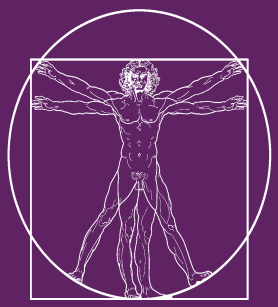

International bulk purchasing as an NMA

Using Article 6.8 of the Paris Agreement to reduce the cost of climate technology

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TABLE OF CONTENTS

SUMMARY

Article 6.8 of the Paris Agreement recognises the importance of "non-market approaches" (NMAs) to assist Parties in implementing their Nationally Determined Contributions (NDCs). The definition and scope of NMAs is very broad: they include all types of measures, instruments, and interventions that do not lead to a transfer of mitigation outcomes, and they cover mitigation, adaptation, finance, technology transfer, and capacity building. NMAs are by far the least well defined of the three Article 6 approaches. There is therefore a need to explore their potential in concrete terms, and with concrete examples.

In this policy brief, we describe a potential NMA related to finance, technology transfer, and capacity building support: international bulk purchasing of climate technologies. The idea is to learn from, and scale up, India's Unnat Jyoti by Affordable LEDs (UJALA) scheme. By reverse auctioning for more energy efficient LED bulbs, the UJALA scheme discovered a bulk procurement price significantly below the market price. To date, close to 370 million LED bulbs have been purchased by Indian households through UJALA, with estimated savings of more than 47.5 Terawatt-hours (TWh), equivalent to the annual electricity consumption of Portugal. The resulting emissions reduction of 38.5 million tonnes (Mt) of carbon dioxide annually make this a striking story of technology transition in a developing country.

Bulk purchasing technology under NMAs could help developing countries, especially Least Developed Countries (LDCs) and Small Island Developing States (SIDS), to access climate-friendly technology. The policy brief describes how such NMAs could allow groups of developing countries to drive down costs and access efficient technology by pooling procurement for the same technology and using reverse auctioning to discover the lowest price. NMAs based on bulk purchasing could initially focus on specific technologies such as cooling technologies, and build on the work of existing programmes like the Kigali Cooling Efficiency Program, which bring with them the additional benefit of existing financial support.

This policy brief also describes how the Article 6.8 institutional architecture would benefit such bulk purchasing arrangements, by providing an entry point for interested parties, sharing relevant information and knowledge, and facilitating access to existing financial support from multilateral funds and donor agencies. The number of participating developing countries should increase steadily if such NMAs work as intended. The authors conclude that bulk purchasing technology under NMAs could drive down the cost of climate technologies and accelerate their diffusion, thereby transforming economic sub-sectors.

BACKGROUND

During the negotiations for the Paris Agreement, not all countries were in favour of using market mechanisms to meet mitigation targets. A few countries like Bolivia and Venezuela were completely against market mechanisms, arguing that they threaten the environmental integrity of climate policy, shift the burden of reducing emissions to developing countries, and worsen the climate crisis.[1]

The idea of "non-market approaches" (NMAs) first came up in 2010, at the 16th Conference of the Parties (COP16) to the United Nations Framework Convention on Climate Change (UNFCCC), in Cancun. NMAs were proposed as a way of integrating adaptation and mitigation, and as a more holistic alternative that could also address sustainable development and poverty eradication. The idea was initially opposed by several (mainly developed country) Parties, who feared that NMAs would duplicate existing non-market approaches and instruments under the UNFCCC; or be used as a leverage mechanism to increase demands for international public climate finance.

In the end, the Cancun Agreements requested Parties "*to consider the establishment, at the seventeenth session of the COP, of one or more non-market-based mechanisms to enhance the cost effectiveness of, and to promote, mitigation action*" (§84). This was followed by many ideas and initiatives that supported NMAs in the run-up to COP21 in Paris in 2015.

The negotiations eventually resulted in the recognition of NMAs under Article 6.8 of the Paris Agreement, in addition to two market approaches (under Article 6.2 and 6.4). Article 6.8 recognises the importance of "*integrated, holistic and balanced non-market approaches*" to assist Parties in the implementation of their Nationally Determined Contributions (NDCs), in the context of sustainable development and poverty eradication, including through mitigation, adaptation, finance, technology transfer, and capacity building. NMAs shall aim to:

- Promote mitigation and adaptation ambition.
- Enhance public and private sector participation in the implementation of NDCs.
- Enable opportunities for coordination across instruments and relevant institutional arrangements.

Notably, the scope of NMAs is rather broad as they can take different forms and refer to mitigation, adaptation, finance, technology transfer and capacity-building. Article 6.9 further defines a "*framework for non-market approaches to sustainable development*" to promote NMAs.

Paris Decision 1/CP.21 also called on the Subsidiary Body for Scientific and Technological Advice (SBSTA) to undertake a work programme to consider how to enhance linkages and create synergy between, *inter alia*, mitigation, adaptation, finance, technology transfer, and capacity building, and how to facilitate the implementation and coordination of NMAs.

From the beginning, however, NMAs have been by far the least well understood, and indeed talked about, of the three Article 6 approaches. For instance, when the topic was discussed by senior climate negotiators during the ecbi Fellowship Programme in 2018, both the lead presenter from the Alliance of Small Island States (AOSIS) and the respondent from Europe admitted that NMAs are not understood well. None of the participants were able to give a concrete example of an NMA – the only thing that was clear was that NMAs do not involve the sale of emission reductions (also called mitigation outcomes).

Despite attempts at successive COPs in 2018 and 2019, it proved impossible to agree on detailed rules and procedures for the implementation of Article 6 as a whole. On Article 6.8 specifically, the exact definition of NMAs, the governance structure for the NMA framework, and the modalities and procedures of the NMA work programme could not be agreed.

At COP25 in Madrid in 2019, Parties finally agreed on draft text to operationalise Articles 6.8 and 6.9, but could not adopt it because of considerable disagreements on the market mechanisms under Article 6.2 and 6.4. Ultimately, the complete Article 6 package was deferred to COP26, which is now expected to be held in November 2021 in Glasgow.

The latest iteration of the COP25 Presidency draft text describes modalities and activities for NMAs.[2] Under its provisions, the work programme will be implemented through workshops and meetings with stakeholders and experts, supported by submissions by Parties and technical papers by the UNFCCC Secretariat.

Box 1: A 3-D Conception of Non-Market Approaches

Rene Orellana Halkyer, Head of Mission of the Plurinational State of Bolivia to the European Union, former Minister of Development Planning and Head of Delegation of Bolivia, and one of the early proponents of NMAs, summarises his conception of such approaches

In my view, a NMA could also be understood as a set of elements composed of three dimensions: finance provision; technology transfer and capacity development; and mechanisms.

Finance Provision: The provision of finance to support mitigation and adaptation actions could have two different forms:

- Results-based (mitigation, or mitigation and adaptation) finance, where finance is provided after the targets have been fulfilled. This does not imply a payment in terms of transference or trade of emissions, but the finance of certain projects that aim to achieve mitigation targets, or mitigation and adaptation targets.
- Input finance, output mitigation or mitigation and adaptation, where finance is provided in advance for the execution of concrete projects, to invest financial resources to achieve concrete mitigation, or mitigation plus adaptation, outputs.

Finance could be provided by the international level as well as by the national or sub-national level, or from a mix of these sources.

Technology transfer and capacity development: The transfer of technology and capacity development is an input, and the output is specific targets in terms of mitigation, or mitigation and adaptation, results. Technology is understood as an input in order to achieve mitigation outputs, or mitigation and adaptation outputs. Technology and capacity development could be provided through different ways , including bulk procurement, acquisition in the technology market (for example of renewable energies), direct transfer on the basis of a menu of technologies attached to capacity building processes offered by the Climate Technology Centre and Network (CTCN), etc.

Mechanisms: Mechanisms include technical, normative, and institutional tools that could include finance provision as well as technology transfer and capacity development, oriented to fulfil mitigation, or mitigation and adaptation, targets. Examples include joint mitigation and adaptation mechanisms for the integral and sustainable management of forests, and bulk purchasing.

Finally, while NMAs are not about marketing emissions reduction efforts, that does not mean that they have to avoid private investments. NMAs should not be viewed as a "non-private investments approach" – the private sector can also contribute, for instance through bulk purchasing of technologies, involving private investors.

The work programme will include activities to identify suitable NMAs through the development of tools (such as a UNFCCC web-based platform) and information sharing. A NMA forum will be established to govern the NMA framework and implement the work programme. This forum will be requested to identify focus areas of the NMA work programme through submissions from Parties. The Presidency draft text suggests five broad focus areas:

- Integral and sustainable management of forests.
- Social ecological resilience.
- Reduction of emissions by sources and enhancement of removals.
- Energy-efficiency schemes.
- Finance, technology development and transfer and/or capacity-building support.

The draft text foresees two steps to identify potential NMAs:

- Identification of specific focus areas of work programme activities by Parties.
- Identification of existing NMAs.

Under the provisions of the Presidency draft text, the framework will only facilitate NMAs that:

- Are identified by participating Parties.
- Involve more than one participating Party.
- Do not involve the transfer of any mitigation outcomes against payment or quid pro quo operations, and are not reliant on market-based approaches.
- Do not duplicate ongoing work.
- Are innovative and can be expected to contribute to increasing ambition in NDCs.
- Focus on sectors and issues that are currently sidelined by international public climate finance.

In this policy brief, we describe a potential NMA related to finance, technology transfer, and capacity building support: international bulk purchasing of climate technologies. A NMA along these lines could drive down the cost of climate technologies and accelerate their diffusion, thereby transforming an economic sub-sector. It could be particularly pertinent for small economies like LDCs and SIDS, which are disadvantaged by the higher costs of mitigation technologies due to their small market sizes.

MOBILISING ECONOMIES OF SCALE

According to economic theory, the costs of a product or service decline with its production volume through economies of scale. Increasing demand is an important precondition to reduce the cost of an emerging technology, as demonstrated by the recent decline in costs of key renewable energy technologies such as solar photovoltaic and wind.

Business administration literature also provides strong evidence that bulk purchasing and procurement procedures can be powerful tools to exploit economies of scale in reducing the costs of procured goods and services,[3] with a cost savings potential of 10-40%.[4] The cost reduction potential of bulk procurement is already recognised, for instance, in the context of vaccines.[5]

Other empirical examples include the Top Runner Programme, introduced in Japan in 1999 to use procurement to generate demand for the most energy efficient ("top runner") appliances. The Programme initially focused on 18 product groups (including electrical and electrical equipment, cars, and gas-using equipment). The standards set in the Programme were later incorporated in other approaches and regulation, such as the Green Purchasing Law which came into force in 2001. According to a study by the Swedish Environmental Protection Agency (SEPA), the linkage between the Top Runner Programme and the Green Purchasing Law has not only raised consumer awareness but also accelerated the commercial application of energy-efficient products and technologies.[6]

Affordable LED bulbs for all

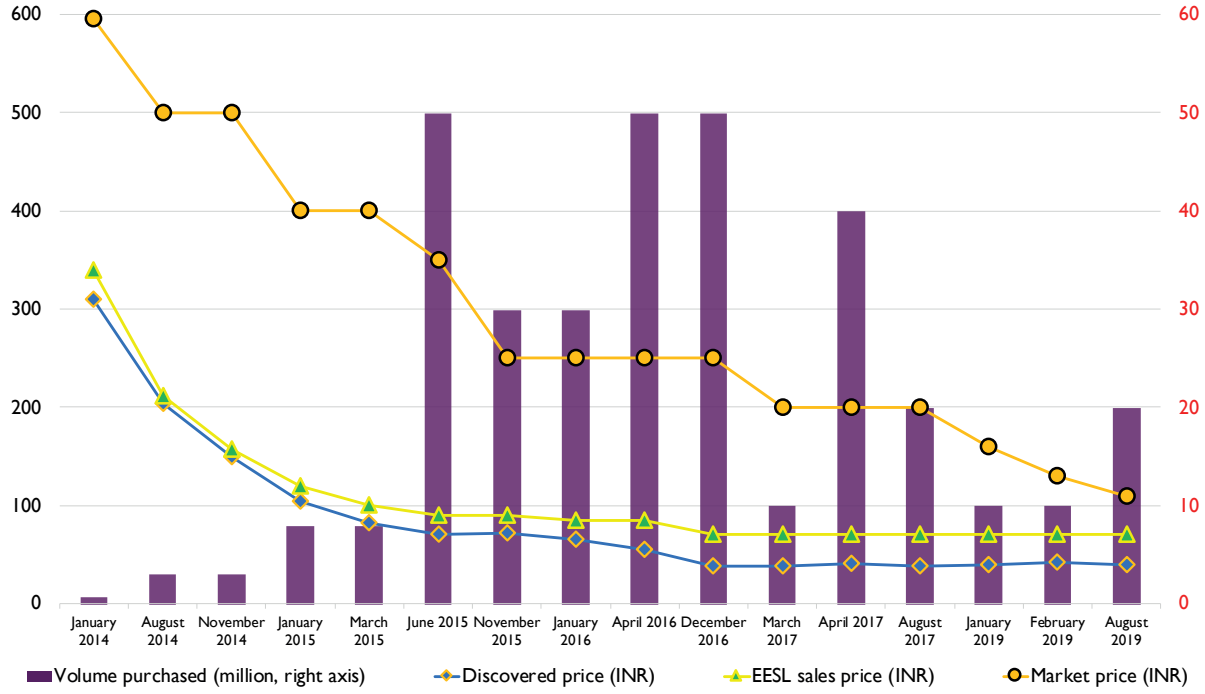
One example in particular that provides a blueprint for the use of bulk purchasing to mobilise economies of scale as an NMA approach is UJALA, a project to promote efficient lighting technologies in India.

In January 2014, the publicly owned Indian energy services company Energy Efficiency Services Ltd. (EESL) floated an open tender for the procurement of 750,000 light emitting diode (LED) bulbs, which are 50% more energy efficient than other bulbs, for the Indian state of Puducherry.

Procurement was carried out through "reverse auctioning", where vendors bid by submitting their lowest unit price for the quantity sought by the buyer. The lowest price is thus "discovered" by the auction, and the buyer purchases from the vendor bidding the lowest price. The market price for LEDs in India at that point of time was ₹595 (US$ 4.08). The reverse auctioning "discovered" a bulk procurement price of ₹310 – very near half the market price.

In 2015, reverse auctioning for LEDs was scaled up to the national level through the Unat Jyoti (progressive light) by Affordable LEDs for All (UJALA) scheme. The expansion meant that the procurement quantity increased over time (see **Figure 1**), with a corresponding decrease in the discovered price, to ₹39.9 in August 2019 (87% lower than in January 2014). (The market price of LEDs also declined over that period by 82% to ₹110, mirroring in part a 70% decline in the average global retail price.)

Figure 1: LED bulk procurement through the UJALA programme and resulting prices



Source: *EESL*

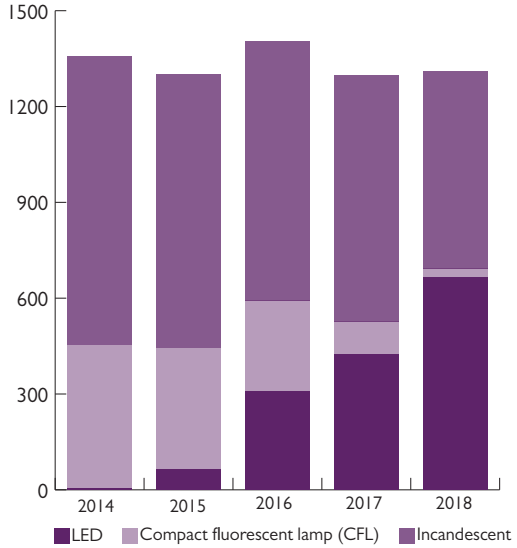
EESL invested a total procurement cost of just under US$ 260 million between January 2014 and August 2019. Loans and guarantees from a number of multilateral donors were arranged for this investment – including most recently a US$ 220 million loan and US$ 80 million guarantee from the World Bank for 2019-2022. **Table 1** reflects scenarios in which a certain percentage of the bulbs acquired at an auction is sold on the spot at the sales price listed on that date, and the rest at the lowest (August 2019) price of US$ 0.53. It shows a considerable range of outcomes from 46% profit if all had been sold on the spot, to a 30% loss if all had been sold at the August 2019 price, with a break-even point of 40% spot sales. Given that the prices did not fluctuate significantly after December 2016, it can safely be assumed that the sale of the bulbs procured after that date yielded a healthy surplus of approximately US$ 65 million (78%).

Following the launch of UJALA, annual sales of LEDs grew by more than 130 times, to over 650 million between 2014 and 2018. In total, 1.5 billion LEDs were sold over the five-year period, of which just over a fifth were through UJALA. Initially, the LEDs were mostly displacing Compact Fluorescent Light (CFL) bulbs (see **Figure 2**), but since 2018 the sale of LEDs has overtaken incandescent bulbs in absolute terms.

Table 1: UJALA Sales Scenarios in 2019 (US$ million)*				
Time Period	January 2014 – August 2019			December 2016 – August 2019
Procurement cost to EESL	256			83
Spot sales percentage**	100%	40%	0%	100%
Total sales revenue	373	257	180	147
Sales revenue surplus	117	1	-76	65
	46%	0%	-30%	78%

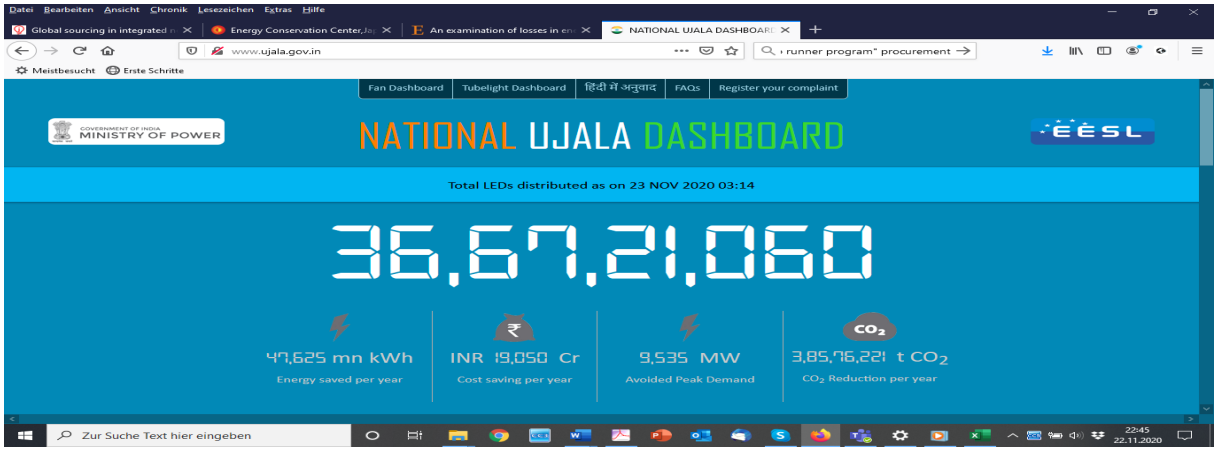
Note: **US$ 1 = ₹76 ** remainder @ US$ 0.53* ***Source:*** *EESL*

Figure 2: Indian light bulb sales by type



Source: *Kamat, A.S.; Khosla, R.; & Narayanamurti, V. (2020): Illuminating homes with LEDs in India: Rapid market creation towards low-carbon technology transition in a developing country.* In Energy Research & Social Science, *Volume 66.*

Clearly, there has been a technology transition in the Indian domestic lighting sector. To date, close to 370 million LED bulbs have been purchased by Indian households through UJALA alone (see **picture** below, from the National UJALA Dashboard on 23 November 2020), with estimated savings of more than 47.5 Terawatt-hours, equivalent to the annual electricity consumption of Portugal. The resulting emissions reduction of 38.5 million tonnes of CO_2 annually make this a striking story of technology transition in a developing country.



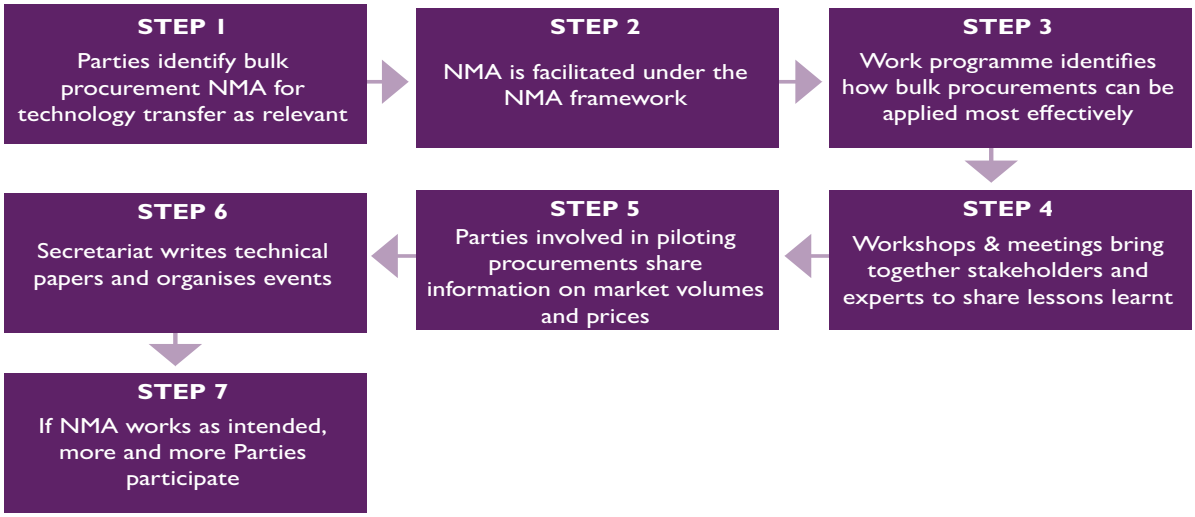
Bulk purchasing was only one of three factors that led to the success of UJALA. The second one was demand aggregation. Bulk purchasing, particularly in conjunction with reverse auctioning, will usually result in a reduction of the purchasing price, but it is not sustainable, particularly if done by an intermediary, if the bulk purchased item cannot be sold or delivered to the intended consumers. UJALA created the required demand through a combination of enlisting political support and social marketing (see **picture** on next page and COOL4climate). Last, but not least, UJALA used an innovative business model referred to as "pay and save" where otherwise prohibitive up-front costs are paid over time after delivery. In the case of UJALA, the purchaser paid the price of an incandescent bulb and the rest was collected in instalments with the electricity

Aggregation and bulk procurement resulted in similar declines in prices for other products procured by EESL. For instance, the cost of streetlights was reduced from ₹170 (US $2.5)/ Watt in 2014 to ₹40 (US $0.6)/ Watt in 2020, by increasing the average procurement size from 100,000 in 2014 to 2 million in 2020. As a result, 11.2 million of the 14 million streetlights that were installed in 2014 are more energy efficient, and the annuity for municipal bodies was reduced by 70% over this period. The price of smart energy meters was similarly reduced by 50% for 5 million meters, and by 20% for 10,000 electric vehicles.

BULK PROCUREMENT AS AN NMA

India's experience could be scaled up internationally to help LDCs and SIDS, in particular, leverage the power of bulk purchasing to access climate-friendly technology. By pooling their procurement needs for the same technology and using reverse auctioning to discover the lowest price, groups of (two or more) LDCs, SIDS, and other developing countries could use the provisions of Article 6.8 to access and drive down the costs of more efficient technology (see **Figure 3**).

Figure 3: Designing a bulk purchase NMA for technology transfer



Such an approach would be particularly beneficial to SIDS and other small countries whose market is so small that they suffer from hefty markups of the sales price of mitigation technologies, often multiplying prices several times compared to large, mature markets (see **Box 2**).

Box 2: Bulk procurement to drive technology costs down for small island States

Diann Black-Layne, Chair of the Alliance of Small Island States, Director of the Department of the Environment of Antigua and. Barbuda, and Antigua and Barbuda's Ambassador for Climate, elaborates on the barriers faced by SIDS to access mitigation and adaptation technologies and the role of bulk procurement and NMAs to overcome these barriers.

Article 6.8 of the Paris Agreement can be an important provision to support SIDS, which are often too small for economies of scale to work, in implementing their Nationally Determined Contributions.

The use of non-market measures is already an important part of existing economic strategy in SIDS. In my country Antigua and Barbuda, for instance, the cost of installing solar photovoltaic is 2.5 times the cost of installing it in Miami, which is only a couple of hours away by flight. The situation is similar for energy efficiency technologies for mitigation, and building technologies for adaptation. The Government of Antigua and Barbuda is therefore using loan funding from the Abu Dhabi Fund for Development to pilot the bulk purchase of solar panels with batteries, to reduce the costs of back-up systems for micro businesses. Such back-up systems are an important part of the island's adaptation strategy, and for building resilience in energy systems. The results of this approach will be known by 2022 – if it is successful, it will be scaled up in the sub-region.

Antigua and Barbuda is also providing a platform for testing new and emerging technologies on a small scale in the islands. For instance, the Adaptation Fund Board recently approved an innovation grant for Antigua and Barbuda to test a new solar reverse osmosis technology that could be a game changer for small islands.

The Caribbean States have teamed up in the past to procure other technologies – most recently, for the COVID-19 vaccine through the World Health Organization's COVAX Facility, which is responsible for enuring quality control and effectiveness so countries can confidently adopt the technology. This is a classic example of governments jointly purchasing technology owned by the private sector, to reduce costs and for more efficient and equitable distribution.

At the regional level, the Organisation of Eastern Caribbean States (OECS) has purchased medicine and educational material on behalf of nine islands for over a decade, enabling access at reasonable prices.

Island States, particularly those in the Caribbean which are constantly threatened by hurricanes, need access to renewable energy-based back-up energy systems, hurricane shutters, mosquito screens, cooling devices, and farming technologies. These could all be purchased via a bulk purchase facility.

Article 6.8 can therefore be crucial to ensure capacity building and efficient delivery mechanisms, and to generate trust among consumers of a technology under a UN umbrella.

The Article 6.8 institutional architecture will benefit a bulk purchasing arrangement by providing an entry point for LDCs to enter into the arrangement; allowing sharing of information and knowledge of technologies and approaches; and enabling access financial support (loans and guarantees) from multilateral funds and donor agencies. Lessons learnt and best practices can be shared in workshops and meetings among both Parties and non-Party stakeholders – including multilateral development banks and private sector entities. Moreover, ways to bring in the communities that will use the technology and will have to be convinced that the technology actually fulfils their needs can be refined and shared across countries.

The NMA work programme could be used to identify how bulk purchasing can be used effectively to transfer technologies to LDCs, SIDS, and other developing countries by bringing together key stakeholders and experts to share lessons learned from technology transfer and dissemination in general and/or in a given sector such as cooling. Parties involved in piloting bulk purchasing programmes could be asked to regularly submit information on market volumes and prices of the supported technology, to be shared publicly through the UNFCCC. This will allow other countries to assess the benefits of joining the bulk purchasing programme. The UNFCCC Secretariat could contribute by writing technical papers that take these submissions into consideration, and by organising further events.

Such an arrangement will fulfil the key criteria for NMAs: it does not duplicate existing efforts; does not include transfer of mitigation outcomes or quid pro quo operations; is an innovative form of voluntary cooperation; and addresses technology transfer collaboration, which is an issue that is currently sidelined by international public climate finance. It will also demonstrate that it is possible to engage in economically motivated international collaborations that do not involve emission trading or simple monetary transfers.

A range of technologies that are relevant for diffusion in low and medium income countries could be covered by such an approach, including air conditioners, refrigerators, cars, and industrial motors. While initial purchasing could focus on appliances, motors, and vehicle fleets required by government institutions, this could expand over time to include industrial and household needs.

An initial focus on cooling technologies could also lead to a downward revision of the baselines for the phase-down of hydrofluorocarbons (HFCs) under the 2016 Kigali Amendment to the Montreal Protocol.[7] An excellent anchor for such an NMA could be the Kigali Cooling Efficiency Program (K-CEP), which promotes policies, standards, and programmes for efficient cooling in 23 countries and two regions (Southeast Asia and West Africa), focusing on room air conditioners and domestic refrigerators.[8] The programme is already active in LDCs such as in Bangladesh, Cambodia, Guinea, Mali, and Niger, and in other priority countries that face the biggest risks in terms of extreme heat, including Brazil, China, India, Indonesia, Mozambique, Nigeria, Pakistan, and Sudan.[9] It has recently expanded its scope to all developing countries that are willing to include the cooling sector in their updated NDCs, and launched an NDC Support Facility for Efficient, Climate-Friendly Cooling.[10] Bulk purchasing under an NMA could build on the work of K-CEP and benefit from its existing financial support. It could initially focus on scaling up, for instance, the transfer and diffusion of efficient split air conditioners and domestic refrigerators.

Over time, as the NMA accelerates the diffusion of mitigation technologies while driving down costs, the number of participating developing countries will increase steadily, bringing further benefits. A bulk purchase NMA thus leads to benefits for public institutions and the private sector alike – public sector institutions face lower costs to incentivise the diffusion of mitigation or adaptation technologies while private companies see an upscaling of the market for their technologies.

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