



Asia-Pacific  
Economic Cooperation

Advancing Free Trade  
for Asia-Pacific Prosperity



# APEC Economic Policy Report 2022

Structural Reform and a Green Recovery  
from Economic Shocks

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Annex B:

# Case Studies



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## AUSTRALIA

### A. FUELLING THE FUTURE: AUSTRALIA AS A HYDROGEN POWERHOUSE<sup>1</sup>

#### Introduction

Australia has the resources, and the experience, to take advantage of increasing global momentum for clean hydrogen. With the potential for huge economic growth, thousands of regional jobs, and greater low-cost renewable power generation, the Australian hydrogen industry is poised to be a catalyst for achieving net-zero carbon emissions domestically and around the world.

#### Pre-reform situation

The global economy has been powered by fossil fuels since the beginning of the industrial revolution. As economies accelerate action on climate change, changes in global demand for Australia's energy exports will present challenges for our economy.

We will not put industries, regions or jobs at risk. We are taking advantage of new economic opportunities and technologies while continuing to supply our traditional export markets. Australia must continue to reduce emissions while keeping our economy growing, maintaining affordable, reliable energy and ensuring our regions remain strong.

Technological developments that support energy affordability, improve energy system reliability and contribute to long-term emissions reductions will be vital as global energy markets continue to evolve. Hydrogen is one of the many tools that can help us on this evolution and Australia is in a unique position to maximise on this opportunity. The development of our hydrogen resources could enhance Australia's energy security, create Australian jobs and build an export industry valued in the billions.

#### Policy Response

Australia has all the pieces needed to create a new hydrogen industry and supply clean hydrogen to the world: the energy resources, expertise, and infrastructure.

In October 2021 the Australian Government announced its [Long-Term Emissions Reduction Plan](#) to achieve net zero emissions by 2050. The Plan consists of four pillars: driving down technology costs; enabling deployment of low-emissions technologies at scale; seizing opportunities in new and traditional markets; and, fostering global collaboration.

As part of its Plan to achieve net zero emissions, the Australian Government expects to invest around A\$21 billion in low-emissions technology over the next decade, helping to secure more than A\$84 billion in total investment from the private sector and state governments.

The Australian Government's [Technology Investment Roadmap](#) is the cornerstone of the Plan and clean hydrogen is one of six priority low emissions technologies under the Roadmap which are critical to create jobs, reduce emissions and achieve economic growth while meeting our net zero by 2050 target.

Hydrogen is a safe, flexible and clean fuel that can be used to power vehicles, generate electricity and produce heat while lowering carbon emissions. Building a clean hydrogen industry will help Australia transition to a clean and secure energy future.

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<sup>1</sup> Case study submitted as at February 2022.

Australia's [National Hydrogen Strategy](#), released in 2019, lays the foundation for this transformation and sets our goal to become a major producer and exporter of clean hydrogen by 2030.

To reach this goal Australia is:

- investing more than \$1.4 billion dollars into building a clean hydrogen industry.
- supporting the development of up to seven clean hydrogen industrial hubs (A\$464 million) in regional Australia, as well as design and development studies. These industrial hubs will:
  - concentrate demand for hydrogen in one geographic region to reduce costs and share information;
  - bring hydrogen producers, users and exporters together to accelerate industry growth;
  - lower the cost of production, encourage innovation, and enhance skills and training efforts;
  - help the hydrogen industry build the demand and scale needed to produce hydrogen at under A\$2 a kilogram – ‘H2 under 2’. This is important because at this price hydrogen becomes competitive with existing conventional fuels.
- driving economy-wide regulatory reform to help all jurisdictions remove barriers to industry development, while keeping Australians safe and protecting the environment. We will ensure Commonwealth laws are reviewed and reformed where necessary, to allow for the development of a strong hydrogen industry in Australia.
- establishing agreements with key international markets to underpin investment. And,
- working internationally to develop an international certification scheme for hydrogen, working closely with local and international companies, and like-minded economies and in multi-lateral forums, like through the IPHE (International Partnership for Hydrogen and Fuel Cells in the Economy).

In other priority actions under the National Hydrogen Strategy we are looking closer to home. We are working with Australian state and territory governments to undertake Australia's first National Hydrogen Infrastructure Assessment, expected to be completed by April 2022, and we are working to review legislation and regulations relevant to hydrogen industry safety and development, and reviews to support hydrogen use in gas networks.

We are also looking to advance a hydrogen-ready workforce, by mapping and supporting hydrogen skills and training needs, as well as supporting analysis to understand community attitudes towards hydrogen to support the future expansion of the industry.

## Impact

In December 2021 Australia released its inaugural [State of Hydrogen Report](#), which provides a snapshot of Australia's progress and also against global developments. The report finds that Australia is on track to realise its hydrogen vision, with [more than 70 projects announced](#) (the largest pipeline of announced clean hydrogen projects in the world).

The [report finds](#) building demand, achieving low-cost production at scale and reducing delivery costs are challenges facing the industry globally. Australian governments are acting to help the hydrogen and related industries to overcome these challenges, through measures including:

- Investment
  - the National Hydrogen Strategy has stimulated approximately \$8 billion in support for hydrogen and underpinning renewables across all levels of Australian governments, including more than \$1.4 billion in federal funding specific to hydrogen and billions more in related initiatives and state and territory government funding including:
    - \$3.8 billion from New South Wales government
    - \$2 billion from Queensland government
    - \$570 million from Western Australian government

- **International partnerships**  
In 2021 the Australian Government announced new low emissions partnerships with Japan, Germany, Singapore, the United Kingdom, and the Republic of Korea – all of which feature cooperation on hydrogen. And in 2022 we announced a new partnership with India which will see our economies work on reducing the cost of ultra low-cost solar and clean hydrogen. These partnerships have a strong focus on leveraging industry investment and involvement.
- **Guarantee of Origin scheme**  
As we look to new export opportunities it is more important than ever to establish a robust framework for a future global trade in hydrogen. Through the [IPHE](#) Australia is leading efforts to reach agreement on an internationally agreed methodology for tracking the carbon emissions from hydrogen production. This will provide consumers with the assurances they need on carbon emissions and enable consumer choice about the hydrogen they are buying.

Overall, Australia's hydrogen industry is creating jobs, cutting emissions and boosting economic growth. Hydrogen will create new industries and help existing industries make cleaner products. It is projected that clean hydrogen exports could directly support 16,000 jobs by 2050, plus an additional 13,000 from the construction of related renewable energy infrastructure. Australian hydrogen production for export and domestic use could generate more than \$50 billion in additional GDP by 2050.

### **Challenges and lessons**

Australians will want the new jobs and growth of clean hydrogen to be achieved without compromising safety, cost of living, water availability, access to land or environmental sustainability. Governments and industry have the responsibility to ensure community safety, confidence and trust in the new industry, and deliver benefits for all Australians.

## **B. REGIONAL AND REMOTE COMMUNITIES RELIABILITY FUND<sup>2</sup>**

### **Introduction**

The Australian Government's \$50.4 million Regional and Remote Communities Reliability Fund supports feasibility studies that help communities and businesses understand how microgrids could improve the reliability, security and affordability of their energy supply. From remote Indigenous communities in Western Australia through to large industrial customers in New South Wales, the fund is supporting feasibility studies to investigate how microgrids could better meet their energy supply needs. Microgrids are particularly well suited to regional and remote areas where they can increase community resilience during extreme weather events and natural disasters, including bushfires. Where upgrading existing infrastructure or implementing microgrids are found to be feasible, projects will have emissions reductions benefits for communities and businesses by avoiding the consumption of diesel fuel.

### **Pre-reform situation**

Australia's large land mass means that fringe-of-grid and off-grid customers in regional and remote locations face unique challenges and are often the costliest to supply. Many of these communities rely on long transmission lines and other infrastructure that are expensive to construct and maintain, with costs passed onto consumers. Communities and industries on the fringes can have supply disrupted due to extreme weather events and bushfires causing damage to power lines and other infrastructure. Due to the lack of reliable and secure electricity supply, many customers in these communities are still reliant on expensive diesel generation for their primary or back-up supply.

This measure supports feasibility studies to understand the benefits of microgrids to improve reliability, security and affordability of energy supply for regional communities and industries. Microgrids are groups of interconnected local energy generation, such as small-scale solar photovoltaics, and consumption or storage, such as powering a local business or charging up battery storage. Microgrids can be controlled as a single entity and operate either in connection with the main grid or in isolation as a stand-alone power system. Microgrids can:

- provide backup for the main grid in case of emergencies
- reduce costs by avoiding expensive maintenance and investment in network infrastructure
- connect to community-scale local energy sources
- allow communities to be more energy independent
- lower emissions, for example by reducing diesel fuel consumption.

### **Policy response and implementation**

In March 2019, the Australian Government announced the measure as part of its commitment to deliver significant investments focused on creating jobs and driving economic growth in regional and remote Australia. Additionally, the Government's Technology Investment Roadmap identified that microgrids and stand-alone power systems provide an innovative solution to increased energy security, resilience, affordability and emissions reductions through better integration of distributed energy resources (DER) and system stabilisation. Where feasibility studies supported by the measure find that microgrids are economically viable, moving some customers to off-grid or alternate energy supply could save hundreds of millions of dollars in network costs.

Australia has many opportunities to test the potential of emerging technologies, including microgrids, DER and demand management, to support the low emissions transition of regional communities and industrial sectors such as agriculture, mining, and the built environment. Technological advancements

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<sup>2</sup> Case study submitted as at February 2022.

and falling costs of renewable energy generation and storage are making microgrids a competitive solution to improve power supply for off-grid and fringe-of-grid communities. Microgrids can reduce whole-of-system costs by providing essential system stabilising services and avoid costly network and infrastructure upgrades. Where microgrids are economically viable, moving some customers to off-grid supply could save hundreds of millions of dollars in network costs, resulting in cost savings for all consumers. Microgrids can also provide critical local infrastructure to enable vulnerable communities to prepare for, ride through and recover from network disruptions, severe weather events and natural disasters.

Microgrids have a high potential for reducing emissions across multiple sectors and applications, and are identified as a generation enabling technology under the Australian Government's Technology Investment Roadmap and Low Emissions Technology Statement. Microgrids often incorporate and orchestrate other priority low emission technologies including clean hydrogen and energy storage, electric vehicle charging, residential and industrial energy management systems, digital infrastructure and energy efficiency.

The measure supports 37 feasibility studies covering more than 110 regional and remote communities, including over 60 Indigenous communities. These studies are investigating how microgrids can deliver local benefits for energy supply, health, education, and economic growth. All feasibility studies are expected to be completed by 30 June 2024.

In September 2020, the Government announced an additional \$50 million worth of grants would be available from the Regional Australia Microgrid Pilots Program to support the delivery of microgrid pilot studies through the Australian Renewable Energy Agency. Pilot studies will demonstrate the design and performance of microgrids to help communities further understand the benefits of investing in these systems. This Program contributes to the Government's commitment to making electricity more affordable, reliable and secure for communities across Australia.

## C. CASE STUDY ON WATER EFFICIENCY LABELLING AND STANDARDS<sup>3</sup>

### Introduction

The Australian Water Efficiency Labelling and Standards (WELS) scheme commenced in 2006 with the goal of improving water efficiency through the promotion and regulation of indoor water-using appliances and fixtures. Building on an earlier voluntary labelling scheme, WELS is an economy-wide, government-run scheme that makes water efficiency labelling mandatory and imposes a minimum water efficiency standard for some products.

The *Water Efficiency Labelling and Standards Act 2005* (Cth) (the WELS Act) is a standard which seeks to provide guidance to manufacturers and suppliers whilst creating a level playing field in rating and labelling water efficient products. It provides guidance for suppliers on correctly rating and labelling their products in terms of water use. More specifically, this standard can be applied to showers, tap equipment, flow controllers, lavatory equipment, urinal equipment, dishwashers, clothes washing machines, and the dryer of combination washer/dryers where water is used to dry a load.

### Pre-reform situation

Australia is a dry continent with highly variable water resources. In 1994, Australian state and territory governments committed to a framework of water reform to address issues of over-allocation and pressure on existing supplies. Water reform continued with the 2004 National Water Initiative, in which all jurisdictions committed to a range of principles and actions aimed at increasing the efficiency of Australia's water use and providing greater certainty for investment.

Australia has become recognized as a leader in water management, with decades of experience in water reform such as establishing secure tradable water rights separate to land rights, enacting basin-scale planning, addressing water pricing, and introducing management tools.

The Water Efficiency Labelling and Standards scheme (WELS) addressed a National Water Initiative commitment to better manage urban water demand. The stated objectives of the WELS scheme are to:

Conserve water supplies by reducing water consumption

- Provide information for purchasers of water-use and water-saving products
- Promote the adoption of efficient and effective water-use and water-saving technologies

WELS requires specified water-using products to be registered and labelled with accurate, easily understood water use information so consumers can make informed purchasing decisions. Reduction in domestic water use reduces costs to consumers, leaves more water available for other uses like agriculture or manufacturing, and allows communities to reduce or postpone investment in water infrastructure like dams or desalination plants.

### Policy response and implementation

The implementation of this standard provides a useful example of where standards and legislation worked together to provide a complete and effective policy response.

### Cooperation between Standards Australia and the Department of Agriculture Water and Environment

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<sup>3</sup> Case study submitted as at February 2022.

This project was a strong example of where a standard is drafted with the intention of it supporting legislation. The Department of Agriculture Water and Environment were active Committee members and assisted in drafting the standard along with other stakeholder. The standard was written to support the WELS scheme going into legislation.

The Department of Agriculture Water and Environment is also a co funder along with Standards Australia of the international initiative at ISO to create an international standard based on the Australian WELS standard.

### **Role the standard plays in relation to legislation**

The functions and requirements of the ELS scheme are established through legislation and associated standards. Water efficiency standards detail the criteria for testing, rating and labelling [products regulated under the WELS scheme](#). The WELS standard, and the powers and functions of the scheme, are established through [legislation](#).

### **Community benefit and consensus of the standard**

The WELS standard went through Standard Australia's rigorous process to ensure that the Standard will be a benefit to the Australian community. The first step was to meet the Net Benefit requirement which includes:

- **Public Health and Safety:** Will there be an overall increase in safety, or can the standard help to prevent injuries or incidents from occurring?
- **Social and Community Impact:** Will the community be impacted by the introduction of this standard, will it support social cohesion or address social issues?
- **Environmental impact:** Will the standard have an impact on the environment?
- **Competition impact:** Will the standards impact competition in Australia? Will it create monopolies, or prevent fair market entry?
- **Economic impact:** Will the standard have a cost impact? Will it make things cheaper, will it make consumers pay a higher price?

The Technical Committee that drafted the WELS standard included balanced stakeholders and the standard was approved by consensus. The committee comprised representatives of various interest groups such as suppliers, regulatory authorities, government departments, associations, academia and consumers. Committee members' interests aligned with the broader sector or domestic views concerning the benefit to Australia, industry best practice, health and safety of consumers, the environment, new and emerging technologies, and fitness for purpose.

The Standard also went through a public consultation phase which ensured that the broader community had an opportunity to review the content and direction of the document prior to its completion. The draft as per Standard Australia guidelines was available to the public for comment for nine weeks. All comments from the public were considered in detail by the technical committee.

### **Importance of consumer choice in labelling schemes**

WELS is Australia's most successful consumer water conservation program. It is also among Australia's most successful carbon reduction schemes.

The scheme's purpose is to conserve water by helping consumers make informed decisions and encouraging uptake of water-saving technologies. The scheme allows consumers to have visibility of the water efficiency of a product and empowers consumers purchasing products with the knowledge of how water efficient products will be.

## Impact

Experience in Australia is that when household products such as showers, taps, toilets, and clothes washing machines are labelled with their water efficiency at the point of sale, consumers use that information to choose more efficient products. This reduces household water consumption and savings increase over time as more efficient products replace less efficient ones across a community. Water efficiency can also be used by governments to set minimum performance standards, further reducing demand. Effectiveness of water efficiency labelling, underpinned by an Australian standard WELS commenced in Australia in 2005 and is subject to a five-yearly independent review. The 2015 review found that the Australia's WELS scheme was appropriate, highly effective, and largely efficient and cost-effective in meeting its objectives, delivering water savings at far lower cost than alternative water supply augmentation measures. It found that WELS provides effective and valued consumer information at extremely low marginal costs, avoids regulatory and administrative duplication, and drives technological development and improvement.

Market research published in 2014 found that 87% of consumers recognised the water rating label, 83% believed the scheme was 'very' or 'quite' credible, and over half used the water rating labels in making purchasing decisions<sup>4</sup>.

An evaluation of the environmental effects of Australia's WELS scheme, conducted in 2015 by the University of Technology Sydney, estimated annual water savings from WELS of 70 billion litres in 2013, rising to 147 billion litres in 2021 and 204 billion litres in 2030. Australia's population in 2013 was 23 million people, so the per capita savings was over 3000 litres per person. Note that one billion litres are enough water to fill approximately 444 Olympic swimming pools, and the water saved is high quality potable water.

The evaluation found the greatest savings were from more efficient showers (35%), taps (35%) and clothes washing machines (19%). Efficient toilets save substantial water, but more efficient toilets were already mandatory in Australia, so the water savings were not attributed to WELS.

An additional benefit identified by the evaluation was in energy savings, as less energy was required to heat, pump, and treat water. In Australia this is expected to reduce greenhouse gas emissions between 2005 and 2030 by over 46 million tonnes of carbon dioxide equivalents. Australian households' also reduced utility bills by an estimated total \$520 million AUD in 2013, rising to over \$2 billion AUD in 2030.

A summary of estimated savings in 2015 attributed to the WELS scheme is outlined in the table below:

	2013	2021	2030
<b>Annual water savings (GL/year)</b>	70	147	204
<b>Cumulative GHG reduction (MT CO<sub>2</sub>-e)</b>	5.5	20.4	46.4
<b>Annual household utility bill savings (\$m/year)</b>	520	1390	2063

## Challenges and lessons

A lesson learnt was that Australia could propose a New Work Item at ISO and lead on an international water efficiency standard. Standards Australia is currently the Committee Manager of ISO/PC 316

<sup>4</sup> Research can be accessed at (page includes links to PDF and Word versions): <https://www.waterrating.gov.au/about/review-evaluation/consumers>

*Water efficient products – Rating.* ISO/ PC 316 is currently considering a draft of an international standard based on Australia’s success with the domestic WELS standard.

Standards Australia has submitted a proposal for a new International Standard on water efficiency labelling with the help of Singapore, Malaysia, China, and New Zealand. This aims to further reduce domestic water wastage, support the government’s Water Efficiency Labelling and Standards (WELS) scheme, and make it easier for more economies to benefit from using water efficient products.

### **Benefits of an international standard**

The region has been very supportive of introducing an International Standard as this standard will assist their domestic governments and local industries reduce water use by implementing a proven water efficiency consumer labelling scheme. Australia and New Zealand’s schemes are closely linked, and China’s Water Efficiency scheme was developed based on workshops with Australia as part of an MOU on water between the two economies. Singapore and Malaysia share similarities in their schemes with Australia’s WELS scheme as well.

The international standard would facilitate formal harmonization and form the basis for an ISO label that will link individual domestic schemes into a system that consumers and business can understand, and one that applies in multiple economies. An international standard would also encourage development and marketing of water efficient products and enable consumers to clearly identify and purchase the best products in the industry, positively influencing manufacturing to improve the performance of their products through consumer power and information.

Potentially within scope are:

- Showers / showerheads and mixers
- Tap equipment / taps and mixers
- Flow controllers
- Lavatory equipment / Dual-flush low capacity flushing cisterns, sitting toilets and squat toilets
- Urinal equipment / urinal flush valves
- Dishwashers for household use
- Clothes washing machines for household use
- The dryer function of combination washer/dryers, where they use water
- to dry washing loads

Some specific benefits of an International Standard would be:

- Businesses will be encouraged to create more water efficient products and services, knowing this will be recognized and will therefore give them a market advantage.
- Governments can reduce urban water use by attaching an efficiency rating to water-using products. This can reduce or postpone the need for costly water infrastructure or can allow available water to service a greater number of people.
- Governments can also use water efficiency ratings to set minimum product standards again reducing urban water use without compromising services
- Consumers will be encouraged to be water-smart, to think about consumption and create demand pressures on businesses to develop water-efficient innovations and improvements.
- Business will be able to trade across borders with no restrictions and a consistent playing field for their exports, increasing competition and opening new opportunities.

## CANADA

### Introduction

The impacts and costs of climate change are being felt first-hand by communities in Canada and around the globe. Extreme weather events threaten people's safety, their health, their homes and their livelihoods. Individuals and communities pay for these impacts when they are forced to repair and rebuild homes and businesses after a flood or wildfire, when they pay higher insurance premiums, or through rising costs for food, health care or emergency services.

As investors, consumers, and governments increasingly base their decisions on environmental sustainability, taking climate action now is a critical economic opportunity that will maintain and create jobs, and make the global economy more resilient and more competitive. This is what economies around the world are already doing. We know that a cleaner economy will grow stronger and faster in an increasingly low-carbon global economy.

In Canada and around the world, clean technology companies are taking advantage of these opportunities by developing new innovative technologies and approaches. Canadian companies are creating electric transit buses, carbon-free aluminum, and low-carbon cement. These and other innovations are contributing to expand global markets and build strong international partnerships as the global economy transforms.

### Policy context

A price on carbon pollution is widely recognized as one of the most effective, transparent, and efficient policy approaches to reduce greenhouse gas emissions and stimulate clean growth. Carbon pollution pricing provides an incentive to reduce greenhouse gas emissions, stimulates investments in clean innovation, and encourages a competitive and prosperous economy as we transition to a low-carbon world. It creates a financial incentive for businesses and households to decide for themselves how best to reduce their emissions.

Carbon pricing is about recognizing the cost of pollution and accounting for those costs in daily decisions. For more than a decade, sub-central provinces in Canada have been taking action to mitigate the impacts of climate change by reducing greenhouse gas (GHG) emissions through carbon pricing.

- British Columbia's carbon tax came into effect in 2008, which applied to the purchase and use of fossil fuels.
- Alberta has been pricing carbon pollution since 2007 through several different regulatory approaches, most recently the *Technology Innovation and Emissions Reduction Regulation*, which took effect in 2020 with the goal of managing GHG emissions from large industrial emitters.
- Quebec introduced a cap-and-trade system in 2013, and officially linked its carbon pricing system with California in 2014.

Canadians understand that putting a price on carbon pollution spurs the development of new technologies and services that can help reduce their emissions cost-effectively, including through how they heat their homes and the kind of energy they use to do so. Implementing a price on carbon pollution also provides Canadians with an incentive to adopt these changes or solutions into their lives, and encourages everyone to pollute less, conserve energy, and invest in low-carbon solutions.

## Policy response and implementation

On December 9, 2016, the Pan-Canadian Framework (PCF) on Clean Growth and Climate Change was adopted to fight climate change, build resilience to the changing climate, and drive clean economic growth. This was Canada's first ever economy-wide climate change plan, which outlined over 50 concrete measures to reduce carbon pollution, with carbon pricing as a foundational pillar.

The Pan-Canadian Approach to Pricing Carbon Pollution implements the pillar under the PCF of putting a price on carbon pollution. It gives provinces and territories flexibility to develop their own carbon pollution pricing systems, while also outlining a set of minimum domestic stringency standards, known as the 'federal benchmark' that all pricing systems must meet. The goal is to ensure that carbon pricing applies to a broad set of emission sources throughout Canada with increasing stringency over time to reduce GHG emissions at the lowest cost to business and consumers.

In December 2020, Canada released a strengthened climate plan, *A Healthy Environment and a Healthy Economy*, which built on the Pan-Canadian Framework on Clean Growth and Climate Change. This plan continued to include a price on carbon pollution as a central element, and set a longer-term price trajectory. Under this plan, the carbon price will rise to CAD\$170 in 2030.

In 2021, Canada submitted an updated Nationally Determined Contribution under the Paris Agreement. Canada's 2030 target is to reduce emissions 40-45% below 2005 levels. In March 2022, Canada released its 2030 *Emissions Reduction Plan*, which details how that target will be met. Carbon pricing continues to be a foundational policy.

### The federal benchmark: a flexible approach to pricing

Since 2019, every jurisdiction in Canada has had a price on carbon pollution, either under a provincial pricing system that meets the federal benchmark, or through the federal carbon pricing system. If a province or territory decides not to price pollution, or proposes a system that does not meet the benchmark, the federal system is put in place. This ensures consistency and fairness across jurisdictions.

The federal carbon pricing system has two parts: a charge on fossil fuels, and a performance-based emissions trading system for industrial facilities, known as the Output-Based Pricing System. This system can be implemented in whole or in part in provinces and territories that request it, or that do not implement their own systems that meet the benchmark requirements.

Canada has updated the federal benchmark for 2023-2030 to ensure pricing systems continue to be effective. Changes in the benchmark aim to improve consistency and ensure that carbon pricing systems continue to drive emission reductions required to meet Canada's climate commitments and build a cleaner, more prosperous economy.

### Maintaining the price signal: why it makes sense to return funds

The Government of Canada does not keep any direct proceeds from the federal carbon pollution pricing system, where it applies. All direct proceeds from the federal system remain in the province or territory of origin in the following way:

- For those jurisdictions that have voluntarily adopted the federal system, direct proceeds from the federal carbon pollution pricing system are returned to the governments of those jurisdictions.
- In other jurisdictions where the federal system applies, the Government uses the vast majority of direct fuel charge proceeds to support households through direct payments, known as Climate Action Incentive payments.

- The remaining fuel charge proceeds are used to support key sectors and populations including trade-exposed small businesses, farmers and Indigenous groups.
- Proceeds from the federal system for large industrial emitters will be returned via a merit-based program focused on reducing emissions from industrial facilities and supporting grid-greening projects in the electricity sector.

The Government of Canada has made affordability a priority, in particular for low income and vulnerable households. Proceeds can be used very successfully to address affordability concerns. The current approach used for the federal pricing system results in the majority of households receiving more in payments than they face in costs due to carbon pricing. The federal Climate Action Incentive provides a 10% top up for eligible individuals and families who live outside a census metropolitan area, as defined by Statistics Canada.

In addition to the Climate Action Incentive payment, the Government of Canada is also directing a dedicated portion of proceeds to Indigenous communities through a co-developed approach. Canada also uses a portion of proceeds to support business competitiveness for trade-exposed small businesses, whose competitors may not face similar carbon costs.

The carbon price signal drives emission reductions in carbon pricing systems. By putting a price on pollution, households, and businesses have an incentive to choose lower or zero emitting alternatives.

### Impact and Lessons

As noted in the *Pan-Canadian Approach to Pricing Carbon Pollution: Interim Report 2020*,<sup>5</sup> carbon pricing is a powerful tool to reduce GHG emissions, keep costs low, and to drive innovation. It further detailed how “while an uneven global policy environment creates a risk of carbon leakage and competitiveness concerns for EITE sectors, the tools and policies used to date in existing carbon pricing systems appear to have successfully addressed this risk.”

Canada’s approach, in which carbon pricing revenue remains in the province or territory of origin, prioritizes affordability through Climate Action Incentive payments. This approach allows the majority of households, especially low-income households, to be better off. Two independent studies have found that the federal approach to revenue return results in progressive outcomes that disproportionately benefit lower income households.

Analyses by Canada’s Parliamentary Budget Officer (PBO) have repeatedly found the government’s carbon pricing revenue approach to be progressive. In a February 2020 report, the PBO found federal pricing revenue returns to be progressive, with lower income households facing lower net costs than higher income households, as these households generally have lower energy consumption but receive the same payments.<sup>6</sup> A 2022 update of the analysis reconfirmed that households will receive more in payments than they face in direct costs due to carbon pricing.<sup>7</sup>

Similar results have been found in other independent analyses of Canada’s revenue approach. A June 2021 report from the Smart Prosperity Institute found that when lump-sum (i.e. like Climate Action Incentive) payments are used as the revenue return approach within a province or territory, nearly all low-income households are better off. Other approaches, including income tax reductions and cuts to provincial sales tax, were found to be less beneficial to lower income households. The report provided additional descriptive evidence that the household carbon costs generally increase with income, due to higher levels of consumption of carbon intensive goods, leading to progressive impacts from the policy even before revenue is returned through payments. The report also found that the implementation of the carbon pricing system for large industrial emitters, which reduces average costs for energy-intensive

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<sup>5</sup> Environment and Climate Change Canada, *Pan-Canadian Approach to Pricing Carbon Pollution: Interim Report*, 2020.

<sup>6</sup> Parliamentary Budget Office, Review the fiscal and distributional analysis of the federal carbon pricing system, 2020.

<sup>7</sup> Parliamentary Budget Office, A distributional analysis of federal carbon pricing under a health environment and a health economy, 2022.

and trade-exposed industries, reduced the financial burden on households by decreasing the carbon costs that industry passed on to customers.<sup>8</sup>

These reports show how carbon pricing in Canada has been designed to help support lower income households while simultaneously incentivising behavioural change, ensuring an equitable approach to decarbonisation.

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<sup>8</sup> Smart Prosperity Institute, [Carbon pricing costs for households and progressivity of revenue recycling options in Canada](#), 2021.

## CHINA: PRACTICES FOR SUPPORTING MSMEs AMID COVID-19

Micro-, small and medium-sized enterprises (MSMEs) play an important role in China's economy. According to the latest statistics, at the end of 2018, 18.07 million market entities in China were MSMEs, accounting for 99.8% of all enterprises; 233.004 million people were employed by MSMEs, accounting for 79.4% of the total enterprise employees; the assets of MSMEs reached RMB 402.6 trillion, 77.1% of the total enterprises' assets; 68.2% of all turnover came from MSMEs, totaling RMB 188.2 trillion.

MSMEs have faced enormous pressure to survive since the outbreak of COVID-19. After the Spring Festival holiday of 2020, more than 20 provinces and municipalities including Hubei, Hunan, Guangdong, Shandong, and Shanghai delayed the resumption of business. Production and operation were suspended and businesses' income and cash flow were interrupted due to the postponement of the resumption of business. While facing difficulties in fulfilling orders and contracts as well as drained cash flow, companies had to pay rigid costs such as rent, wages, and interest. MSMEs, being smaller and less resilient, were particularly affected. Newly registered market entities declined sharply in Q1 2020. In 2020, the profits of medium-sized and small businesses decreased on a year-on-year basis by 30.0% and 37.4%, respectively, much bigger than in 2018 and 2019. Due to Sporadic outbreaks, MSMEs were threatened by increasing adverse factors, including rising raw material prices, shrinking orders, extended accounts receivable cycles, difficult and expensive employment, as well as power outages and limits in certain areas.

### Policy response and implementation

To deal with the impact of the COVID-19 on small and medium-sized enterprises (SMEs) and foster stable economic recovery and growth, based on the APEC Putrajaya Vision 2040, China has launched a package of bailout measures that help MSMEs overcome difficulties, boost innovation, and improve the business environment.

**First, China has increased its support for MSMEs struggling with difficulties.** The bailout measures cover taxation, finance, employment, and industry development, etc. For example, a temporary large-scale tax and fee reduction policy was implemented to exempt or reduce value-added tax for small taxpayers. The government has reduced the financing costs of MSMEs by lowering down the Required Reserve Ratio, offering medium-term lending facility (MLF) loans, launching a refinancing and rediscounting scheme, and innovating monetary policy instruments that directly support the real economy. There is a significant growth in inclusive loans to micro and small businesses, and the amount of credit loans and proportion of first-time borrowers are on the rise. The business loan rate from January to April 2022 was 4.39%, which was 0.25% lower on a year-on-year basis and remained at a relatively low level among available statistics. The government offers financial support to companies affected by COVID-19 through providing interest subsidies for businesses and for guaranteed startup loans, as well as reducing guarantee and re-guarantee fee rates. A portion of small and micro-sized businesses in the service industry, as well as individual industrial and commercial households, have been granted temporary rent concessions. More efforts have been made to help companies keep their payroll stable and create new jobs. To stabilize employment, RMB 100 billion of unemployment insurance fund was refunded in 2022. Targeted measures have been introduced for the most affected areas in the industrial and service sectors.

**Second, China has taken various measures to support MSMEs' innovative development.** Digital transformation, "development of specialization and innovation", building first-class companies, and "going global" are the main directions for enhancing the competitiveness of MSMEs. The government implemented the Action Plan for Digital Transformation Partnership, and the Special Action for Digital Empowerment of SMEs, etc. to promote the research and development of key technologies and products for digital transformation, and to establish a cross-industry digital ecosystem that integrates the

upstream and downstream of the industrial chain. The echelon of high-quality companies has been further improved, including innovation-driven SMEs, "specialization and innovative" SMEs, "little giants", and champion companies in specific manufacturing fields. The government has been helping SMEs explore both domestic and international markets. By launching a batch of new comprehensive cross-border e-commerce pilot areas and rolling out overseas promotion plans for Chinese cross-border e-commerce companies, the government guides SMEs to achieve global presence through cross-border e-commerce.

**Third, a more favorable environment has been created for MSMEs.** More efforts are being made by the government to streamline administration, delegate power, improve regulation, and upgrade services. A better development environment has been created for companies as market-oriented allocation of production factors is being improved, business-related services optimized, and regional barriers removed. The "action for improving the certification of quality management system for small and micro-sized enterprises" is being vigorously implemented across the economy. In areas such as factor acquisition, access permits, business operations, government procurement and bidding, obstacles and hidden barriers that hinder market competition have been eliminated. The direct financing support system for private companies has been improved, as has the long-term mechanism for eliminating and preventing payment delays for private SMEs.

### Policy impact

The relevant policies have been landed in an orderly manner, bringing tangible benefits to MSMEs, effectively protecting market players, and unleashing market vitality.

**First, the number of market entities continues to grow.** Despite a decline in Q1 2020, market entities have been on the rise since Q2. Newly registered market entities increased, while a decline was observed in the number of businesses that had their licenses revoked or cancelled. In 2020, 25.021 million new market entities were registered in China. By the end of 2021, the total number of Chinese market entities had reached 154 million. A total of 28.872 million new market entities were registered in 2021, a year-on-year growth of 15.4%.

**Second, tax and fee reductions continue to expand.** Small taxpayers are temporarily exempt from value-added tax. In 2020, the premiums of basic pension insurance, unemployment insurance, and work-related injury insurance payable by companies were temporarily reduced or exempted, and contributions of companies to employees' medical insurance were halved. In 2020 and 2021, burdens of over RMB 2.6 trillion and 1 trillion were relieved for market entities, respectively, thanks to newly reduced taxes and fees.

**Third, financial support has been significantly strengthened.** For the first time ever, the total loan balance of Chinese banking financial institutions for small and micro-sized enterprises exceeded RMB 50 trillion at the end of 2021, which included loans for small and micro-sized enterprises, loans for self-employed, and loans for small and micro-sized business owners.

**Fourth, MSMEs are now operating well and enjoy good prospects.** China Association of Small and Medium Enterprises (CASME) reported that the development index of Chinese SMEs in January 2022 was 89.4, marking a month-on-month increase of 0.2% on a comparable basis. The index has risen for three consecutive months.

### China's experience

In the process of coordinating COVID-19 response and economic development, the Chinese government has managed to bail out a number of MSMEs. China's experience is threefold. **The first key is high-level attention and interdepartmental coordination.** Since the outbreak of COVID-19, Chinese leaders have repeatedly stated that SMEs can accomplish great things. The leadership stressed that a greater emphasis should be placed on helping industries in need as well as MSMEs, and

supporting corporate innovation; a batch of "specialization and innovative" SMEs should be fostered; and as long as the 100 million market entities are secured, the foundation won't be shaken and the future is still bright. As a result of the leadership's attention, government departments work together to create a multifaceted policy system that covers government and private finance, employment, innovation, and the environment. **The second key is to boost the competitiveness of enterprises.** Seizing the opportunities of the new round of science and technology revolution as well as industrial transformation, the Chinese government vigorously develops the digital economy, supports the digital transformation of MSMEs, develops "specialization and innovative" MSMEs, and continuously strengthen their core competitiveness so that they can "go global". **The third key is to unleash market potential.** Enterprises eventually thrive on the endogenous development momentum triggered by positive market competition. Staying market-oriented, the Chinese government strives to foster a market-oriented, world-class business environment governed by a sound legal framework so as to bring domestic rules in line with international ones and provide efficient domestic reforms.

## INDONESIA: REDUCING CARBON EMISSION THROUGH JOINT CREDITING MECHANISM

### Introduction

A concern on climate change was widely echoed in 2015 when 196 parties across the globe agreed to limit global warming to well below 2 degrees Celsius under the Paris Agreement. The COVID-19 pandemic seemed to accelerate this issue. The JP Morgan Report in 2020<sup>9</sup> stated that 71% of respondents claimed that it was "rather likely", "likely", or "very likely" that the occurrence of a low probability/high impact risk, such as COVID-19, would increase awareness and actions globally to tackle high impact/high probability risks such as those related to climate change and biodiversity losses.

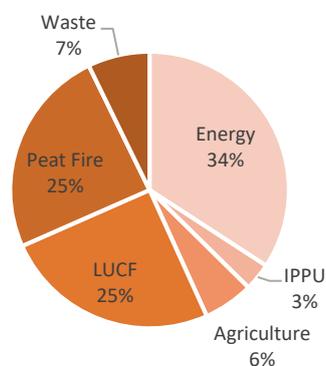
Indonesia also entered into the Paris Agreement as stipulated on Law Number 16/2016<sup>10</sup> and committed to reduce its greenhouse gas (GHG) emissions as stated in Indonesia's Determined Contribution (NDC) target. Indonesia targets GHG emission reduction of 29% (unconditional) and up to 41% (conditional) compared to business as usual in 2030. Through Long Term Strategy for Low Carbon and Climate Resilience 2050 (LTS-LCCR 2050), Indonesia will further increase the target to 540 Mton CO<sub>2e</sub> by 2050, followed by net-zero emission in 2060 or sooner (Government of the Republic of Indonesia, 2021).

To achieve the target, the government has set up five priorities for low carbon development as stipulated on the Medium-Term Development Plan (RPJMN) 2020-2024 (Yoshio, 2021). These include: (1) the development of sustainable energy facility in order to achieve 23% renewable energy (EBT); (2) restoration of peatlands (330,000 ha per year) as well as improvement of forest and land cover (420,000 ha per year); (3) waste management target of 339.4 million tons in five years; (4) the development of the green industry with 10% of medium and large corporates are targeted to obtain green industry-standard certification; and (5) low carbon program in coastal area and sea through recovering 50,000 ha of mangrove and coastal ecosystems.

### Pre-reform Situation

Based on GHG and MPV Inventory Report 2020 by the Ministry of Environment (2021), Indonesian GHG emissions have increased by 0.68 GtCO<sub>2e</sub> during 2000-2019. In 2019, the GHG emission reached 1.87 GtCO<sub>2e</sub>. The breakdown of GHG emission (**Figure 1**) revealed a significant contribution of the forestry sector in GHG emission (peat fire and LUCF – Land-use Change and Forestry) of 50%, the highest, followed by the energy sector of 34%, respectively.

**Figure 1. Indonesia GHG emissions in 2019**



Source: Ministry of Environment, 2021.

**Table 1. Top 10 emitters in 2008 vs. 2018 (% annual share)**

Economy	2008	2018	Comment
China	19.7	23.9	Worsened
United States	14.5	11.8	Improved
European Union (27)	8.9	6.8	Improved
India	5.4	6.8	Worsened
Brazil	4.7	2.9	Improved
Russia	4.0	4.1	Worsened
Japan	2.6	2.4	Improved
Indonesia	2.5	3.5	Worsened
Germany	2.1	1.6	Improved
Iran	1.6	1.7	Worsened

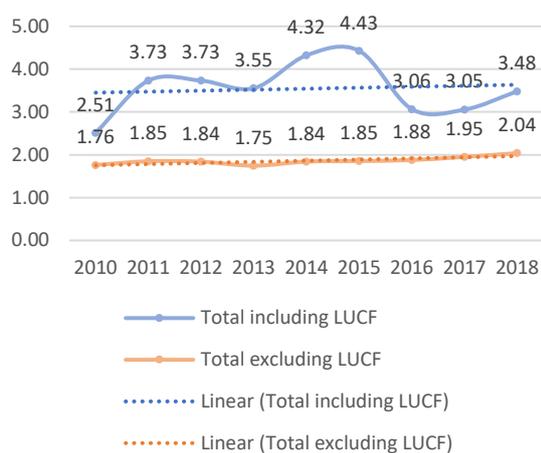
Source: Climate Watch, 2022.

<sup>9</sup> JP Morgan. (2020). Why COVID-19 Could Prove to be a Major Turning Point for ESG Investing

<sup>10</sup> Ratification of the Paris Agreement to the United Nations Framework Convention on Climate Change.

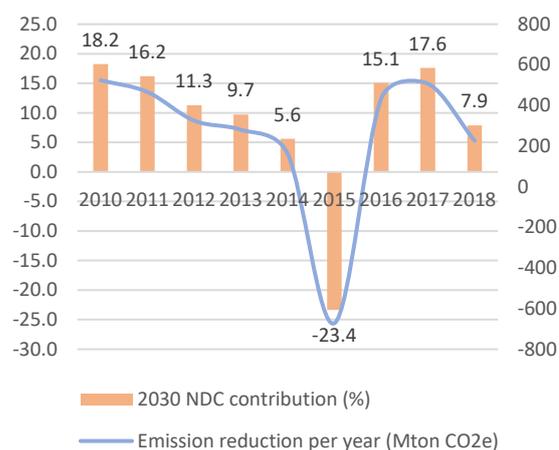
Indonesia is included in the ten most significant contributors of GHG emissions in the world (**Table 1**). In 2018 Indonesia was placed in the 6<sup>th</sup> position, and the trend was worsened compared with the previous decade. Although the share declined from its peak of 4.4% in 2015 (El Niño became one of the main culprits for high emission during 2015 because it caused a devastating fire in the forest), the trend was worrying. This implied that many initiatives need to be in place to reduce GHG emissions in Indonesia.

**Figure 2. Annual Share of GHG Emissions (in %), 2010-2018**



Source: Climate Watch, 2022.

**Figure 3. Contribution of GHG Emission Reductions to NDC Target, 2010-2018**



Source: Ministry of Environment, 2020.

## Policy Reform and Implementation

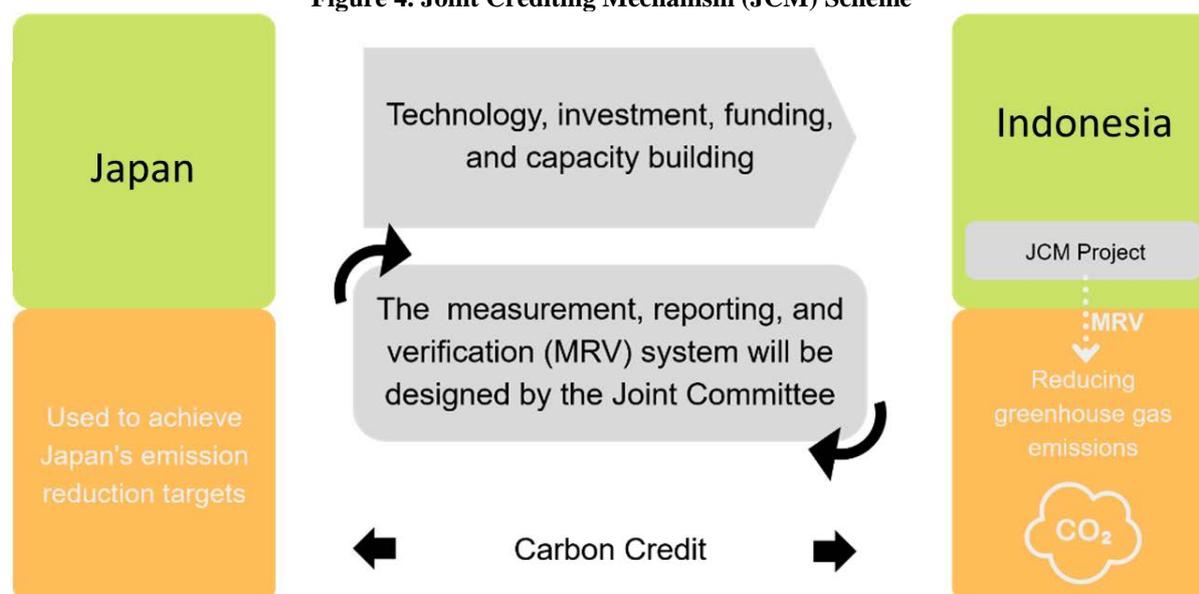
Being one of the significant contributors to GHG emissions in the world, Indonesia is expected to be one of the world leaders in reducing emissions. Boston Consulting Group (BCG) estimates that Indonesia could achieve a value between USD4-6 billion by 2030 through its voluntary carbon credit market (Oehling & Schmidt, 2021).

One of the main challenges for Indonesia to support the NDC target is the lack of funding. The Ministry of Environment and Forestry estimated that around IDR343 trillion spending is required per year to meet the objective, of which the government budget can cover only 34%. Therefore, Indonesia needs to promote international collaboration to fill the gap.

Before the Paris Agreement, Indonesia has established cooperation with Japan to promote energy efficiency, renewable energy, forestry deforestation or degradation, construction, waste management, fugitive emission, and manufacturing industry through the Joint Crediting Mechanism (JCM) signed in August 2013. This bilateral collaboration could be considered part of Indonesia's 41% GHG emission reduction target with international support.

The JCM is Indonesia's most progressive market-based mechanism and climate change mitigation activity. It includes technology transfer, a green investment, and low-emission development. It seeks to encourage the private sector to engage in low-carbon development by providing incentives from Japan. JCM also plays a crucial role in decreasing GHG emissions through measurable and verified mitigation measures to contribute to the United Nations Framework Convention on Climate Change's (UNFCCC's) primary goals by facilitating global GHG emission-reduction measures.

Figure 4. Joint Crediting Mechanism (JCM) Scheme



Source: JCM Secretariat Indonesia, 2021.

There are several funding schemes available under the JCM scheme, namely:

- **JCM Model Project:** a funding scheme from the Ministry of Environment of Japan, in a maximum capital subsidy of up to 50% from low-carbon projects. It includes funding for facilities, equipment, transportation, and facility construction. Financing under this scheme must complete the project no later than three years from the time the subsidy is given.
- **Japan Fund for JCM (JFJCM):** a collaboration between the Ministry of Environment of Japan and the Asian Development Bank (ADB) offers financial incentives to adopt advanced low-emission technology but is high in cost. In 2021, the budget *provided* for JFJCM reached JPY1 billion (approx. USD10 million). The scheme can be given to government projects (sovereign projects) or private projects (non-sovereign projects).
- **Demonstration Project:** sponsored by the Ministry of Economy, Trade, and Industry (METI) and carried out by the New Energy and Industrial Technology Development Organization (NEDO), this project provides goods to the host economy as a demonstration of low-carbon technology implementation. One of the prerequisites under this program is a Memorandum of Understanding (MoU) between the NEDO party and one of the Indonesian Government institutions for each project.

Post Paris Agreement, the JCM scheme has gained a more important role in assisting partner economies in reducing emissions through the diffusion of decarbonizing technologies, products, systems, services, and infrastructure, while at the same time promoting sustainable development. As voluntary cooperation between economies, JCM has supported economies in using internationally transferred mitigation outcomes (ITMOs), which complies with Article 6.2 Paris Agreement (Carbon Market Express, 2022).

One of the breakthrough projects under collaboration with JCM is the Waste Heat Recovery Utilization project, a partnership between PT Semen Indonesia and JFE Engineering Corporation. According to JCM Indonesia Secretariat, this project has the potential to reduce GHG emissions by 149,063 tCO<sub>2</sub> per year (the highest potential decrease compared with other JCM projects). Semen Indonesia built an IDR638 billion power plant that utilizes energy sources from exhaust gas with an average capacity of 28 MW. The company then saved 152 million kWh per year in power use and IDR120 billion in electricity costs by constructing its plant's Waste Heat Recovery Power Generation (WHRPG) facility

(Detik Finance, 2014). In addition to lowering power expenses, the building of the WHRPG demonstrates that the Semen Indonesia Group is an eco-friendly company.

### **Impact**

As of 2019, 12 projects in Indonesia have issued carbon credit under the JCM scheme. The total carbon credit issued was 56,254 tCO<sub>2</sub> from registered projects. There was no additional carbon credit in 2020 and 2021 due to delays in project validation and verification due to the COVID-19 pandemic. The share for Indonesia is 34.99%, while the remaining is for Japan.

In terms of annual potential emission reduction, it is estimated to be less than 1 million tCO<sub>2</sub>. Even though it is relatively small compared with Indonesia's GHG emissions per year, the trend is expected to improve further in the future. The number of projects under the JCM scheme has continued to grow while potential projects are in the pipeline.

Implementation of JCM projects has successfully gathered more than USD128 million, whereas around USD51 million is a grant from Japan. It is an achievement for Indonesia as the JCM scheme becomes the market-based mechanism for emission reduction with the strongest growth domestically. Compared with the other 16 host economies under the JCM scheme, Indonesia is the leading economy in JCM development, with 23 projects registered and 12 projects issued carbon credit (JCM Indonesia Secretariat, 2021).

Furthermore, Indonesia is reported to gain significant technical experiences and expertise by participating in the JCM. It is also relevant when seeking to operationalize Article 6.2 (ADB, 2021). Positive impacts resulting from the JCM scheme are: (1) new technology penetration, as companies work under the JCM scheme will learn the application of new technology to support green economy (2) technology replication. Solar Sel at Sport City Jakabaring Palembang is one of the good examples of how the company replicated the technology adopted in one of their projects to another project and (3) role model for green technology to encourage companies to invest in green technology.

### Challenges and Lessons

Pandemic COVID-19 has brought a challenge in terms of project implementation. Some delays occurred concerning project validation, verification, and engineer availability. Another challenge is the implementation of article 6 Paris Agreement, which requires the corresponding adjustment to avoid double counting/double claiming of emission reduction.

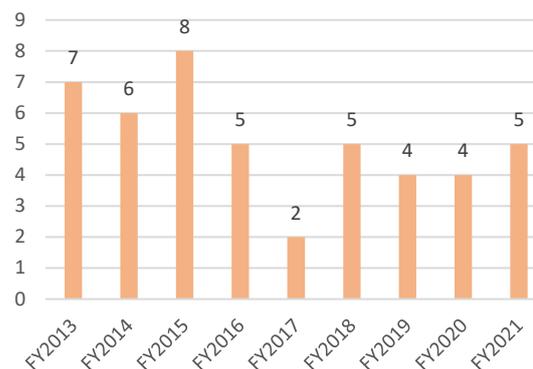
In addition, challenges remain with regard to the availability of qualified human resources for reporting requirements and the asset transfer for BOT projects. Furthermore, procurement issues for projects involving SOEs or regional governments and the expensive fees charged by electricity company have also affected the feasibility study for projects related to energy efficiency.

While the above challenges can be handled through a series of negotiations and discussions, a robust vision and strategy are crucial for JCM to be accepted globally and sustainably. Meanwhile, the number of projects under JCM collaboration is expected to increase further, thus supporting both economies' commitment to reducing GHG emissions. Through bilateral, regional, and international market mechanisms that facilitate and expedite technology development and transfer, technical cooperation, and access to financial resources, Indonesia will achieve its NDC target by 2030.

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**Figure 5. Number of Active JCM Financed Project by Fiscal Year**



Source: IGES, 2021.

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## **JAPAN: THE GREEN GROWTH STRATEGY THROUGH ACHIEVING CARBON NEUTRALITY IN 2050**

### **Introduction**

*Briefly explain the economy's economic context, including the impact of the economic shock to be the focus of the case study, and the relevant sector/s to be covered by the case study.*

Climate change is a threat to the basis for socio-economic activities due to climate change and is one of the long-term economic shocks that must be overcome by the entire world, including Japan. Global warming, in particular, is progressing in every part of the world, and in Japan the average temperature has been rising at a rate of 1.26 degrees Celsius (°C) per century, while frequency of short-duration heavy rainfall exceeding 50 mm per hour has been increased by about 1.4 times in the last 30 to 40 years.

Under these circumstances, the Japanese government is promoting countermeasures against climate change not only to ensure the safety and security of its citizens, but also as part of its growth strategy. In October 2020, the government announced its aim to achieve carbon neutrality by 2050, (i.e., net-zero greenhouse gas emissions), while focusing on a “virtuous circle of economy and environment” as a pillar of its growth strategy. In June 2021, the “Green Growth Strategy Through Achieving Carbon Neutrality in 2050”, a specific implementation plan for this activity, was formulated.

Through the Green Growth Strategy, the government set high goals for the thus-determined industries (14 industrial fields) that are expected to grow, including energy-related industries such as next-generation renewable energy, transport- and manufacturing-related industries and lifestyle-related industries. At the same time, the government mustered all possible and necessary policies to achieve the targets for each sector, including budget, taxation, finance, regulatory reforms/standardization and international cooperation. By implementing measures in line with this Strategy, the government would aim to encourage bold investment and green innovation by the private sector and realize the 2050 Carbon Neutrality and a “positive cycle of economic growth and environmental protection”.

### **Pre-reform situation**

*Briefly describe the situation before the structural reform including what relevant institutional arrangements and policies were in place in the economy as a whole and in the affected sector/s. Describe how a need for structural reform was identified, and what benefits were expected to arise from the reform.*

Addressing climate change has generally been considered as cost or constraint to economic growth. Meanwhile, in the “Green Growth Strategy”, newly formulated this time, the government shifted the conventional mindset and considered the countermeasures against climate change as a great opportunity for further prosperity. Taking measures positively to tackle climate change will be expected to lead to transformation in the industrial structure and social economy, and leads to the next strong growth (realization of a “positive cycle of economic growth and environmental protection”).

## Policy response and implementation

*What structural reforms and policies were implemented to respond to the economic shock?*

- *What factors related to the shock, or weaknesses revealed by the shock, drove the choice of the policy eg market-based, regulation, information instruments?*

As countermeasures against climate change, the government has set a policy target of carbon neutrality by 2050. At the same time, it has decided to shift the conventional mindset towards countermeasures against climate change, from constraint or cost to the economic growth to a great opportunity for further prosperity which drives green innovation in companies operating in the various related industries.

- *What were the tradeoffs involved in selecting the structural reform policy?*

Promotion of green innovation in companies is expected to have a certain degree of negative impact on related industries, such as increased costs for human resource development and employment adjustment associated with the creation of new products/services and the transformation of the industrial structure. In order to minimize these negative impacts, the government will also implement human resource development policies aimed at steady job creation, such as the use of subsidy systems that promote companies' recruitment of human resources and investment in human resources, the use of education and training benefit systems, and the improvement of the environments of regional vocational training institutions, while taking into account the needs of companies.

- *What methods were used in their implementation, including planning, sequencing, monitoring, evaluation, coordination between central government and local government, partnership between the private and public sector and cross-border alignment?*

- **Formulation of Action Plans:** For each of key areas essential to achieving Carbon Neutrality by 2050, an “action plan” under the framework of the Green Growth Strategy will be formulated that includes (1) targets with clearly defined time limits, (2) R&D and demonstration, (3) regulatory reform, standardization, and other institutional improvements, and (4) international collaboration. In the action plans for important fields, the current status, issues, and future action policies in the relevant fields should be clearly indicated, and a process chart with a time axis up to 2050 should be presented. Relevant policies shall prioritize creation of demand through regulatory reform/standardization and financial market, and price reduction through expansion of private investment.
- **Major Cross-cutting Policy Tools:**
  - **Budget:** the government has established a 2 trillion yen “Green Innovation Fund”.
  - **Tax systems:** the government will establish tax treatments to induce private investment toward decarbonization in order to cultivate new demand through early marketing of products with large greenhouse gas reduction effect, or to promote decarbonization of production process currently in use.
  - **Financing:** Toward decarbonization, it is important for the government to draw in private investment for renewable energy, energy transition and green innovation. Thus, the government will promote green bonds, transition finance and innovation finance.
  - **Regulatory reform and standardization:** The government will improve domestic regulations and systems by strengthening regulations so as to create demand for

new technologies and rationalizing regulations that were not designed for new technologies. It will also actively work on international standardization and other measures to facilitate the use of new technologies contributing to carbon neutrality worldwide. In addition, economic methods that use market mechanisms (e.g., carbon pricing), will be studied.

- **International cooperation:** The government will enhance international cooperation for decarbonization. It will promote cooperation with major economies in innovation policies and support for emerging economies, while supporting voluntary efforts to accelerate energy transitions in Asia and other emerging economies.
- **Promoting university initiatives:** The government will develop education and research systems at universities to realize carbon neutrality. It also promotes cooperation between universities and local communities, as well as the use of investments in university-launched ventures.
- **World Exposition in Japan:** Using the opportunity of the 2025 World Exposition in Japan (Osaka/Kansai Expo), the government will work on demonstrating innovative technologies, etc.

- *What was the role of macroeconomic and microeconomic policy?*

(Micro policy) The various policy tools described above will be used to promote green innovation in the private sector.

- *What and who are the targets and/or beneficiaries of the structural reforms and policies?*
  - The Japanese government aims to achieve the 2050 Carbon Neutrality. To achieve this, the government has established Action Plans in the important industrial fields as described above, and set out the current status, issues, future action policies and targets in each field.
  - Key industrial fields (14 fields listed): (1) Offshore wind, solar and geothermal industries (next-generation renewable energy); (2) Hydrogen and fuel ammonia industry; (3) Next-generation heat energy industry; (4) Nuclear industry; (5) Automobile and battery industries; (6) Semiconductor / information and communication industry; (7) Shipping industries; (8) Logistics, people flow and civil engineering infrastructure industries; (9) Food, agriculture, forestry and fisheries; (10) Aircraft industry; (11) Carbon Recycling and material industry; (12) Housing and building industry and next generation power management industry; (13) Resource circulation-related industries; (14) Lifestyle-related industries.
  - The benefits of this reform have a far-reaching impact on industry, individual companies and people's lives. For example, the reform will boost green growth of companies by encouraging the development of new products/services. It will also bring many benefits to people's lives, such as lower energy prices through the promotion of energy efficiency and renewable energy, and improved safety and convenience in mobility through the popularization of fuel cell vehicles and others.
- *What are the possible risks the policy may pose?*
  - As described in the “trade-offs” question above.

- What green policy reforms were implemented to respond to the economic shock?
  - As described in the “policy tools” question above.
- Who are the beneficiaries of these green economy reforms?
  - As described in the “benefits of structural reforms” question above.

## Impact

What were the environmental, economic, health and social impacts of the structural reforms and policies?

- How and to what extent did they assist sectors, regions, economic actors and groups of the population affected most by the economic shock?

As the Green Growth Strategy has just been formulated in June 2021, it is difficult to specifically assess its impact at this stage. On that basis, as explained in III, the Green Growth Strategy will aim to provide full support to private companies in conducting their forward-looking challenges such as a bold investment to make innovation in 14 key industrial fields. Thus, it will bring a wide range of benefits across industries, individual companies and people's lives. Through this Strategy, the government musters all possible and necessary policies to achieve the targets for each sector, including budget and taxation. For example, the government's 2- trillion-yen budget will be expected to be used as pump priming to induce private companies to invest approximately 15 trillion yen in R&D and equipment, and to move toward ambitious innovation

- *What were the costs and how were they distributed?*
  - The government will support companies' development and introduction of key technologies in each key sector, depending on its phase; a “Research and Development Phase,” a “Demonstration Phase,” an “Introduction and Expansion Phase,” and an “Autonomous Commercialization Phase.”
- *How was the transition managed, especially for those adversely affected?*
  - As mentioned in III2 above, the government will support companies to stably secure human resources and invest in human resources, etc., in order to minimize the negative impact of promoting green innovation on employment.
- *How and to what extent did these reforms support a green recovery?*
  - The Green Growth Strategy is a set of industrial policies that bring changes in the industrial structure and socio-economy, which in turn will lead to next strong growth (realization of a “positive cycle of economic growth and environmental protection”), by considering countermeasures against climate change as a great opportunity for further prosperity as well as by taking measures positively to tackle climate change.
- *What is the long-term outlook, and how did these reforms contribute to building resilience against subsequent shocks, including COVID-19, or how will they contribute to resilience against future shocks? Please provide data and statistics as necessary.*
  - The government will increase energy resilience in line with the Green Growth Strategy. For example, the use of renewable energy and decarbonized fuels such as hydrogen and ammonia, and the capture and reuse of carbon dioxide will be promoted to ensure a stable energy supply.

- Through such diversification of energy sources, the government will aim to achieve carbon neutrality and secure a stable and affordable supply of energy.

### **Challenges and lessons**

*What were the successes and challenges in the implementation of the structural reform?*

- *What steps were taken to manage the challenges?*
  - The government has analyzed the current status and issues of key sectors, and formulated a process chart with targets to be achieved and actions to be taken by 2050. The contents of this process chart will be reflected in the “Growth Strategy Action Plan” that was decided in June 2021, of which the progress will be followed up and the contents and areas will be examined on an ongoing basis.
- *How was social license to support the reforms managed?*
  - Not applicable.
- *How and to what extent did the shock itself facilitate structural reform?*
  - The Green Growth Strategy was formulated to address climate change, which is one of the long-term economic shocks to be overcome worldwide. The Strategy aims to achieve carbon neutrality in 2050 and a realization of “positive circle between economic growth and environmental protection”, by seeing countermeasures against change as an opportunity for economic growth as well as by taking measures positively to tackle climate change.
- *How dependent was the structural reform on the successful implementation of other policies?*
  - As mentioned above, the Green Growth Strategy is a set of all possible and necessary policies to be mobilized such as budget, taxation, finance, regulatory reforms/standardization and international cooperation in a wide range of areas to realize the 2050 Carbon Neutrality and a “virtuous circle between the economy and the environment”. It is therefore important to effectively and comprehensively implement these various policies according to the specific characteristics and circumstances of the sector.
- *What opportunities did the reform create and make available for the economy?*
  - The government will provide fully support to private companies in conducting their forward-looking challenges, such as a bold investment to make innovations in a wide range of key industrial fields, such as technological development, energy diffusion and overseas expansion in energy-related industries such as offshore wind power, next-generation solar energy, geothermal, hydrogen and fuel ammonia. In addition, decarbonization and electrification in the automobile storage battery industry as well as technology promotion and cost reduction in the resource recycling industry will be promoted.
- *Did the structural reform accelerate policy change in other areas of the economy by breaking down barriers for other reforms?*
  - Not applicable.

- *Did reform in other areas of the economy have beneficial or damaging effects on the environment as a side-effect, or reinforce or diminish the impacts of the structural reform?*
  - Not applicable.
- *Are there residual barriers to full implementation of the policies?*
  - Not applicable.
- *What assistance or partnerships will be beneficial moving forward?*
  - The government is working in cooperation with various industries to promote green innovation in companies. At the same time, it is also acting in close cooperation with financial institutions and local communities.
- *What lessons were learned for future reforms?*
  - We learnt that it is important to change the conventional mindset. That is, countermeasures against climate change are not considered as a constraint or cost to the economic growth, but a great opportunity for further prosperity.

## NEW ZEALAND: CASE STUDY ON CLIMATE-RELATED DISCLOSURES

### Introduction

1. Businesses face two types of risk in relation to climate change:
  - a. Risks relating to the physical impacts, through longer term shifts in climate patterns, and more frequent and severe extreme weather events.
  - b. Risks related to the transition to a lower-carbon economy, including litigation or legal risks, technology risks, market risks through changes in supply and demand, and consumer and community reputation risks.
2. However, because climate change is taking place at relatively slow pace, it has not created the sense of urgency required for the risks to be adequately factored into business, investment, lending and insurance underwriting decisions, leading to incorrect valuations of assets and liabilities and failure to take account of transition risks. Without intervention, the problem could become too acute, have had too much impact, or be too late to reverse. Taking action now means we can smooth the transition to a low emissions economy, reducing the potential for sudden, drastic economic shocks.
3. Driven by the above concerns, in 2015, the Financial Stability Board (an international body that monitors and makes recommendations about the global financial system) established the Task Force on Climate-related Financial Disclosures (**TCFD**) to develop a standardised framework to help public companies and other organisations disclose climate-related risks and opportunities.
4. The TCFD's final report<sup>11</sup>, published in June 2017, structured its recommendations around the four thematic areas that represent the core elements of how organisations operate: governance, strategy, risk management, and metrics and targets. The TCFD has recommended 11 sets of disclosures under these four pillars.



### Pre-reform situation

5. There was very little transparency about climate risks in New Zealand at the time the TCFD report was published in 2017. Most organisations published no information about their climate risks.

<sup>11</sup> Recommendations of the Task Force on Climate-related Financial Disclosures, June 2017, <https://assets.bbhub.io/company/sites/60/2020/10/FINAL-2017-TCFD-Report-11052018.pdf>

Climate-related information that was made public was not easy to find and incomplete. Disclosures could not be compared because there was no consistent basis for reporting.<sup>12</sup>

6. The TCFD recommendations and guidance material have created opportunities for organisations to make useful climate disclosures. Some New Zealand organisations have started voluntarily publishing TCFD reports, notably businesses that operate in the energy and banking sectors.

### Policy response and implementation

7. In September 2020 the New Zealand government announced its intention to require significant financial sector organisations to report on climate risks and opportunities. In October 2021, Parliament passed the Financial Markets (Climate-related Disclosures and Other Matters) Amendment Act. The Act will require approximately 200 organisations, comprising large listed issuers, banks, insurers, and investment scheme managers to disclose climate-related information.
8. The Act provides for disclosures to be made in accordance with standards issued by the External Reporting Board (**XRB**), which is responsible for issuing financial reporting, and auditing and assurance standards. The XRB is currently developing a Climate-related Disclosure standard (**NZ CS 1**) based on the TCFD Recommendations.<sup>13</sup> The XRB's timeline for developing NZ CS 1 and accompanying documents appears below.



9. Under this timeline, it is expected that NZ CS 1 will come into force for climate reporting entities for financial years commencing on or after 1 January 2023.
10. The Act also provides for the Financial Markets Authority (**FMA**), which is the financial markets regulator, to monitor disclosures and enforce the disclosure regime. The FMA plans to issue high level guidance on compliance expectations by December 2022 and provide more detailed guidance in 2023. The FMA's initial approach will be to support climate reporting entities and encourage the development of good practice.<sup>14</sup>

### Impact

11. The goals of mandatory climate-related disclosures by climate reporting entities are to:
  - a. ensure that the effects of climate change are routinely considered in business, investment, lending and insurance underwriting decisions
  - b. help climate reporting entities better demonstrate responsibility and foresight in their consideration of climate issues
  - c. lead to more efficient allocation of capital, and help smooth the transition to a more sustainable, low emissions economy.

<sup>12</sup> McGuinness Institute, *Analysis of Climate Change Reporting in the Public and Private Sectors*, July 2018, pp.50-53, <https://www.mcguinnessinstitute.org/wp-content/uploads/2018/10/20181029-Working-Paper-2018%E2%80%A203-cover-4.30-pm.pdf>

<sup>13</sup> External Reporting Board, *Mandatory climate-related disclosures*, <https://environment.govt.nz/what-government-is-doing/areas-of-work/climate-change/mandatory-climate-related-financial-disclosures/>

<sup>14</sup> Financial Markets Authority, *New climate-related disclosure regime expand FMA's responsibilities*, October 2021, <https://www.fma.govt.nz/news-and-resources/media-releases/climate-related-disclosure-fma-responsibilities/>

12. It is too early to state what impact climate-related disclosures will have, given that the disclosure regime has not yet commenced. The government will review the effectiveness at a later date.

## Challenges and lessons

### *The main challenges*

13. New Zealand was one of the first economies in the world to adopt a mandatory climate-related disclosure regime. It was the first economy to decide to underpin a TCFD-based climate reporting regime with standards set by an independent regulator. When officials started this project in 2019, one objective was to design a regime that would fit within the range of international best practice. However, this was challenging because best practice was rapidly evolving and it wasn't clear how it might develop. While the design work for a New Zealand scheme was in progress, governments and regulators in other economies were announcing the introduction of mandatory and voluntary disclosure regimes. It was also clear that more governments and regulators would announce decisions to introduce reforms after the New Zealand regime had been designed.
14. The multiplicity of international sustainability and climate reporting frameworks created a further challenge when designing the reporting regime. It was unclear whether any of those frameworks would become globally recognised as authoritative. This situation appears to be changing. On 3 November 2021, the IFRS Foundation Trustees announced the creation of the International Sustainability Standards Board (**ISSB**). The ISSB has been created to help meet the demand for high quality, transparent, reliable and comparable reporting by companies on climate and other environmental, social and governance matters. The ISSB intends to deliver a comprehensive baseline of sustainability-related disclosure standards.<sup>15</sup> There is strong support for the ISSB.
15. The uncertainties associated with rapidly evolving international best practice were managed by making the New Zealand disclosure regime flexible. The Act leaves it to the XRB, as the independent climate standards setter, to adopt what it considers to be best practice, modify NZ CS 1 in response to changing circumstances, and add new standards as they see fit. Under the Act, the XRB will make decisions on such matters as:
  - a. how to achieve the TCFD goals of relevance (including materiality), completeness, understandability, comparability and reliability
  - b. whether to harmonise New Zealand climate standards with international standards or other economies' standards
  - c. whether to require the disclosure of Scope 1, 2 or 3 greenhouse gas emissions<sup>16</sup>
  - d. how to promote consistency between financial reporting and climate reporting.

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<sup>15</sup> IFRS Foundation, *About the International Sustainability Standards Board*, <https://www.ifrs.org/groups/international-sustainability-standards-board/>

<sup>16</sup> Scope 1 covers direct emissions from owned or controlled resources. Scope 2 covers indirect emissions from the generation of purchased electricity, steam, heating and cooling consumed by the reporting company. Scope 3 includes all other indirect emissions that occur in an organisation's value chain.

### ***Gaining support for the reforms***

16. The Government did not encounter any significant difficulties in obtaining support for the reforms. The strong level of support for the changes can be attributed in part to:
  - a. Effective leadership by the responsible Ministers
  - b. The release of a discussion document in 2019 that clearly outlined the case for change
  - c. A team effort by all the key government agencies including two government departments, the XRB and the FMA.
  
17. Support for the reforms can also be partly attributed to limiting the scope of the disclosure regime to large financial markets participants. It may have been more difficult to obtain support had it applied to a wider range of entities where the case for compulsion was less clear.

### **Next steps**

18. The focus with the reforms was to establish a robust regime and leave other secondary issues until later. The Government will make further policy decisions after the disclosure regime comes into force in 2023:
  - a. Requirements relating to the independent assurance of climate disclosure statements and the regulation of assurance providers
  - b. Consideration of the possible extension of climate-related reporting to a wider range of organisations.

## RUSSIA

### Introduction/Pre-reform situation

The global economy is gradually recovering after two years of the pandemic: according to preliminary IMF estimates, global GDP grew by 5.9% in 2021 after a 3.5% decline in 2020. Despite the emergence of new strains of the virus and new waves of infections, economies have generally adapted to respond to new emerging outbreaks.

In 2020, the decline in GDP in the Russian Federation amounted to 3%, which is better than in the world as a whole (-3.5%). In 2021, Russia's GDP growth was 5.2%.

About half of the negative GDP dynamics is explained by the pandemic itself. In Russia, there was no such hard and long lockdown as in many other economies - the industry continued to work without significant disruptions. Russia is also much less affected by quarantine measures due to its structural features: due to the smaller share of small businesses and the lower share of the service sector, which suffers greatly during the current crisis.

As in all economies, there was a significant unevenness of dynamics across sectors of the economy in 2020: trade in services to the population fell by 17.1% (including hotels and catering fell by 24%), mining - by 6.9% (effect cuts in production due to the OPEC deal and the overall demand for energy resources in the world), retail trade - by 4.1%, while manufacturing, agriculture, construction and wholesale trade showed stability or growth up to 1.5%.

Thus, the economic downturn due to the coronavirus in Russia was much less than in many Asia-Pacific economies.

*Today, the climate agenda plays a big role in the sustainable recovery of economic growth. Measures to combat climate change must be balanced with the task of recovering economies from the crisis caused by the coronavirus pandemic.*

Russia consistently participates in international efforts to combat climate change. In terms of the accumulated volume of emissions reductions since 1990 (more than 40 bln tons of CO<sub>2</sub> equivalent, comparable to the annual emissions of all economies of the world) and the actual reduction in emissions since 1990 (-49% by 2019) Russia is the world leader.

### Policy response and implementation

- Russia has set domestic targets for reducing greenhouse gas emissions up to 2030 and up to 2050 that are reflected in the adopted Strategy of Socio-Economic Development of Russia with a low level greenhouse gas emissions until 2050 (Government Decree, 01.11.2021).

The target for 2030 is included in the first Nationally determined contribution of the Russian Federation to the implementation of the Paris Agreement (published on the official portal of the UNFCCC in November 2020)

- target by 2030 - reduction by 70% from the level of 1990.

- target by 2050 - reduction by 60% from the level of 2019 and by 80% from the level of 1990. Net emissions for 2021-2050 should not exceed the EU level. Further implementation of this scenario will allow Russia to achieve carbon neutrality by 2060.

- The National Plan for Adaptation to Climate Change is being implemented, and Russia is preparing more detailed plans for adapting sectors of the economy to climate change and the global energy transition.
- Concepts for the development of new carbon-free industries (nuclear, hydrogen, electric transport) have been adopted.
  - Nuclear power has great potential as a low-carbon energy source. Along with the expansion of renewable energy and the shift from coal to natural gas, increased nuclear power generation helped stabilize global CO<sub>2</sub> emissions in 2019 at 33 gigatonnes. Since October 2020, Russian company Rosatom has been a member of the United Nations Global Compact, the largest international UN initiative for business in the field of corporate social responsibility and sustainable development. The operation of all nuclear power plants of Russian design in the world saves about 210 million tons of CO<sub>2</sub> emissions per year, including 107 million tons of CO<sub>2</sub> in the Russian Federation.
- The basis for climate regulation has already been elaborated - in July 2021, the Federal Law “On Limiting Greenhouse Gas Emissions” (dated July 2, 2021 No. 296-FZ) was adopted, which includes the following tools:
  - Mandatory emissions reporting for large emitters (initially for organizations with emissions of more than 150 thousand tons of CO<sub>2</sub> equivalent per year, from 2024 - more than 50 thousand tons). A framework for voluntary carbon reporting has also been formed;
  - System of voluntary emissions reductions and removals projects and circulation of carbon units (offsets);
  - The market of verification services. The first validation bodies for greenhouse gas verification are being established. The task of these bodies is to verify carbon reporting and climate projects. Work is also underway on the international recognition of Russian accreditation in this area.
- In addition, the first regional cap-and-trade emissions trading system (ETS) experiment is being prepared for launch - Sakhalin region. Russia expects to achieve carbon neutrality in this region by the end of 2025 - the draft federal law has been submitted to the Government, a detailed program of the experiment is being formed.

Russia has a huge potential for the generation and certification of carbon-free and low-carbon electricity (“green certificates scheme”). Together with the implementation of climate projects, such certificates will allow interested companies to reduce the carbon footprint of products in a verified way.

The domestic taxonomy of sustainable, including "green" and adaptation projects is approved. For example, the Moscow Exchange has already issued about 30 billion rubles (450 mln US dollars) of green bonds, while their volume is predicted to grow to 250-300 billion rubles (4 - 4,5 bln US dollars).

Measures to combat climate change are being extended to cities. This includes creation of parks and green spaces, new systems of waste segregation, replacement of vehicles with internal combustion engines for its "environmentally friendly" types, including electric cars and electric trains. In 2021, the Moscow government decided to stop purchasing public buses with internal combustion engines, except in special cases. There are more than 650 electric buses on the streets, and by the end of 2021 their number will reach 1,000. Also in Moscow in 2022, it is planned to test the use of buses running on hydrogen fuel. They are expected to emit ten times less CO<sub>2</sub> than a regular public transport.

## Impact

- change in the energy balance with the strengthening of the role of carbon-free nuclear energy and renewable energy sources,
- expansion of steam- and cogeneration,
- intensive work to reduce the leakage of petroleum gas,
- modernization of the gas transmission system,
- development of electric and gas-powered transport,
- development of the best available technologies (BAT) institute,
- modernization of housing and communal services.

Ambitious tasks are set in relation to the protection and improvement of the quality of natural sinks and accumulators of greenhouse gases, primarily forests. The importance of efforts in this direction is emphasized in Article 5 of the Paris Agreement.

Russia proceeds from the fact that it is the increase in absorption that will make it possible to compensate for emissions in those industries where there are no technological solutions to reduce emissions yet or they are so expensive that in practice their mass implementation is difficult (at least now). Preliminary calculations show that Russia's potential can reach an unprecedented 2-2.5 billion tons of CO<sub>2</sub> equivalent per year or more.

## Challenges and opportunities

- Measures to decarbonize the economy will require additional investment
- Over the past year, due to the optimization of a set of measures, the costs of implementing the strategy have been halved.
- Expansion of international cooperation on the climate agenda, free movement of investments in the direction of the most effective reductions in greenhouse gas emissions will contribute to a large extent to reducing costs.
- The emergence of working mechanisms under Article 6 of the Paris Agreement is an important component of the development of climate regulation and a factor in the liquidity of carbon credits, including certified emission reductions

Development according to the Target scenario by 2050:

- Will reduce the energy consumption of economy by 2 times and reduce the carbon intensity by 6 times (in terms of net emissions)
- Guaranteed achievement of the domestic goal of limiting greenhouse gas emissions by 2030 (up to 70% of 1990 levels) and by 2050 (not exceeding the EU level for cumulative net emissions from 2021 to 2050)
- Achieve carbon neutrality by 2060

## Priorities for international cooperation

- Support for the principle of technological neutrality: non-discrimination of the results of emissions reductions and absorption increases, regardless of the technologies used. Including nuclear and hydropower. If a technology, solution or projects help to reduce net emissions, then they should be recognized as a real reduction - without exemptions and restrictions
- Convergence of approaches between different cap-and-trade systems
- Exemption of climate projects from potential sanctions and unilateral restrictions

- Launching the working mechanisms of Article 6 of the Paris Agreement, which take into account the above principles and features of the implementation of forest projects.

## **CHINESE TAIPEI: IMPLEMENTING THE “GREEN FINANCE ACTION PLAN 2.0” TO BUILD A SUSTAINABLE FINANCIAL ECOSYSTEM**

### **Introduction**

The Sustainable Development Goals (SDGs) adopted by the United Nations in 2015 call the world’s attention to sustainability issues. Since then, seeking co-existence and co-prosperity between man and nature, fostering peaceful, just and inclusive societies, and working toward a sustainable future become the goal of all mankind.

Sustainable development has become the core value around the world and Chinese Taipei is no exception. Financial institutions take in funds from the public, and manage and utilize those funds by undertaking activities such as lending and investment. They hold enormous assets and play the role of allocating social resources. They are a key force in steering public attention toward sustainable development. Hence, governments around the world have been employing financial market forces to promote sustainable development. In the early stage, their promotional efforts emphasized green or environmental issues, but they have now moved on to pursue sustainable finance, which additionally emphasizes environmental, social, and corporate governance (ESG) concerns. Sustainable finance is the core consideration in financial policy in many economies.

### **Pre-reform situation**

The Green Finance Action Plan previously proposed by Chinese Taipei in 2017 has currently attained major achievements in the following areas: (1) relaxed rules and regulations on extension of credit and financing by financial institutions to make it easier for renewable energy companies to obtain credit from banks and insurance companies; (2) created and developed a green bond market; (3) encouraged insurers to invest directly or indirectly in the green energy industry; (4) cultivated financial professionals with knowledge of the green energy industry; (5) encouraged banks to develop green credit cards; (6) promoted green stock index, green ETFs and other green financial products; and (7) required banks and insurers to disclose their management directives for sustainable finance in their corporate social responsibility reports (CSR reports).

Seeking economic growth while taking into consideration of sustainable development issues, financial institutions play the key role of steering public attention. After reviewing the measures in promoting green finance, Chinese Taipei finds that the current state of our green finance development has room for refinement from an international perspective, which includes: (1) there are no clear definitions of “green” or “sustainable” economic activities and assets; (2) the quality of corporate ESG disclosure has room for improvement; (3) responsible investment data await integration and promotion; (4) domestic companies and investors in general do not integrate ESG factors into decision-making process; and (5) most financial institutions have not factored climate change into their risk management strategy. On the basis of the existing “Green Finance Action Plan,” and referring to the practices and measures currently adopted internationally, Chinese Taipei has proposed the “Green Finance Action Plan 2.0.”

### **Policy response and implementation**

Through public and private sector collaboration, Chinese Taipei has implemented the “Green Finance Action Plan 2.0” from 8 major aspects:

1. Credit: Encourage financial institutions to grant credit and loans to green energy industries and sustainable development projects.

2. Investment: Advocate responsible investing by amending relevant rules and guidelines and encourage financial institutions and government agencies to invest in sustainable development projects.
3. Capital market fundraising: Promote green bond issuance and investment, and develop sustainability bonds to provide a wide variety of financial products and financing channels in our capital market.
4. Professional development: Cultivate financial professionals with expertise in green and sustainable finance in the hope to build capability for developing sustainable finance.
5. Development of green financial products or further development of services: Encourage financial institutions to develop innovative green financial products or services that will meet the financial demands of businesses and investors pursuing low-carbon transformation and sustainable development.
6. Information disclosure: Improve the quality, consistency, and transparency of corporate ESG disclosure by amending related regulations and establishing integration platforms so as to provide the financial market participants with comparable, reliable, and comprehensive information.
7. Prudential supervision: Prompt financial institutions to examine climate-related risks they may be faced with and their ability to address such risks, and furthermore, build resilience and grasp opportunities. Below are 2 measures to be implemented.
8. International connections and incentive mechanisms: Study the scope of sustainable finance in reference to international practices, and through incentives such as evaluation, public commendation, and rewards, education, and propagation, encouraging financial institutions, businesses, and investors to seek sustainable development and continue to participate in international activities.

## Impact

### 1. Facilitating effective information disclosure for effective businesses decision-making:

Regular disclosure of material impact of climate change by businesses on their operations and finance is the first and foremost step in the implementation of climate change governance. To strengthen the disclosure of non-financial information, Chinese Taipei expands the scope of listed companies required to prepare CSR report. In addition, with references to international standards such as SASB and TCFD, we clarify the contents of ESG disclosure, and issue guidelines on climate-related financial disclosures of domestic banks and insurance companies.

### 2. Pushing financial institutions to address climate change risks and capitalize on associated opportunities:

To encourage financial institutions to obtain international rating or sign up for international principles, they may understand more about international trends and come up with response strategies. Besides, financial institutions should require their relevant departments to gather climate-related data and conduct scenarios analysis and stress testing for the purposes of drafting relevant business strategies, risk assessment and managing climate-related financial risks.

### 3. Using market mechanism to steer the economy toward sustainable development:

By leveraging the power of shareholder activism and the business activities of financial intermediaries such as lending, investment or products to call the attention of businesses to climate change and ESG issues, and to become aware of the importance of managing ESG risks and opportunities for their sustainable operations. These actions are critical to starting a successful path to industry transformation and low-carbon economy.

**Challenges and lessons**

The international community actively promotes net-zero greenhouse gas emissions, carbon tariffs, and transitional justice. Chinese Taipei also announced in April 2021 that the overall policy of achieving net-zero greenhouse gas emissions by 2050 should be addressed to respond to climate change and promote sustainable development. To achieve this goal, leveraging the power of the financial market to support low-carbon transformation, continuing strengthening the role of financial institutions is important. By promoting the green finance policies, we hope to better drive our enterprises to disclose more climate-related information and ultimately transform our economy into a low-carbon or zero-carbon economy.

## THAILAND

### Introduction

Throughout the past several decades, abundant natural resources and diverse cultural backgrounds have made Thailand one of the top tourist destinations in the world. In 2019, prior to the outbreak of COVID-19, Thailand welcomed almost 40 million international tourists; its tourism industry generated approximately 3.06 trillion THB, making up 18.14 percent of its GDP.

While its contribution of the Thai economy is undeniable, the ever-growing tourism industry has led to some rolling economic shocks. In the areas where the number of tourist arrivals exceeds their carrying capacity, buzzing tourist activities often result in continuing natural resource and environment depletion. The exploitation of cultural heritage sites, arts, and crafts has also reduced their socio-cultural values to mere economic commodities.

To demonstrate the impacts of economic shocks arising from boosting tourism and how Thailand has used the Bio-Circular-Green Economy (BCG) Model to drive structural reforms and address such impacts at the local level, this case study will focus on Krabi province – one of our most famous tourism hotspots renowned for its idyllic beaches and limestone formations. In particular, it will examine the “Krabi Goes Green” initiative, which was developed in accordance with the BCG model, in terms of its implementation, impacts, as well as issues and challenges to be addressed.

### Pre-reform situation

Known as the “Emerald of Andaman”, Krabi is one of the most scenic coastal destinations in the South of Thailand. Owing to its rich natural endowment, together with active advertising campaigns, Krabi witnessed a surge in international tourist arrivals in the past years. With an average annual growth of over 10 percent, the number of international tourist arrivals in Krabi increased from 2 million in 2013 to 4.3 million in 2019, making it the fourth most visited province in Thailand. In terms of revenue, Krabi’s tourism receipts rose from 60 billion THB to almost 120 billion during the same period.

With the massive influx of tourists came some very serious problems. The linear economy model, which is based on the traditional view that resources are static and infinite, was predominantly employed by tourism service providers in the past. The “take-make-use-dispose” model caused the symptoms of overtourism, such as marine ecological degradation, worsening pollution, and mismanaged waste, to grow more apparent to local communities, businesses, as well as the government. For instance, it was reported in 2018 that over half of the coral reefs at Maya Bay, one of Krabi’s most famous attractions, had been damaged extensively due to the bay’s overwhelming popularity. Following the discovery, Maya Bay was declared off limits to tourists for four consecutive years as the authorities undertook a restoration program aimed to assist the natural recovery process of degraded coral reefs.

### Policy response and implementation

Conceptualized in Thailand as a strategy for economy-wide development and post-pandemic recovery, the BCG Model is based on the combination of three existing concepts, namely bioeconomy, circular economy, and green economy. For Thailand in particular, the BCG model is used to underpin our approach to turning our comparative advantage in biological resources and cultural diversity into competitive advantage in four strategic sectors, namely 1) agriculture and food, 2) wellness and medicine, 3) energy, materials and biochemicals, and 4) tourism and creative economy. Ensuing the adoption of the BCG model as an economy-wide agenda, the BCG Action Plan 2021 - 2027 was formulated with an aim of guiding the BCG implementation and enabling the paradigm shifts for inclusive and sustainable growth at all levels.

In the case of Krabi, the application of BCG Model leads to stronger and more coordinated efforts in promoting green recovery in the tourism industry. Various strategies under the BCG Action Plan 2021 - 2027 have been incorporated into the province's green recovery initiative named "Krabi Goes Green". Examples of BCG-related actions under "Krabi Goes Green" initiative are as follows.

### **1. Promoting wellness tourism**

The strategies for Thailand's post-pandemic tourism under the BCG Action Plan 2021 – 2027 focus heavily on high-income tourists and niche-market segments, such as wellness tourism, gastronomy tourism, and cultural tourism. To promote wellness tourism in Krabi, hotels and restaurants are encouraged to source produce directly from organic farms and/or farmers' associations in the area. People in the local communities are also being trained to use technology and innovation to produce value-added products for sale, such as aroma oil.

### **2. Advancing sustainable tourism management**

To promote green tourism in the province, the "Railay" model was developed and piloted in Railay – a picturesque peninsula accessible only by a boat journey from mainland Krabi. In alignment with BCG's quadruple helix approach that engages all sectors, namely government, businesses, academic, and people, the Railay model comprises several collective actions for sustainable tourism management, for example:

- *Limiting the number of incoming tourists:* to ensure that the number of tourists visiting Railay does not exceed its carrying capacity, the QueQ application for online tourist registration developed by a Thai startup is being used by tourism service providers, such as hotels and boat operators.
- *Restricting boating activities:* to keep the corals safe from potential damages from boating and mooring, all arriving boats must be docked and moored only at the designated areas on the east side of the peninsular.
- *Improving waste management:* to reduce the amount of waste that needs to be transported to the mainland for disposal, every hotel in Railay is mandated to practice waste sorting and recycling. The local community has also been trained by a group of volunteers to properly dispose of their waste and keep the area clean.

### **3. Adopting innovation for green tourism**

With support from the National Science and Technology Development Agency (NSTDA), the local government and businesses in Krabi have welcomed several innovative solutions for green tourism. For instance, Krabi Hotel Association has adopted the ozone laundry systems which reduce the amount of water and chemicals used for laundry, allowing the wastewater to be released or reused without further treatment.

## **Impact**

The transition from mass tourism to high-value tourism has allowed Krabi to foster the tourism industry while also protecting natural assets. In 2018, Krabi was awarded the "Global Low-Carbon Ecological Scenic Spot" at the 2018 Annual Session of Global Forum on Human Settlements and Sustainable Cities and Human Settlements Awards Ceremony. The adoption of the BCG model at the provincial level, especially its application in "Krabi Goes Green" initiative, has further consolidated and strengthened efforts made by all actors in the province to make tourism greener and more sustainable. Moreover, the implementation of some activities has also allowed the economic benefits of tourism to reach a wider group of local people. Organic farmers, for instance, are benefiting from the shift towards wellness tourism as they now have direct/indirect access to more market channels, including high-end tourism

service providers such as luxury hotels. However, a quantitative assessment of the impacts of the initiative is yet to be conducted.

In short, provided that all stakeholders remain committed to implementing BCG-related activities, it can be expected that:

- The tourism industry will maintain its competitiveness;
- Biological diversity and environmental purity will be protected;
- Economic and social benefits will be distributed more evenly across local communities.

### **Challenges and lessons**

Based on the implementation of “Krabi Goes Green” initiative, it can be observed that the success of this program relies heavily on the engagement of various stakeholders, especially at the provincial and local levels. For best results, stakeholders should be able to take part in all stages of the policy process, from agenda setting to planning and implementation, as well as monitoring and evaluation. The support from stakeholders is particularly important when the changes that the initiative entails may directly affect them, e.g. by initially lowering their income as the province forgoes mass tourism.

In term of the BCG Model which underpins much of structural reforms that Thailand is undergoing, its application in “Krabi Goes Green” initiative highlights that (1) the overarching concepts of the BCG Model, as well as the strategies identified in the BCG Action Plan 2021 – 2027, are highly applicable in pursuit of green recovery and (2) its role as an economy-wide agenda provides a mandate and/or incentive for different actor to work towards common goals and encourages cross-sectoral cooperation.

## UNITED STATES

### Introduction

Briefly explain the economy's economic context, including the impact of the economic shock to be the focus of the case study, and the relevant sector/s to be covered by the case study.

The Great Recession of 2008-2009 was a severe financial crisis that saw a steep decline in consumer and business confidence, household wealth, and access to credit. In the last quarter of 2008, employment was falling by more than 700,000 jobs per month and U.S. real gross domestic product (GDP) contracted at an 8.9 percent annualized rate. Overall, 8.8 million jobs were lost between 2007-2009, with about a \$19.2 trillion lost in household wealth. Renewable energy industries were exposed to the highly turbulent financial markets and a contraction of economic activity. The result was a dramatic tightening of credit availability. Several of the largest institutions investing in renewable energy either ceased to exist, skirted solvency, or required government intervention.<sup>17</sup>

### Pre-reform situation

Briefly describe the situation before the structural reform including what relevant institutional arrangements and policies were in place in the economy as a whole and in the affected sector/s. Describe how a need for structural reform was identified, and what benefits were expected to arise from the reform.

The American Recovery and Reinvestment Act (ARRA) of 2009's immediate goal was to stabilize the economy, preserve and restore jobs, and assist deeply suffering industries. In a context of weak aggregate demand, already aggressive use of monetary policy tools bringing interest rates to near-zero levels, highly constrained credit, and expectations of protracted contraction, there is a strong economic case for a significant fiscal stimulus to increase near-term economic output. During times with extremely tight credit markets, such as just after the 2008 financial crisis, there is often limited availability of capital for investments in promising new technologies. These capital constraints very likely afflicted clean energy investments just as the ARRA funding became available. Such capital constraints at times of crisis call for greater availability of financing for promising new technologies.<sup>18</sup>

A diverse array of market failures affecting clean energy markets provides an economic rationale for the use of a variety of policy tools for government intervention. It also underscores that when a sizable stimulus package is needed for macroeconomic purposes, there is an economic rationale for investing this funding in clean energy-related technologies that will provide long-term benefits.<sup>19</sup>

### Policy response and implementation<sup>20</sup>

What structural reforms and policies were implemented to respond to the economic shock?

- What factors related to the shock, or weaknesses revealed by the shock, drove the choice of the policy e.g., market-based, regulation, information instruments?
- What were the tradeoffs involved in selecting the structural reform policy?

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<sup>17</sup> Renewable Energy Project Financing: Impacts of the Financial Crisis and Federal Legislation  
<https://www.nrel.gov/docs/fy09osti/44930.pdf>

<sup>18</sup> A Retrospective Assessment of Clean Energy Investments in the Recovery Act (2016)  
[https://obamawhitehouse.archives.gov/sites/default/files/page/files/20160225\\_cea\\_final\\_clean\\_energy\\_report.pdf](https://obamawhitehouse.archives.gov/sites/default/files/page/files/20160225_cea_final_clean_energy_report.pdf)

<sup>19</sup> A Retrospective Assessment of Clean Energy Investments in the Recovery Act (2016)  
[https://obamawhitehouse.archives.gov/sites/default/files/page/files/20160225\\_cea\\_final\\_clean\\_energy\\_report.pdf](https://obamawhitehouse.archives.gov/sites/default/files/page/files/20160225_cea_final_clean_energy_report.pdf)

<sup>20</sup> A Retrospective Assessment of Clean Energy Investments in the Recovery Act (2016)  
[https://obamawhitehouse.archives.gov/sites/default/files/page/files/20160225\\_cea\\_final\\_clean\\_energy\\_report.pdf](https://obamawhitehouse.archives.gov/sites/default/files/page/files/20160225_cea_final_clean_energy_report.pdf)

- What methods were used in their implementation, including planning, sequencing, monitoring, evaluation, coordination between central government and local government, partnership between the private and public sector and cross-border alignment?
- What was the role of macroeconomic and microeconomic policy?
- What and who are the targets and/or beneficiaries of the structural reforms and policies?
- What are the possible risks the policy may pose?
- What green policy reforms were implemented to respond to the economic shock?
- Who are the beneficiaries of these green economy reforms?

The ARRA clean energy-related investments can be divided into two categories based on the funding mechanism. First, there were 45 investment provisions with an initially estimated total allocation of \$60.7 billion. These provisions were primarily focused on areas of high-value investment to prime a sustainable 21st century economy. Second, there were 11 tax incentives, which the U.S. Treasury estimated would invest \$29.5 billion through fiscal year 2019. These tax incentives were primarily focused on fostering new technologies in the renewable energy and advanced vehicle technology space, but also provide strong support for energy efficiency. Such investments accelerated the growth of key new technologies, which helped reduce environmental externalities and U.S. reliance on oil. Acknowledging that tax incentives would not benefit all renewable energy project developers, two new support programs that provided loan guarantees and grants were created under ARRA. The Section 1705 loan guarantee program addressed difficulties in securing financing for renewable projects. The Section 1603 cash grant program provided grants equal to 30% of renewable energy project costs as an alternative to taking the investment tax credit. As tax equity markets tightened during the financial crisis, Section 1603 grants supported development of renewable energy projects that lacked sufficient tax liability to take advantage of tax incentives.

Direct investments from ARRA funded a variety of different projects with long-run implications. These projects were broadly targeted to help address market failures, such as environmental externalities and innovation market failures. For example, grants for deployment of renewable energy projects, such as solar photovoltaic (PV) projects, helped to reduce greenhouse gas and other pollutant emissions. Similarly, these grants may have fostered learning-by-doing spillovers through a growing and publicizing of the market. Many of the projects involved research and development at critical points in the value chain when the technology spillovers to others are likely to be large, and thus the private investment especially low.

A key element in all the ARRA clean energy-related investments is that while they were designed to provide long-term benefits, the allocations focused on projects that could be deployed relatively quickly, in order to take advantage of resources in the economy that were under-utilized due to the Great Recession. In short, the allocations aimed to put people back to work and contributed to both the recovery and reinvestment goals of the legislation. More broadly, the choice of allocation across the many possible projects was based primarily on a several criteria: the ability to deploy resources quickly, the potential for federal support to stimulate private financing, existence of administrative and authoritative capacity for policy implementation, CO2 reduction potential, and impact per dollar in employment, economic activity, and changes to the energy system. Federal capacity to administer programs and funds were also considered to help assess feasibility.

## **Impact**

What were the environmental, economic, health and social impacts of the structural reforms and policies?

- How and to what extent did they assist sectors, regions, economic actors and groups of the population affected most by the economic shock?
- What were the costs and how were they distributed?
- How was the transition managed, especially for those adversely affected?

- How and to what extent did these reforms support a green recovery?
- What is the long-term outlook, and how did these reforms contribute to building resilience against subsequent shocks, including COVID-19, or how will they contribute to resilience against future shocks? Please provide data and statistics as necessary.

The ARRA clean energy-related programs were successful in stimulating job creation in renewable and energy efficiency sectors and supported roughly 900,000 job-years (full-time jobs over one year) in clean energy fields from 2009 to 2015. Each \$1 million of green ARRA investments created 15 new jobs, which mostly arose from 2013-2017. Specifically, cash grants supported an estimated 44,000-66,000 short-term jobs in wind energy and 8,300-9,700 short-term jobs in solar from 2009-2013, and 4,500-4,900 permanent jobs for wind and 610-630 permanent jobs for solar; \$2.5 billion in loans estimated to support 8,000 short-term construction jobs and 500 permanent jobs; and the State Energy Program supported 51,000 job-years from 2009 to 2013, and expected to lead to GHG emissions reductions of 164 million metric tons from 2009- 2050.<sup>21</sup>

ARRA investments in the deployment of clean energy technologies also helped contribute to dramatic cost reductions for those same technologies as part of a virtuous cycle. For example, the overnight capital cost of utility-scale photovoltaic (PV) systems fell from \$4.1/watt (W) in 2008 to \$2.0/W in 2014—a decrease of 50 percent. Cost reductions for this and other technologies resulted from several factors—including economies of scale, technology learning, and new business practices—that were assisted by the widespread deployment made possible by ARRA.

In addition, ARRA-funded energy efficiency projects helped build long-term economic and environmental resilience. For example, stimulus spending on public transit led to 70% more job-hours than equivalent spending on highways. Spending on coastal habitat restoration created 17 job-years per \$1 million, more than spending on fossil fuels would have.<sup>22</sup>

## Challenges and lessons

What were the successes and challenges in the implementation of the structural reform?

- What steps were taken to manage the challenges?
- How was social license to support the reforms managed?
- How and to what extent did the shock itself facilitate structural reform?
- How dependent was the structural reform on the successful implementation of other policies?
- What opportunities did the reform create and make available for the economy?
- Did the structural reform accelerate policy change in other areas of the economy by breaking down barriers for other reforms?
- Did reform in other areas of the economy have beneficial or damaging effects on the environment as a side-effect, or reinforce or diminish the impacts of the structural reform?
- Are there residual barriers to full implementation of the policies?
- What assistance or partnerships will be beneficial moving forward?
- What lessons were learned for future reforms?

One challenge in implementing ARRA was the failure of certain R&D funding to yield results. For example, ARRA authorized USD 3.4 billion support for carbon capture and storage (CCS) research and design, commercial demonstration, implementation, and education. In 2016, the U.S. Department of Energy (DOE) returned USD 1.3 billion of the initial support to the U.S. Department of Treasury for four CCS projects that were funded by DOE under the ARRA and were not able to advance given the ARRA funding timeframe. The limited success of CCS deployment within recovery packages

<sup>21</sup> Hearing on “Building a 100 Percent Clean Economy: Opportunities for an Equitable, Low-Carbon Recovery” (2020) <https://www.congress.gov/116/meeting/house/111008/witnesses/HHRG-116-IF18-Wstate-SahaD-20200916.pdf>

<sup>22</sup> <https://www.wri.org/insights/lessons-great-recession-covid-19-green-recovery>

highlights the challenges faced by businesses that are introducing innovative, early-stage energy technologies to markets.<sup>23</sup>

Another challenge lies in the distribution of benefits from green ARRA projects, which created more jobs in communities with larger initial shares of occupations that use intensively such skills. In the case of ARRA, green stimulus enhanced opportunities in communities already in position to support a green economy. Care must be taken to match green investments to the skill base of the local economy. To support communities without the required green skills, expanding specific technical programs and engineering education (the most important green skills) could complement green stimulus investments.<sup>24</sup>

On the whole, the ARRA experience demonstrates that public financing can be used to catalyze private investment in clean energy without crowding out private finance.

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<sup>23</sup> A Retrospective Assessment of Clean Energy Investments in the Recovery Act (2016)  
[https://obamawhitehouse.archives.gov/sites/default/files/page/files/20160225\\_cea\\_final\\_clean\\_energy\\_report.pdf](https://obamawhitehouse.archives.gov/sites/default/files/page/files/20160225_cea_final_clean_energy_report.pdf)

<sup>24</sup> The Employment Impact of Green Fiscal Push: Evidence from the American Recovery Act (2020)  
[https://www.nber.org/system/files/working\\_papers/w27321/w27321.pdf](https://www.nber.org/system/files/working_papers/w27321/w27321.pdf)

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