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International Carbon Markets: Fuelling New Opportunities for Australia



July 2023

International carbon markets: fuelling new opportunities for Australia.

The world's economies, Australia and China included, are falling short on their ambitious decarbonisation plans. An under-supply of abatements, and an over-supply of obligations, is driving greater consideration of how international carbon markets can enhance national climate strategies.

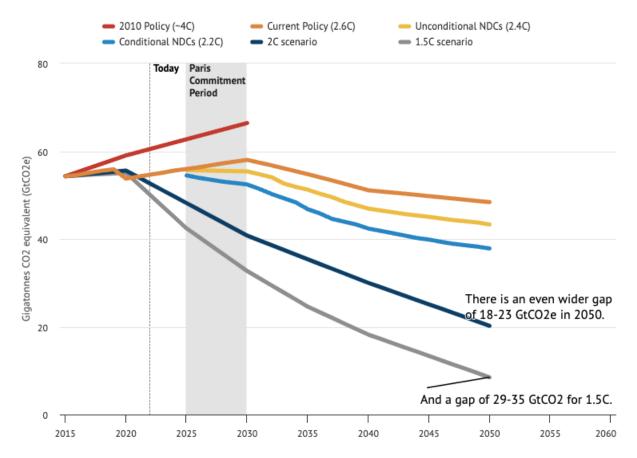
Australia is well placed to take a lead role in the development of carbon markets to grow our own economy and build global influence to assist others as they transform theirs.

As covered in ACBC's 2022 Climate Collaborations Report the climate challenge will affect every area of Australia's economy from energy to mining, transport, finance, the built environment and agriculture.

This month, we look at the economics of carbon markets and the innovation and investment opportunities for Australia.

Can carbon smarts replace coal?

The gap¹ between our collective global emission reduction targets and our current efforts to decarbonise is widening daily, leading many² to highlight the need to accelerate actions addressing the climate challenge to hold the world to 2°C warming.



¹ Climate Action Tracker Emissions Gap

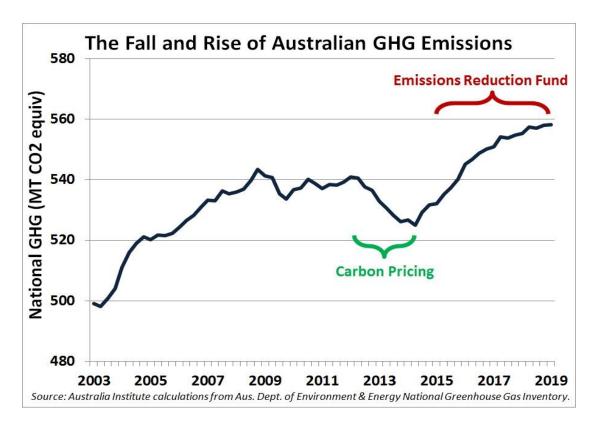
² IEA Australia Climate Action Report

With a 20 gigatonne shortfall in global emissions re-balance³, keeping the biosphere under 2°C warming requires a team effort which is why ACBC's Green Channel reinforces the call for "Net Zero faster, together".

So, this month we're bringing attention to developments in China's Carbon Markets⁴ and why we think they should be of strategic importance to Australia.

Australia's Green Economy opportunity

Australia's leadership in carbon markets post-GFC was short-lived⁵, however the then Climate Minister, Senator Penny Wong, was not alone highlighting the need to introduce market-based mechanisms⁶ to address the negative effect of climate-warming carbon emissions from our economy.



Despite the best efforts of subsequent Coalition governments to "axe-the-tax⁷, Australia's current Renewable Energy Superpower⁸ status is built on the back of a 'stack⁹' of regulatory developments and financial instruments introduced over a decade ago that enabled Australia to build out its renewable energy generation and grid integration capacity to what is now a working pilot case study for the world.

³ UNEP Emissions Gap Report

⁴ China Ministry of Ecology & Environment Opinions

⁵ <u>Australia's Carbon Emissions Trading announcement 2008</u>

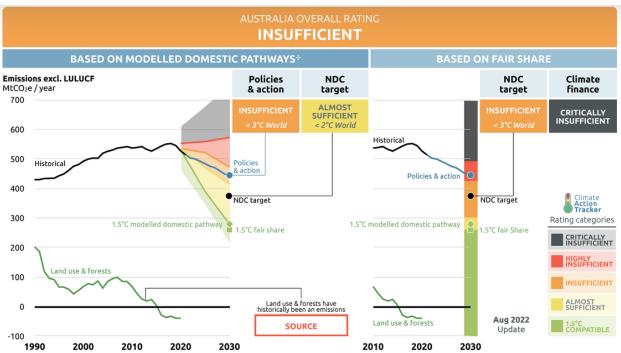
⁶ Garnaut Review 2008

⁷ Australia's Clean Energy Act 2011

⁸ Renewable Energy Superpower

⁹ Australian Clean Energy Regulator on Carbon Markets

We're not yet a green economy¹⁰, however the potential to share our experience to date with international trading partners like China could go a long way to helping us achieve our green economy ambitions.



⁺ Modelled domestic pathways reflects a global economic efficiency perspective with pathways for different temperature ranges derived from global least-cost models

¹⁰ Australia's Trade data May 2023

This is why we believe the converging vectors of **emissions gap**, **renewable energy growth** and **carbon markets** within the **green economy transition** are of strategic importance to Australia, and why we need to improve the stickiness of our local market offering if we're to succeed in the burgeoning **Green Economic future**.

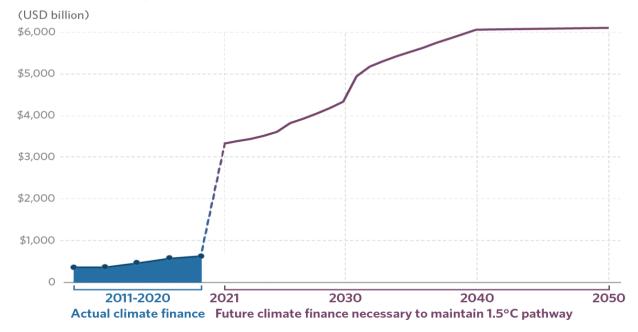
Australia's Green Innovation Credentials

Weaving between the tangled web of Australia's national and state-based contestable gas and electricity markets, renewable energy targets¹¹ and a conflicted gen-tailer distribution system, the transition of Australia's National Electricity Grid¹² to a renewable energy-fed system inspired Australian entrepreneurs to deliver some ingenious world firsts, including:

- installer training and accreditation driving productivity and safety;¹³
- installer quoting software driving sales and estimating efficiencies;¹⁴
- large-scale wind and solar generation balanced with fossil-fuel dominant grid integration.
- Renewable Energy Certificate (REC) registry¹⁵ supported by certificate trading software;¹⁶
- frequency controlling and Ancillary service providing inverters and battery systems;¹⁷ and
- the flourishing of new cloud-based system integration and asset management software¹⁸

All this innovation was made possible on the back of billions of dollars of private investment flowing from the carbon credits generated by Australia's renewable energy target - large-scale generation certificates (LGCs) and small-scale technology certificates (STCs).

Figure 3: Global tracked climate finance flows and the average estimated annual climate investment need through 2050



¹¹ South Australia 100% RE target

¹² Australia's Electricity Market

¹³ Clean Energy Council installer accreditation

¹⁴ Rooftop Mapping

¹⁵ REC Registry

¹⁶ Certificate Trading software

¹⁷ Musk Tesla Battery success South Australia

¹⁸ <u>VPP Battery fleet software</u>

Market drivers have also led to a new suite of innovations in solar cell production¹⁹ and solar installation²⁰.

Australia's carbon market

ACCUs, NDCs and VERs

Introduced in 2014 to replace the Gillard Government's **Clean Energy Act**, Australia's **Emissions Reduction Fund**, managed through the **Clean Energy Regulator**²¹ (CER), provided a new economic value for Australian emissions via **Australian Carbon Credit Units**²²(ACCU's). Criticised for redistributing investments from **mitigation** (ie: decarbonisation) to **offsets** (ie: transferring the CO2 reduction efforts to others), continued trade-offs (carbon passes) to heavy emitters under the new **Safeguard Mechanism**²³ threaten the integrity²⁴ of Australia's Green Economy in a maturing world carbon market.

¹⁹ Sundrive solar

²⁰ 5B Solar systems

²¹ Australia's Clean Energy Regulator

²² Australian Carbon Credit Units

²³ Safeguard Mechanism

²⁴ Carbon Offset Greenwashing

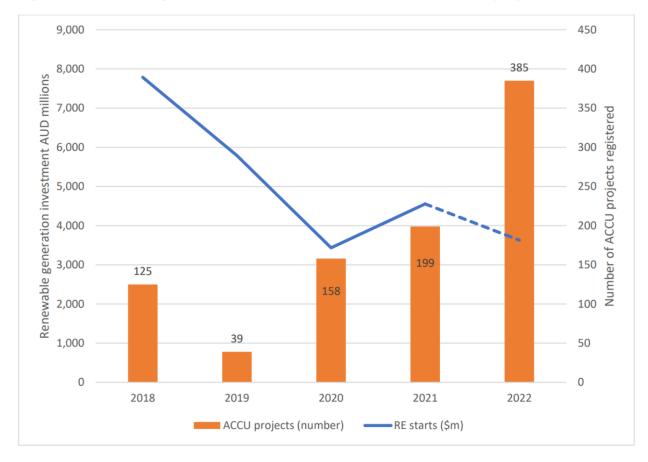


Figure 7: Renewable generation commencements vs number of ACCU projects

After lengthy industry engagement (read government administrative delays), Australia's Clean Energy Regulator is in the last stages of launching Australia's new **Carbon Exchange**²⁵.

The development of a new Unit Register could foster a new era of growth in Australian carbon market assets and associated tech innovations.

Developments like the **Indigenous Carbon Exchange**²⁶, **Aboriginal Carbon Foundation**²⁷ and the **Indigenous Carbon Industry Network**²⁸ further reinforce Australia's ingenuity and progressiveness in drawing on First Nations knowledge in a global carbon industry with Indigenous organisations producing carbon credits through their carbon projects land management activities.

Developing these with integrity and connecting with International markets will be a game-changer.

These, along with other initiatives such as increased funding for the Australia's Renewable Energy Agency²⁹ (ARENA), the Clean Energy Finance Corporation³⁰ (CEFC) and the National

²⁵ Australian Carbon Exchange July 2023

²⁶ Indigenous Carbon Exchange

²⁷ Aboriginal Carbon Foundation

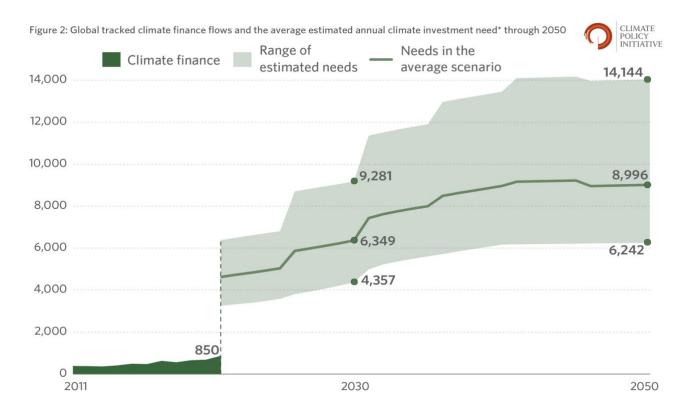
²⁸ Indigenous Carbon Industry Network

²⁹ ARENA

³⁰ CEFC

Reconstruction Fund³¹ will provide some fresh oxygen (or should that be hydrogen?) to fuel ambitions for Australia to be a **Green Economy** superpower.

Because WOW, are we going to need it....



Australia - Green Energy Superpower?

As always is the case in the energy transition discussion, Australia's scope 1 and 2 emissions³² (excluding exports³³ of ~400 million tonnes per year), within the context of global emissions (~50 gigatonnes³⁴), seems like we are only doing the bare minimum.³⁵

³¹ National Reconstruction Fund

³² Clean Energy Regulator website

³³ Australia's Exported Emissions

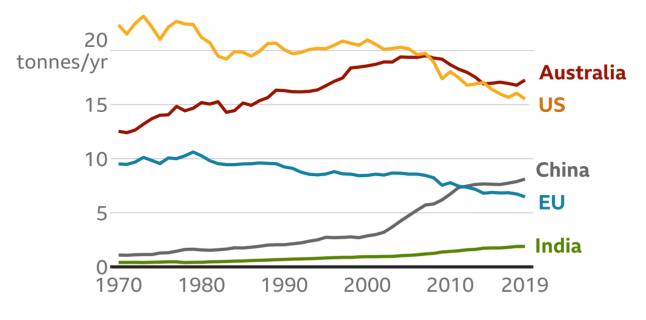
³⁴ Carbon Brief Oct 2022

³⁵ Our World in Data (Australia)

But just as we like to quote that we have the highest amount of solar PV installed per head in the world³⁶, so too are we the highest per capita emitter of emissions³⁷.

Australia has higher emissions per person than many countries

Per capita CO2 emissions in selected countries



EU includes UK

Source: EC, Emissions Database for Global Atmospheric Research

BBC

³⁶ Australia installed PV

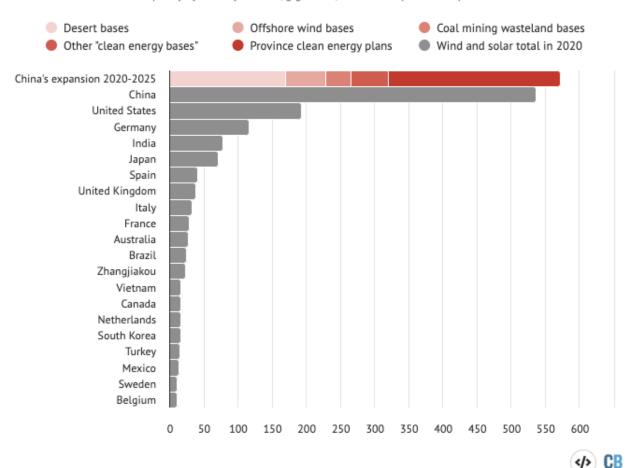
Australia's CO2 Emissions per capita

Green Energy superpower

The world ticked over 1000 GW³⁸ of installed solar PV generation capacity in 2022, with China installing half of that. Australia contributed ~4GW of solar PV in 2022 sitting us 9th globally, (and 6th overall on cumulative installations with our 30GW all up). Ironically, much of this is built with Chinese manufactured equipment³⁹. However, while Australia installed 4GW, China installed 400GW. Installing as much *each quarter* as what our total cumulative installed capacity is (30GW).

China's wind and solar expansion plans dwarf capacity in other countries

Installed wind and solar capacity by country in 2020, gigawatts, and China's planned expansion



And this does not include China's 330+GW of wind and other hydro and nuclear renewable energy.

China's ambitions are not pegged to PV install rankings; they're linked to its 2030 Peak Carbon goal and a high-quality growth driven 14th 5-Year Plan.

What we're highlighting in this newsletter is the potential for Australia to align our domestic activities (that support our national interests) with developments in carbon markets internationally, to drive new investment and new innovations at home *and* with our key trading partners.

³⁸ Our World in Data

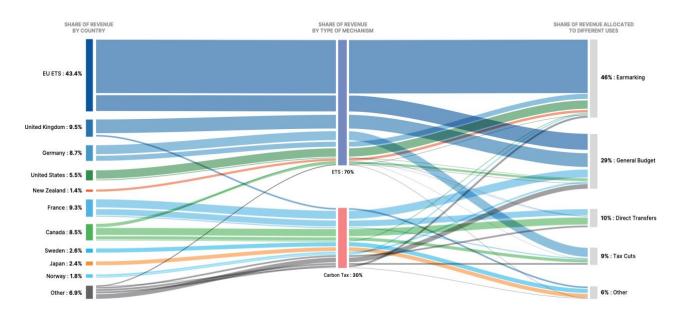
³⁹ Solar PV Market share (Australia)

International carbon market industry growth

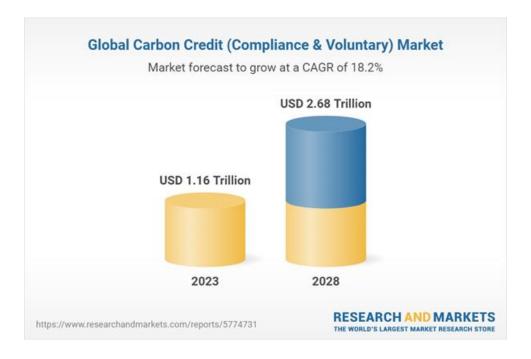
According to the World Bank's annual "State and Trends of Carbon Pricing" report, revenues from Carbon Taxes and Emissions Trading Systems (ETS) reached a record high of USD95 billion in 2022.

7 STATE AND TRENDS OF CARBON PRICING 2023 WORLDBANK.ORG

SCALE AND USES OF CARBON REVENUE IN 2021



The Global Carbon Market is set to reach USD2.68 trillion by 2028⁴¹ at a CAGR of 18.00%.



⁴⁰ World Bank Caron Market Report 2023

⁴¹ Research & Markets Global Carbon Credit Market to 2028 Report

Green Finance

Ignoring the pleas for no new fossil fuel production, when one acknowledges the SCALE of the carbon "Mitigation" challenge, (ie: exiting fossil-fuels), Australia also needs to consider the opportunities for attracting investment via "Adaptation" strategies⁴².

According to a 2021 report by the Climate Policy Initiative, an increase of 590% is required to meet agreed objectives by 2030, and by UNEP's Adaptation Gap Report, USD150-300 billion is required.

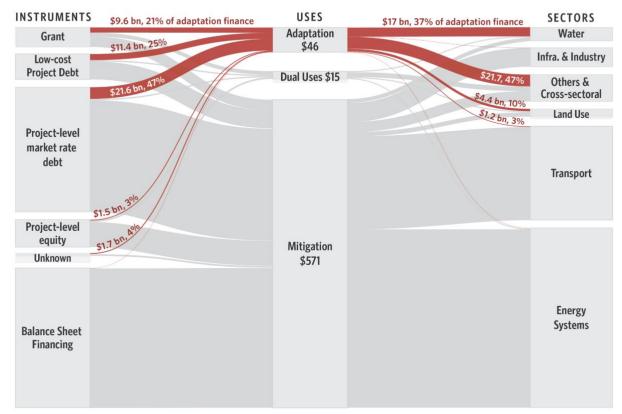


Figure 17: Adaptation finance by source and instrument

Source: Climate Policy Initiative

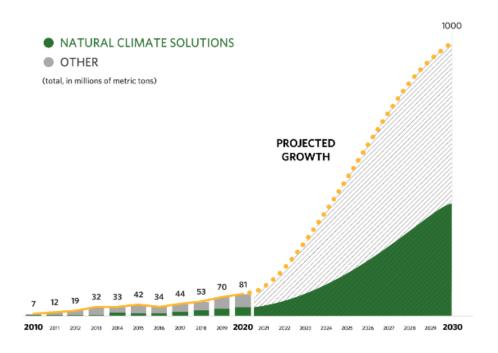
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⁴² Climate Policy Initiative - Global Gren Finance Landscape

International Carbon Markets

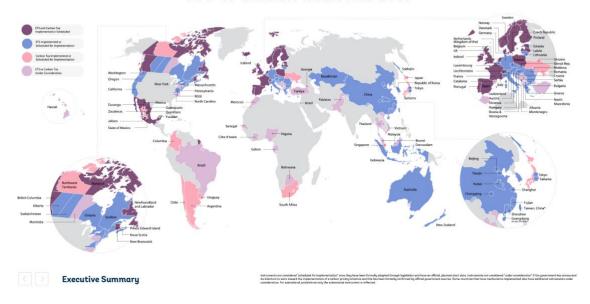
International carbon markets⁴³ include the UN-led **Clean Development Mechanism⁴⁴** and **Voluntary Emissions Reduction Standards⁴⁵** that are administered by non-government organisations internationally and are increasingly linked to **Nature Positive** activities.

Growth forecast of voluntary carbon markets to 2030



And they're rolling out all over the world⁴⁶...

MAP OF CARBON TAXES AND ETSs



⁴³ Centre for Strategic Studies review of Carbon Markets

⁴⁴ UNCC Clean Development Mechanism

⁴⁵ <u>DNV Voluntary Markets</u>.

⁴⁶ World Bank Carbon Pricing Dashboard

The Carbon Market Ecosystem

What follows any new market development is a **new market ecosystem**, and it is within this ecosystem that we see Australia's Green Economic future will develop and encompass more than just climate science, and environmental remediation, but everything we do with Energy (green), Mining (green), Manufacturing (green), Finance (green), Built Environment (green), Agribusiness (green), Education, and Consumption (food, fashion, travel, homewares, etc).

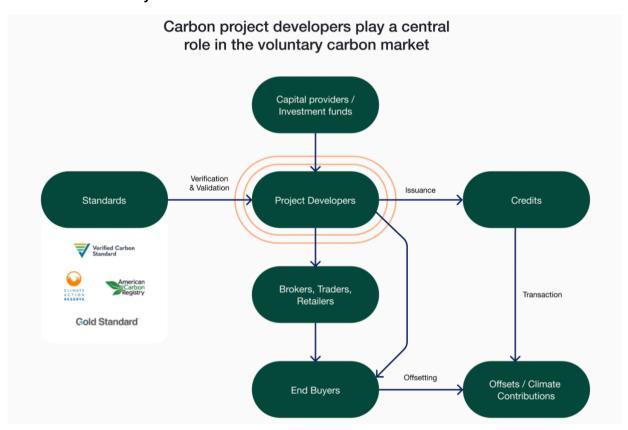
A Green Economy linking positive human activities to UN Sustainable Development Goals.

Under the UN's **Clean Development Mechanism** emission-reduction projects can earn **certified emission reduction credits** which can be sold to companies to meet emission reduction targets.

This is creating a pipeline for investment attraction and new technological innovations.

There are plenty of arguments about the impact of credits v offsets in on the path to Nature Positive⁴⁷, however a scan of the membership of the **International Emissions Trading Association⁴⁸** (IETA) highlights the growth in participating members across greenhouse gas emitters, verifiers, certifiers, auditors, investors, insurers, traders, brokers, financial and commodity exchanges serving the greenhouse gas emissions trading market in developed, emerging economies and developing countries.

Carbon Markets Ecosystem



⁴⁷ Australia Institute Pros and Cons

⁴⁸ International Emissions Trading Association

Developments in the EU around its **Carbon Border Adjustment Mechanism**⁴⁹ have accelerated global discussions about a more integrated (integrity-focussed) international carbon market⁵⁰.

Currently, demand for international units and certificates in Australia is primarily driven by **voluntary emissions reduction ambition**, (ie businesses certifying their actions against the government-backed Climate Active⁵¹ Carbon Neutral Standard⁵²).

The popularity⁵³ of the offset programs exposed a few downsides⁵⁴ to voluntary carbon markets, however the transition to a green economy is a process, and improvements are being made through market feedback⁵⁵ and consumer demand with new global standards improving integrity.



Core Carbon Principles

In the world of voluntary emission reductions, **Verified Emission Reductions** (VERs) are created by projects which have been verified outside of the Kyoto Protocol (ie: non-Country Determined Reduction targets), with one VER equivalent to 1 tonne of CO2 emissions.

Through projects linked to VERs, industries and individuals voluntarily compensate for their emissions, or fund projects that provide an additional contribution to mitigating climate change. VER projects are developed and calculated in compliance with one of several VER standards with rules defining how emission reductions are measured and are required to be verified by an independent third party.

⁴⁹ ADB on CBAM

⁵⁰ Carbon Pricing Wilson Centre Report June 2023

⁵¹ Climate Active Certification

⁵² DCCEEW Carbon Neutral Standards

⁵³ Climate Active Brands

⁵⁴ ABC Australia Institute on Climate Active claims

⁵⁵ DCCEEW review of ACCU's

Getting with the Program

Of the 2000+ projects verified with VERRA Australia currently has **9** projects listed with **VERRA**. China has **1038**⁵⁶.



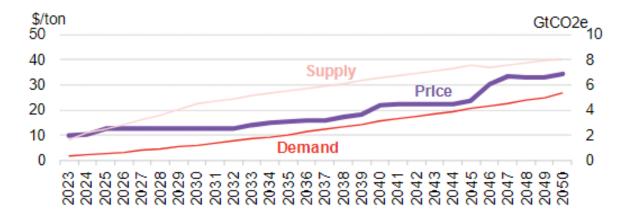
Project and Credit Summary VCUs Issued VCUs Retired 606,381,841 VCS Projects Registered VCS Projects with VCUs Issued 7,047 VCS Projects without VCUs Issued Total Available Buffer 69,583,614

A quick glance at these projects provides a walk-up BD list of collaboration projects for Australian product and service providers with opportunities from farming to water, power, forestry, and waste management.

Last year's **Kunming-Montreal Agreement at COP15**⁵⁷, led by China, went a long way to determining the framework for halting, and even reversing nature loss by 2050 and elevating the need for greater growth and integrity of Nature-based projects.

Voluntary carbon credits, whilst historically transacted through bespoke bilateral agreements between buyer and seller, can increasingly be bought through specialised carbon credit exchanges and trading platforms leading to a forecast future market for tradable credits.

And presto, a Carbon Market.



⁵⁶ VERRA China projects list

⁵⁷ COP15 Kunming-Montreal Global Biodiversity Framework

Voluntary Carbon Markets in our Region.

Given the requirements and projected growth of the voluntary carbon credit market, more established exchanges have launched their own offerings. CTRB & ICE in Europe, ICE, Nasdaq and NYMEX in US.

In July 2022, **HKEX** announced the **Hong Kong International Carbon Market Council** to develop Hong Kong as an international carbon market leader and a hub for Asia (ANZ HKG a member) and launched their **CORE Climate Marketplace**⁵⁸. Delegates on ACBC's recent China business delegation were briefed on this new strategic direction by Hong Kong Government and HKEX representatives.

This year Malaysia's stock exchange launched the **Bursa Carbon Exchange**⁵⁹ and is looking to grow accredited projects to attract investment. There are **three** carbon exchanges in Singapore⁶⁰, with **Climate Impact X**⁶¹(**CIX**), (DBS Bank, Standard Chartered and Temasek), **Cyberdyne Tech Exchange (CTX)**, and **AirCarbonExchange (ACX)**.

In the Middle East, Saudi Arabia's sovereign wealth fund (**Public Investment Fund**) and the Saudi stock exchange, **Tadawul**, launched **VCM**⁶² as their voluntary exchange for carbon credits. **UAE**, which invested in Singapore's AirCarbonExchange, also launched a local version of ACX.

As these developments highlight, there is ample room for Australia to ramp up its efforts. Fortunately, Australia's new **Carbon Exchange**⁶³ is on the way.

⁵⁸ HKEX CORE Climate Exchange

⁵⁹ Bursa Carbon Exchange Malaysia

⁶⁰ Singapore Exchange

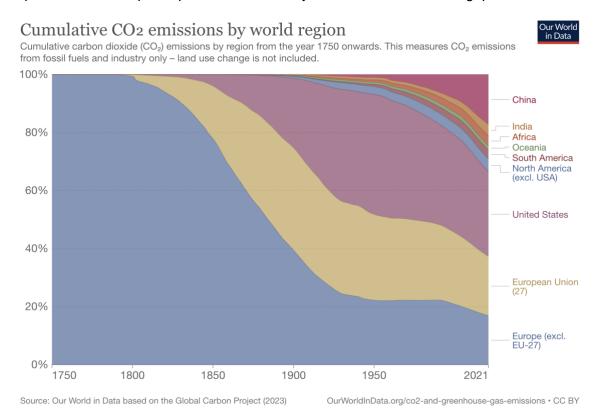
⁶¹ SGEX Climate Impact Exchange X

⁶² VCM Saudi Arabia

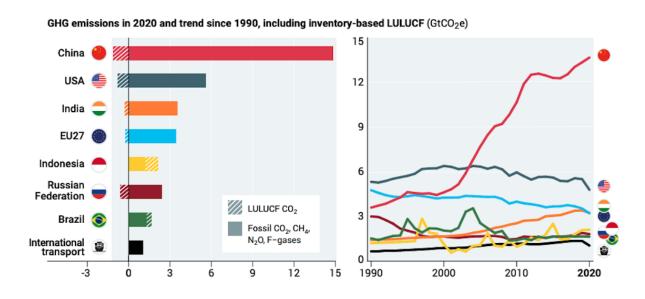
⁶³ Australian Carbon Exchange July 2023

China's "High Quality" Growth

Many are quick to quote China's burgeoning coal consumption (50% of global use) and related industrial emissions (25% of global emissions) when referencing its renewable energy activity⁶⁴. However, some historical context needs to be provided to these figures, along with the challenging aspect that China's per capita GDP is still only 25% that of the US, Singapore or Australia.



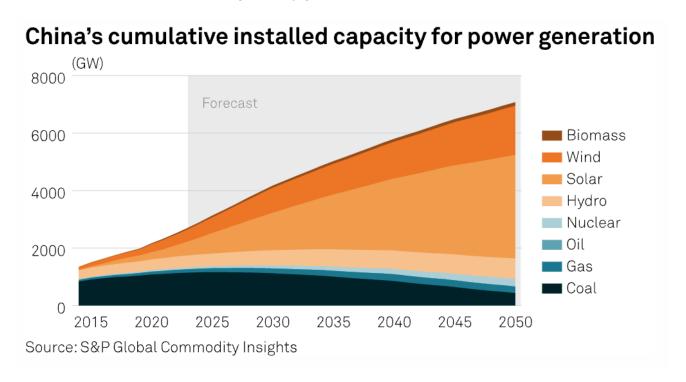
However, considering China's meteoric industrial transformation since the turn of the century, and associated meteoric emissions, logic (and China's technocratic decision making) dictates that the old way of economic growth can't continue.



⁶⁴ Climate Energy Finance China Q1 RE Report

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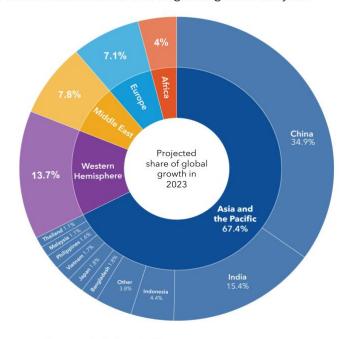
Despite the current fossil-fuel addiction, few⁶⁵ are recognising all the work being done behind the scenes⁶⁶ to accelerate China's "high quality growth" and rapid industrial transformation.



Even fewer considering the maths behind China's role in global GDP⁶⁷ now, and into the future.

Bigger driver

Asia will contribute about 70% of global growth this year.



Source: IMF, World Economic Outlook, April 2023. Note: Groupings based on IMF Regional Economic Outlook classifications.

IMF

⁶⁵ https://climateenergyfinance.org/

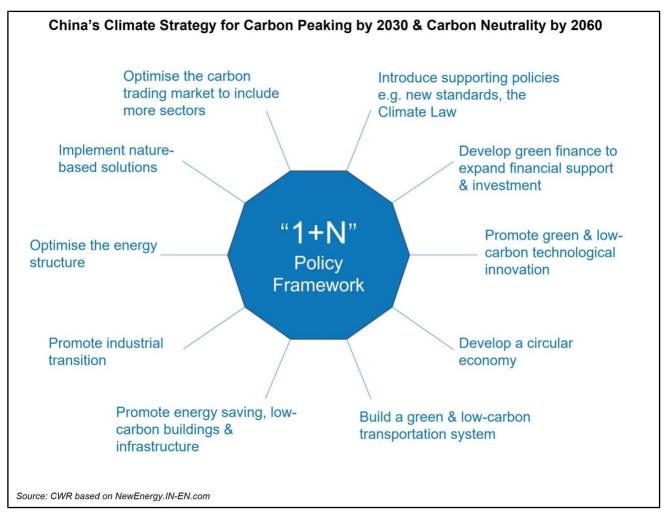
⁶⁶ Zhang, Y., Gong, S. A recent regulatory storm in China: theoretical interpretation and applicability. ARPE 2, 1 (2023). https://doi.org/10.1007/s44216-023-00011-3

⁶⁷ IMF on China's role in global GDP

China's Carbon Markets

China's 2060 Net Zero ambitions rely on it achieving its Peak Carbon goal by 2030.

Despite all the nay-sayers, current installation activity sees China pulling forward its peak carbon and renewable energy generation targets by 2025.



Mitigation by energy generation replacement alone however will not be enough, which is why some considerable work has been done on China's own Emissions Trading Scheme (initially, only power generation), Voluntary Carbon Markets (abatement projects) and other financial incentives.

King & Wood Mallesons' most recent market update on China's Voluntary Carbon Markets⁶⁸ opines⁶⁹ that since moving the China Certified Emissions Reduction (CCER)⁷⁰/ Carbon Credits from NDRC to the Ministry of Ecology & Environment⁷¹ following its halt in 2017, new rules currently under consultation will see the market move forward as a 'conservative' pace with a focus on "Authenticity, Uniqueness and Additionality⁷²".

Australia has an opportunity to play a role in all these aspects.

⁶⁸ KWM March 2023 on Carbon Markets

⁶⁹ KWM China Voluntary Carbon Markets

⁷⁰ CCER

⁷¹ China Ministry of Ecology and Environment

^{72 &}quot;Additionality" in China Carbon Projects

Carbon Market Forums

Indeed, Australia is actually already heavily involved in China's Carbon Markets, with people like ClientEarth's Huw Slater⁷³ (ANU/ Monash) co-authoring the annual China Carbon Pricing Survey⁷⁴ for the China Carbon Forum⁷⁵. Their 2023 report released this month, and also Huw is also intimately involved with China-EU ETS and Carbon Market dialogue and training.



Along with the plethora of other industry activity underway in China to drive international engagement with their high-quality growth, China's **5th Carbon Market Trading Development Forum**⁷⁶ also takes place in Beijing this week with a full program of government, academic and industry expertise on hand to hear about the feedback defining its Carbon Market development.



Anyone from Australia going?

Australia needs to be looking strategically into the implications of China's developing Voluntary Carbon Markets and integrating Australia's Carbon Exchange, new decarbonisation projects and deeper nature-based solutions that will drive our transition to a Green Economy. At a conservative estimate, China's CCER spot market will reach about RMB 20 billion (USD2.8 billion) by 2025, according to a research report by Minsheng Securities.

⁷³ ACBC Green Channel Carbon Markets podcast episode

⁷⁴ China Carbon Pricing Survey

⁷⁵ China Carbon Forum

⁷⁶ China 5th Carbon Trading Market Development Forum

Australia's Carbon Challenge

Last year the UN⁷⁷ reinforced that the world needs "wide-ranging, large-scale, rapid and systemic transformation" if we are to limit warming to under 2C.

From now on, emissions must fall by 5% a year, and we reiterate again that just building out clean energy at our current rate, (requiring a 10 times level of investment in itself), is not enough.

Australia's Green Economy Opportunity

Australia needs to encourage a wider range of industries and enterprises to participate in greenhouse gas emission reduction actions and support the development of

- more renewable energy
- forestry carbon sinks
- methane utilisation
- carbon reduction, and
- carbon sink increases

All are economy-driving initiatives.

Strategically, Australia's aid activity, international trade & investment development support focus, university research and commercialisation focus needs to align with this global challenge.

Also, Australia needs to actively promote the development of large-scale decarbonisation projects, incorporating the at-scale use of new Australian technologies and services to build assets here, and develop products and services that are applicable to solve China's (and other) global emission reduction requirements.



This means that not only do we need to develop our own carbon market (supply and demand), but also build a bigger pipeline to attract a greater share of global green finance into Australian projects.

Australia's Green Economy

Demand for Voluntary Credits is accelerating yet there is no organised effort to supply these projects at scale with the acceptable level of quality. Australia should be focusing on being a leader in this. While Australia is building out our own asset base, we should also be building up skills, products and services which will be of value in a market with 1,000 times our requirements – China.

In this era of settling, not resetting, this new (Green) market opportunity should be the focus for defining Australia's future market engagement with China providing clarity for Australian business.

⁷⁷ UN on Climate Goals Carbon Brief

Australia's Carbon bridge

The urgency caused by historical delays in decarbonisation means resources must not only be applied towards expanding the **quantity** and **diversity** of Verifiable Carbon Projects, but we also need to act with **speed**.

Speed - "I feel the need, the need for speed"

Supply-side project developments have experienced⁷⁸ exceptionally long lead times between initial investment, and the sale of offsets. This timeframe must be shortened considerably if we are to get these new markets functioning in time to make the impact required in the decade ahead.

Australia did this with its many innovative industry-wide solutions in large-scale and roof-top solar, wind and battery development, installation and commissioning. We can do it again. With a plan.

Scale

We must also address the issue of volume, (ie: thinks gigatonnes v kilograms). Individual kg-related offsets are nice (like the odd plane ticket offset), but our emissions gap is blowing out daily, and there will also be a few billion more people on the planet by 2100.

We need more projects FAST.

This doesn't mean we must sacrifice quality, but we need new mechanisms that aggregate offsets at impact-level volumes. This again will drive technology innovations, of which Australia is a leader.

Scope

Finally, we must expand the geographic scope of market participation beyond our borders and beyond the 'Live-Aid' ideals of third-world country forestry. Efforts to better incorporate carbon offsets into Nationally Determined Contributions and plans for biodiversity protection initiatives should be pursued in all countries and regions.

What next?

Australia should be the carbon king, but in a good way.

After a lost decade Australia (industry & government) should be looking at new opportunities for new products, in new markets to take the lead in our Green Economic future.

Doing more already, or want to do more? Contact ACBC's Green Channel lead, Anthony Coles, to register your interest in our next ACBC China Carbon Market discovery tour / market development delegation.

Anthony Coles, Chair, ACBC Net Zero Working Group. anthony.coles@acbc.com.au

⁷⁸ Climate Policy Initiative - Voluntary Carbon Markets need

Further Links:

China Carbon Exchange - https://www.cbex.com.cn/ https://www.cbex.com.cn/ywwz/home/cbeex/

Beijing Green Finance Association - http://www.bgfa.org.cn/

China Biodiversity Conservation and Green Development Foundation - http://www.cbcgdf.org/NewsShow/5033/23394.html

China Academy of Environmental Planning Carbon Neutral Centre -

http://www.caep.org.cn/sy/tdftzhyjzx/zxdt/202306/t20230605_1032563.shtml

Institute for Global Decarbonisation Progress - http://www.igdp.cn/

Green Association of Industrial Parks - https://greendev.org.cn/

Institute of Energy Research & Planning Peking University - https://www.ccetp.cn/sy

*China Carbon Neutrality Tracker - https://ccnt.igdp.cn/action-topics

HSBC https://www.hsbc.com/insight/topics/the-vital-role-of-voluntary-carbon-markets

Hong Kong Exchange -

https://www.hkex.com.hk/Join-Our-Market/Sustainable-Finance/Core-Climate

Saudi Arabia Exchange - https://vcm.com.sa/

 ${\bf Climate\ Policy\ Initiative\ -\ Climate\ Finance\ \underline{https://www.climatepolicyinitiative.org/publication/global-landscape-of-climate-policyinitiative.org/publication/global-landscape-of-climate-policyinitiative.}$

finance-a-decade-of-data/

NatureMetrics - COP15 https://sustainablebrands.com/read/new-metrics/cop15-environmental-dna-technology-enables-world-first-nature-performance-monitoring-service