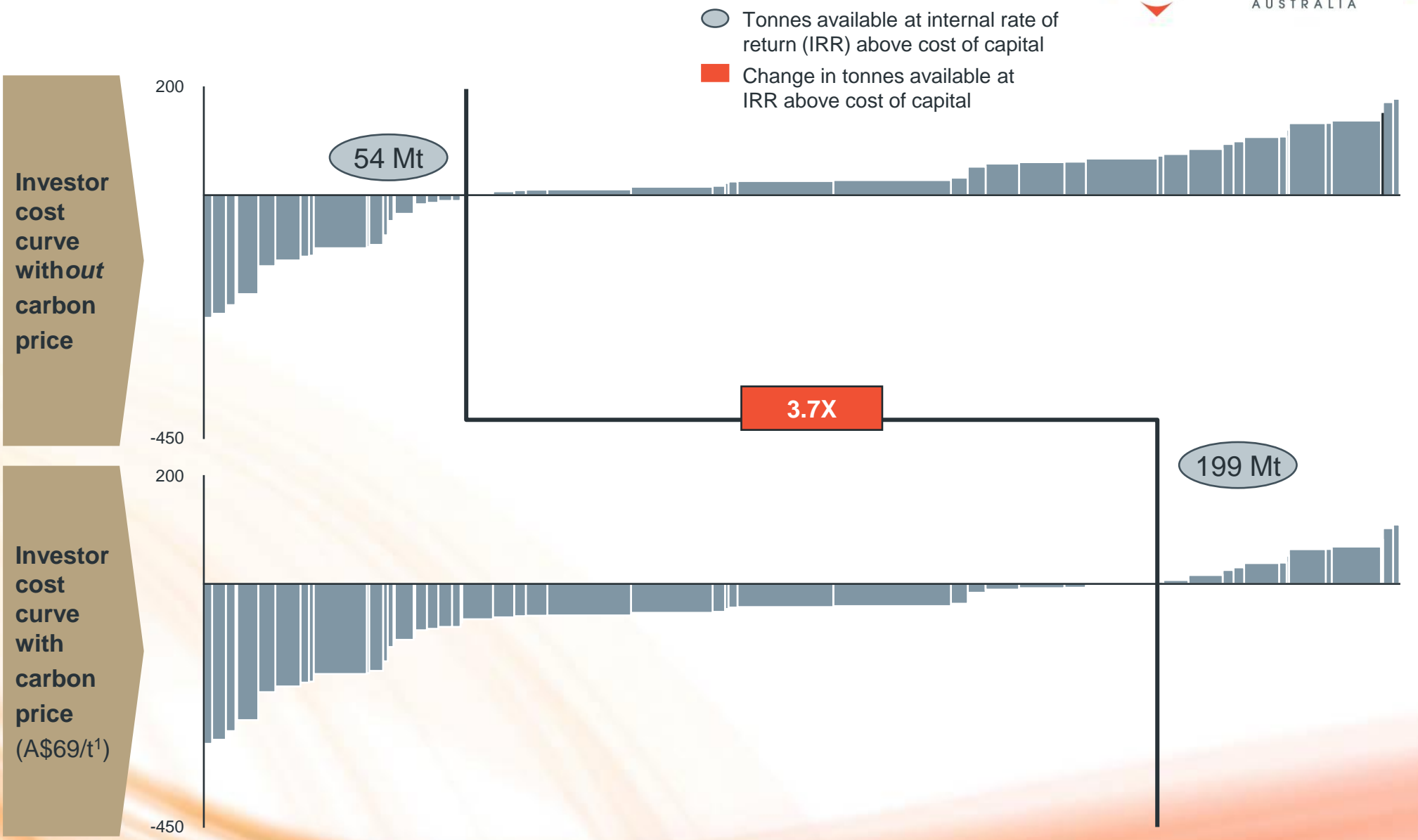
Informed decision process

- ▶ Access to information
- ▶ Lack of awareness or understanding
- ▶ Low business priority
- ▶ Lack of statistical experience to prove benefits
- ▶ Lack of long term view on carbon/energy price
- ▶ Split administrative structures or budget allocation process

Market structure and supply

- ▶ Split incentives (owner/tenant, current/future)
- ▶ Lack of project scale (increased transaction costs, fragmented decision-makers)
- ▶ Sufficient availability of or access to equipment, infrastructure and skilled labour
- ▶ Reliability/quality of supply (immature markets)

Impact of carbon price on investor economics



1 Carbon price in 2020 of A\$69 per tonne based on Treasury Garnaut -25% estimate (*Australia's Low Pollution Future*) converted to 2010 dollars

SOURCE: ClimateWorks team analysis, derived from 2020 GHG emissions reduction cost curve (exhibit 4)

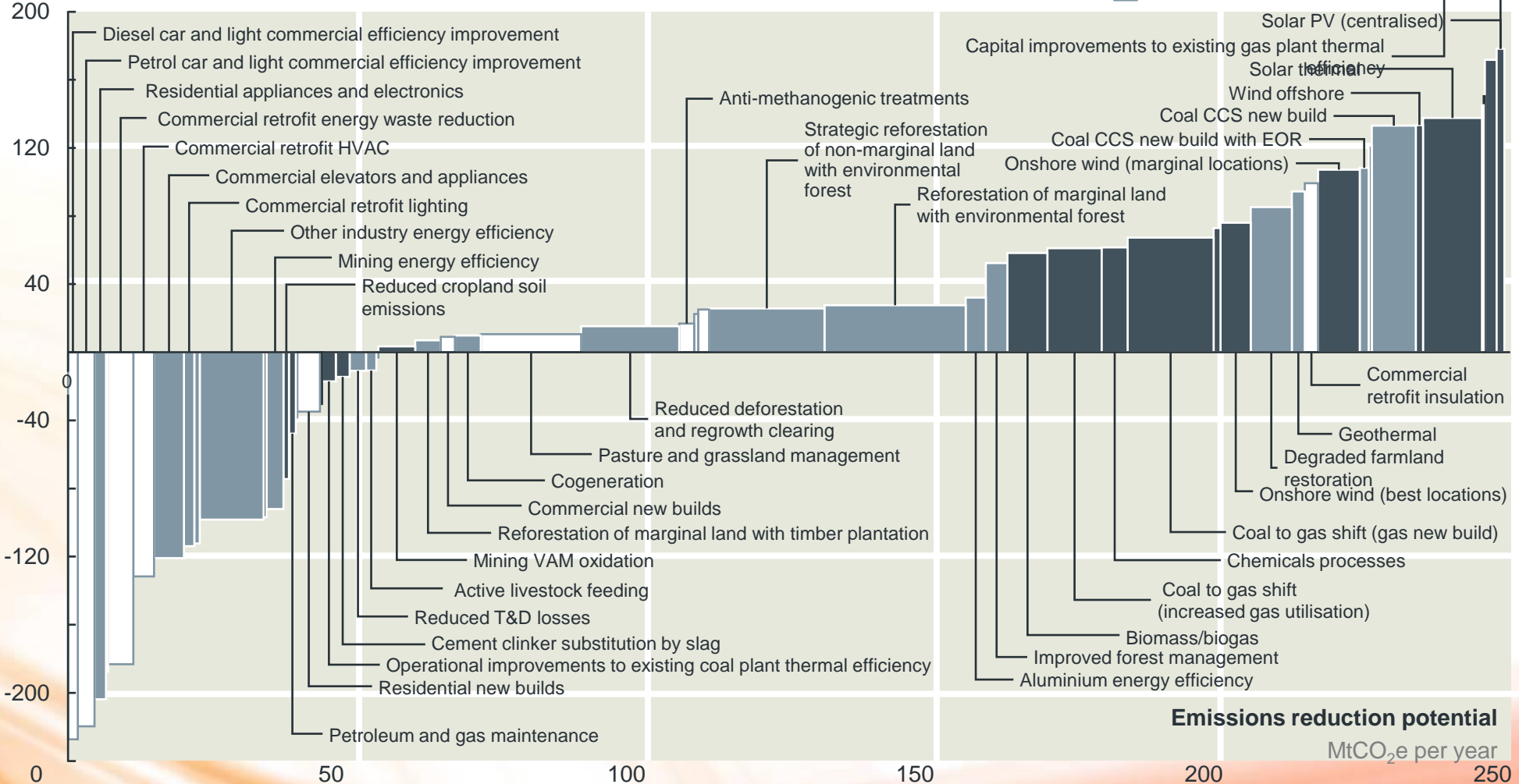
Expected traction of carbon price

Based on 2020 GHG emissions reduction *investor* cost curve

A carbon price will also reduce emissions not represented on this curve by encouraging changed lifestyle or behavioural decisions²

Cost to an investor

A\$/tCO₂e



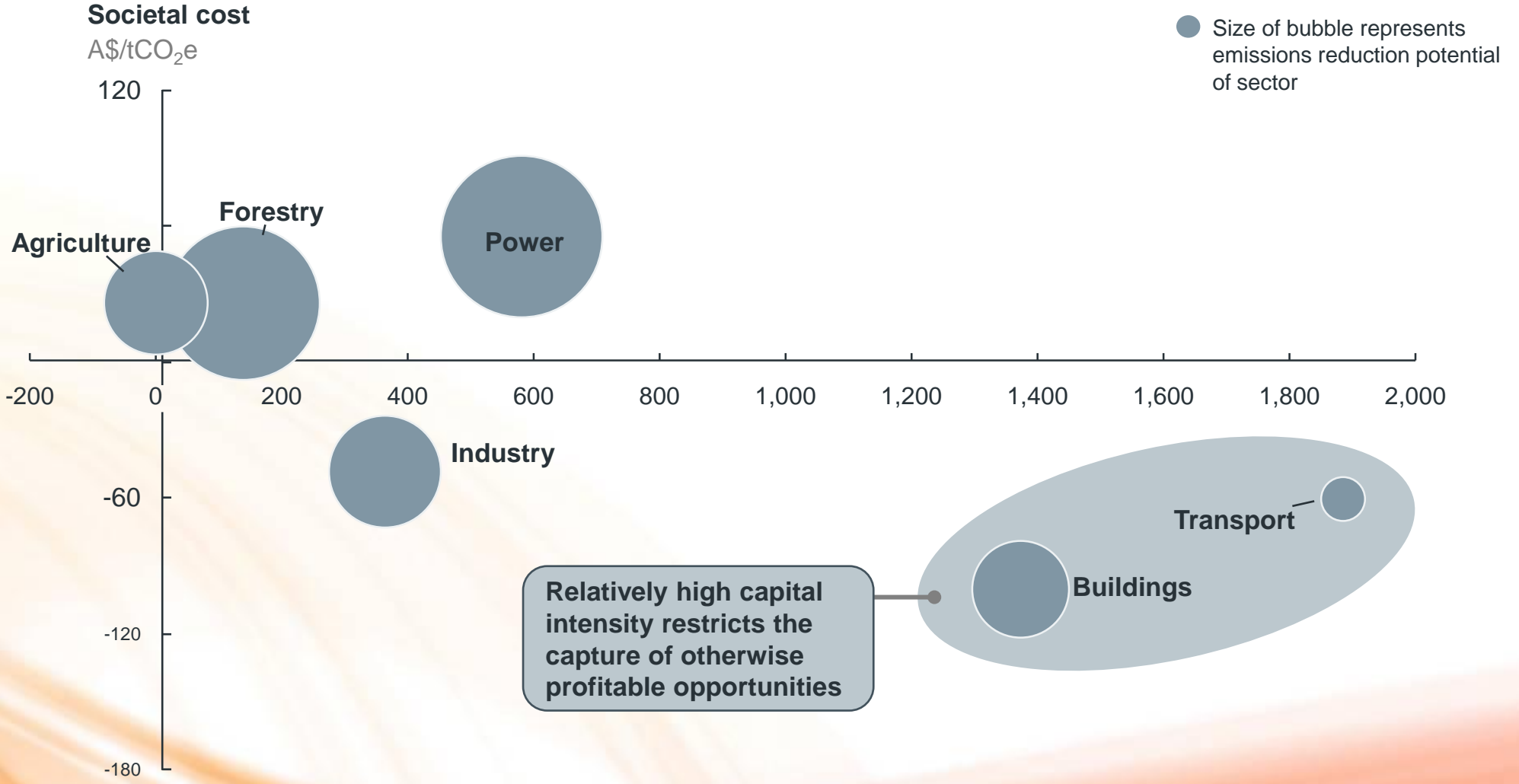
1 Analysis assumes a carbon price large enough to make each opportunity profitable

2 Such as reduced consumption (e.g. turning lights off, driving fewer kms) and switching to less carbon-intensive forms of consumption (e.g. using public transport instead of driving)

SOURCE: ClimateWorks team analysis, derived from 2020 GHG emissions reduction cost curve (exhibit 4)

Capital intensity of opportunities by sector

2020 capital intensity and emissions reduction cost



Capital intensity
Capex/tCO₂e

SOURCE: ClimateWorks team analysis, derived from 2020 GHG emissions reduction cost curve (exhibit 4)

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Roadmap of action

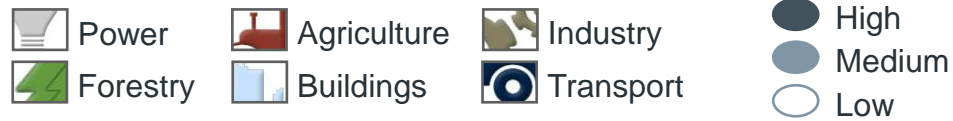
x Abatement potential, Mt CO₂e (total 249 Mtpa)









Ease of implementation (cost and barriers)

		Ease of implementation (cost and barriers)			Type of response
		Relatively simple	More challenging	Difficult	
Risk of lock-in	High	<ul style="list-style-type: none"> Residential new builds <p>4</p>	<ul style="list-style-type: none"> Coal to gas shift (gas new build) Solar thermal Onshore wind (marginal locations) Onshore wind (best locations) Commercial new builds Solar PV (centralised) <p>41</p>	<ul style="list-style-type: none"> Biomass/biogas Geothermal Wind offshore <p>11</p>	<p>1 Implement now</p> <p>2 Act now to remove barriers and motivate action</p> <p>3 Invest now in information and innovation to reduce long-run cost</p>
	Medium	<ul style="list-style-type: none"> Other industry energy efficiency Commercial elevators & appliances Cogeneration Mining energy efficiency Reduced T&D losses Residential appliances & electronics Commercial retrofit lighting Residential lighting <p>31</p>	<ul style="list-style-type: none"> Commercial retrofit HVAC Aluminium energy efficiency Petrol car and LCV efficiency Commercial retrofit insulation Capital improvements to existing gas plant thermal efficiency Diesel car and LCV efficiency Biomass co-firing Commercial retrofit water heating Residential HVAC <p>18</p>	<ul style="list-style-type: none"> Reduced deforestation and regrowth clearing Coal CCS new build Coal CCS new build with EOR Diesel car hybrids Petrol car hybrids Gas CCS new build Residential building envelope <p>28</p>	
	Low	<ul style="list-style-type: none"> Coal to gas shift (gas utilisation) Comm. retrofit energy waste reduction Improved forest management Improve existing coal plant efficiency Cement clinker substitution by slag Petroleum and gas maintenance Reduced cropland soil emissions Improve existing gas plant efficiency Large articulated truck efficiency improvement <p>25</p>	<ul style="list-style-type: none"> Reforestation of marginal land with environmental forest Strategic reforestation of non-marginal land with enviro. forest Mining VAM oxidation Chemical processes & fuel shift Reforestation of marginal land with timber plantation Active livestock feeding Iron and steel processes <p>62</p>	<ul style="list-style-type: none"> Pasture and grassland management Degraded farmland restoration Anti-methanogenic treatments Cropland carbon sequestration <p>29</p>	

Impact of non price barriers



Sector	Opportunity	Action required to achieve	Societal cost A\$/tCO ₂ e	Size of opportunity Mtpa	Responsive-ness to carbon price	Market structure and supply	Information and decision process	Capital constraints
	Cogeneration	Implement 100% in two steel plants; 9% of thermal energy replaced in refineries; 7.5% energy savings in chemicals; 3% energy savings for other industries	-48	4.5	●	○	○	●
	Commercial retrofit energy waste reduction	Reduce energy consumption by a 10% average in existing buildings by 2020	-138	4.4	○	●	○	●
	Residential new builds	Build 100% of new builds to a 7.2 star rating between 2013 and 2020	-98	3.9	○	●	○	○
	Improved forest management	Improve management of 375,000 ha forest annually to increase woody growth	54	3.8	●	●	○	○
	Mining energy efficiency	Save 5.2% energy through operational improvements and equipment upgrades	-106	2.9	●	○	○	●
	Reduced T&D losses	Reduce T&D losses from 8% to 6.5% across the national network	-37	2.8	●	●	●	○

- ▶ **Australia has the potential to achieve GHG emissions reductions of 249 MtCO₂e (25% below 2000 levels) at a low average cost in the next ten years**
 - The average cost in 2020 is the equivalent of \$185 per household

- ▶ **Reducing GHG emissions can be profitable for businesses**
 - 22% of the opportunities are profitable to investors today

- ▶ **A combination of a carbon price and targeted actions are required to achieve Australia's full potential of low cost emissions reductions**

- ▶ **A portfolio of prompt action is required**
 - There are 54 practical actions – no silver bullet!
 - Some are ready to be implemented now, while others will need attention from government and businesses to make sure they are implemented by 2020

Next steps



What will ClimateWorks Australia do now?



- ▶ Implementing these 54 opportunities can be done ... but we need you!
- ▶ The actions are in the hands of all the businesses and individuals across all sectors of our economy

- ▶ **ClimateWorks Australia will:**
 - Work with businesses and governments on specific projects that will achieve the emissions reductions in the next ten years
 - Track progress toward achieving 249 Mtpa

Questions?



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