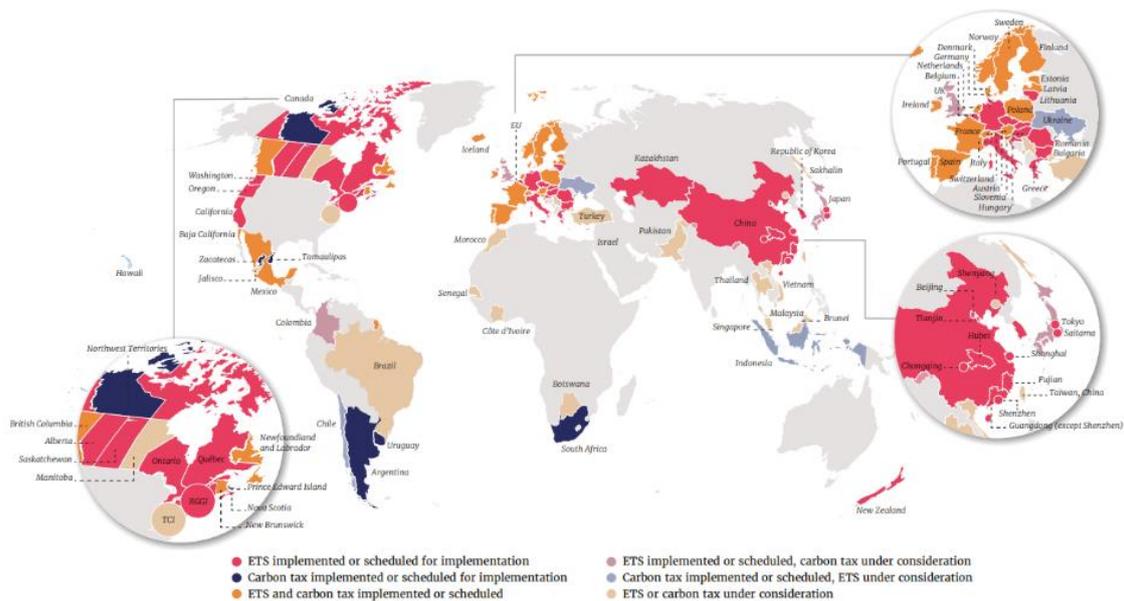


Toward Net Zero: Accelerating Carbon Market in Indonesia



Summary map of regional, national, and subnational with carbon pricing initiatives. Source: World Bank (2022)

Highlights

Many countries have committed to net zero pledges in 27th Conference of the Parties to reduce their carbon emissions including Indonesia that has pledged to achieve net zero by 2060 and reach carbon neutrality in the forestry sector by 2030. Faced with these challenging transitions, Indonesia needs to secure sizeable financing and technical support to reach its goals. In the other hand, as a developing country, Indonesia needs to balance between sustainability effort and its economic growth that requires lot of energy source that is sufficient and affordable.

Innovative method such as carbon market could be explored as alternative financing scheme. Carbon market allow transaction of carbon credits that in returns could be utilized to fund low-carbon project development. Indonesia contributes 75-80% of the world's carbon credits creating a huge potential for carbon market and trading (ICDX, 2022)

There are four key steps that have been identified in this study to accelerate carbon market development in Indonesia:

- Engaging primary and secondary stakeholders in the early stage of carbon market development to ensure effective policy creation
- Centralized communication and carbon market policy under single institutions to create transparency and clarity
- Exploring opportunity to establish joint taskforce between public and private sector with focus on capability building, e.g., creation of carbon center of excellence or think-tank with focused on carbon market development
- Ensure synergy between national and international carbon standards

Trends and Challenges

GLOBAL TRENDS

Historically, the world has started on its efforts to fight climate change from decades ago. The first step are collective efforts from several countries during human environment conference in Stockholm in 1972 that led to establishment of United Nations Environment Programme (UNEP).

Currently, the global carbon market is still growing with total of 68 carbon pricing initiatives covering ~22% of global greenhouse gas emissions in 2022. Furthermore, the value of traded global markets in Compliance Carbon Market (CCM) for carbon dioxide permits grew by 164% to a record 760 billion euros (\$851 billion) on 2021 (Refinitiv, 2022). Recent additions in 2021 from China and United Kingdom’s national emission trading scheme that bring positive development of the global carbon market.

Indonesia has pledged to achieve net zero by 2060 or sooner with carbon market becoming key focus area alongside other emission reduction initiatives. Indonesia plan to roll out carbon tax in 2023, followed by Emission Trading System.

CHALLENGES

Indonesia needs to secure sizeable financing and technology transfer from developed countries to accelerate its effort to reach its goals including phasing out all coal fired power plant by 2056. Ministry of Finance estimate the cost required to mitigate climate change issues will require cumulative cost of IDR 3,779 trillion or IDR 343.6 tn/year from 2020 to 2030. This problem currently being addressed through climate financing scheme such as green bonds, green sukuk, and hybrid financing. However, the result is still relatively far from expected target, which required innovative financing such as carbon market to be explored as alternative source of fund.

Overview on Carbon Market

CARBON MARKET MECHANISM

Carbon market mechanism could be defined into 4 categories based on trade mechanism and regulatory requirement.

Trade mechanism define whether the credit generated throughout carbon offset projects could be used for trading activities or not.

Meanwhile, carbon market mechanism could be categorized into two based on regulatory requirement, whether it is mandatory or voluntary. Based on this framework, there are 4 type of carbon market based on above categories:

1. Tradable – Mandatory

In this market mechanism, carbon market is required by government or regulator which often called as Compliance Carbon Market (CCM). Carbon credit generated through emission reduction project then could be sold to other companies that required this credit to offset their emission.

The transaction of carbon credit is being conducted through an ETS or Emission Trading System. There are several ETS being implemented globally, e.g., European Union, China, South Korea, Switzerland, Mexico, United Kingdom, Japan, and Germany. The main advantage of ETS is its capability to incentivize ESG leaders and promotes low-carbon development in the area. Businesses that able to reduce their emission or generate carbon credits could gain financial benefit by selling its credits to other parties.

Further details on best practices of global Emission Trading System will be discussed on this policy brief.

Regulatory Requirement	Trade mechanisms	
Mandatory	Tradable Usually called Emission Trading System or Compliance Carbon Markets (CCM) 	Non-tradable Carbon Tax , usually collected by government either national or regional 
Voluntary	Voluntary carbon markets (VCM). This market mechanism typically follow international standards and tradable via offline trade or over the counter mechanism with price being agreed directly by buyer and seller 	Internal Carbon Pricing , mechanism that typically used by leading companies to put a value on its GHG emissions using TCFD guideline. Example of companies as follows: 

Types of Market Mechanism for Carbon Market. Source: Author, various press search (2022)

2. Tradable – Voluntary

This market is often called as Voluntary Carbon Market (VCM), where companies are not required by regulation to reduce their emission or generate carbon credit

Calculation method and standard for carbon credit generated are usually following established global standards, e.g., Gold Standard, Verified Carbon Standard (VCS), The Climate, Community & Biodiversity Alliance Standard (CCBA), or American Carbon Registry. The fund generated from these transactions could be used to scale up an existing project or create new projects that support emission reductions effort.

The advantages of VCM are its ability to enable investors both governmental or private businesses to voluntarily purchased verified carbon credits and contribute to emission reduction projects. Scaling up voluntary carbon market would help to unlock the full potential of carbon market and create liquidity in the market

3. Non-tradable – Mandatory

This mechanism is highlighted by carbon pricing that being applied to CO₂ emitters by government entities either national or regional. Furthermore, the credits could not be traded or sold to other parties.

One of the examples of this market mechanism is carbon tax that directly sets a price on carbon by defining an explicit tax rate on carbon emissions with unit measurement of tCO₂e.

There are increasing number of countries globally that have implemented and planning to implement carbon tax globally, e.g., Colombia, Mexico, South Africa, Switzerland, Canada, Sweden, Portugal, Iceland, Finland, Ireland, United Kingdom, India, Cote d' Ivoire, Norway, and Ukraine.

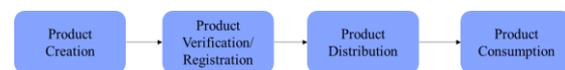
4. Non-tradable – Voluntary

This market type is actually not a “real” carbon market, as there is no transaction of pricing between buyer and seller. Also, there is no mandatory obligation by government or regulatory bodies with the activities are conducted on a voluntary basis by business players. One of the examples on this market is a mechanism called Internal Carbon Pricing (ICP), which is a tool an organization uses internally to guide its decision-making process in relation to climate change impacts, risks and opportunities

By applying an internal carbon pricing, companies could prepare for future change of regulations related to carbon price. In 2021, the average price of ICP being implemented by companies is ~USD 25/ton. There are multiples companies that are already implemented ICP in their organizations, mostly in the form of shadow pricing, e.g., Equinor, Teck, BHP, Rio Tinto, Hyundai, KIA, Nissan, Renault, Hitachi, LG, Mitsubishi Corporation, etc.

VALUE CHAIN OF CARBON MARKET

In this policy brief, author would like to assess current state of capabilities of Indonesia alongside value chain of carbon market.



Value chain of carbon market. Source: Author (2022)

- a. **Product creation** refer to activities where carbon credit is generated through carbon offset project or emission reduction efforts. Indonesia has latent potential with its abundant natural resources mainly from forestry and renewable energy. Indonesia have Nature Based Solutions (NBS) potential of 1.4 GtCO₂e per year makes it a world leader with potential value of ~\$4-6bn USD/year if being managed successfully (BCG, 2021). On energy source, Indonesia has 443 GW potential of renewable energy from solar, hydro, wind, bioenergy, geothermal, and tidal.
- b. **Product verification or registration** refer to Monitoring, Reporting, and Verification (MRV) activities which ensure accurate and transparent carbon credits. Indonesia currently still developing a national standard for carbon accounting through national system registry (“Sistem Registri Nasional” or SRN). This standard need to be aligned with international standards such as CDM, VCS, or Plan Vivo to ensure that carbon credits generated in Indonesia are being recognized by global organizations and could be integrated to international trading system.
- c. **Product distribution** refer to activities where carbon credits are being transacted through an exchange platform. Indonesia could explore several transaction types for its carbon market ecosystem. First is direct collection could be done via carbon tax or levy that businesses need to pay to the government entities.

Second, OTC (Over the Counter) where carbon credit transactions is being done directly between buyers and sellers without the supervision of an exchange. Currently, most of voluntary carbon market projects in Indonesia are using this method. Third is transaction through exchange market using a publicly available platform. Indonesia through ICDX group is preparing to set up a platform where carbon credits could be exchanged as commodity. This platform will enable transactions of spot, forward, and futures

- d. **Product consumption** refers to demand side of carbon credits. By setting a target and commitment for net zero, Indonesia could stimulate carbon credits demand domestically. This demand could come from compliance demand to meet regulations (e.g., ETS or carbon tax); voluntary demand of corporates aim to meet their climate goals and decarbonization targets; and investment. Recently, there is also trend of carbon credits being used as an asset class by financial actors, e.g., Toucan Protocol, a cryptocurrency trading platform, were one of the biggest buyers of carbon credits in 2021 with 17 million tons purchased.

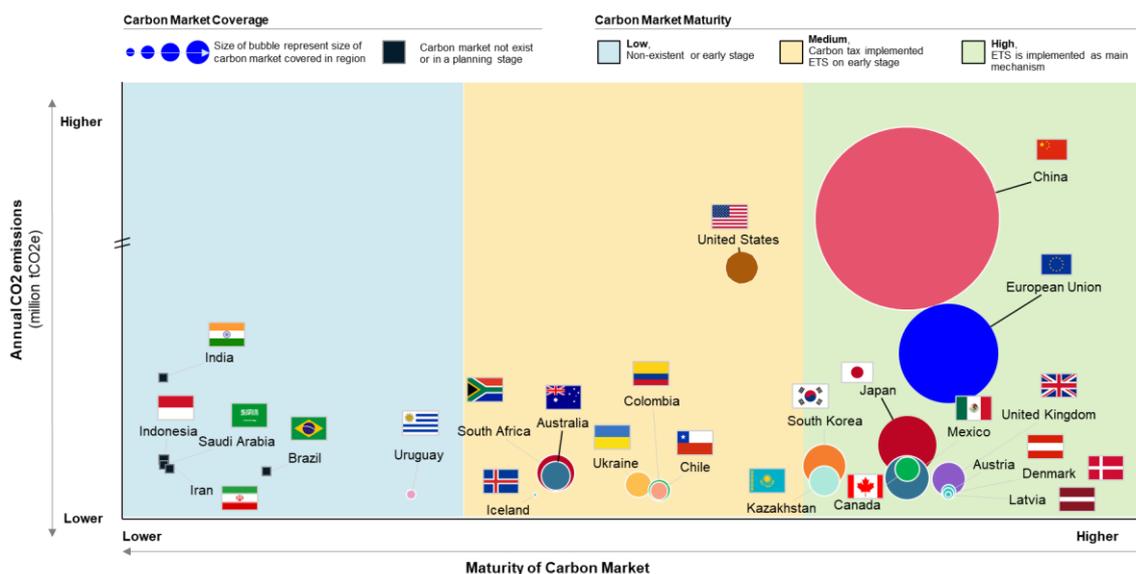
provide insight on how Indonesia could plan their implementation roadmap. Secondary data is gathered from research and publicly available data. Carbon maturity framework was developed to assess the maturity of carbon market in selected countries with their potentials. This framework was divided into 3 three main levers:

- **Maturity of Carbon Market (X-axis)**
 Defined as how developed the carbon market in the specific region. Weighted average scoring was used to assess this category, with components of availability of carbon tax, availability of ETS, number of year carbon market has been implemented, and coverage of carbon market (regional, national, or province level).
 Low maturity means carbon market is not yet exist or is still on planning stage. Medium maturity means carbon market has been implemented mainly in the form of carbon tax with ETS is still on early phase. High maturity means carbon market has been implemented in the form of ETS.
- **Annual CO2 emissions by country (Y-axis)**
 Defined as actual CO2 emissions of each country for 2021
- **Coverage by carbon market (size of bubble)**
 Defined as on actual emissions coverage by carbon market from respective countries with data acquired from publicly available data. Size of the bubble in the chart represent the size of emissions coverage

Global Best Practices on Carbon Market

CARBON MARKET MATURITY FRAMEWORK

Best practices from other countries that have implemented carbon market will be explored to



Carbon market maturity framework. Source: Press search, Our World in Data, ICAP, World Bank, author analysis (2022)

Based on this framework, 4 countries were selected as global benchmarking reference for carbon market development in Indonesia. European Union was selected as it is the most developed and mature ETS, while South Korea is selected as representative for developed countries. China and Mexico is also included as both have the high maturity carbon market and also a developing countries, which is similar to Indonesia.

BEST PRACTICES

Best practices are summarized from selected countries that are relevant and could be implemented to accelerate development of carbon market in Indonesia. These recommendations are divided into two main types: compliance and voluntary carbon market.

On development of compliance carbon market, following best practices could be implemented:

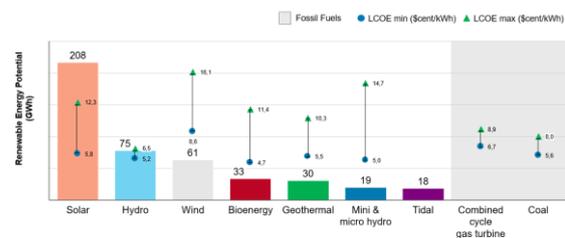
1. Create **synergy of standards** between national and global to ensure carbon credit being produced could be used for international trade activity
2. Rolling out **carbon tax in the pilot phase** will help Indonesia to build capability in required skills such as carbon accounting and MRV (Measurement, Reporting, and Verification)
3. **Setting up emission threshold for business** to be included in carbon pricing mechanism. This will simplify the process and provide transparency for businesses that will be impacted by the regulation
4. Explore options to **implement regional ETS** with focus in key industrial areas e.g., Greater Jakarta, East Java, or another industrial zone
5. **Phased implementation of ETS** with specific predetermined time frame and gradual scope increase
6. Establishment of carbon market supporting mechanism through **Market Stability Reserve** to avoid price volatility and addressing liquidity in ETS

Indonesia’s Voluntary Carbon Market (VCM) is expected to reach a value of IDR 60-85 trillion (\$4-6 billion) by 2030. This value could be unlocked by successful development of Indonesia’s **Nature Based Solutions (NBS)** and **renewable energy development**.

On NBS, Indonesia needs to formalize clear regulatory framework and simplify the permit required. State-owned enterprise could also actively participate and lead by example in NBS

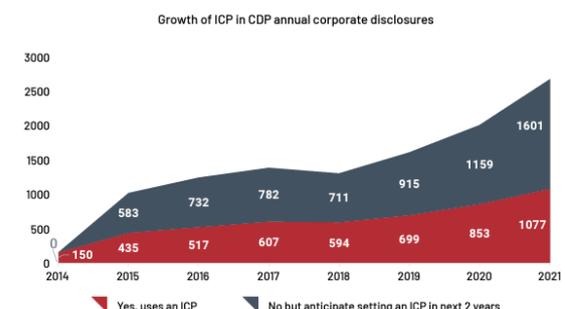
project development, e.g., synergy between Pertamina, Perhutani, Perusahaan Listrik Negara (PLN), PT Perkebunan Nusantara (PTPN), etc. This pilot project could stimulate further participation of private sectors in NBS related projects.

On renewable energy, there is an urgent need to decarbonize Indonesia’s power grid and switch to cleaner energy with lower LCOE (Levelized Cost of Electricity), e.g., solar, wind, and geothermal. Currently, LCOE of renewable energies are already competitive against fossil fuels and could become even lower in the future with technology development. Government through Ministry of Finances could also provide alternative funding support through Viability Gap Fund, ESG-linked financing to lower cost of capital for renewable energy development.



Indonesia’s renewable energy potential and its LCOE cost vs fossil fuels. Source: IESR, ASEAN Center for Energy, Indonesia’s National Energy Council (2022)

Business players could also participate by adopting **internal carbon pricing** to prepare for regulatory changes and net zero aspiration. Internal carbon pricing (ICP) traditionally is being used by companies to evaluate risks from a mandatory government regulation, however there is an increasing trend of ICP being used to manage long term climate risk and shifting toward low-carbon portfolio by increasing internal carbon emission reduction and energy efficiency initiatives.



Growth of ICP in CDP’s annual corporate disclosures. Source: CDP (2022)

By implementing an Internal Carbon Pricing, business players could get multiple advantages from preparing for future regulation, building internal capabilities, stimulating emission reduction effort, engaging stakeholders, securing a lower cost of fund from financial institutions, e.g., bank, private equity, or sovereign wealth fund

Recommendations

ENGAGEMENT OF KEY STAKEHOLDERS

Several stakeholders are identified from the research which could be categorized as shown in the picture below.

There are three main categories of stakeholders that need to be engaged from policy maker, business to independent organizations. Successful engagement between stakeholders will enable carbon market will be adopted faster by business players and accelerate the development of Indonesia’s carbon market.

This early engagement allows stakeholders to **provide feedback** throughout the process, **develop sense of ownership**, and also build positive momentum to pull and **secure buy-in** from other stakeholders.

Financial institutions could also play a role by providing access to ESG linked capital with lower interest on projects with good ESG impact to incentivize companies that are initiating stage phase-outs from carbon-intensive businesses

CENTRALIZED COMMUNICATION CHANNEL

One of the key levers for successful carbon market implementation is clarity of regulatory framework and policy from government. As of now, there are multiple regulations and guidelines released by different ministries, creating a confusion for business players. For example, Ministry of Forestry (“KLHK”) that currently becoming the focal point of carbon market regulation, has control over forestry and environment regulation, however it doesn’t have control over the other sectors e.g., mining, oil and gas, cement, industrial, etc. This could pose a challenge later in the implementation stage.

Therefore, there is a need to select government institutions that has authority over other ministries, for example Kemenko Marves (Coordinating Ministry for Maritime & Investment Affairs) that has authority over other ministries, e.g MEMR (Ministry of Energy and Mineral Resources), KLHK, BKPM (Ministry of Investment or Investment Coordinating Board), Kemenparekraf (Ministry of Tourism and Creative Economy), etc. This institution then could act as independent institutions that will prepare regulation and oversee carbon market deployment in Indonesia.

Alternatively, government of Indonesia could also create a new coordinating entity that will be responsible for carbon market development that ensure **centralized communication channel** under single institution. This will create **transparency** and provide **clarity** for business players to act into.

Based on types	Based on influence or interest		
	High		Low
	Primary Stakeholders	Secondary Stakeholders	Tertiary Stakeholders
Policy Maker	Ministries in Indonesia 	Ministry of Industry and Commerce 	Indonesia’s House of Representatives
Businesses	Financial Institutions Businesses on emission-intensive sectors Traders (institutional or retail)	Brokers & exchangers Businesses on less emission-intensive sectors 	Business groups, e.g., Chamber of Commerce, B20 group
Independent Organizations	Carbon standards organizations 	Auditor (validators and verifiers) Environmental NGO and Public 	Research institute Academic institute (ITB, etc.)

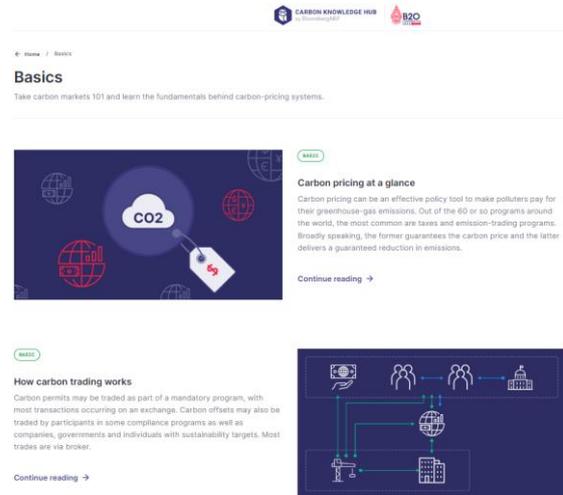
Example of key stakeholders in Indonesia’s carbon market (Author, 2022)

PUBLIC-PRIVATE PARTNERSHIP

Public and private sector could work together in a joint taskforce team to ensure smooth roll out process of carbon market. Participation from business players could help on **accelerating knowledge and capability building** to level the playing field and reduce gap between Indonesia and other countries.

These initiatives could be seen in multiple sharing session conducted by B20 in 2022 on carbon market and creation of Carbon Knowledge Hub. Sharing session conducted by these practice experts enable all stakeholders to build collective knowledge and engage future generation to become active participant of upcoming carbon market.

Furthermore, Carbon Knowledge hub developed created through collaboration between the Indonesian Chamber of Commerce and Industry (KADIN) and BloombergNEF, provides the knowhow and insights on how to navigate the carbon markets.



The screenshot shows the 'Basics' section of the Carbon Knowledge Hub website. It includes a navigation bar with 'Home / Basics', a sub-header 'Basics' with the text 'Take carbon markets 101 and learn the fundamentals behind carbon-pricing systems.', and two article cards. The first card is titled 'Carbon pricing at a glance' and describes carbon pricing as an effective policy tool. The second card is titled 'How carbon trading works' and explains that carbon permits can be traded as part of a mandatory program.

Carbon Knowledge Hub as part of Carbon Centre of Excellence. Source: B20 (2022)

Business players could also participate by becoming an **advisory body** in Indonesia's carbon market development or **driving technological innovation** in Monitoring, Reporting, and Verification (MRV) process of CO₂ emission.

This Policy Brief is the result of a desk study as a part of Final Project on SBM Jakarta Master of Business Administration program study at the School of Business and Management, Institut Teknologi Bandung. The data presented are secondary data obtained from journals, webinars, references on the internet, and author analysis using several frameworks. Furthermore, primary interviews were conducted from August 2022 to January 2023 with multiple stakeholders from policy makers, business players from state-owned company to private company, and also independent stakeholders such as environmental NGOs and think-tank