# PROMOTING CLIMATE ACTION THROUGH NON-PRICING POLICY MEASURES

**An Inputs Paper Submitted by the Asian Development Bank**
**For the 2nd Sustainable Finance Working Group Meeting**
**21-23 March 2023**

**ASIAN DEVELOPMENT BANK**

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## ABBREVIATIONS

| | |
|---|---|
| ADB | Asian Development Bank |
| $CO_2$ | carbon dioxide |
| EITE | emissions intensive trade exposed industries |
| ETS | emissions trading system |
| EU | European Union |
| GDP | gross domestic product |
| GHG | greenhouse gas |
| ODC | ozone depleting substances |
| REC | renewable energy certificate |
| ROK | Renewable Obligation Certificate |
| RPO | Renewable Purchase Obligation |
| RPS | renewable portfolio standard |
| R&D | research and development |
| TPS | Tradable Performance Standards |
| TRC | Tradable Renewable Certificate |
| OECD | Organisation for Economic Co-operation and Development |
| UK | United Kingdom |
| US | United States (of America) |

# INTRODUCTION

1. The urgency to effectively tackle climate change requires the development of a coherent climate policy mix adapted to national circumstances and aligned with national priorities. The policy mix should not only enable reduction of greenhouse gas (GHG) emissions but also ensure that the transition to a low-carbon and climate resilient future is just, affordable, inclusive, and politically feasible.

2. A coherent climate policy will usually require multiple policy levers involving pricing and non-pricing measures, depending on individual country circumstances, the aim of the policy intervention and the political and economic context. Prioritization, sequencing, and the complementarity of these two types of measures will vary across countries. Separately, policy levers can be sector-specific or encompass a wide range of sectors, and there needs to be a combination of both scopes of intervention, designed to complement each other, to effectively reduce GHG emissions.

3. Implementing an effective climate policy is still hampered by existing policy frameworks and economic interests continuing to be geared toward fossil fuels (coal, oil, and natural gas) and carbon-intensive activities that have fueled global economic development for centuries. Intentionally or not, this creates a misalignment between existing policy frameworks and climate objectives, hindering low-carbon investment and consumption choices.[1] Research shows that there is a need for multiple measures, including both pricing and non-pricing climate policy measures, to avoid path dependencies and lock-in of long-lived, high-carbon assets.

4. Non-pricing tools can play a critical role in reducing emissions and lowering the social and political cost of carbon emissions, especially in countries where typical pricing instruments are difficult to implement due to domestic political, economic, institutional, and social constraints. Higher carbon prices may deliver more emission reductions faster, but national political economy constraints may make this approach difficult to implement, and there are significant challenges in adopting or creating a high carbon price in the short term amid rising inflationary and macroeconomic pressure, particularly in developing countries.

5. The aim of this paper is to explore the role of non-pricing measures in supporting countries to reduce their GHG emissions and achieve national and sectoral climate mitigation targets. A great variety of non-pricing measures exist, and they can have a key role in promoting climate action and sustainable development by enabling low-carbon development as measures that are environmentally effective. One advantage of these measures is that their costs to economic agents are less visible than those of carbon pricing, making them easier to implement politically.[2] The paper provides an overview of non-pricing measures and examines their respective merits as a part of the broader national climate policy architecture. It also provides specific discussion of non-pricing measures taken by various countries, developing and developed, in pursuit of adopting low-carbon pathways.[3]

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[1] Organisation for Economic Co-operation and Development (OECD), International Energy Agency (IEA), Nuclear Energy Agency (NEA), and International Transport Forum 2015. *Aligning Policies for a Low-carbon Economy*. Paris.
[2] D. Furceri, M. Ganslmeier, and J. D Ostry. 2021. Are Climate Change Policies Politically Costly? *IMF Working Papers* No. 21/156. https://www.imf.org/en/Publications/WP/Issues/2021/06/04/Are-Climate-Change-Policies-Politically-Costly-460565.
[3] Carbon pricing measures are not under the scope of this study but have been referred to in instances where they can complement non-pricing measures.

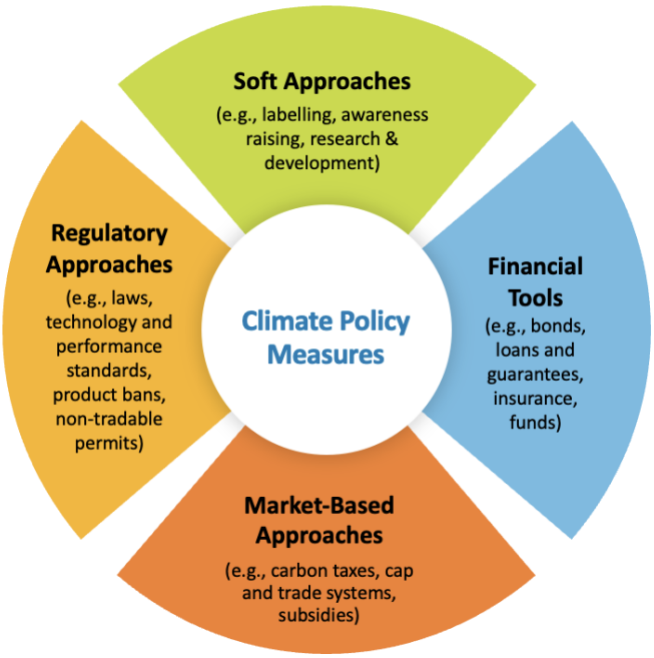
6. The paper illustrates if, and under what circumstances, non-carbon pricing measures can be effective for reducing GHG emissions. A key issue is whether non-price measures can influence public behavior—businesses and households—to reduce GHG more effectively than pricing measures. It is in this context that the paper explores the role of non-pricing climate measures in supporting countries to reduce their GHG emissions, achieve climate ambitions, and promote sustainable development. It also provides specific discussion of non-pricing measures taken by various countries, developing and developed, in pursuit of adopting low-carbon pathways.

## THE LANDSCAPE OF NON-PRICING CLIMATE POLICY MEASURES

7. Every climate policy measure can be designed well or poorly – to be stringent or lax, politically attractive or unattractive, feasible or infeasible to implement. Another critical component of policy design is fairness or justice, as policies can be designed to be more or less equitable. It is often argued that along with a focus on designing individual policies, mobilizing a range of policies in a policy mix in alignment with each other is preferable to implementing single policy instruments. Comprehensiveness in coverage, consistency of policies with the overarching vision and its objectives, and the need to pay close attention to how policies might interact are important design criteria.[4] There is a range of policy measures that can be used for climate change mitigation, and these generally fall within four categories—regulatory approaches, soft approaches, financial tools, and market-based approaches, as highlighted in Figure 1.[5]

[4] M. Pathak et al. 2022. Climate Change 2022: Mitigation of Climate Change—Technical Summary. In P. R. Shukla et al., eds. *Climate Change 2022: Mitigation of Climate Change*. Intergovernmental Panel on Climate Change. https://www.ipcc.ch/report/ar6/wg3/downloads/report/IPCC_AR6_WGIII_TechnicalSummary.pdf.
[5] This is a classification used by this paper while noting that all policies are regulatory.

**Figure 1: Landscape of Climate Policy Architecture**




**Source:** Asian Development Bank.

8. This paper employs the categorization on Figure 1, with a focus on the first three categories of climate policy architecture that relate to non-pricing measures. However, it is important to note that there are other ways of categorizing policy measures as well, so the scope of the categorization in this case is only to understand their broad landscape. The Intergovernmental Panel on Climate Change (IPCC), for example, classifies mitigation policies as economic instruments, regulatory instruments, and other instruments.[6] It is also possible to look at these instruments as "demand-pull" or "supply-push" instruments. Generally, "demand-pull" measures have been used to create and enhance the demand for alternative technologies. These include instruments such as feed-in tariffs, renewable energy certificates, standards, and regulations. "Supply-push" measures are used to correct market failures and help reduce the costs of producing a technology—for instance, investment subsidies and tax incentives, and public finance for research and development (R&D).[7]

## Regulatory Approaches

9. Regulatory approaches include non-tradable permits, technology standards, emissions and performance standards, and product bans. In contrast to carbon pricing, which relies on market-based incentives, regulatory approaches follow the command-and-control approach and are specific directives that require polluting entities to comply with the law.

[6] P. R. Shukla et al., eds. *Climate Change 2022: Mitigation of Climate Change*. Working Group III. IPCC.https://www.ipcc.ch/report/ar6/wg3/downloads/report/IPCC_AR6_WGIII_Chapter13.pdf.
[7] Asian Development Bank and Asian Development Bank Institute. 2012. *for Low-Carbon Green Growth in Asia: Policies and Practices*. https://www.adb.org/sites/default/files/publication/159319/adbi-low-carbon-green-growth-asia.pdf.

10. Some regulations can take the form of technology standards that mandate the use of specified technologies or processes, such as carbon capture or fuel-switching, by all regulated entities. Alternatively, regulations can take the form of performance standards, which limit the quantity of emissions per unit of time or per unit of input or output—again, for all regulated entities, regardless of their marginal abatement costs. Standards can also come in the form of product standards, which are specifications and criteria for the characteristics of products. Process standards are criteria for the way the products are made.

11. A technology standard, as such, does not say anything about performance (levels of emissions or emissions intensity, in the case of air pollution). A technology standard will not have any emissions target, although the regulator's intention is to lower emissions, and the regulator may have some target in mind. Performance standards and technology standards are the inverse of each other, to a certain degree: a performance standard certainly has an emissions or emissions intensity target, by definition, but allows flexibility regarding technology choice, and a technology standard allows flexibility about emissions levels (although, the regulator would expect emissions to decrease with the mandated technology). Box 1 provides an overview of the Ontario Emissions Performance Standards Program.

**Box 1: Ontario Emissions Performance Standards Program**

Industrial establishments must adhere to an emission limit set each year by the Ontario emissions performance standards (EPS). Every year, the criteria are tightened, requiring emitters to either cut their emissions or pay for going over the limits.

The Emissions Performance Standards (EPS) Regulation (O. Reg. 241/19) under the Environmental Protection Act, regulates greenhouse gas (GHG) emissions from large industrial facilities. The program, which became effective on 1 January 2022, is intended to: (i) encourage the industrial sector to reduce GHG emissions, and (ii) minimize competitiveness impacts and carbon leakage—the risk of production leaving Ontario for other jurisdictions with less stringent climate policies.

The GHG reporting program is an integral part of Ontario's EPS program as it provides verified emissions, production, and emissions limit data for all registrants in the EPS program. These data are then used to determine a facility's compliance obligation or the number of emissions performance units (EPUs) it is eligible to receive for emitting less than its emissions limit. The facilities have the option of either banking their EPUs to offset excess emissions in the future or selling them to other facilities that fail to meet their GHG emissions limit. This means that while the Ontario EPS is a hybrid pricing/non-pricing system, there is much to learn from the non-pricing element of the Ontario EPS.

Source**:** Ontario Government. Emissions Performance Standards program. https://www.ontario.ca/page/emissions-performance-standards-program.

12. Regulatory measures and standards generally provide some certainty of emissions levels, but their environmental effectiveness depends on their stringency and efficacy in implementation (which is the case for all climate mitigation measures). They may be preferable when information or other barriers

prevent firms and consumers from responding to price signals.[8] To maximize affordability, performance standards can be tailored to the realities of each sector, including the availability of low-carbon solutions in the near-term and the pace of capital investment and infrastructure turnover in the sector.

13. Regulatory instruments play an important role in achieving specific mitigation outcomes in sectoral applications. Regulation is effective in specific applications and often enjoys greater political support but will cost more economically than pricing instruments. Flexible forms of regulation (e.g., performance standards) have achieved targets for renewable energy generation, vehicle efficiency, fuel standards, and energy efficiency in buildings and industry. Infrastructure investment decisions are significant for mitigation because they lock-in high- or low-emissions trajectories over long periods.[9] Box 2 provides insights on the successful case of utilizing regulatory approaches to phase-out ozone depleting substances, which come from several important sources of emissions across multiple sectors.

**Box 2: Regulatory Measures to Phaseout Ozone-depleting Substances**

Perhaps the most successful effort to reduce greenhouse gas (GHG) emissions is the Montreal Protocol. To date, the Parties to the Montreal Protocol have phased out 98% of ozone depleting substances (ODS) globally compared to 1990 levels. Because most of these substances are also potent GHGs, the Montreal Protocol is also contributing significantly to reducing GHG emissions. From 1990 to 2010, the treaty's control measures are estimated to have reduced GHG emissions by the equivalent of 135 gigatons of carbon dioxide, the equivalent of 11 gigatons a year.

Under the Montreal Protocol, all parties have specific responsibilities related to the phaseout of the different groups of ODS, control of ODS trade, annual reporting of data, national licensing systems to control ODS imports and exports, and related matters. Developing and developed countries have equal but differentiated responsibilities, but most importantly, both groups of countries have binding, time-targeted, and measurable commitments.

The phaseout of ODS have been implemented nationally using regulatory measures, for example, in Canada the European Union (EU) and Japan National implementation has also included soft policy measures. For instance, Malaysia's Phase-out Management Plan (for compliance with the 2013 and 2015 control targets for consumption of certain types of ODS according to the Montreal Protocol) comprises a combination of measures such as technology transfer investments, policies and regulations, technical assistance, training, awareness-raising, and communications.[a]

[a] Government of Malaysia and the United Nations Development Programme (UNDP). 2012. *Malaysia HCFC Phase Out Management Plan for compliance with the 2013 and 2015 Control Targets for Annex-C, Group-I Substances*.https://www.doe.gov.my/wp-content/uploads/2021/10/Malaysia-HPMP-Book-Final-R4-1-Part1.pdf.

**Source:** United Nations Environment Programme. Montreal Protocol. https://www.unep.org/ozonaction/who-we-are/about-montreal-protocol.

[8] S. Gupta et al. 2007. Policies, Instruments and Co-operative Arrangements. In B. Metz et al., eds. *Climate Change 2007: Mitigation*. Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. IPCC. https://www.ipcc.ch/site/assets/uploads/2018/02/ar4-wg3-chapter13-2.pdf.
[9] Footnote 4.

14. A renewable portfolio standard (RPS) is a regulatory mandate that typically requires a certain percentage of electric-power generation from renewable sources such as wind, solar, biomass, and other alternatives to fossil and nuclear electric generation.[10] It is also known as a renewable electricity standard. From the evidence of the United States (US), an RPS is most successful in driving renewable energy projects when combined with a production tax credit. States in the US often design them to drive a particular technology by providing "carve out" provisions that mandate a certain percentage of electricity generated comes from a particular technology (e.g., solar or biomass). US states can choose to apply the RPS requirement to all its utilities or only the investor-owned utilities. They can also define what technologies are eligible to count toward the RPS requirements.[11]

## Soft Approaches

15. Soft approaches include measures such as information campaigns, labelling, awareness-raising, and R&D. Information instruments, including public disclosure requirements, may affect environmental quality by promoting better-informed choices and lead to support for government policy. For example, although energy-efficient technologies offer advantages both in terms of reducing cost as well as environmental damage, research suggests consumers and businesses do not use it to the degree that would be justified, often referred to as “energy paradox.”[12] There is only limited evidence that the provision of information can achieve emissions reductions; however it can improve the effectiveness of other policies.[13] Box 3 provides insights from the United Kingdom on policy measures to educate planners and contractors on how to construct and maintain green buildings.

**Box 3: Educating Planners and Contractors on the Construction and Maintenance of Green Buildings in the United Kingdom**

Green building education and training are crucial for construction, renewable energy installations, waste and pollution reduction systems, and air quality inspections. To achieve a transition to dependable and secure low-carbon infrastructure, many of these call for rigorous qualifications and state-of-the-art techniques.

Although perhaps indirectly relevant to governments, the case of the World Green Building Council provides an example on how soft approaches can be implemented, including on their relevance to inter sectoral influences. The World Green Building Council was started in the United Kingdom and now has offices worldwide. It provides a wide range of studies, seminars, and awareness campaigns on the importance and cost-effectiveness of green buildings. It has launched the Net Zero Carbon Buildings Commitment, which calls on cities, regions, states, and companies to commit to achieving net-zero operating emissions by 2030 and net-zero buildings by 2050. To date, 35 countries use GBC expertise to green their buildings at the local or national level, and 42 stakeholders, including national building councils from various countries, have signed the Net Zero Carbon Buildings Commitment, committing to reduce carbon dioxide ($CO_2$) emissions by 221 million tons of $CO_2$ equivalent, equal to taking 47.3 million cars off the road each year.

[10] National Renewable Energy Laboratory (NREL). Renewable Portfolio Standards. https://www.nrel.gov/state-local-tribal/basics-portfolio-standards.html (accessed on 7 March 2023).
[11] Footnote 10.
[12] T. D. Gerarden, R. G. Newell, and R. N. Stavins. 2017. Assessing the Energy-efficiency Gap. *Journal of Economic Literature*. 55 (4). pp.1486–1525.
[13] Footnote 8.

The Concrete Centre in the United Kingdom also offers advice on how to use concrete and masonry to build sustainable buildings that are highly energy-efficient, resilient, comfortable, and economical. To help with this, they have developed a set of resources and tools to go along with their online learning modules on concrete materials and design.

**Source:** OECD. 2023. Climate Policy Solutions. https://www.oecd.org/stories/climate-action/key-sectors/inform-and-educate-buildings

16. Voluntary agreements between industry and governments, which vary considerably in scope and stringency, raise awareness among stakeholders and have played a role in the evolution of many national policies. A few have accelerated the application of best available technology and led to measurable reductions of emissions compared to the baseline, particularly in countries with traditions of close cooperation between government and industry. However, there is little evidence that voluntary agreements have achieved significant reductions in emissions beyond business as usual. The successful programs all include clear targets, a baseline scenario, third party involvement in design and review and formal provisions for monitoring.[14]

17. Labelling is useful in combination with a regulatory (standards) approach. By establishing minimum requirements for a variety of energy usages, the government can push the market to produce more efficient products. Labeling these products empowers consumers to make more informed decisions about how the products they buy will impact the environment. Box 4 provides insights from the Standards and Labeling Scheme (S&L) implemented by the Bureau of Energy Efficiency (BEE) in India.

**Box 4: India's Standards and Labeling Scheme**

The Government of India set up the Bureau of Energy Efficiency (BEE) under the provisions of the Energy Conservation Act, 2001 with the primary objective of reducing the energy intensity of the Indian economy. The Standards and Labeling Scheme (S&L) is one of the major thrust areas of BEE. Launched in May 2006, it aims to give the consumer an informed choice about the energy saving and thereby cost saving potential of marketed products.

The scheme established minimum energy performance standards and requires high-energy end-use equipment and appliances to display energy performance labels. The scheme uses a star rating, from 1 to 5 in the ascending order of energy efficiency, on products registered with BEE. The star or energy labeling is based on standards that prescribe limits on energy performance (usually maximum use or minimum efficiency) based on specified test protocols and describe energy performance in terms of energy use, efficiency, or energy cost.

The appliances covered under the S&L scheme include products on which labeling is mandatory, alongside products on which labeling is voluntary. The following products are required to display labels: frost free (no-frost) refrigerators; tubular florescent lamps; room air-conditioners (cassette, floor standing tower, ceiling, corner); distribution Transformers; direct cool refrigerators; and color TVs. Meanwhile, displaying labels are voluntary for products including electric geysers, induction motors, agricultural pump sets, ceiling fans, liquefied petroleum gas stoves, and washing machines.

**Source:** Government of India, Ministry of Commerce and Industry, Department of Commerce, Bureau of Energy Efficiency. India Standards Portal. http://www.indiastandardsportal.org/standardbodiecontent.aspx?StandardBodyId=3.

[14] Footnote 8.

18. Labelling can also be used, outside directly impacting GHG emission sectors, such as by targeting resource efficiency amid the backdrop of increasing materials use and waste generation, which are putting growing pressure on environmental systems.[15] Paucity of information, information asymmetries, and competency gaps are considered key barriers toward increased resource efficiency and circularity, causing sub-optimal decision-making along all phases of the value chain.[16] Upstream in the value chain, firms may miss opportunities to more resource-efficient procurement from higher tiers. At the consumption stage, consumers make misinformed purchasing decisions, leading to market inefficiencies and increased environmental externalities. Further downstream, recycling firms are unable to process potentially valuable secondary material, which can be due to missing information on waste streams and their material composition.[17] In the public sector, these information deficiencies inhibit the greening of public procurement toward more resource efficient and circular products.[18] Box 5 shares insights on circular economy labels and information schemes (CELIS) and how they can be designed to address some of these barriers.

**Box 5: Circular economy labels and information schemes**

Circular economy labels and information schemes (CELIS) compose the group of labels, certifications, and standards of information schemes that fully or at least partially address one or more resource efficiency or circular economy elements. CELIS can be quite helpful in promoting circular economy. They can give market actors the power to categorize and judge products based on their environmental performance, which promotes market growth and innovation in resource-saving goods and services. Information systems also improve supply chain management and let businesses recognize environmental risks and repercussions throughout their supply networks.

CELIS can be broadly divided into information systems facilitating the flow of information between businesses (B2B) and consumer oriented (B2C) labels. The design and information content of the information system varies per target group. While B2C labels usually provide consolidated and simplified information to improve the product clarity and comparability for consumers (e.g., European Union Ecolabel, Blauer Engel, or Nordic Swan labels), B2B information systems are typically more detailed and sophisticated (e.g., IMDS database or chemSHERPA).

There are already many labels, certificates, standards, and information systems that, at least partially, provide information about resource efficiency and aspects of circular economy. Especially in the last 2 decades, environmental labeling and information systems have multiplied and varied in scope, size, and nature. Labels and information systems focusing on certain natural resources and wastes grew at the same rate.

**Source:** F. Laubinger and P. Börkey. Labelling and Information Schemes for the Circular Economy. *Environment Working Paper* No. 183. OECD. 27 October.
https://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=ENV/WKP(2021)15&docLanguage=En.

[15] F. Laubinger and P. Börkey. 2021. Labelling and Information Schemes for the Circular Economy. *Environment Working Paper* No. 183. OECD. 27 October.
https://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=ENV/WKP(2021)15&docLanguage=En.
[16] Footnote 15.
[17] Footnote 15.
[18] Footnote 15.

19. The availability of infrastructure (such as cycle lanes or high-speed rail) and socio-cultural norms affect the likelihood of consumers changing their energy-use behavior. Changes are also only likely to happen at the level of individual citizens if governments bring about systemic changes on mobility and consumer awareness through effective policy. The gradual shifts in lifestyles and opinions needed for these changes will therefore require timely, clear, and consistent policy interventions and investment.[19]

20. Both economic and psychological research has shown that behavioral interventions—also referred to as nudges—can be powerful tools in shaping people's behavior in a variety of domains. According to Thaler and Sunstein, who were among those popularizing the term "Nudge Theory," a "nudge" is any form of choice architecture that alters people's behavior in a predictable way without restricting options or significantly changing their economic incentives.[20] To count as a mere nudge, the intervention must be cheap and require minimal intervention.[21] Non-pricing measures do not interfere with people's choice sets as strongly as, for example, taxes or bans on certain products. Consequently, policy makers are now exploring nudges as a cost-effective approach for reducing energy consumption.[22]

21. A considerable percentage of annual emissions in industrial countries is generated by residential energy consumption. In addition, private households are a prime target for behavioral interventions. Households may conserve energy in two ways: they can reduce their consumption of energy services, lighting use, for instance; or they can modify their purchasing behavior and invest in energy efficiency, for example by buying a highly efficient washing machine. Behavioral interventions with the aim of inducing energy conservation can therefore target either the purchase decision or more directly, the consumption behavior.[23] Box 6 provides insights from nudging commuters to move toward more sustainable transport options in the United States.

**Box 6: Nudging commuters to move towards more sustainable transport options in the United States**

In Durham, North Carolina, United States, city officials wanted to nudge commuters out of their single-occupancy cars and toward more sustainable options. In 2018, Durham used two different behavioral-economic strategies to urge 1,500 downtown workers to leave their cars at home. The first strategy involved participants providing their home and work addresses, and opting into receiving personalized maps with bike, bus, and walking routes. They were then emailed maps that compared the trip times using more sustainable transit methods with a reminder that they could save gas money and increase their physical activity if they did not drive to work. The maps also included some social norms influencing and this nudging worked better than the city initially expected. Employees who took part in the pilot were 12% more likely to use alternative methods of transit than the employees who did not have the nudge.

[19] D. Crow, L. Staas, and O. McAlinden. 2022. *Behavioural Changes*. Paris: OECD and the International Energy Agency.
[20] R. H. Thaler and C. S. Sunstein. 2008. *Nudge: Improving Decisions about Health, Wealth, and Happiness*. Washington, DC: Yale University Press.
[21] Footnote 20.
[22] M. A. Andor and K. M. Fels. 2018. Behavioral Economics and Energy Conservation—A Systematic Review of Non-price Interventions and Their Causal Effects. *Ecological Economics*. 148 (January 2018). pp. 178–210.
[23] Footnote 22.

The second intervention targeted city employees It not only nudged them toward more environment-friendly transport options but also rewarded them for taking the bus rather than driving alone through the GoDurham bus lottery. Bus riders were able to enter a lottery every week with a chance to win a cash prize. Commuters who participated in the weekly bus lottery said that they used car alternatives commuting by [car] alternatives 19% more, were happier, and experienced less stress during the pilot. The successful pilot activities earned the City of Durham $1 million from the Bloomberg Philanthropies Mayors Challenge competition. They will continue to nudge residents toward healthier, greener transit in the years succeeding the pilots.

**Source:** B. Gardner. 2019. Nudging for Sustainable Mobility. *Harvard University Data Smart Solutions*. 5 December. https://datasmart.hks.harvard.edu/news/article/nudging-sustainable-mobility

22. One must remember that with any policy instrument, there are challenges to nudging as well, stemming from the complexity of human behavior and the diversity of factors that influence it.[24] There is a growing body of research on the effectiveness of different kinds of nudges, suggesting that nudges have at least a small effect on behavior.[25] Nudging is being used as a policy measure in different countries and sectors to more systematically integrate behavioral insights into policy design and implementation, but the size of the effects of policy interventions and the actual outcomes of interventions in different contexts are very diverse.[26] As with many other policy tools, nudge tools are seen as a complement to the traditional policy instruments rather than as a substitute for laws and regulations and economic tools. As a complementary approach that addresses the shortcomings of nudges, Hertwig and Grüne-Yanoff proposed the concept of boosts, a decision-making aid that fosters people's competence to make informed choices.[27]

## Financial Tools

23. Financial tools and policies are frequently used by governments to reduce GHG emissions and stimulate the diffusion of new, less GHG-emitting technologies. While economic costs are generally higher for these than for other instruments, financial incentives are often critical to overcoming the barriers to the penetration of new technologies.[28] Government support, through financial contributions, setting standards, and market creation, is important to the promotion of technology development, innovations, and technology transfer.

24. One review examined 40 studies in 1991–2018 involving 886, 576 subjects and found that the most effective measure shown to reduce emissions were financial incentives for personal vehicles, defaults for reduced meat consumption (which is a type of nudge), and feedback for home energy use.[29]

[24] M. Lehner, O. Mont, and E. Heiskanen. 2016. Nudging–A Promising Tool for Sustainable Consumption Behaviour? *Journal of Cleaner Production*. 134 (Part A 15 October). pp.166–177.
[25] S. Mertens et al., 2022. The Effectiveness of Nudging: A Meta-analysis of Choice Architecture Interventions across Behavioral Domains. *Proceedings of the National Academy of Sciences*. 119 (1). p. e2107346118. and S. DellaVigna and E. Linos. 2022. RCTs to Scale: Comprehensive Evidence from Two Nudge Units. *Econometrica*. 90 (1). pp.81–116.
[26] Footnote 24.
[27] R. Hertwig and T. Grüne-Yanoff. 2017. Nudging and Boosting: Steering or Empowering Good Decisions. *Perspectives on Psychological Science*. 12 (6). pp. 973–986.
[28] Footnote 8.

25. There is a landscape of financial tools and policies that can be utilized by countries to spur climate action, reduce GHG emissions, and advance sustainable development. This ranges from bonds, which include multiple types and labels such as sovereign bonds issued on international and domestic markets, diaspora bonds, green bonds, or development impact bonds, which can be designed and implemented to serve a variety of purposes. Loans and guarantees can also play a very important role, particularly in countries where the bond market is not very mature. This can range from accessing loans and guarantees from international markets such as development banks, or for central banks to create facilitative policy environments such as through creating green finance policies and roadmaps, green lending guidelines, priority sector lending facilities, etc. Policies surrounding insurance, establishment of funds, or guidelines and policies for environments to access funds such as the Green Climate Fund (GCF) can also play a critical role in scaling finance as a non-pricing measure to enhance and promote climate action. A typical financing toolbox has been provided in Table 1.

**Table 1: Typical Financing Toolbox**

| | |
|---|---|
| **Bonds** | • Sovereign bonds issued on international and domestic markets<br>• Diaspora bonds<br>• GDP-linked bonds<br>• Green/blue bonds<br>• Social impact bonds<br>• Development impact bonds |
| **Loans and guarantees** | • Loans (including: multilateral and bilateral development banks, other official flows (OOFs), counter-cyclical loans, contingent credit facilities, development policy loan deferred draw-down options, catastrophe risk deferred, drawdown options, debt buy backs, debt-swaps, blended finance, public–private partnerships, and guarantees) |
| **Insurance** | • Weather index-based insurance<br>• Catastrophe Risk Insurance Facility |
| **Funds** | • Vertical Funds (e.g., GAVI Alliance, Global Fund and UNITAID, Adaptation Fund, Global Environment Facility, Green Climate Fund, Securities, and structured funds)<br>• Microfinance investment funds |
| **Grants** | • Official Development Assistance (ODA)<br>• Philanthropic and other private donations |

GAVI Alliance = Gavi, the Vaccine Alliance, GDP = gross domestic product.
Source: United Nations Development Programme.

26. Central banks and ministries of finance play a particularly important role in designing policy measures that can impact sustainable finance investment decisions, both directly (i.e., directly impacting the availability of finance or cost of finance for sustainable projects) or indirectly (i.e., affecting the mobilization of finance by influencing the revenue, cost, profitability, and bankability of projects).

27. An Asian Development Bank (ADB) study that undertook a survey among 18 central banks from Asia and the Pacific highlighted that survey respondents believe that they should be playing a key role in promoting green finance and sustainable funding options, either through amending the regulatory framework, encouraging green loans and products, or introducing climate change considerations in their monetary and financial policy operations.[30]

28. Central banks and financial institutions can also be a part of international initiatives which are playing a key role in supporting the creation of an enabling environment for financial tools to support climate action and sustainable development. In June 2022, the Glasgow Financial Alliance for Net-Zero launched its Asia Pacific Network to support engagement with financial institutions and policymakers across the Asia Pacific region, incorporating feedback and ensuring its work on net zero is inclusive and applicable to all.[31] It aims to enable mutual knowledge-sharing and open dialogue on the opportunities and challenges of net zero, to ensure a truly global green transition. Similarly, the Network for Greening the Financial System, which is a coalition of the willing, gathering central banks and supervisors, on a voluntary basis, is working to share best practices and contribute to the development of environment and climate risk management in the financial sector.[32] It also seeks to mobilize mainstream finance to support the transition toward a sustainable economy. Box 7 provides insights on what Indonesia has been doing, including the range of policies introduced in Indonesia, to advance sustainable finance, through insights from the Sustainable Banking and Finance Network.

**Box 7: Indonesia's sustainable finance policies**

Indonesia is a member of the Sustainable Banking and Finance Network (SBFN) and is committed to moving its financial sectors towards sustainability, with the twin goals of (i) improving the management of environmental, social, and governance (ESG) risks—including climate risks—across the financial sector; and (ii) increasing capital flows to activities with positive environmental and social impacts, including climate change mitigation and adaptation. The primary organizations involved in promoting sustainable finance in Indonesia include Indonesia's Financial Services Authority, the Central Bank of Indonesia, the Ministry of Environment Affairs and Forestry, and the Ministry of Finance.

Indonesia has continued to make significant progress in sustainable finance and is in the last stages of maturing sustainable finance into its financial system based on the SBFN progression matrix. In 2021, the Indonesia Financial Services Authority (OJK) issued the Sustainable Finance Roadmap Phase II (2021–2025) and continues to broaden and deepen the development of sustainable finance nationwide. Indonesia's sustainable finance framework addresses ESG integration, climate risk management, and financing sustainability. Its coverage has extended from just the banking sector to

[30] A. Durrani, U. Volz, and M. Rosmin. 2020. The Role of Central Banks in Scaling Up Sustainable Finance: What Do Monetary Authorities in Asia and the Pacific Think? *ADBI Working Paper* 1099. Tokyo: Asian Development Bank Institute. https://www.adb.org/publications/rolecentral-banks-scaling-sustainable-finance-asia-pacific.
[31] Glasgow Financial Alliance for Net Zero. Asia Pacific Network. https://www.gfanzero.com/asia-pacific-network/
[32] Network for Greening the Financial System. https://www.ngfs.net/en

the rest of the financial sector ecosystem, including pensions, capital markets, and asset management. Consistent and authoritative data on ESG risk management and sustainable finance flows has started to become available, particularly in the banking sector. A national green finance taxonomy was launched in January 2022.

The national strategies, roadmaps, policies, voluntary principles, regulations, guidelines, research, templates, and tools that provide an enabling framework for sustainable finance in Indonesia are shown in the following figure.

**Figure:** Indonesia's non-pricing financial policy efforts to create an enabling environment for sustainable finance


Source**:** International Finance Corporation and SBFN. 2022. *Indonesia Country Progress Report: Supplement to the 2021 Global Progress Report of the Sustainable Banking and Finance Network*. March https://sbfnetwork.org/wp-content/uploads/pdfs/2021_Global_Progress_Report_Downloads/2021_Country_Progress_Report_Indonesia.pdf.

29. Within policies to attract sustainable finance, green bonds (also including climate bonds or sustainability bonds) are a relatively novel financial tool that have gained much attention in recent years. It is differentiated from a regular bond by its green label, which signifies a commitment to exclusively use the funds raised to finance or re-finance "green" projects, assets, or business activities. Green bonds have the potential to provide low-cost, long-term sources of debt capital; they can directly finance or refinance investments, and can allow for "recycling" of loans, leading to increased lending. Bonds can also tap into a deep global pool of capital with a diverse base of investors.[33] There is considerable experience within the G20 countries to utilize green bonds as a key financial tool to raise funds for green projects. Box 8 provides an example of financial policies surrounding green bonds in the People's Republic of China (PRC).

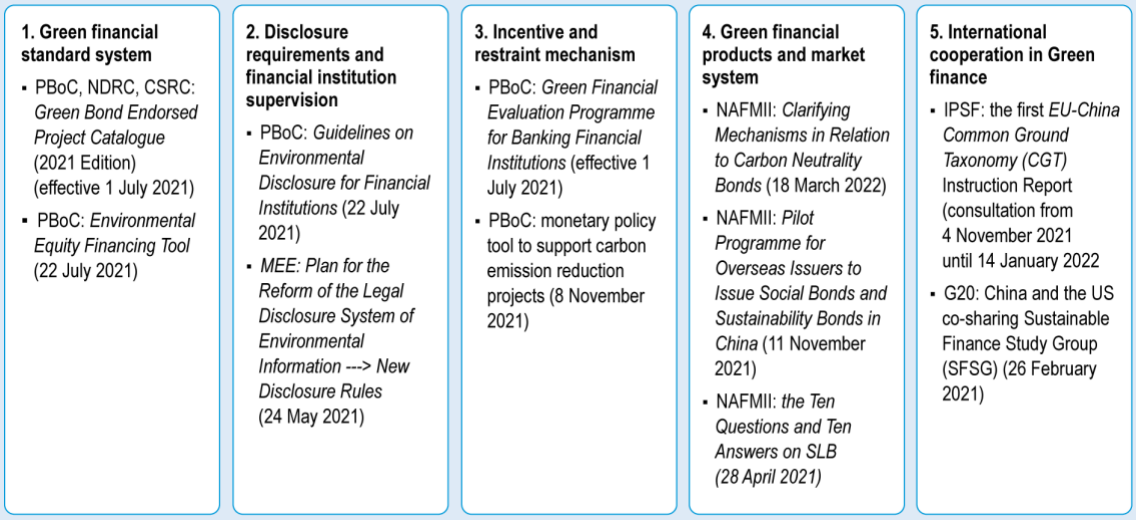
**Box 8: Green financial policy and green bonds in the People's Republic of China**

[33] OECD. 2016. *Mobilising the Debt Capital Markets for a Low-Carbon Transition*. Green Finance and Investment. Paris: OECD Publishing.

The People's Republic of China (PRC) has seen a vigorous expansion of its green bond issuances over recent years. Cumulative issuance of green bonds by Climate Bonds definition reached nearly $200 billion (CNY1.3 trillion) at the end of 2021. Annual issuance made a record high to $68.2 billion (CNY440.1 billion), up 186% from the previous year. The PRC ranked the second-largest green bond market in the world by both accounts. The PRC's green bond issuance grew the most among major markets in 2021. The surge was mainly spurred by the influx of new issuers, mostly nonfinancial corporates from the industrials and utilities groups. Issuance from non-financial corporates surpassed financial corporates to be the top supply of the PRC green bonds. Over 60% of overall use-of proceeds (UoP) went to renewable energy, reflecting robust investments to transform the nation's energy consumption structure.

Several mechanisms covering standards, disclosure, incentives, products, and international cooperation have played a key role in the scaling of the green bond market in the PRC. The foundation of this comes from the 2016 Guidelines for Establishing the Green Financial System, which marked the official start of the PRC's green finance market, endorsing activities supporting environmental improvement, climate change mitigation and more efficient resource utilization. This approach has led to tremendous growth in green financial products (including green bonds) underpinned by a continuous revision of green financial policies. The detailed green financial policy frameworks introduced across five different themes, that underpin the green bond market in the PRC has been visualized in the following figure.

**Figure:** Green finance policy framework in the People's Republic of China (PRC)




CSRC = China Securities Regulatory Commission, IPSF = International Platform on Sustainable Finance, MEE = Ministry of Ecology and Environment of People's Republic of China, NAFMII = National Association of Financial Market Institutional Investors, NDRC = National Development and Reform Commission, PBoC = People's Bank of China.

Source**:** Climate Bonds Initiative. 2022. *China Green Bond Market Report 2021*. https://www.climatebonds.net/resources/reports/china-green-bond-market-report-2021#:~:text=cbi_china_sotm_2021.pdf.

30. Financial tools are key for innovation. Policies for technology development and innovation typically focus on fostering links between industry and science. Public support for the transfer of technology comes in different forms and includes R&D cooperation centers, technology transfer offices, grants promoting cooperation between industry and science, innovation vouchers (which can be used

for specific purposes), exchange programs for people working in academia and industry, and information dissemination services.[34]

## DESIGN CONSIDERATIONS AND NATIONAL CIRCUMSTANCES

31. An important element in the policy mix, particularly on energy transition and decarbonization, is that reducing emissions seldom is the only policy objective. For instance, the reasons for increasing the share of renewable energy sources may vary between developed and developing economies. Developed nations are promoting clean energy technologies due to environmental concerns and international commitments, such as under the Paris Agreement. The reasons for developing economies to increase the share of renewable energy sources may be to enhance energy security (reduction in energy imports) and enable energy access.

32. Alongside the choice of non-pricing measures, it is imperative to identify what sector, or combination of sectors, such non-pricing measures should and can focus on. A focus on energy transition and decarbonization is important. However, other economic sectors are also important, including agriculture, forestry and other land use, building, industry, electricity and heat consumption, and transport.[35] Sometimes, there may be a need for cross-sectoral approaches as well as realizing that it's just not about implementing a single policy but creating a well-designed climate policy toolbox so policies can complement each other.

33. In the agriculture sector, for example, a mixture of approaches—regulatory; financial tools; and soft measures, such as labelling, information and awareness raising—are all essential and best undertaken in combination.[36] Lessons learned from the agricultural sector in the United Kingdom (UK) shows, firstly, that emissions related to production (agriculture) and consumption (dietary choices and waste) must be addressed together to reduce leakage. Otherwise, emissions will not be reduced in absolute terms but will simply be displaced to other countries or regions. For example, action to reduce consumption in one country can lead to increases in meat and dairy exports to another.[37]

34. In some sectors, development of the policy mix is done at the international level and supported through multilateral agreements. For example, through the combination of technical analysis and intergovernmental negotiations at the International Civil Aviation Organization, several policy measures have been combined to formulate a collective response by the aviation industry to the climate mitigation challenge.[38] The adopted policy mix includes soft approaches (an aspirational fuel efficiency target), regulatory approaches (a carbon dioxide [$CO_2$] emission standard for aircraft), as well as market-based approaches (cap on net $CO_2$ emissions). Some national governments have also put in place other policies to support the internationally agreed approaches, including measures to support the production and uptake of sustainable aviation fuels.

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[34] European Bank for Reconstruction and Development. 2014. Transition Report 2014: Innovation in Transition.
[35] OECD. Climate Action: Explore Policy Solutions by Key Economic Sector. https://www.oecd.org/stories/climate-action/key-sectors/.
[36] T. Garnett. 2012. *Climate Change and Agriculture: Can Market Governance Mechanisms Reduce Emissions from the Food System Fairly and Effectively?* London: International Institute for Environment and Development.
[37] Footnote 36.
[38] International Civil Aviation Organization Assembly. 2022. 41st Session Resolutions. October.

35. National circumstances will play a critical role too. Sectoral systems are often different in different countries, including for example, the role of state-owned enterprises in energy systems. Non-pricing measures cannot be designed in isolation from the broader socioeconomic and political structure and priorities of the countries. It is therefore critical to ensure measures are contextualized based on national circumstances and priorities of the countries. Another key element on this is a focus on sub-national levels and cities; measures need to be targeted to ensure they are in line with priorities and circumstances in the sub-national level and designed in close coordination with local stakeholders.

36. Cases where privately optimal choices are different from economically efficient choices, are known as market failures. In such cases, policy intervention can improve net social welfare if the cost of implementing the policy is less than the gains from improved outcomes.[39] Understanding the specific market failures that exist within a sector (considering the relevant geographic and product market) based on a detailed understanding of how the specific market works is essential for identifying the desired policy intervention for improving outcomes.[40]

37. Stakeholder engagement and proper communication of the non-pricing measure, irrespective of the choice of the instrument, will be key, as they are with any policies. But this is particularly the case with climate policy, and while non-pricing measures are often less politically sensitive than pricing measures, certain regulations may create instability and stakeholder opposition. The transformative change required to reach the temperature goals of the Paris Agreement is bound to have significant impacts on infrastructure, household consumption, travel patterns, building design and urban development, and work force patterns. An affordable and just transition require that policy measures ensure affected individuals' and households' rights and their continued ability to make a living, even as society undergoes transformational change. Not doing so may lead to political risks when implementing policies to reduce emissions.

38. Higher energy costs can have an adverse effect on the distribution of welfare in the absence of countervailing policies. The negative impact is inversely correlated with the level of income and positively correlated with the share of energy in the households' budget, which is high for low- and middle-income households.[41] Moreover, climatic conditions and the geographical conditions of human settlements matter for heating and mobility needs. Medium-income populations in the suburbs, in remote areas, and in low-density regions can be as vulnerable as residents of low-income, urban areas. Poor households with low levels of energy consumption are also impacted by price increases of non-energy goods caused by the propagation of energy costs.[42]

39. Driving innovation in the system itself, i.e., market structures, business organization, as well as in development and cost reduction of system critical components such as flexible dispatch, system

[39] K. Gillingham and J. Sweeney. 2010. Market Failure and the Structure of Externalities. In B. Moselle, A. J. Padilla, and R. Schmalensee, eds. *Harnessing Renewable Energy in Electric Power Systems*. Routledge. pp. 69–91.
[40] J. Tirole. 2014. Market Failures and Public Policy. *The American Economic Review*. 105 (6). pp. 1665–1682. https://www.jstor.org/stable/43495435.
[41] H. De Coninck et al. 2018. Strengthening and Implementing the Global Response. In V. Masson-Delmotte et al., eds. *Global Warming of 1.5°C: An IPCC Special Report on the Impacts of Global Warming of 1.5°C above Pre-industrial Levels and Related Global Greenhouse Gas Emission Pathways, in the Context of Strengthening the Global Response to the Threat of Climate Change, Sustainable Development, and Efforts to Eradicate Poverty*. IPCC.
[42] Footnote 41.

capacity, and storage, is a significant challenge.[43] Substantial additional investments in, and policies for, R&D are needed to ensure that technologies are ready for commercialization to stabilize of GHGs in the atmosphere.[44]

40. Technological innovation on climate mitigation is believed to be hampered by several factors, including the combination of underpricing of carbon emission and knowledge spillovers that benefit firms other than the inventor.[45]

41. The IPCC identified three distinct innovation phases that include research and development, demonstration, and deployment and diffusion.[46] There can be significant differences between each innovation phase in terms of activities, actors, and actions. The types of policy intervention needed to correct for the market failures may therefore differ significantly by the innovation phase, technological readiness level, as well as the specific market circumstances under consideration.

42. Non-pricing measures are suitable for the lower-middle income countries and least developed countries, both as independent measures that may be more effective and favored as alternatives in some circumstances, as well as complementary and supportive to carbon pricing measures.

43. Persistent market and regulatory failures in developing countries that are well-documented in the energy, environment, and development economics literature, are initially the same as those in the developed economies. They include capital intensiveness of low carbon investment, lack of information, imperfect regulation of energy prices, instability of international fossil fuel prices, and learning externalities in relation to the clean innovations process. [47]

44. All these obstacles are exacerbated in emerging economies, and even more so in less developed countries. For example, investment in low carbon equipment is more restricted due to the greater constraint on financial resources, given limited access to financial markets in the context of recurring public debt crises. The environment for investing in low-carbon options is more uncertain than in developed countries, with many regulatory uncertainties in different sectors and many other price uncertainties (property and land prices, interest rates, exchange rates).[48]

45. While the choice of the instrument is a national prerogative, it is important to understand the need for complementary policy measures and ensure that focus is on the policy toolbox as opposed to a single policy. Complementary policy measures are necessary even if a country wishes to utilize a carbon pricing measure, for example to accelerate technology innovation and overcome behavioral barriers.[49] Flaws in carbon pricing systems have resulted in perverse incentives such as windfall profits

[43] Swedish Agency for Growth Policy Analysis. 2014. *Drivers and Barriers for a Transition to a Sustainable Energy System - An Analysis of the Electricity Market*. PM 2014:14. https://www.government.se/government-agencies/swedish-agency-for-growth-policy-analysis-growth-analysis/.
[44] Footnote 8.
[45] W. D. Nordhaus. 2011. Designing a Friendly Space for Technological Change to Slow Global Warming. *Energy Economics*. 33 (4). pp. 665–673. https://www.sciencedirect.com/science/article/pii/S014098831000126X.
[46] Footnote 6, Chapter 16, Innovation, Technology Development and Transfer.
[47] Footnote 22.
[48] Footnote 22.
[49] OECD and International Energy Agency (IEA). 2017. Real-World Policy Packages for Sustainable Energy Transitions: Shaping Energy Transition Policies to Fit National Objectives and Constraints. IEA Insight Series.

for companies receiving free allocation, negative policy interactions such as the waterbed effect (case study on renewable energy), or incidence of criminal and abusive market behavior (e.g., all experienced in the European Union Emissions Trading System). Non-pricing measures are critical in ensuring pitfalls of carbon pricing measures can be addressed.

46. It also goes the other way around as in certain instances, a non-pricing measure may require a pricing measure to be fully effective. Box 9 provides insights on the use of tradable performance standards in the transportation sector in the US, which is a hybrid instrument comprising of the non-pricing measure of performance standard incorporating trading, which is a pricing measure, while sharing insights on the importance of complimenting with a direct pricing measure to maximize policy effectiveness.

**Box 9: Tradable Performance Standards in the Transportation Sector in the United States**

The United States (US) has longstanding experience in utilizing tradable performance standard (TPS), with most prominence in the US electricity sector. Although there are fewer examples of utilizing TPS in the transport sector globally, the US also has experience in incorporating TPS into several of its. transportation programs. The most prominent example is the US lead phasedown in the 1980s that employed a TPS that rapidly drove the lead content of gasoline to negligible levels.[a]

Key recent examples of incorporating TPS in the US transportation system include regulations for greenhouse gas emissions from passenger cars and trucks (national), zero-emission vehicle programs (in 10 states), the Renewable Fuel Standard (national), and low-carbon fuel standards (in 2 states). TPS allows for equalization of marginal costs across eligible technologies and is therefore more efficient than pure regulations.

Sectoral TPS programs have high credit prices but low-price effects on products and provide strong incentives for upstream innovation and technology transformation. Unlike emissions pricing, however, they do not have a strong output effect: consumers do not bear the full cost of the pollution and do not have an incentive to reduce consumption of polluting products. Given that the expected carbon price may be too low to substantially affect transportation demand or technology change, combining TPS with a carbon price may be necessary to drive innovation and achieve a sustained low-carbon transformation in the sector.

[a] S. Kerr, R. G. Newell. 2003. Policy-Induced Technology Adoption: Evidence from the US Lead Phasedown. *The Journal of Industrial Economics.* 51 (3). pp. 317–343. https://www.jstor.org/stable/3569713.

Source: S. Yeh. 2021.Tradable Performance Standards in the Transportation Sector. *Energy Economics*. 102 (October 2021). p. 105490. https://www.sciencedirect.com/science/article/pii/S0140988321003765.

https://iea.blob.core.windows.net/assets/07a1adb2-b7a6-4f8c-bc5e-b40c19d7ef9a/Realworldpolicypackagesforsustainableenergytransitions.pdf.

**Case Study—Integrating Regulatory and Market-Based Measures in India: Increasing the Share of Renewable Energy**

47. India provides a salient case study on increasing the share of renewable energy by integrating regulatory and market-based measures.

48. Renewable energy projects are associated with high upfront (capital) cost and variable levels of energy generation due to varying availability of natural resources like solar radiation and wind velocity), which typically has led to a higher cost of energy generation. Some types of renewable energy have a limited ability to reach economies of scale, most wind and solar projects are limited to not more than few hundred megawatts of capacity. To make renewable power competitive with conventional power sources, countries across the globe have been supporting renewable energy with market-based and regulatory measures. The three main support mechanisms to finance renewable energy development programs are feed-in-tariffs (FiTs), tax incentives, and renewable energy certificates (RECs).[50]

49. Within this set of measures, it has been opined that the financial instruments have the maximum impact as they directly reduce the cost of installing renewable energy projects that enhance the financial viability and/or reduce the cost of energy generation. Research suggests that support through capital allowances is more efficient than the energy market in promoting renewable energy. However, in the case of developing economies, there are constraints in terms of availability of monetary resources at competitive terms due to competing demands from other sectors like education, healthcare, agriculture, and infrastructure. [51]

50. There has been a significant leap forward for renewable energy with India undertaking one of the world's largest renewable energy expansion programs in the world. India had announced a renewable target of 175 gigawatts (GW) by 2022 and has already achieved 89 GW as of September 2020.[52]

51. The growth of the renewable energy sector in India (especially grid-connected wind and solar photovoltaic technologies) can be attributed to a more pronounced role of non-financial instruments.[53] These non-financial instruments include wheeling and banking of power with grid, solar capacity auctions and bundling (with coal), citizens participation through green bonds and captive projects, renewable purchase obligations, and tradable green certificates. Some other measures include encouraging local manufacturing and provision of low-cost funds.[54]

[50] S. Thapar et al. 2016. Economic and Environmental Effectiveness of Renewable Energy Policy Instruments: Best Practices from India Renewable and Sustainable. *Renewable and Sustainable Energy Reviews*. 66 (2016). pp. 487–498. https://www.sciencedirect.com/science/article/abs/pii/S1364032116304397.
[51] Footnote 50.
[52] Government of India. 2021. Third Biennial Update Report to the United Nations Framework Convention on Climate Change.
[53] It should be noted that India also received support for wind and solar power through the Clean Development Mechanism, which is classified under support through a carbon pricing instrument.
[54] Footnote 50.

**Table 2: Examples of Renewable Energy Support Measures in India**

| | |
|---|---|
| **Round-The-Clock (RTC) Power Procurement** | India provides guidelines for procuring round-the-clock power from grid-connected renewable energy projects supported by conventional thermal power projects. The guidelines require that the generator shall supply dispatchable renewable energy power complemented with thermal power round-the-clock adhering to at least 85% availability annually and at least 85% availability during the peak hours. |
| **Distribution** | India has assisted the state and distribution companies in reducing the technical as well as commercial losses by providing the funds for strengthening and augmentation of distribution system, and by introducing aerial bundled cables and various antitheft means under its ongoing schemes. |
| **Renewable Purchase Obligations (RPOs)** | In continuation of the RPO targets, India has notified annual targets for a further period of 3 years from 2019–2020 to 2021–2022. Under the new targets, by 2021–2022, RPOs amount to 21.0%, of which 10.5% must be from solar. |
| **Renewable Energy Certificates (RECs)** | In an order dated 30 December 2019, the validity period of the RECs has been extended to 31 March 2020. |

Source: S. Thapar et al. 2016. Economic and Environmental Effectiveness of Renewable Energy Policy Instruments: Best Practices from India Renewable and Sustainable. *Renewable and Sustainable Energy Reviews*. 66 (2016). pp. 487–498. https://www.sciencedirect.com/science/article/abs/pii/S1364032116304397.

52. India has used many of these tools innovatively to achieve a significant growth in its renewable energy sector with a low dependency on financial support. These measures do not include carbon pricing, although they include market-based instruments such as trade with RECs.[55]

53. These measures have, among others, resulted in a total of 36.05 GW grid-connected solar power Projects and an installed wind energy capacity of 38.12 GW (as of 30 September 2020). This addition of renewable energy to the grid has resulted in 60 megatons (Mt) of $CO_2$ equivalent in total cumulative emission reductions from grid-connected solar power from 2014–2015 to July 2018. The solar target of 100 GW is expected to abate more than 170 $MtCO_2$ over its life cycle. Wind power development has led to an emission reduction of 188.08 $MtCO_2$ during 2014–2015 to July 2018.[56]

## CONCLUSION

54. There is a wide range of non-pricing measures available for countries to take advantage of as part of the broader climate policy architecture to promote climate action. These mostly fall under regulatory approaches, soft approaches, and financial tools.

55. This issue paper highlights examples where non-pricing measures, either in isolation or in combination with other policies as part of the broader climate policy architecture, can be effective in reducing GHG emissions and promoting climate action. The examples show that climate change

[55] Footnote 50.
[56] Footnote 52.

mitigation is possible, with significant impacts, by using non-pricing measures, though careful design considerations will be key.

56. Learning from country experiences while contextualizing those learnings to the unique national as well as sub-national circumstances and priorities will be essential to ensure the success of any non-pricing instruments. Alongside the identification of the non-pricing measures, stakeholder consensus, effective communication strategies, a focus on reducing distributional impacts, and enabling a just transition will be key. A focus on ensuring non-pricing measures is not implemented in isolation, but rather looked at as part of the broader climate policy toolbox cognizant of the need to ensure sector-specific design considerations; such a focus will be imperative for the success of non-pricing measures.

57. Countries in the progress of choosing appropriate policies have several instruments, measures, and tools to use. It could be useful to assess and evaluate all options, including combinations of policy measures, and, importantly, conduct assessments on the potential impacts of such choice before implementation.

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