



# THE CRITICAL DECADE: GLOBAL ACTION BUILDING ON CLIMATE CHANGE



April 2013



# CONTENTS

PREFACE / 3

KEY FINDINGS / 4

INTRODUCTION / 6

01. CHAPTER 1: THE GLOBAL ENERGY GIANTS ARE MOVING / 10

1.1 Recent developments in the People's Republic of China / 13

1.2 Recent developments in the United States of America / 17

02. CHAPTER 2: TYPES OF INTERNATIONAL ACTION / 21

2.1 Carbon pricing schemes / 21

2.2 Renewable energy / 24

2.3 Energy efficiency / 28

03. CHAPTER 3: A CRITICAL DECADE FOR AUSTRALIA / 31

REFERENCES / 34

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The Critical Decade:  
Global Action Building  
on Climate Change

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## Preface

The Climate Commission brings together internationally-renowned climate scientists, as well as policy and business leaders, to provide an independent and reliable source of information about climate change to the Australian public.

This is the Climate Commission's 25<sup>th</sup> publication in our two years of operation. It follows a series of reports on the science and impacts of climate change, renewable energy and international action.

In our discussions with Australians we are consistently asked about global action on climate change and Australia's role. In response in August 2012 the Climate Commission released *The Critical Decade: International Action on Climate Change*. That report showed that all major economies were taking action to reduce their greenhouse gas emissions. Since that report was released there have been a number of important developments, particularly from the energy giants, the United States and China. This report provides an overview of recent international progress, and considers the types of action countries are taking, focusing on the energy giants.

The information in this report is compiled from a number of authoritative sources. The information provided throughout the report is based on the latest available data. A list of references is included at the end for those who would like further information on a particular subject.

We would like to thank our fellow commissioners. The authors retain sole responsibility for the content of the report.

A handwritten signature in black ink, appearing to read 'Tim Flannery'.

**Professor Tim Flannery**  
Chief Climate Commissioner

A handwritten signature in black ink, appearing to read 'Roger Beale'.

**Mr Roger Beale AO**  
Climate Commissioner

A handwritten signature in black ink, appearing to read 'Gerry Hueston'.

**Mr Gerry Hueston**  
Climate Commissioner

# KEY FINDINGS

## 1. The energy giants China and the United States are accelerating action.

- China and the United States (US) are the world's two largest economies and together produce approximately 37% of world emissions. Both nations are on track to meet their international commitments to tackle climate change. In recent months they have each signalled they will be strengthening their efforts and in April they reached an historic agreement to tackle climate change together.
- Increasing action from the global energy giants can re-energise the global effort to tackle climate change. While China and the US cannot solve the problem alone, they are acting as significant drivers of change.
- Only a few years ago some commentators pointed to insufficient action in China and the United States to delay action in Australia. Today the energy giants are undoubtedly on the move, which will fuel global momentum.

## 2. China's efforts demonstrate accelerating global leadership in tackling climate change.

- China is reducing its emissions growth. In 2012 China reduced the carbon intensity of its economy more than expected. Growth in demand for electricity, which is largely generated from coal, almost halved after years of strong growth.
- China will begin introducing seven emissions trading schemes this year that cover a quarter of a billion people. A national trading scheme is planned, based on these models.
- China has emerged as the world's renewable energy powerhouse, taking ambitious strides to add renewable energy to its mix. 2012 was another year of extraordinary growth:

- Between 2005 and 2012 China increased its wind power generation capacity by almost 50 times. The amount of electricity generated from wind in 2012 was about 36 per cent higher than in 2011.
- New solar power capacity expanded by 75% in 2012. Solar power capacity is expected to triple to more than 21,000 megawatts by 2015.
- In 2012 China invested US\$65.1 billion in clean energy, 20% more than in 2011. This was unmatched by any nation and represented 30% of the entire G-20 nations' investment in 2012.
- China remains the world's largest emitter. However, if it continues to make gains in reducing growth in demand for electricity and fossil fuels, China could curb its emissions sooner than expected.

## 3. The United States has made a new commitment to lead.

- The US appears to be gaining momentum with President Barack Obama outlining his strong intent to address climate change and for America to play a leadership role.
- Emissions in the US have been declining. With continued efforts the US is on track to meet the national goal of reducing emissions by 17% on 2005 levels by 2020. Policy settings have made a contribution, as well as the impact of the economic downturn and a progressive shift away from coal to gas.
- Important foundations have been set that are likely to have a lasting impact in the coming decades, including:
  - In January 2013 the world's 9<sup>th</sup> largest economy, California, commenced an emissions trading scheme.
  - More than half of US states now have policies to encourage renewable energy.

- In just four years, between 2008 and 2012, the US has nearly doubled its installed renewable energy capacity.
- US investment in renewable energy was US\$35.6 billion in 2012, second only to China.

#### **4. Global momentum to tackle climate change is growing. Every major economy is tackling climate change, setting in place policies to drive down emissions and increase investment and capacity of renewable energy.**

- Ninety-eight countries have committed to limit their greenhouse gas emissions.
- The number of countries pricing carbon is increasing, with four new schemes starting so far this year. Emissions trading schemes are now operating in 35 countries and 13 states, provinces and cities. These 48 schemes, together with the 7 Chinese schemes, are expected to involve 880 million people and about 20% of global emissions.
- Global renewable energy capacity is growing quickly; in 2012 alone capacity rose 15%. The capacity of solar photovoltaic panels increased by 42% and wind capacity 21%. Total global renewable energy power generation is expected to increase by more than 40% from 2011 to 2017.
- Policy support has been central to driving investment and growth in installed renewable energy capacity in many countries. Conversely, declining support, or policy uncertainty, has stifled investment in other countries.
- The global pressure to reduce emissions is only likely to increase as the climate shifts and global action accelerates.

#### **5. Australia is a major player and is important in shaping the global response to climate change.**

- Australia is one of the most vulnerable developed countries to climate change

and is already experiencing the impacts of more frequent and severe extreme weather. For instance, during the most recent Australian summer more than 123 heat, flood and rainfall records were broken. Australia's global influence in averting these risks will depend on how effectively we implement policy solutions at home.

- Australia is the 15<sup>th</sup> largest emitter, larger than 180 other countries. This means that Australia has a responsibility to play its part and that Australian actions have a global influence.
- There have been significant developments in Australia, including:
  - Greenhouse gas emissions have declined. Greenhouse gas emissions from electricity generation in the period from June to December 2012 were the lowest since 2001-02.
  - Australia's renewable energy capacity almost doubled from 2001 to 2012. This year a significant milestone of one million households having installed solar photovoltaic panels was reached.

#### **6. This is the critical decade for action.**

- While significant progress is being made, it is not enough. Globally emissions are continuing to rise strongly, posing serious risks for our society.
- This decade must set the foundations to reduce emissions rapidly to nearly zero by 2050. The earlier such action is under way the less disruptive and costly it will be. This is the critical decade for accelerating action. All countries, particularly the major emitters like China, the United States and Australia, must move beyond their current commitments to reduce their emissions more deeply and swiftly. This is the critical decade to turn the global emissions trend downwards and to set the global foundations for accelerating reductions in decades to come.

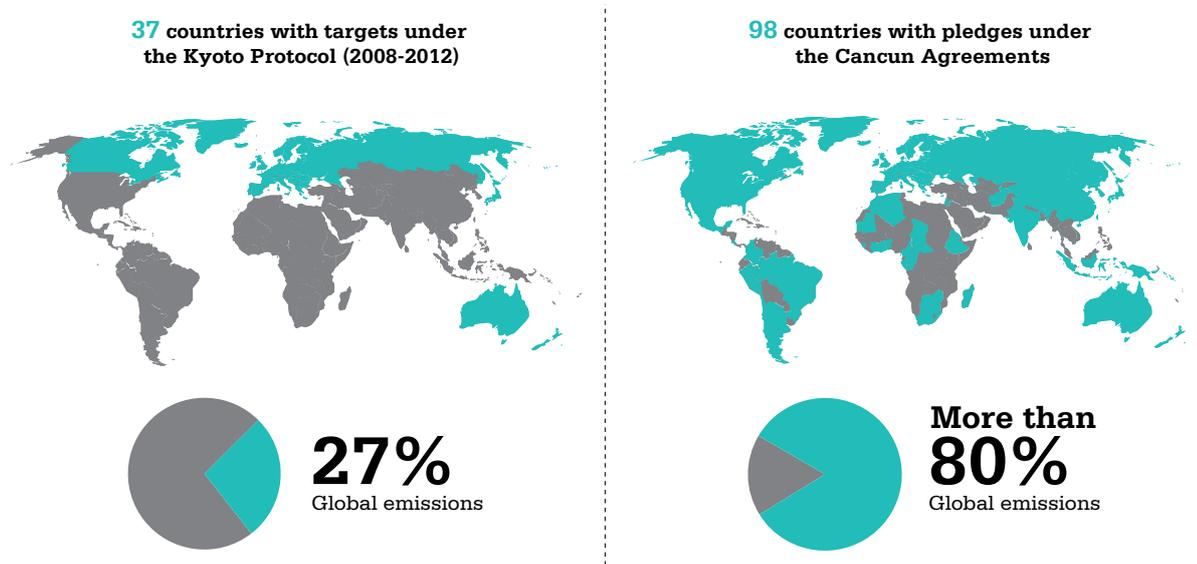
# INTRODUCTION

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INVESTING IN TACKLING  
CLIMATE CHANGE IS AN  
INSURANCE POLICY AGAINST  
SERIOUS FUTURE DAMAGE FROM  
A CHANGING CLIMATE.  
—



Across the world countries have agreed that deep cuts in greenhouse gas emissions are necessary to prevent global temperatures from rising to levels that will cause significant and irreversible damage. Ninety-eight countries, including the world's largest economies, the United States (US) and China, have now committed to limit their greenhouse gas emissions (Figure 1).

**Figure 1: Map of growth in the number of countries pledging action and the portion of global emissions covered under the United Nations Framework Convention on Climate Change.**



Sources: WRI, CAIT, 2012; UNFCCC, 2013; IMF, 2013

In its report *The Critical Decade: International Action on Climate Change*, the Climate Commission outlined the global response to climate change, finding that every major economy had policies in place to tackle climate change. Since the report's release, there has been significant progress in many countries, including China and the US.

This report presents an overview of progress since August 2012, with a particular focus on China and the US which together are responsible for approximately 37%<sup>1</sup> of global emissions. It also considers progress in Australia as one of the 20 countries contributing most of the world's emissions.

China and the US, the world's energy giants, have strengthened their climate change response in recent months. China faces multiple drivers for domestic climate action, including reducing air and water pollution, limiting risks from climate change, improving energy and water security, enhancing the competitiveness of its economy, and becoming a global leader in advanced energy technologies. China's leaders have consistently acknowledged the risks of climate change and accepted that China must act. Together, these drivers provide strong motivation for robust domestic action in China.

<sup>1</sup> All information in this report on countries' percentage contributions to global greenhouse gas emissions is based on emissions in 2005 (as reported in WRI, CAIT, 2012), the most recent year for which consistent emissions data for the countries discussed are available. Changes since 2005, such as strong emissions growth in China, can be expected to alter countries' proportional contributions over time.

China is the world's largest emitter and its emissions will continue to rise for some time. However, China is significantly reducing its emissions growth, outperforming its carbon and energy intensity targets in 2012 and setting tougher targets for 2013. China is emerging as the world's renewable energy powerhouse, with 2012 standing out as another year of extraordinary growth.

Despite polarised views in the US Congress around climate change action, the US has taken regulatory and executive actions which have contributed to reductions in emissions. In the last four years, installed renewable energy capacity in the US almost doubled, and is now of a similar size to Australia's total electricity generating capacity. Recent statements by President Obama and Secretary of State Kerry indicate a strong willingness to take further action to cut emissions.

As well as domestic action, China and the US are stepping up their collaborative efforts. In April 2013 the US and China announced new ministerial-level arrangements to collaborate in areas including renewable energy and clean technology development (DoS, 2013). Together China and the US will drive global momentum to tackle climate change.

Importantly, it will take some time to see the impact of the policies that are being put in place today.

It is clear that many countries around the world are continuing to tackle climate change. The most common types of action include carbon pricing, supporting renewable energy, and energy efficiency measures. There have been important developments in each of these areas in the last nine months; for example, four jurisdictions commenced carbon pricing schemes in January 2013. Twenty-three of the

top 25 emitters have economy-wide energy efficiency policies, while 118 countries have renewable energy policies.

There has been further progress in international negotiations to develop a new international climate change agreement requiring all major emitters to take action on climate change. At the 2012 United Nations climate change conference in Doha, Qatar, countries commenced work on a legally binding agreement that is to be finalised by 2015 and will come into effect from 2020. However, there is still some way to go to achieve a workable global agreement.

It is the Climate Commission's assessment that the international will to develop a strong international agreement will come from countries making good on the commitments they have already made to rein in their domestic emissions. In other words, a global agreement will be built on the action taken by each country in their domestic environment. This action builds the goodwill required for nations together to create more ambitious climate change goals. Fortunately not only are countries implementing policies to tackle climate change but action from the largest players appears to be accelerating.

Like the US, around one third of the other Organisation for Economic Co-operation and Development countries have now achieved absolute reductions in carbon dioxide emissions while growing their economies (OECD, 2012). This is a critical development because it demonstrates that countries can continue to grow their economies while shrinking their emissions – separating emissions from economic growth.

Recent developments in Australia and major emitters including the US and China show

that growth in emissions can be slowed and reversed. It also shows that price signals can quickly drive energy markets to alternative fuel sources.

The top 20 emitters, which include the US, China and Australia, contribute around 75% of the world's greenhouse gas emissions. These countries together will be the most influential in shaping the global response to climate change. Australia is the 15<sup>th</sup> largest emitter in the world and can play an influential role.

In Australia greenhouse gas emissions from electricity generation in 2012 were down 4.7% on the previous year, while in the period from June to December 2012 they were the lowest since 2001-02 (DIICCSRTE, 2013a).

While recent developments and increasing national ambition represent significant progress, they are not enough. Globally emissions continue to rise and are tracking at the high end of the levels that scientists expect (Peters et al., 2012). Climate change is already increasing the intensity and frequency of extreme weather events. During the past decade, unusually severe heatwaves occurred in the central regions of Western Europe, Greece, Russia and the United States. In Australia, more than 123 heat, flood and rainfall records were broken during the 2012/13 summer.

The concentration of carbon dioxide and other greenhouse gases in the atmosphere is at its highest level in 800,000 years. By 2011, levels of carbon dioxide, the main greenhouse gas, were 40% higher than at the start of the Industrial Revolution (GCP, 2013). Burning of fossil fuels, like coal, oil and gas, is a major contributor.

To reduce the risks we must rapidly reduce the amount of greenhouse gases we produce to near zero by 2050. We have less than four decades to transform energy systems around the world. This will require a progressive shift away from fossil fuels to cleaner forms of energy, like solar and wind power.

This means that all countries, particularly the major emitters like China, the United States and Australia, must move beyond their current commitments to reduce their emissions more deeply and swiftly. This is the critical decade to turn the global emissions trend downwards and to set the global foundations for accelerating reductions on greenhouse gas emissions in years and decades to come. In the next few years all major countries must consolidate and strengthen current action, with a view to significant further strengthening in years to come.





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NINETY-EIGHT COUNTRIES HAVE  
COMMITTED TO LIMIT THEIR  
GREENHOUSE GAS EMISSIONS.

THESE COUNTRIES COLLECTIVELY  
REPRESENT MORE THAN 80% OF  
THE WORLD'S EMISSIONS AND  
AROUND 90% OF THE GLOBAL  
ECONOMY.

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# CHAPTER 1: THE GLOBAL ENERGY GIANTS ARE MOVING

China and the US are two of the world's largest economies and together produce about 37% of world emissions. A serious commitment to tackle climate change from both countries is critical in continuing to fuel global momentum. While China and the US cannot solve the problem alone, they will act as significant drivers of change.

## Future policy continuity from the energy giants

At the time the Climate Commission published its last report on international action the US election and the change of Chinese leadership were on the immediate horizon. In November 2012, US President Barack Obama was re-elected. He quickly affirmed his commitment to tackling climate change and investing in cleaner energy sources. In March 2013 Chinese leaders named Li Keqiang Premier for a five year term. Similarly the Chinese leadership has affirmed its strong commitment to tackling climate change. This delivers substantial policy certainty and continuity to the global effort to tackle climate change. In addition, the US and China have agreed to work together to show global leadership.

Only a few years ago some commentators pointed to insufficient action in China and the US to delay action in Australia. Today the energy giants are not just on the move, but they are striding into the future.

“We will respond to the threat of climate change, knowing that the failure to do so would betray our children and future generations. Some may still deny the overwhelming judgment of science, but none can avoid the devastating impact of raging fires, and crippling drought, and more powerful storms. The path towards sustainable energy sources will be long and sometimes difficult. But America cannot resist this transition; we must lead it. We cannot cede to other nations the technology that will power new jobs and new industries – we must claim its promise. That is how we will maintain our economic vitality and our national treasure – our forests and waterways; our croplands and snowcapped peaks.”

**President Barack Obama,  
Second Inauguration Speech.**



# CHINA SNAPSHOT

## Action on a giant scale

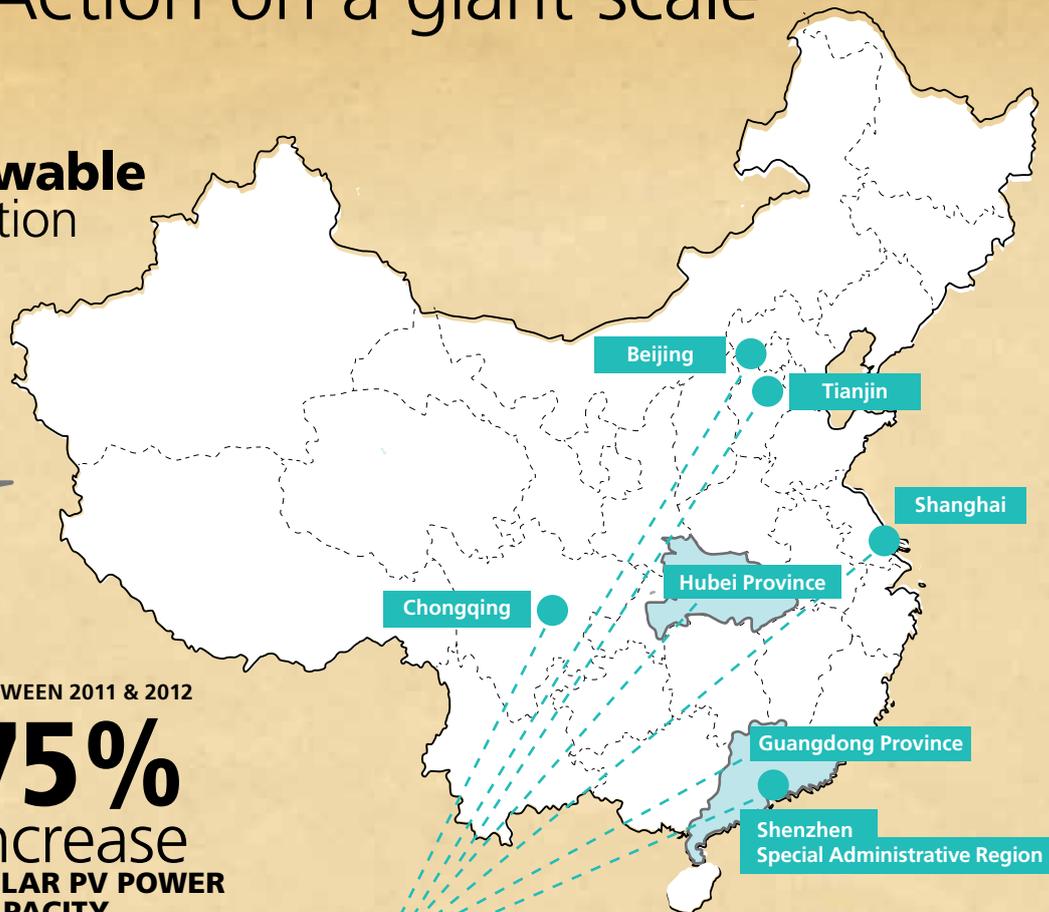
China has **the highest renewable power** generation capacity in the world

IN 2012  
**36%**  
increase  
WIND POWER  
generated



BETWEEN 2011 & 2012

**75%**  
increase  
SOLAR PV POWER  
CAPACITY



**7** PILOT EMISSIONS TRADING SCHEMES ARE EXPECTED TO BEGIN FROM MID 2013

These pilot schemes cover

- 256 MILLION PEOPLE
- 3.4% OF GLOBAL ECONOMY

China plans to build on these pilots to establish nationwide emissions trading from 2016

WORLD LEADING  
US **\$65.1 billion**  
NEW Investment in clean energy



POPULATION: **1.34 BILLION**

Highest greenhouse gas emissions of any country

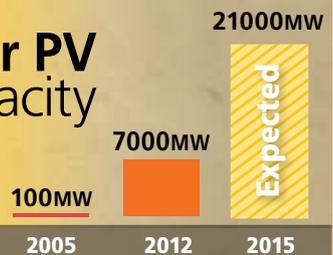
PERCENT OF GLOBAL EMISSIONS



**5% reduction in carbon intensity in 2012**



Installed **Solar PV** capacity



Installed **WIND** capacity

2005 – **1,300MW**  
 2012 – **63,000MW**  
 2015 expected **100,000MW**



## 1.1 Recent developments in the People's Republic of China

“We shouldn’t pursue economic growth at the expense of the environment. Such growth won’t satisfy the people.”

**Premier Li Keqiang, press conference following the 12th National People’s Congress, 17 March 2013 (The Climate Group, 2013).**

“The Chinese government attaches great importance to addressing climate change issues.”

“The Chinese government believes actively responding to climate change is not just a major challenge but also a good opportunity for accelerating transformation of the development mode and adjusting industrial structure.”

**Xie Zhenhua, Vice Chairman, National**

**Development and Reform Commission, keynote address, Second Australia China Climate Change Forum, Sydney, 27 March 2013.**

### Overview

China has in recent years taken strong steps toward positioning itself as a global leader in renewable energy and putting itself on a path to reduce greenhouse gas emissions. These efforts delivered promising results in 2012, and China announced significant further steps in early 2013.

As the world’s largest emitter, contributing around 19% of global emissions in 2005, China’s actions over the coming decade will play a central role in curbing global emissions (WRI, CAIT 2012). China faces myriad drivers for domestic action. The Chinese Government is concerned about worsening air and water pollution and as a result is increasingly focused on sustainable development and environmental protection. In his address to the National People’s Congress on 5 March 2013, outgoing Premier Wen Jiabao described the “sharpening contradictions” between economic development, resources and the environment as a key challenge for the next administration. China is also concerned with energy and water security, enhancing the competitiveness of its economy, and becoming a global leader in advanced energy technologies. Together, these drivers provide strong motivation for China to continue its efforts to reduce emissions.

China is one of the 98 countries that have made international pledges to limit their greenhouse gas emissions (UNFCCC, 2013; IMF, 2013). China’s pledge is to reduce emissions per unit of GDP (emissions intensity) by 40-45% relative to 2005 by 2020.

China’s pledge, like those made by some other developing countries, aims to reduce growth in emissions. The Chinese Government has placed high priority on continued economic growth and poverty reduction. Rapid economic and social development is accompanied by strong growth in energy demand, as was the case in developed countries during the 20<sup>th</sup> century.

China's energy systems currently depend heavily on coal and other fossil fuels, and rising energy demand is driving strong growth in fossil fuel use and associated greenhouse gas emissions. China's pledge recognises that it will take time to make the changes needed to slow this growth in emissions. Current expectations are that China's emissions could peak by around 2025 to 2030 and then progressively decline (Jiang et al., 2012).

### International pledges

China, the US and other major developed and developing countries have made pledges, or commitments, to reduce or limit their emissions by 2020. The pledges take different forms in different countries, including reducing absolute emissions and reducing emissions intensity (emissions per unit of GDP). Since the Commission's August 2012 report, the number of countries with pledges has grown from 90 to 98. These countries collectively represent more than 80% of the world's emissions and around 90% of the global economy.

China's 12<sup>th</sup> Five-Year Plan, its key economic planning document, sets out ambitious goals for constraining emissions. These goals include reducing energy consumption per unit of GDP (energy intensity) by 16% and emissions per unit of GDP by 17% by 2015, compared with 2010 levels, and increasing the share of non-fossil fuels in energy consumption from 8.3 to 11.4% by 2015. The 12<sup>th</sup> Five Year Plan is the first to include a commitment to gradually introduce market mechanisms to control energy consumption and carbon emissions. To help meet the national goals, each province has been allocated specific energy conservation and carbon reduction targets (Xie, 2013).

In 2012 China's carbon intensity fell by around 5%, outperforming its annual target by 1.5% (NDRC, 2013). China also achieved a 3.6% reduction in energy intensity, again more than meeting its target of 3.5% for 2012 (NDRC, 2013). In response, targets for reducing both carbon and energy intensity in 2013 have been strengthened, from 3.5% to 3.7% respectively (NDRC, 2013)

### CHINA OUTPERFORMED ITS TARGETS FOR REDUCING CARBON INTENSITY AND ENERGY INTENSITY IN 2012.

Importantly, while China has been curbing its growing demand for fossil fuels its economy has also been growing. The net effect is that China has slowed the rate at which its emissions are rising.

China is one of the world's largest electricity producers, and electricity generation, largely from coal, accounts for almost half of its greenhouse gas emissions (Baron et al., 2012; IEA, 2012a). Growth in electricity demand, and in use of fossil fuels to help meet the demand, is expected to continue over the next two decades. However, annual growth in demand for electricity slowed from around 11% to 5.7% in 2012 (Baron et al., 2012; Garnaut, 2013). After a doubling of electricity demand over the last decade, this is a substantial achievement.

If China continues to reduce its growth in demand for electricity and fossil fuels it could curb its emissions growth sooner than previously expected.

### Carbon pricing

China is establishing pilot emissions trading schemes in seven major cities and provinces. These include the cities of Beijing, Shanghai, Tianjin, and Chongqing, the provinces of Guangdong and Hubei and the Shenzhen Special Administrative Region. The first of these schemes is expected to commence this year, with Shanghai and Shenzhen both announcing plans to commence in the middle of this year. Together, these seven cities and provinces have a combined population of 256 million and annual greenhouse gas emissions equivalent to about twice the emissions covered under the Australian scheme (Combet, 2013a).

### CHINA IS ESTABLISHING SEVEN PILOT EMISSIONS TRADING SCHEMES FROM 2013, COVERING A POPULATION OF 256 MILLION.

China will use the experience gained from piloting emissions trading to develop a national emissions trading scheme after 2015 (PMR, 2013). China's nation-wide scheme is likely to be the world's largest in terms of the quantity of emissions covered.

In March 2013, for the first time, China released a detailed plan for developing its national scheme (PMR, 2013), mapping out a comprehensive pathway for implementing the scheme. The plan covers technical and policy areas and includes a work stream to consider linking China's national scheme with other emissions trading schemes in the future.

These developments demonstrate China's commitment to using market-based approaches to reduce emissions.

## Renewable energy

China is the world's renewable energy powerhouse. China ranks first in the world for renewable power generation capacity and is investing heavily in rapidly expanding this capacity (Pew, 2013).

In 2012 China invested US\$65.1 billion in clean energy, 20% more than in 2011 (Pew, 2013). This was unmatched by any nation and represented 30% of the entire G-20 nations investment in 2012. China set a one-year record with US\$31.2 billion invested in solar energy, which represented 25% of all global investment (Pew, 2013).

China's installed wind power capacity reached 63,000 megawatts (MW) in 2012, almost 50 times the capacity in 2005 (Xie, 2013). A quarter of this capacity – 16,000 MW was installed in 2012 (Pew, 2013). Installed capacity is expected to reach 100,000 MW by 2015 (Xie, 2013). The amount of electricity generated from wind in 2012, although a small proportion of total generation, was about 36% higher than in 2011 (Garnaut, 2013).

The rate of growth in China's installed solar photovoltaic capacity has been even greater than growth in wind power. Capacity grew from 100 MW in 2005 to 7,000 MW in 2012 (Xie, 2013). New capacity of 3,200 MW was added in 2012, representing a 75% expansion in one year (Pew, 2013). Solar power capacity is expected to triple to more than 21,000 MW by 2015 (Xie, 2013).

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**NEW SOLAR POWER CAPACITY OF 3,200 MEGAWATTS WAS ADDED IN 2012, REPRESENTING A 75% EXPANSION IN ONE YEAR.**  
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To illustrate the scale of China's efforts, the installed capacity of the Australian National Electricity Market, which represents more than 80% of Australia's total electricity generation, is about 48,300 MW (AER, 2012). This means that in one year alone the combined new installed capacity of wind and solar implemented by China was equal to at least a third of the NEM installed capacity in 2012.

China is also making large investments in new electricity transmission infrastructure and pumped hydro power storage, which will allow greater use of renewable energy supplies and encourage new investment (Garnaut, 2013).

## Caps on energy and coal

In March 2013 China proposed to cap energy consumption at 4 billion tonnes of coal equivalent up to 2015 (State Council of the People's Republic of China, 2013). Meeting this cap will require annual growth in energy demand to drop by about one third, from the recent level of 6.6% per year to around 4.3% per year (State Council of the People's Republic of China, 2013). Achieving such reductions is significant globally because current expectations are that China will contribute more than one third of growth in global energy use over the next two decades (IEA, 2012a).

The cap on energy consumption is in addition to a cap on coal output (3.9 billion tonnes by 2015) announced in 2012. Meeting this cap will involve a substantial reduction on the current rate of growth in coal production. This cap could lead to a reduction in the amount of coal used to generate electricity (Garnaut, 2013). The use of natural gas, which produces lower levels of emissions of greenhouse gases per unit of energy produced, is expected to increase (IEA, 2012a).



# USA SNAPSHOT

## A commitment to lead

### US EMISSIONS HAVE DECLINED



#### CALIFORNIA

Population **37 MILLION**  
**6.6%** of the country's emissions  
9th largest economy in the world  
Emissions trading commenced 1 Jan 2013  
Goal to reduce emissions to 1990 levels by 2020



**IN 2012**

■ **Record 3,200MW solar installed**

■ **Record 13,600MW of wind-generating capacity**



**Renewable capacity almost doubled**



2008 = 44,000MW  
2012 = 86,000MW



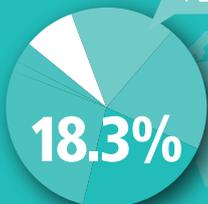
**\$35.6 billion** new investment in clean energy



POPULATION: **315 MILLION**

**3rd highest** greenhouse gas emissions per person in the developed world

PERCENT OF **GLOBAL EMISSIONS**



National pledge to **REDUCE EMISSIONS** in the range of **17%** below 2005 levels by 2020

**Lowest** electricity sector emissions since 1996



"I will direct my Cabinet to come up with executive actions we can take, now and in the future, to reduce pollution, prepare our communities for the consequences of climate change, and speed the transition to more sustainable sources of energy"

**President Obama's State of the Union address 2013**

In April 2013, the **USA** and **China** announced new high-level arrangements giving urgent priority to stronger collaborative action on climate change



## 1.2 Recent developments in the United States of America

### Overview

Developments at national and sub-national levels in the US since the Climate Commission’s 2012 report indicate that the world’s second-largest emitter is moving steadily to reduce emissions.

President Obama’s State of the Union Address on 12 February 2013 set out directions for stronger national action on climate change:

*‘I will direct my Cabinet to come up with executive actions we can take, now and in the future, to reduce pollution, prepare our communities for the consequences of climate change, and speed the transition to more sustainable sources of energy.’*

The President’s subsequent 2014 budget proposal included new measures to support renewable energy and energy efficiency (OMB, 2013).

The US has pledged to reduce its emissions in the range of 17% below 2005 levels by 2020 (WRI, 2013). Emissions have already declined by 7% from 2005 to 2011 (EPA, 2013). With further action at national and state levels, the target is considered achievable (NRDC, 2012; WRI, 2013).

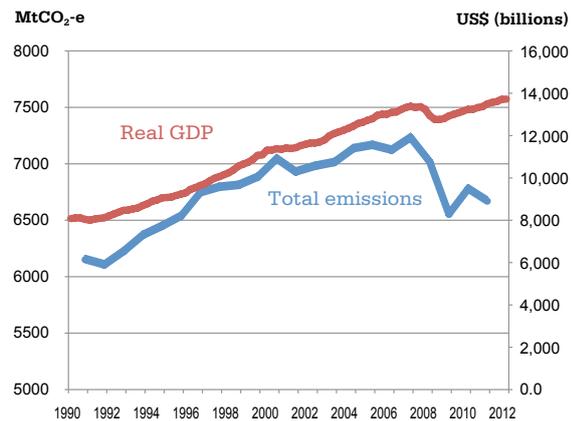
Reductions in emissions from electricity generation and transport in particular led to a 1.6% reduction in total US emissions from 2010 to 2011 (Figure 2). While emissions have fallen, the US economy has continued to grow.

The reduction in emissions from these energy sectors is due to factors including:

- growth in use of natural gas (due to lower prices) which has replaced some coal
- mild winter temperatures that reduced demand for heating
- a significant increase in hydroelectric power generation
- Federal government energy regulations and state-level regulations and emissions trading schemes.

(EIA, 2013; EPA, 2013, NRDC, 2012; WRI, 2013).

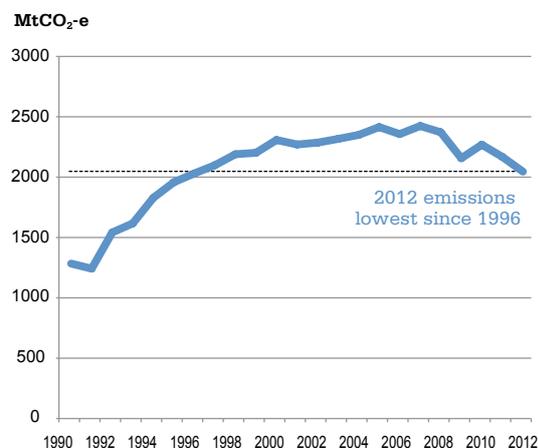
**Figure 2: US total greenhouse gas emissions (excluding land use, land use change and forestry), and real gross domestic product, 1990 to 2011.**



Source: EPA, 2013; BEA, 2013

Emissions from electricity generation in the US have declined by about 16% from 2007 to 2012 (Figure 3). Electricity sector emissions in 2012 were at their lowest level since 1996. The reductions are significant given electricity generation contributes one third of total US emissions (EPA, 2013).

**Figure 3: US electricity sector emissions, 1990 to 2012**



Source: EIA, 2013

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## EMISSIONS FROM ELECTRICITY GENERATION WERE AT THEIR LOWEST LEVEL SINCE 1996.

—

Emissions from coal-fired electricity generation declined by 5.7% from 2010 to 2011 (EPA, 2013).

The shift toward gas has been a rapid and fundamental shift in the US energy market. Cheaper gas saw electricity generators move quickly away from coal. While gas is a fossil fuel and does produce greenhouse gases, when burnt it produces less greenhouse gas emissions per unit of energy produced than coal. Coal has been an entrenched energy source in the US for decades. However, the speed and scale of the shift demonstrates that price signals work effectively in the energy industry. Energy markets move quickly to lower-cost fuels. This bodes well for the shift to renewable energy technologies as they decrease in price.

Transport contributes around 26% of US greenhouse gas emissions (EPA, 2013). A substantial proportion of these emissions are produced by cars and light trucks. The US has introduced progressively tighter fuel efficiency standards. Carbon dioxide emissions from cars and light trucks peaked in 2004, and have declined by 10% since then, due to improvements in fuel efficiency as well as some changes in vehicle use patterns and market share of different types of passenger vehicles (EPA, 2013).

## Carbon pricing

The most significant recent development in carbon pricing in the US is the establishment of the Californian emissions trading scheme, with compliance obligations commencing in January 2013. California is particularly significant because it is the 9th largest economy in the world and accounts for 13% of the nation's output (LAO, 2013). Californian emissions are the second highest for any American state, representing 6.6% of total US emissions from fossil fuels in 2010 (EPA, 2010).

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## CALIFORNIA, THE WORLD'S 9<sup>TH</sup> LARGEST ECONOMY, COMMENCED AN EMISSIONS TRADING SCHEME IN 2013.

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The Californian scheme is designed to reduce the state's emissions to 1990 levels by 2020, with initial coverage of electricity utilities and large industrial facilities (ARB, 2011). The scheme currently covers 36% of the state's overall greenhouse gas emissions (ARB, 2011; ICAP, 2013). However, scheme coverage is expected to grow to 85% of the state's greenhouse gas emissions after 2015 as the scheme will be expanded to include emissions from the fuel sector (ARB 2011; ICAP, 2013). California has also set up a domestic offsets scheme, similar to Australia's Carbon Farming Initiative, that provides incentives for emission reductions in agriculture, forestry and waste management projects across the US.

The economy-wide Californian emissions trading scheme builds on US state experience with an electricity sector based trading scheme operating in nine north-eastern US states since 2009, the Regional Greenhouse Gas Initiative. A recent review of the first three year compliance period has recommended changes to tighten the regional cap and deal with excess allowances (and low auction prices) in the scheme.

## Renewable energy

Installed renewable energy capacity in the US has grown substantially with a record new 13,600 MW of wind-generating capacity in 2012 (Pew, 2013). Between 2008 and 2012, the US nearly doubled its installed renewable energy capacity, from 44,000 MW to 86,000 MW (BNEF BSCE, 2013). This excludes hydropower, which is the single largest source of renewable energy, at 101,000 MW in 2012 (BNEF BSCE, 2013). In just four years the US installed 42,000 MW of renewable energy capacity, which is the equivalent of almost 90% of the installed capacity of Australia's National Electricity Market.

—  
**BETWEEN 2008 AND 2012, THE US NEARLY DOUBLED ITS INSTALLED RENEWABLE ENERGY CAPACITY.**  
—

Renewable energy portfolio standards, obligations and targets are all mechanisms to drive investment in renewables by mandating an increase in renewable energy and electricity use. Twenty-nine states and the District of Columbia now have policies that encourage renewable energy. Renewable portfolio standards require electricity generators to have a specified share of electricity sales from renewables or a minimum amount of renewables capacity (IEA, 2012a).

An example of a renewable project that opened in 2013 is an 845 MW wind farm in Oregon, producing 2 billion kilowatt hours of electricity annually, powering an estimated 235,000 homes (EGOGEN, 2012).

In 2011 the US was the largest global investor in clean energy. In 2012 the US ranked second highest amongst G-20 nations, investing US\$35.6 billion (Pew, 2013). Clean energy investment in 2012 did not reach the high of 2011, falling 32% due in part to the uncertainty of government support for renewables (Bloomberg, 2013a). However, solar PV investment increased by 42% in 2012 (Pew, 2013).



# CHAPTER 2: TYPES OF INTERNATIONAL ACTION

Countries are using a range of policies to reduce emissions. The most common policy measures include carbon pricing; support for renewable energy; and energy efficiency.

## 2.1 Carbon pricing schemes

Carbon pricing, including emissions trading schemes and carbon taxes, is increasingly being adopted across the world. Substantial steps forward in emissions trading across the world have been made since August 2012. Thirty-five countries and 13 sub-national jurisdictions<sup>2</sup> have operating emissions trading schemes and the first of China's seven sub-national pilot schemes are expected to commence in 2013. Once all 55 schemes are in operation they will cover a population of about 880 million people, and the countries and jurisdictions covered will represent about 20% of global emissions (WRI, CAIT, 2012; Combet, 2013a; DCCEE, 2013; EPA, 2010; World Bank, 2013). In January 2013 four new carbon pricing schemes commenced:

- California, the world's 9<sup>th</sup> largest economy, introduced a state emissions trading scheme.
- Québec, the second largest Canadian province in terms of population and GDP, introduced an emissions trading scheme.
- Croatia became the 31<sup>st</sup> country to join the European Emissions Trading Scheme.
- Kazakhstan introduced a national emissions trading scheme.

A few months earlier in October 2012, Japan, the 5<sup>th</sup> largest emitter, implemented a carbon tax.

China is expected to commence rolling out seven pilot emissions trading schemes in mid-2013, with Shanghai and Shenzhen both announcing plans to commence pilots in the middle of the year. In March 2013 China released a detailed plan for developing its national scheme to start after 2015.

The Republic of Korea, which has annual emissions of a similar level to Australia, has taken further steps to develop its emissions trading scheme, set to be under way in 2015.

<sup>2</sup> US states of Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New York, Rhode Island and Vermont (Regional Greenhouse Gas Initiative participants) and California; Canadian province of Quebec; and Tokyo and Saitama Prefecture (Japan).

## WHAT IS CARBON PRICING?

Carbon pricing creates an incentive across the economy to reduce greenhouse gases and encourage investment in clean energy. It is based on the principle of 'polluter pays', that is, companies producing pollution should pay for the privilege of doing so, therefore creating an incentive to produce less pollution. Businesses that produce significant amounts of greenhouse gases pay a price that is either set by the government or determined by the market. This creates a strong incentive for businesses to reduce their greenhouse gas emissions and become more efficient, as well as to invest in clean energy.

Costs are passed through to businesses and finally to consumers. This means that everyone has a financial incentive to save energy and shift to cleaner alternatives. The pool of funds raised by a carbon price can be used to support clean energy technologies as well as to assist households, workers and regions with the transition. A common key principle is to ensure that jobs and investment in export businesses or those competing with imports (the 'trade exposed' industries) are not unfairly disadvantaged compared to their international competitors, but that those businesses also have incentives to reduce their emissions.

Carbon pricing can take the form of either an emissions trading scheme or carbon taxes.

## EMISSIONS TRADING SCHEMES AND CARBON TAXES

Under an emissions trading scheme a cap on emissions is set. Permits can be traded and the market sets the price for these permits. Some countries put a cap on the total amount of greenhouse gas emissions that can be produced and then require emitters to purchase a permit for every tonne of emissions they produce. The level of the cap is highly important to the effectiveness of a scheme – if the cap is too generous, prices may be too low to deliver substantial emission reductions. The setting of appropriate emissions trading scheme caps will be of ongoing importance in coming years.

Under a carbon tax, the price is fixed and the market sets the volume of emissions according to supply and demand. The price encourages businesses to reduce emissions and encourages people to use energy more efficiently, as those who are able to reduce their pollution will not have to pay the tax on these units. Simply put, the lower the emissions of a business the lower the tax it would pay.

Productivity Commission analysis found that these ways of putting a price on greenhouse gas emissions are generally more cost-effective than other ways to encourage emissions reductions (PC, 2011). Their effectiveness depends on good design and on the price incentive being sufficient to encourage significant emissions reductions and investment in clean energy.

## North America

The most significant recent development in carbon pricing in North America is the Californian emissions trading scheme that commenced compliance obligations in January 2013 (see Chapter 1).

The Canadian province of Québec also commenced an emissions trading scheme in January 2013. The scheme currently covers 29% of Québec's overall emissions. In line with California's scheme, coverage is expected to increase to 86% of overall emissions after 2015 (ICAP, 2013). The Québec scheme is contributing to the province's goal of a 20% reduction in emissions on 1990 levels by 2020 (GoQ, 2012). Emissions from Québec represent 12% of total Canadian emissions in 2010 – the third-highest emitting province after Alberta and Ontario (Environment Canada, 2013).

The linking of the Californian and Québec emissions trading schemes under the Western Climate Initiative (WCI) is expected to be operational by 1 January 2014. On 8 April 2013 Californian Governor Jerry Brown approved the link, and California is expected to finalise regulations in coming months (Doan, 2013).

The WCI is an initiative to design a regional emissions trading scheme between sub-national jurisdictions in the US, Canada and Mexico (WCI, 2012). British Columbia, California, Ontario, Québec and Manitoba are currently working together to develop a regional emissions trading scheme (WCI, 2013). The WCI aims to reduce regional greenhouse gas emissions to 15% below 2005 levels by 2020 (WCI, 2012).

The provincial-level actions in Canada are some of the main actions to reduce emissions in Canada. The Canadian Federal Government has no immediate plans to implement emissions trading.

Linking emissions trading schemes can lead to a more efficient international carbon market. Linking allows for the opportunity to search for the lowest cost opportunities for reducing emissions across a much larger market.

## Asia: China, South Korea and Japan

China is working toward beginning pilot emissions trading schemes from mid-2013 in the cities of Beijing, Shanghai, Tianjin, Shenzhen and Chongqing and the provinces of Guangdong and Hubei. Together the schemes will involve 256 million people.

In March 2013 China announced that it will implement a national unified emissions trading scheme after 2015 and released a detailed plan for developing the scheme, drawing on experience from the pilot schemes (PMR, 2013).

In May 2012 the Republic of Korea passed legislation to introduce an emissions trading scheme. Since that time it has made substantial steps forward in developing its scheme. In February 2013 the Korean government established a taskforce to consult industry and finalise regulations before 2014. Korea has committed to reducing emissions by 30% from business as usual levels by 2020. Its emissions almost doubled between 1990 and 2005 (Jones and Yoo, 2011).

In October 2012 Japan implemented a carbon tax by increasing existing consumption taxes on fossil fuels (MOE, 2012). Revenue will be used to help reduce emissions, including through energy-saving measures in small and medium-sized enterprises and the promotion of renewable energy and efficient use of fossil fuels (MOE, 2012). Japan has committed to reducing emissions by 25% by 2020 relative to 1990.

## European Union

Croatia joined the European Union emissions trading scheme in January 2013, becoming the 31<sup>st</sup> country to join the world's largest carbon market (EC, 2013a). The European Union emissions trading scheme was the first of its type when introduced in 2005 and continues to have the widest coverage (EC, 2013b).

In August 2012 Australia and the European Union announced that their emissions trading schemes would be linked from 1 July 2015, with full bilateral trade from 2018. From July 2015 Australian businesses will be able to purchase European allowances to meet compliance requirements under the Australian emissions trading scheme. Full linking, meaning European businesses can purchase allowances from the Australian carbon market, is to begin no later than July 2018.

The Climate Commission noted in its 2012 report that a stubborn recession across much of Europe and an ongoing oversupply of emissions permits were contributing to low prices in the EU emissions trading scheme. In April 2013 the European Parliament voted against the specific proposal put forward by the European Commission to delay the auction of 900 million European allowances from 2013-15 to 2019-20 in the European Union emissions trading system. This proposal was aimed at addressing the oversupply of European allowances, which would put upward pressure on prices. The proposal has been referred back to the European Parliament's Environment Committee for further consideration. Failure to address the oversupply of permits has caused the carbon price in Europe to collapse, which has caused uncertainties in Europe and around the world. The oversupply of European allowances in the EU system is an issue that will continue to feature in the system across 2013-20 if not addressed.

## Kazakhstan

Kazakhstan, a land-locked country in Central Asia with a population of 16.5 million (World Bank, 2013), is the world's 31<sup>st</sup> largest greenhouse gas emitter (WRI, CAIT 2012). Kazakhstan is also the 18th largest oil producer in the world (ICG, 2007).

Kazakhstan commenced a national emissions trading scheme in 2013. The Kazakhstan scheme covers 77% of the nation's carbon dioxide emissions and seeks to reduce emissions by 5% below 1990 levels by 2020 (ICAP, 2013). The scheme has commenced as a one-year pilot phase before it continues with longer compliance periods.

Kazakhstan is vulnerable to a changing climate, particularly through reductions in water availability and pasture and arable land (Kazakhstancarbon, 2013a). By establishing an emissions trading scheme Kazakhstan is seeking to contribute to action on climate change while establishing new markets and business opportunities (Kazakhstancarbon, 2013b).

## 2.2 Renewable energy

Energy is fundamental to the way we live, our economy, and our future. For many years we have used cheap and abundant fossil fuels such as coal, oil and gas to produce most of our energy. Burning these fossil fuels is the main source of the greenhouse gases that are triggering the changes we are seeing in the global climate. If we are to avoid the most damaging effects of climate change, we need to virtually eliminate greenhouse gas emissions from fossil fuels within decades. To do this, we need to use energy more efficiently and harness energy technologies, including renewable energy, that produce either no greenhouse gas emissions or very low emissions.

### What is renewable energy?

Renewable energy is energy that is naturally replenished, day to day and year to year. Renewable energy comes from natural resources such as sunlight, wind, rain, waves, tides and geothermal heat.

Renewable energy will be a critical source of energy for the 21<sup>st</sup> century, and global renewable energy production capacity is already growing strongly. The mix of renewables is constantly evolving. Hydropower accounts for the majority of installed capacity over time, while the solar photovoltaic (PV) sector is growing at the fastest rate of all renewable technologies.

In the last year global investment in clean energy technologies was six times 2004 levels and the second highest recorded. China led the world, investing 50% more than the second highest investor, the US (Pew, 2013). Investment in solar PV technology exceeded even the most optimistic expectations, experiencing the greatest annual average growth rates (REN 21, 2012). The wind sector led all others with an extra 48,600 MW of new installed generating capacity in 2012 (Pew, 2013). Renewable energy power generation is expected to increase by more than 40% from 2011 to 2017 (IEA, 2012c).

### Countries are putting in place policies to support renewable energy

Support for renewable energy is being used by nations worldwide as a fundamental strategy for reducing greenhouse gas emissions. It is now widely accepted that government action is necessary to promote renewable energy and transition an economy away from fossil fuels. The European Union's legally binding renewable energy targets introduced in 2009 spurred growth in renewable energy. The European Union as a whole is on track to achieve the target of a 20% share of energy from renewable sources (EC, 2013c).

The total number of countries adopting renewable energy policies has reached 118, an increase of 8% from 2010 to 2011. All major economies and 85 countries in total now have renewable energy targets (CCA, 2012). These policies aim to substitute traditional fossil fuel power generation with renewable energy options. The number of countries, states and provinces adopting complementary feed-in-tariffs increased by 7% from 2010 to 2011, with 92 now in operation throughout the world (REN 21, 2012).

Thousands of cities and local governments around the world have developed policies to support renewable energy development. By the end of 2011 two thirds of the world's largest cities planned for low-emission energy sources through climate change action plans (REN 21, 2012).

The combined effects of support for renewable energy at local, state and national levels show in, for example, high rates of adoption of small-scale PV and solar hot water systems. This shows policy support is fundamental to the further development of renewable energy technologies.

- 118 countries with renewable energy targets
- 92 countries with feed-in-tariffs
- 648,000 MW total installed renewable energy capacity
- US\$269 billion of global investment in clean energy technologies in 2012
- 200 million buildings have installed solar hot water collectors

## Investment in renewable energy is increasing

Renewable energy targets, falling production costs of solar and increasing cost competitiveness from the introduction of carbon pricing are all factors driving greater investment in renewable energy. In 2012, US\$269 billion was invested in clean energy technologies; at least six times the levels of 2004 and the second highest ever recorded (Pew, 2013;).

Ever-increasing uptake of solar technology has led to solar energy overtaking wind as the biggest sector for investment in recent years (REN 21, 2012).

Investment in renewable energy has grown in key regions such as China and the US. China is a world leader in renewable energy investment and capacity. Major economies have been investing heavily in clean energy technologies such as renewables for a number of years and 2012 was no exception (IEA, 2012a). In 2012, China's investment in clean energy surged by at least 20% to a record of US\$65.1 billion, more than 50% above the US

investment of US\$35.6 billion (Pew, 2013). Solar projects overtook wind technologies, receiving the most funding, US\$126 billion (Pew, 2013). Wind investment still increased to US\$72.7 billion from US\$45.5 billion in 2011 (Pew; 2012, 2013). Changes in economic circumstances in Europe have contributed to some recent slowing of investment in that region.

Increasing investment is occurring while the costs of some renewable technologies are dropping rapidly. Over the last two years the cost of producing PV systems has fallen by more than 60% (IRENA, 2013).

## Renewable energy capacity is increasing

There is more global renewable energy capacity installed than ever before. Total installed capacity is 648,000 MW, with new capacity installed in 2012 reaching 88,000 MW (Pew, 2013). An extra 48,600 MW of new installed wind generating capacity in 2012 put wind out in front compared to other technologies (Pew, 2013). Global installed solar PV capacity rose to 104,000 MW in 2012, four times 2009 levels (Pew, 2013). There was an additional 31,000 MW of global solar capacity in 2012, a 42% increase (Pew, 2013). The total solar PV global generating capacity is now more than double the installed capacity of the National Electricity Market in Australia.

Renewables are changing the energy mix globally, as new and diverse renewable energy projects continue to be implemented each year. This means the renewable energy industry is rapidly expanding, continually increasing the total renewable energy capacity worldwide. Increases in the total amount of new renewable energy projects each year have meant that as global energy demand has increased, renewables have consistently met 13% of the world's energy needs since 2000 (IEA, 2012a), and in 2011 provided almost 20% of the total

# WORLD

# RENEWABLES SNAPSHOT

**US\$269 BILLION** of global investment in the clean energy sector

**88,000<sup>MW</sup>** new global renewable capacity in 2012

Solar technologies received most investment in 2012  
**US\$145 billion**

**118** COUNTRIES with renewable energy targets



China has the world's highest renewable energy capacity 152,000MW



China increased solar PV capacity by 75% in 2012



USA nearly doubled its renewable energy capacity between 2008 and 2012



USA invested US\$35.6 billion in new clean energy in 2012



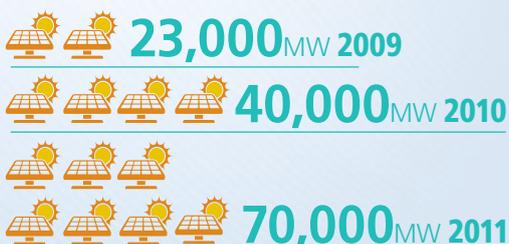
Germany has the world's highest solar generating capacity 32,000MW



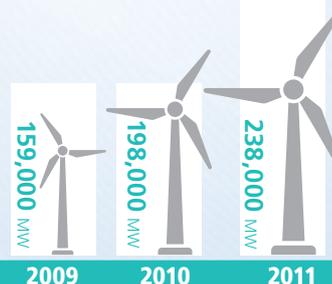
Australia now has more than 1 million households with solar PV

## GLOBAL RENEWABLE ENERGY GROWTH 2009-2011

### SOLAR PV



### WIND POWER



### HYDRO POWER



electricity supply (IEA, 2012c). The challenge is to rapidly expand renewable energy capacity at scale, at the lowest cost possible.

The majority of new installed capacity is coming from the combined efforts of China, the US, Germany, Spain, Italy, India, and Japan, which accounted for about 70% of total non-hydro renewable electric capacity worldwide (REN 21, 2012). However, smaller scale activity is taking place in many other countries; 50 countries installed new wind power capacity in 2011 (REN 21, 2012). China already had more renewable energy capacity than any other nation in 2011, becoming the world's renewable energy powerhouse (REN 21, 2012). China's renewable energy capacity has been increasing rapidly; for instance, 3,200 MW of solar power was added in 2012, representing a 75% expansion in one year (Pew, 2013). China demonstrates the power of economies of scale, installing more than a third of total global new wind turbines in 2011 (Bloomberg, 2012b).

### Renewable energy is expected to continue to grow

Further expansion of adoption of renewable energy technologies is expected. More than 70 countries are expected to deploy new renewable energy capacity in the power sector by 2017 (IEA, 2012c).

There is a lag between investment and increased installed capacity. Similarly there is a lag between the introduction of a policy to stimulate uptake or investment in renewable energy and that renewable energy coming online. Given the enormous increase in policies and investment to stimulate renewable energy across the world and the solid commitment by large nations like China, installed capacity of renewable energy will continue to increase at pace.

We do not yet know what the future energy mix will look like, although it is likely to be more diverse than in the past. Across the world new energy technologies are being tested that may shift the balance of energy sources. One Australian example of recent technological innovation is the installation of a wave energy demonstration plant near Perth, Western Australia, due to be constructed at the end of 2013 (Ferguson, 2012).

### 2.3 Energy efficiency

The goal of energy efficiency is to reduce the amount of energy used to provide products and services. Energy efficiency initiatives are continuing to build momentum across the world. While countries have been investing in and promoting energy efficiency for a long time, in the last year a range of new energy efficiency policies and programs have been implemented, including in the European Union, China and Japan. According to the International Energy Agency, energy efficiency could deliver 65% of all the global greenhouse gas reduction needed to 2035 to avoid serious consequences from climate change (IEA, 2012d).

Twenty-three of the top 25 emitters have economy-wide energy efficiency policies. In addition, many countries have targets to improve energy intensity. Sixty-two countries, representing more than 80% of global emissions, now have economy-wide energy efficiency or intensity targets (DIICCSRTE, 2013b).

**62 COUNTRIES, REPRESENTING MORE THAN 80% OF GLOBAL EMISSIONS, HAVE ECONOMY-WIDE ENERGY EFFICIENCY OR INTENSITY TARGETS AS OF APRIL 2013.**

### What is energy intensity?

Energy intensity is a measure of the energy efficiency of a nation's economy. It is calculated as units of energy per unit of gross domestic product (GDP). For example, China has a target to reduce energy intensity by 16% by 2015 on 2010 levels.

United Kingdom vehicle emissions and fuel efficiency standards meant that between 2010 and 2011 emissions from transport in the United Kingdom fell by 1.4% (2 million tonnes). This decrease was primarily due to a decrease in petrol consumption as a result of higher fuel prices and greater use of diesel, although vehicle emissions and fuel efficiency standards have resulted in a reduction in fuel use (DOE, 2012). Carbon dioxide emissions from new cars in the United Kingdom fell by 5.2% in 2012 (Hall, 2013).

In October 2012 the European Union adopted the Energy Efficiency Directive. It requires each member state to establish national energy efficiency targets for 2020 and requires energy providers to achieve cumulative end-use energy savings by 2020 equivalent to 1.5% of annual energy sales over the period 2014 to 2020 (EC, 2013a; IEA, 2012b). This energy efficiency directive aims to ensure the achievement of the European Union's target of improving energy efficiency by 20% by 2020, compared to 1990 levels.

In November 2012 China's low carbon projects program was expanded. Commencing in 2010 with five provinces and eight cities, the program requires preparation of low-carbon development plans and accelerated establishment of low-carbon industrial, construction and transportation systems. In November 2012 another 29 cities were chosen to join the low-carbon project (Xie, 2013).

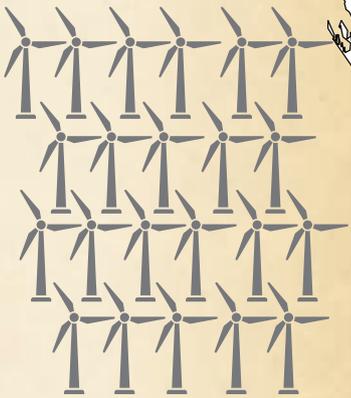
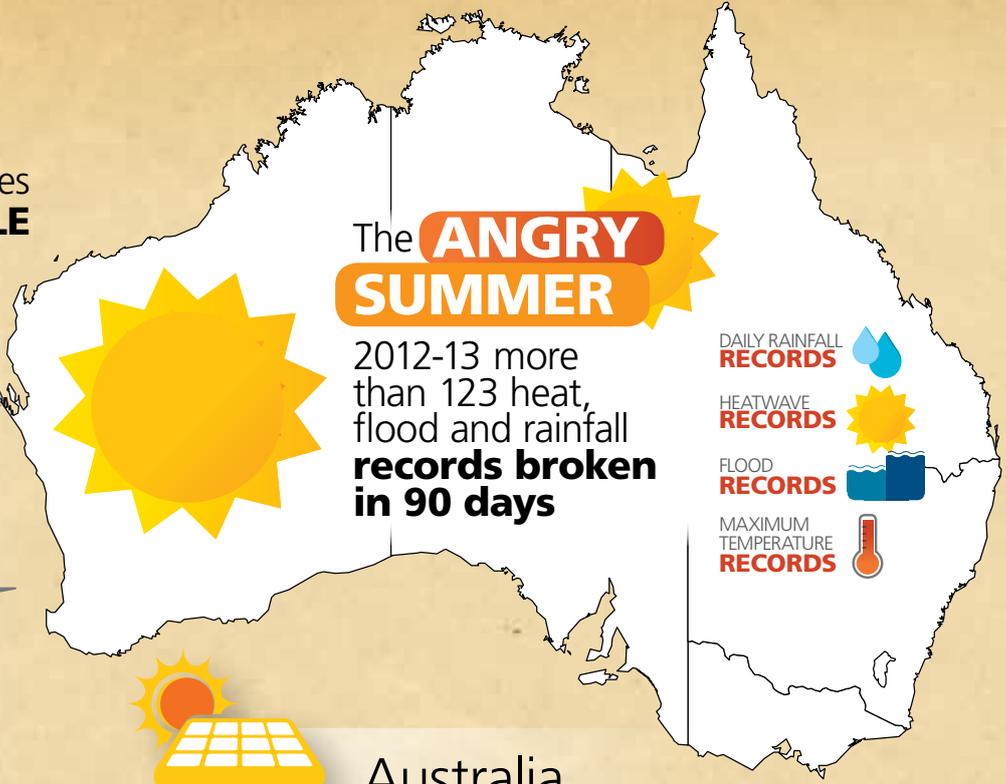
Japan is seeking to improve its energy efficiency, even though it is already a global leader in the field (IEA, 2012a). In September 2012 the Japanese government released a strategy for a greater focus on improving energy efficiency, with a target to cut electricity demand by 10% by 2030, compared with 2010 levels (IEA, 2012b). In March 2013, Japan expanded its energy efficiency program into the housing and building sectors. The program was expanded from covering machinery and equipment to include items that contribute to higher efficiency of energy consumption in housing and building sectors, such as insulation (METI, 2013).



# AUSTRALIA SNAPSHOT

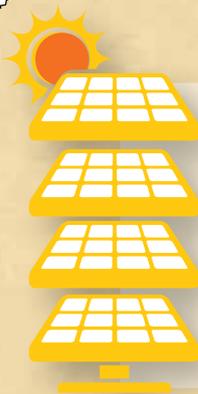
## A changing future

Australia is one of the developed countries **MOST VULNERABLE** to **climate change**



### LARGEST WIND FARM

in the southern hemisphere, opened April 2013 in southwest Victoria



Australia now has more than **1 MILLION** households with solar panels



POPULATION: **23 MILLION**

**Highest emissions** per person in the developed world

One of **20 countries** contributing **most** of the world's **emissions**

**EMISSIONS** from electricity sector the **lowest in 10 years**



## PRICING CARBON

- **Fixed carbon price** of **AU\$23 per tonne** from 1 July 2012
- Flexible price **emissions trading scheme** from 1 July 2015



### Australia-China

stronger collaboration on carbon market development announced April 2013



# CHAPTER 3: A CRITICAL DECADE FOR AUSTRALIA

## Overview

Australia is the 15<sup>th</sup> largest emitter in the world, emitting more than 180 other countries. The average Australian has the highest emissions per person of any developed country; five times that of the average Chinese person. Like other countries that make a substantial contribution to the climate change problem, Australia has a responsibility to be part of the global solution. There is recognition by all Federal political parties that protecting Australia's prosperity requires Australia to contribute to the global effort to reduce greenhouse gases. As one of the major economies Australia can have an influential role in shaping the global response to climate change.

Action taken by Australia – such as the introduction of a carbon price and the renewable energy target – is watched closely by developed and developing countries alike, who draw lessons both for their own action and for the international climate change response.

Australia's global influence will largely depend on how effectively we implement solutions at home. Failure to meet our international commitments could damage our international reputation and the global effort to tackle climate change.

Developments in Australia since the Commission's 2012 report include:

- a decline in greenhouse gas emissions in the electricity sector
- further growth in installed renewable energy capacity
- commencement of new legislation for standards and energy efficiency ratings for appliances, machinery and materials.

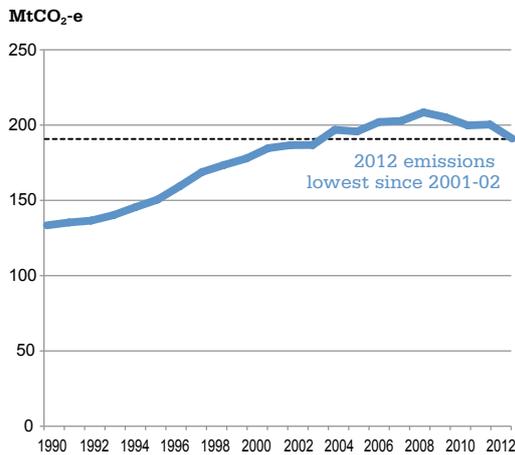
The Australian government has also announced two carbon market collaborations.

- In April 2013 the governments of Australia and China announced new arrangements to strengthen their collaboration on developing carbon markets.
- In August 2012 Australia and the European Union announced plans to link their emissions trading schemes from July 2015. Australian legislation to enable international linking was passed in November 2012.

## Declining emissions

Greenhouse gas emissions from electricity generation in 2012 were down 4.7% on the previous year, while in the period from June to December 2012, they were the lowest since 2001-02 (Figure 4). Emissions from electricity generation have grown strongly in recent decades, and contribute around 35% of Australia's total emissions.

**Figure 4: Australian electricity generation emissions, 1990 to 2012**



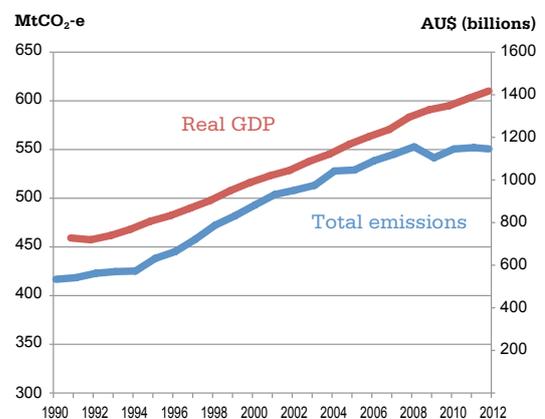
Sources: DIICCSRTE, 2013a

The reasons for the reduced emissions from electricity generation in 2012 include less use of coal and increased use of gas and renewables. Some coal-fired power stations operated below capacity in 2012, while supply from hydroelectricity and other renewables increased (DCCEE, 2012; DIICCSRTE, 2013a). The use of black and brown coal fell by 5.3% and 7% respectively, and overall was the lowest in a decade (DIICCSRTE, 2013a). The introduction of a carbon price in 2012 has also contributed to the shift away from coal (AER, 2012).

Falling demand for electricity has also contributed to the drop in emissions. There are several contributors to the fall in demand, including increasing installation of rooftop solar photovoltaic panels, a decline in some manufacturing sectors, responses to rising electricity prices (partially due to the carbon price) and improvements in energy efficiency of buildings and equipment (DCCEE, 2012).

While emissions in some sectors continue to grow, the reduction in emissions from electricity generation in particular contributed to a 0.2% reduction in Australia's total emissions from 2011 to 2012 (DIICCSRTE, 2013a). This reduction continued an overall trend of slightly lower emissions since 2008. Although emissions increased in 2010 and 2011 after a drop in 2009, in each of the last four years emissions have been slightly below the level reached in 2008. Like other countries, Australia has in recent years been able to reduce overall emissions while continuing to grow its economy (Figure 5). The effects of the carbon price on emissions will be seen more fully over time.

**Figure 5: Australia total greenhouse gas emissions (excluding land use, land use change and forestry), and real gross domestic product, 1990 to 2012.**



Sources: DIICCSRTE, 2013a, ABS, 2013

## Renewable energy

Australia has large renewable energy resources, including world-class solar and wind resources in many parts of the country. Renewable energy production is growing, but from a small base. Australia's renewable energy capacity almost doubled from 2001 to 2012 (CCA, 2012).

A significant milestone of one million households having installed solar photovoltaic panels was reached in early 2013. The Renewable Energy Target Scheme and solar feed-in tariffs have provided financial incentives for expansion of solar power capacity. The Renewable Energy Target Scheme and energy efficiency schemes could account for as much as 53% of the reduction in energy demand since 2008 (GEM, 2012).

The proportion of energy generated from renewable sources has generally remained at around 10%, because while renewable energy generation has grown, so has generation from non-renewable sources. As is the case worldwide, this share needs to increase substantially as part of the transformation to energy sources that do not contribute to climate change.

Major new major renewable energy projects include:

- Australia's largest solar farm, a 10 MW facility near Geraldton, Western Australia (commenced in 2012)
- an innovative wave energy demonstration project that commenced construction in 2013 near Perth, Western Australia
- a 420 MW wind farm at Macarthur, Victoria, which commenced operation in January 2013 and is the largest in the Southern Hemisphere.

(AGL, 2013; Ferguson, 2013)

## Energy efficiency

Australia has also made progress in actions to improve energy efficiency. National Greenhouse and Energy Minimum Standards legislation commenced in October 2012. The legislation builds on previous separate state and territory regulations. It provides for common standards and energy efficiency ratings for appliances, machinery and materials.

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