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ПРОГРАММА ОРГАНИЗАЦИИ ОБЪЕДИНЕННЫХ НАЦИЙ ПО ОКРУЖАЮЩЕЙ СРЕДЕ
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Thoughts Concerning Technical Assistance and Capacity Building to Support the Transfer of Climate Technologies: Possible activities and their potential impact

The *Special Report on Methodological and Technological Issues in Technology Transfer* by the Intergovernmental Panel on Climate Change helped consolidate the view that the 'transfer' of technologies is in fact a multi-faceted process that is more accurately described as development followed by 'diffusion' or 'dissemination'. This is because technology transfer requires the creation of an enabling policy environment, which entails stable macroeconomic conditions; broad stakeholder involvement; the development of human and institutional capacities for selecting and managing technologies, as well as to develop technology codes and standards; and the establishment of procedures that take equity issues into consideration while safeguarding property rights. **Efforts to promote technology transfer in the area of climate change mitigation may thus be usefully articulated in terms of strategies to foster the development of robust markets for cleaner energy technologies.**

A range of barriers hamper the development of such markets. Poor access to timely and unbiased information hinders both the setting of broad policy priorities and the drafting of sector-specific legislation and regulations by public authorities, prevents the finance industry from estimating more accurately the risks of cleaner energy technology investments, and stifles more widespread adoption of cleaner energy technologies by industry in developing countries. Reduced institutional and human capacities are a particularly important concern amongst governmental agencies, which face growing demands in the area of climate change, but lack of capacity also hampers the private sector's ability to organise itself in a more effective manner. Limited access to finance affects all actors in the market, from government, to suppliers, to end-users, and ultimately holds back private sector first-movers from entering the cleaner energy technology sector, thereby slowing down the large-scale private sector investment which typically follows: public sector funds are set to play a catalyser role, to support first-movers and pave the way for that large-scale private investment.

A 2007 report by the UN Framework Convention on Climate Change estimates the additional investment needed in developing countries in 2030 to mitigate climate change at just below USD 100 billion in current prices.[1] Since this investment directly supports the

[1] *Investment and Financial Flows to Address Climate Change - Background paper on analysis of existing and planned investment and financial flows relevant to the development of effective and appropriate international response to climate change*. United Nations Framework Convention on Climate Change. Bonn, 2007.

transfer of the cleaner energy technologies that can make climate change mitigation possible, the figure provides in effect a rough estimate of the implementation costs related to market development for cleaner energy technologies. The report argues that "carbon markets, the financial mechanism of the Convention, ODA, national policies and, in some cases, new and additional resources, will be needed to mobilize the necessary investment". It further recalls that Official Development Assistance (ODA) is of greatest importance to developing countries and, in particular, the least developed amongst those. Understandably, the report makes no attempt to estimate the share of ODA in the overall envelope required to mobilise the total sum noted above, as this could only be done on a case-by-case basis.

The table below outlines a range of activities aimed at fostering market development for cleaner energy technologies in developing countries that could be financed by governments *in order to create the conditions under which private sector, market oriented technology transfer occurs*. The selection includes actions with a potential to help overcome the various barriers mentioned above – poor access to timely and unbiased information, reduced institutional and human capacities, and limited access to finance. They thus aim to develop the 'soft' aspects of technology transfer and create conducive enabling environments.

The combined implementation cost is USD 1.9 billion over five years and would pave the way for much larger investments. This estimate does not include costs of large scale investments that would principally be addressed by other mechanisms. The various initiatives could be undertaken by bilateral or multilateral agencies. *Indicative costs and outputs are presented to indicate the magnitude of funding required, but are estimates only.*

Table 1: Summary of Identified Initiatives

	Initiative	Scope	Funding (US$)
Focus Area 1: Policy	1. Climate policy support	Help governments resolve specific issues related to the design and implementation of climate and sustainable energy policies and programmes	50 million One hundred policies supported
	2. National cleaner energy technology plans	Prepare comprehensive national technology plans that provide the basis for the systematic removal of barriers needed to develop markets for prioritised technologies	50 million National plans developed for 100 countries
	3. Improving energy subsidy frameworks	Provide institutional and financial support to governments willing to test out changes in energy subsidy regimes in favour of climate-mitigation technologies.	200 million Fifty perverse subsidies removed
	4. Financial innovation support facility	Help first-mover financial institutions develop new financial products, move up the learning curve and reduce the high transaction costs of initial climate sector commitments.	50 million One hundred financial products launched

NOTE: The implementation period for each initiative is five years

Table 1: Summary of Identified Initiatives (continued)

Initiative		Scope	Funding (US$)
Focus Area 2: Networking	5. Regional climate change networks	Operate regional networks of climate change officials that provide a means for sharing knowledge, exchanging information and experience, and accelerating technology transfer through cooperative regional efforts	40 million Ten networks established, covering 147 countries
	6. National cleaner energy technology centres	Establish national centres of excellence in clean energy technology, building off existing energy agencies or other suitable institutions	100 million Centres established in 100 countries
Focus Area 3: Finance	7. SME finance facility	Facilitate the scale-up of seed financing and later stage bank financing to climate entrepreneurs	100 million Two hundred SMEs launched
	8. Risk mitigation facility	Establish fund guarantee programmes to share market and technology risks, targeting the mobilisation through local commercial banks of domestic lending for climate projects	200 million Two billion of domestic lending across 15 new climate technology markets
	9. Least-developed country credit facility for climate infrastructure	Provide affordable long term financing on concessional terms for low carbon infrastructure projects	500 million Two billion financed in 10 countries
	10. End-user finance facility	Help the domestic banking community to begin financing the uptake of cleaner technology amongst households and small business	200 million Fifty lending sectors created, benefiting 20 million people
	11. Carbon finance facility	Facilitate first-of-a-kind carbon transactions based on new methodologies and approaches	50 million Two hundred projects served
	12. Incentive facility for first movers in industry	Provision of targeted support for first-movers investing in cleaner energy technologies through financial assistance and information which can help reduce transaction costs	200 million Twenty different technologies in 50 countries

NOTE: The implementation period for each initiative is five years

Table 1: Summary of Identified Initiatives (continued)

	Initiative	Scope	Funding (US$)
Focus Area 4: Technology	13. Regional technology market assessments	Creation of technology platforms to scale-up the uptake of cleaner energy technologies at the regional level in key areas such as energy-using devices, energy intensive industries or fossil-fuelled power generation	80 million Four platforms established, covering 10 sub-regions
	14. Energy efficiency standards and labels	Development of standards and norms for selected products and strengthening of national and regional capacities to adopt, implement and enforce a range of product standard programmes	75 million Five product standard programmes in 100 countries
		Total	**1.9 billion**

NOTE: The implementation period for each initiative is five years.

Annex 1: Description of Initiatives

Initiative 1: Climate policy support

Context: Policies that provide investment certainty help to reduce the risk premium for investors, lowering the cost of projects and the price that consumers have to pay for the low carbon technologies and services. Deciding which policy approach to take and how to implement it is challenging and poses a learning barrier to sector development. Many governments require support in determining, designing, and implementing policy instruments for the climate-mitigation sectors.

Proposed approach: Initiate a *Climate Policy Advisory Facility* to provide governments with small amounts of technical guidance, advice, and information in a fast, flexible and responsive manner to help resolve specific issues related to the policy formulation and implementation process. Targeted support interventions that can quickly respond to government requests have been shown to be an effective policy backstopping tool.

Impact: Help governments formulate 100 new policies to foster investment in climate mitigation.

Initiative 2: National cleaner energy technology plans

Context: Most national energy administrations in developed countries conduct quantitative studies of the potential for increased investment to reduce energy use and exploit domestic renewable energy resources within a specified time frame, which underpin their national policies and actions plans. Developing countries and economies in transition seldom conduct these analyses, which hinders their ability to frame sound long-term clean energy policies.

Proposed approach: Assessments of potential provide a comprehensive, systematic analysis of the energy efficiency and renewable energy 'project portfolios' and make it possible to prioritise opportunities based on cost-effectiveness considerations. They underpin consultations on clean energy programme development, which are most effectively conducted by a neutral third party with knowledge of the lessons learnt through comparable policy planning efforts in other countries.

Impact: Make the initial case or justification for undertaking the establishment of energy efficiency and renewable energy policies and programmes; characterise the current and future potential for energy efficiency and renewable energy, with a view to identifying the most cost-effective opportunities; obtain detailed information about specific measures and the broader clean energy market to aid in technology screening, and programme design and funding; and support priority setting and programme development.

Initiative 3: Improving energy subsidy frameworks

Context: Fossil fuel subsidies in many countries distort the market for low-carbon alternatives. Removing or transferring subsidies to cleaner technologies is not easy as they are usually controlled by parts of government that are distant from energy/climate decisions and are set in legislation, changes to which may be considered politically risky.

Proposed approach: Offer short-term institutional and financial support to governments willing to test out changes in energy subsidy regimes in favour of climate-mitigation technologies. Financial support could be used to temporarily level the subsidy regime, allowing cleaner technologies to compete on a level playing field.

Impact: Support 40 governments in improving/levelling subsidy frameworks at an average cost of US$5 million per intervention and less than US$1 per tCO_2. The governments receiving support would commit to changing subsidy legislation if/when the cleaner technology reached some market threshold.

Initiative 4: Financial innovation support facility

Context: Increased engagement of financial institutions is critical for mobilising climate investment. In the case of commercial finance, facilities that help share some of the preparatory and transitional costs can help mobilise initial investments into the sector. Banks face high front-end development costs and often a lack of internal management support for engaging in 'unproven' sectors and business activities. The more innovative the concept, the more the learning costs involved, both in terms of time commitments and the external costs of hiring external expertise. Resolving such potential blockages to investment can be a catalytic role for public-private cost-sharing facilities.

Proposed approach: Help first-mover financial institutions engage in and scale up their capital mobilisation to the climate mitigation sectors.

Impact: Support the development of 100 new climate finance products; assist 200 projects in raising financing; train thousands of bankers; help mobilise US$20 billion of new climate investment; and avoid 150 Mt of CO_2.

Initiative 5: Regional climate change networks

Context: Developing country governments seldom have sufficient institutional capacity and informed staff to effectively manage and report on their national programmes for greenhouse gas mitigation. Knowledge-sharing approaches that 'network' efforts in different countries and give officials the means of exchanging information and experience have proven to be an extremely efficient method of building institutional and individual capacity under other multilateral environmental agreements, notably the Montreal Protocol.

Proposed approach: Networking provides a platform for government focal points from developing countries to exchange experiences, develop their skills and tap the expertise of their peers in both developing and developed countries. In doing so, a networking platform builds the focal points' skills for implementing and managing their national programmes for climate change. Regional networks also provide a regular and common platform for international agencies, secretariats, and bilateral donors to communicate with and collect feedback from a large number of developing countries at one shot.

Impact: Strengthened access to information on climate change by, and improved institutional capacities of, climate change focal points in all developing countries through a networking effort which offers a coordinated and thus more effective response to what in essence are similar needs by countries within groupings according to similar levels of development.

Initiative 6: National cleaner energy technology centres

Context: The energy and fuel savings resulting from, respectively, improved energy efficiency and a shift to renewable energy represent a major incentive for developing country industries to adopt cleaner energy solutions throughout their operations. However, at present national energy agencies in these countries have limited capacities to provide tailored advice to local industries on cleaner energy technology options, or to engage local financial institutions in cleaner energy technology financing. Similarly, access to lessons learnt from countries facing similar problems is poor.

Proposed approach: Provide tailored support for existing national energy agencies and help set up new ones where there are none – with a view to creating a centre of excellence at the national or, where relevant, sub-national levels. To this end a long-term business plan needs to be established around a self-funded centre relying on the price paid by potential customers to have access to the skills residing in the centre. Initial donor funds are required to build up those skills and cove core start-up centre costs.

Impact: Staff in developing country energy agencies trained; manuals on clean energy solutions for industry developed and adapted to local realities and sectoral specificities; energy audits conducted in key industries and industrial carbon dioxide emissions saved; economic efficiency improved.

Initiative 7: SME finance facility

Context: Mobilizing investment for SMEs involves working with a range of actors, from risk capital providers who finance innovation and new business development, to local banking institutions who provide SMEs working capital.
Entrepreneurs can transform markets, but the environment for entrepreneurship is poor in many developing countries, particularly in the new climate sectors. For new business ventures there is a lack of available enterprise development support services and seed financing is hard to secure, with most investors reluctant to engage too early.

Proposed Approach: Facilitate the scale-up of seed financing and later stage bank financing to climate entrepreneurs by capitalising specialist seed finance investors and providing incentives and technical support to commercial investors that allow them to shift their capital resources into the seed finance sector.

Impact: Seed and later stage financing to 200 new low-carbon enterprises in 50 developing countries. Increased availability of SME financing from a range of financial actors for entrepreneurs and clean energy SMEs.

Initiative 8: Risk mitigation facility

Context: In many countries where commercial banks have sufficient capital resources they may still be unwilling to provide financing to clean energy or other climate projects because of high perceived credit risks. In these situations guarantees can be used to mobilize available domestic liquidity by sharing in the credit risk of project loans. Typically guarantees are partial, that is they cover a portion of the outstanding loan principal with 50-80% being common. This ensures that the banks remain at risk for a certain portion of their portfolio to ensure prudent lending. When effectively structured, one dollar in guarantee funds can directly leverage US$12-15 of commercial investment into climate projects and indirectly catalyze long term growth of financial commitments to the sector.

Proposed approach: Set up a risk mitigation facility that would fund guarantee programmes targeting market and technology risks of new climate technologies. These programmes would be managed by existing national guarantee agencies and would target the mobilization through local commercial banks of domestic lending for climate projects.

Impact: Support local banking institutions to engage for the first time in the climate sectors, writing over US$2 billion of new loans across 15 new climate technology markets.

Initiative 9: Least-developed country credit facility for climate infrastructure

Context: Financial markets in many least developed countries lack the basic liquidity needed to meet medium to long term financing requirements of clean energy or other climate infrastructure projects. In these markets where high interest rates are seen as a large barrier, credit lines can be offered at concessional rates to induce borrowing and direct credit to target sectors and projects. The financing can either be in the form of senior debt or subordinated debt. Subordinated debt can substitute for and reduce the amount of senior debt in a project's source of funds thus improving the debt-to-equity ratio and reducing risk from the senior lender's point of view. Subordinated debt can also substitute for and reduce project sponsor equity requirements by providing the needed capital to a project finance structure.

Proposed approach: Operate a credit line facility for providing long term financing to climate infrastructure projects through commercial financial institutions in least-developed countries.

Lending would be on concessional terms to provide affordable long term financing for climate projects.

Impact: US$2 billion of low carbon infrastructure financed across 10 countries.

Initiative 10: End-user finance facility

Context: Banks are typically reluctant to finance unfamiliar technologies, and most climate technology applications fall in that category. Furthermore, the development of new lending products imposes significant additional transaction costs on banks, especially at the retail level. Therefore, financial sector awareness of climate, and the ability of banks to manage the additional costs and risks of providing financing to these new markets are crucial for the dissemination of low-carbon technologies. New efforts are needed to initiate and scale up local bank financing of small-scale climate technologies.

Proposed approach: Launch a programme to mobilize local bank lending for users of small scale climate technologies. Each intervention would combine banker training with a financial incentive (interest subsidy or risk-sharing option) to help first-mover banks write their first 10,000 – 20,000 loans for a specific climate technology, the number at which lending to these sectors begins to make commercial sense.

Impact: Successful interventions lead to self sustaining financial markets that can finance hundreds of thousands and eventually millions of systems. Help launch 200 new credit markets in thirty developing countries, each aimed at surpassing the 10,000 to 20,000 loan threshold, and in total providing 20 million people with access to a range of low-carbon technologies.

Initiative 11: Carbon asset development facility

Context: Least Developed Countries have thus far failed to substantially benefit from the carbon market. With industrial mitigation potential being small and the majority of opportunities lying in rural areas, the transaction cost of initial LDC carbon projects has been particularly high. However, once the first projects have been completed others will develop more easily and the market will grow.

Proposed Approach: Stimulate growth and commercial investment in LDC Carbon Markets by facilitating first-of-a-kind CDM and voluntary market transactions based on new methodologies and innovative approaches with high potential for replication.

Impact: Capitalized at US$ 50 million, the facility could support the completion of about 200 projects in 40 countries over 5 years. Those reference projects will mitigate (or sequester) a minimum of 200 million tons of CO2 over a 20-year period.

Initiative 12: Incentive facility for first movers in industry

Context: Limited donor assistance cannot directly decrease the cost competitiveness of new technologies. However it can play a role in assisting the transfer of proven technologies to new markets, particularly those in smaller countries where technology providers have difficultly overcoming initial market development costs. While large emerging economies usually present enough of a market opportunity for technology transfer to occur on a purely commercial basis, without the prospect of large commercial volumes, small- to medium-sized least developed countries lack the market potential required for companies to invest in transferring a technology.

Proposed approach: Offer an incentive programme, whereby a fixed cost-sharing subsidy is paid to each company that successfully transfers a priority technology to a target country. The programme would aim to cost-share technology transfer and market deployment costs, not capital costs – the reasoning being that if the technologies are not financially viable once transferred, then uptake will drop off once programme support is removed. The support should target the one-off soft costs that a company will need to invest in commercialising a technology in a given country. These costs typically are in the US$50,000 to US$1 million range.

Impact: Technology providers willing to invest the capital needed to adapt a technology in least-developed country markets, to fulfil local certification requirements, to train local staff and dealers, and to generally develop a market presence in the country.

Initiative 13: Regional technology market assessments

Context: There is an urgent need to move beyond narrowly defined national technology needs assessments to in-depth analyses of the actual market and trade barriers that prevent technology transfer and uptake from taking place, and to follow this up by an analysis of the policy, institutional and financial measures that will overcome these barriers.

Proposed approach: Take a holistic view to market and trade barriers to technology diffusion by considering the uses of a technology both across sectors and countries – to capitalise on the potential market opportunities that exist within different applications of the technology in neighbouring countries with similar needs and levels of development. To this end technology performance benchmarks need to be conducted and local networks of intermediaries (notably equipment suppliers and distributors, installers, service companies, and energy auditors) need to be strengthened.

Impact: Generally applicable approaches for conducting technology market assessments established, tested, and refined for wider application; four technology platforms created (in the areas of minimum performance standards for energy-using devices, renewable energy supply, energy efficiency of energy-intensive industries, and energy efficiency of fossil-fuelled electricity generation); and experiences coordinated among sub-regions through ‘knowledge platforms’.

Initiative 14: Energy efficiency standards and labels

Context: Energy performance standards have proven to be an effective tool to break down the barriers hindering a more widespread diffusion of energy efficient technologies. Standard development requires consultation with concerned industry stakeholders, coordination of certification bodies and testing laboratories, and policy and institutional support to implement and enforce the standard.

Proposed approach: A range of mutually complementary activities are needed to implement energy efficiency standards and labels: identify key technologies in terms of their mitigation potential, facilitate the development of appropriate efficiency standards, support national authorities enact regulation underpinning the implementation of the standards, help establish certification procedures and bodies, and support national authorities with implementation arrangements and enforcement procedures.

Impact: Improved energy performance standards for key technologies developed through an inclusive, consultative process; strengthened national and regional technical capabilities to manage the implementation of a policy that mandates energy efficiency norms for certain technologies; strengthened national policy and institutional capacities to adopt, implement and enforce a programme of energy efficiency norms and standards for priority technologies.