DISCUSSION PAPER

WORLD RESOURCES INSTITUTE

From Positions to Agreement:

Technology and Finance at the UNFCCC

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Preface

This discussion paper describes the state of play in the international negotiations at Poznan, Poland as Parties work to ensure an agreement on technology and financial support that enables mitigation in developing countries. It unpacks and analyzes Parties' submissions on the topic to the Ad Hoc Working Group on Long-term Cooperative Action (AWG-LCA) under the Convention as of December 2008. The analysis reveals some convergence and significant differences in views. Resolving these differences will require Parties to elaborate on their ideas, seek to understand the needs that underlie each others' positions, and work together toward agreement on areas of common interest.

This discussion paper begins by describing the ways in which public policy can promote technology development and diffusion along the innovation chain. By mapping current Party positions against the stages of innovation, we identify key areas of common ground and gaps that negotiators must prioritize as they work toward agreement to support mitigation in developing countries. There may be common ground to be found on important issues such as leveraging private finance, improving national regulatory frameworks, capacity building and coordinated sectoral approaches. Rather than proposing solutions, we present this paper with the hope that it will stimulate further discussion of concrete proposals in these key areas. We look forward to input and welcome the views and input of all of the stakeholders at the Conference of the Parties (COP).

Introduction

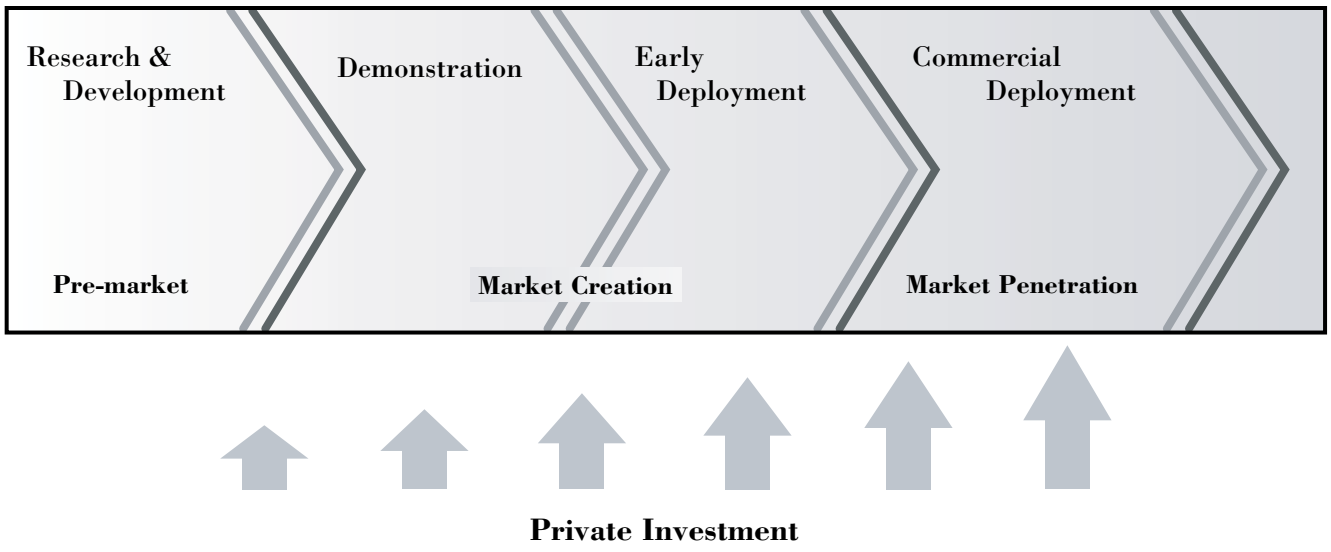
Addressing the problems of growing energy demand, security concerns, and climate change in a harmonized way will require accelerated deployment of clean energy technologies at a transformational scale.[1] This challenge of scale calls for an unprecedented degree of communication and collaboration among policy makers and with the private sector. Fortunately, clean technology advancement tends to build enthusiasm, at least rhetorically, among governments, business, investors, and the public. Parlaying this enthusiasm into technology and financial support for advanced technology deployment in key developing countries will be a critical part of a successful international climate mitigation effort.

Technology is a key component of the Bali Action Plan (BAP), which underpins the current United Nations Framework Convention on Climate Change (UNFCCC) negotiations. Reaching a common understanding or agreement among countries as to what technology and financial support should achieve and how they will be structured is likely a prerequisite to getting any funding at the scale committed, and will be a critical part of successfully negotiating the next stage of the international climate regime.

International climate negotiators have much work to do by December 2009, when an international post-2012 climate agreement is expected, as there is currently little agreement about how technology and financial mechanisms should operate. Technology transfer has been a sticking point in the UNFCCC date; negotiations have tended to break down over disagreements about the nature of intellectual property before progress can be made. However, the negotiation of a post-2012

This document reflects WRI's interpretations of Party submissions. Please contact the authors with any clarifications.

FIGURE 1 | The Innovation Chain



climate agreement is an essential opportunity to enable the deployment of clean technologies at a meaningful scale, and new progress must be made in providing support for those needs. Since the agreement of the BAP, Parties have submitted proposals to the UNFCCC outlining their positions on a number of issues, including funds and mechanisms to support technology deployment (see Annex A). There are similarities across Party submissions indicating broad agreement within the G77[a] negotiating block and among the Annex I countries.[b] There are also significant differences between these two groups on a number of issues, including the role of the UNFCCC the structure of a technology transfer agreement, and support for technology development, deployment, and transfer.

This issue brief examines the current Party positions against the range of possible technology support mechanisms an international technology agreement could create and identifies key gaps that negotiators must prioritize as they work toward agreement. Rather then proposing a specific solution, it discusses the possible functions of an international technology agreement, exploring Party submissions and positions on these different functions, and prioritizes issues for negotiation. This brief focuses on mitigation technology, though the country submissions and the UNFCCC negotiations will also need to address the development and diffusion of technology and knowledge for adaptation.

Supporting Technology: the Innovation Chain

There is a vast body of literature describing the stages of technology innovation and diffusion.2 While there are differences in definitions and terminology, experts generally agree that there are several key stages of technology innovation: research and development (R&D), demonstration, and deployment and commercialization/scaling up/diffusion (see Figure 1).

Public policy can intervene at any stage of this innovation cycle to accelerate the movement of a technology through to large-scale diffusion. Different innovations and technologies require different levels and kinds of support at the various stages of the innovation chain. For instance, the kind of policy intervention that might successfully accelerate the deployment of a technol-

a. The Group of 77 (G77) – an organization of developing countries in the United Nations – is a major negotiating block at the UNFCCC. The group enables the countries of the South to promote their economic interests and enhance their joint negotiating capacity on major international economic issues within the UN system, and promote South-South cooperation. The membership is now 130 countries (and it is often referred to in the UNFCCC framework as the G77+China), but the group retains the name because of historical significance.

b. Annex I refers to the group of countries listed under the UNFCCC, including industrialized countries that were members of the OECD (Organisation for Economic Co-operation and Development) in 1992, plus economies in transition (the EIT Parties), including the Russian Federation, the Baltic States, and several Central and Eastern European States (see http://unfccc.int/parties_and_observers/parties/annex_i/items/2774.php).

ogy near commercialization like concentrating solar thermal power will be very different from that required by technologies just emerging from the laboratory, such as advanced biofuels from algae. It is widely recognized that additional support across the innovation chain is necessary to address climate change. Many Parties, notably the G77, have proposed that the UNFCCC support or accelerate technology deployment by providing funding at all stages described above (see Figure 2 and Annex A). However, each stage of the innovation chain for clean energy technologies may not be equally conducive to international cooperation and public finance. Indeed, level and kind of support to facilitate deployment of specific technologies are frequently country/region specific.

To date, countries have made it clear that they do not accord equal priority – or even agree on the specific role for international financing – for each stage of the innovation chain. However, while the differences are considerable, there does appear to be potential for agreement. This working paper analyzes each stage of the innovation chain and characterizes the UNFCCC's potential role in accelerating these stages, based on proposals from Parties' submissions. This provides a sense of the range of Party positions on technology deployment and where there is potential for agreement (see Figure 2).

Research and Development (R&D)

In the R&D phase publicly and privately funded laboratories and universities seek to develop new technologies or applications. This stage can comprise basic science and technology research as well as technology-specific R&D. The level of risk for investments in technologies in the R&D stage is much higher than those in the deployment and diffusion phases, as large number of funded research projects never lead to commercial applications, so private investment is generally harder to attract in this stage. However, with greater risk, there is the potential for greater reward, as R&D investments that succeed can pay off impressively when the technology advances along the innovation chain toward commercialization (this is the venture capital business model). As technologies near maturity, international (or inter-organizational) cooperation requires more careful sharing of risk and reward. If countries become more concerned with ensuring their share of the payout and less invested in the progress of the technology, the cooperation breaks down. To be well-placed to coordinate international R&D efforts, the UNFCCC would need to seriously expand its roles and responsibilities.

In the submissions, however, most Parties recognize the need for coordinated international R&D efforts. The G77 supports funding for all mitigation actions, including collaborative R&D, coordinated by a proposed new body, and paid for by a proposed new fund. China, Brazil, and Argentina support collaborative R&D, and the latter two of the three add an emphasis on building capacity for research in developing countries. Annex I countries propose to support international R&D, but avoid proposing new funds or bodies under the UNFCCC to do so. Japan supports voluntary international joint R&D including Annex I countries and those Non-Annex I countries that wish to participate. The European Union (EU) proposes technology-oriented agreements, which would be recognized by the Convention but could be outside it, to facilitate and finance international R&D projects.[3] The EU, Australia, and New Zealand support R&D, demonstration, and best-practice sharing through sectoral approaches.

Demonstration

Large scale technology commercialization requires that an innovative concept or technology first be tested to demonstrate its feasibility, performance, and market applicability. Technology demonstrations show potential investors and users that the technology or application works. A product will advance as developers are able to achieve cost reductions. However, demonstration of new technologies (often requiring large scale installations) is costly; unique prototypes cost more than they would if mass-manufactured, and risks of failure remain high. At this stage of the technology chain, governments and private venture capital usually provide seed money – absorbing some (or all) of the risk in exchange for social or financial benefits later in the technology chain when scaling provides a return on the up-front investment.

Recognizing the importance of such demonstration financing, nearly all G77 countries (for example, Brazil and Mexico) call for new clean technology funds, and some specifically call for venture capital style investments to fund technology demonstration projects (Antigua-G77, China, Ghana), meaning funding to enable technology projects to bridge the "valley of death" and scale-up. Brazil and Mexico agree that financing mechanisms should support demonstration. Annex I submissions provide little insight into their negotiating positions; they are largely silent on the issue. The only exception is the EU, which proposes a different model: technology-oriented agreements (TOAs) to facilitate joint demonstration projects (as well as R&D and deployment). It is unclear exactly what "joint" would indicate in practice, but it implies a level of contribution

from developing countries that is somewhat higher than the G77's vision of developed country funding. The EU proposal does suggest that funding would be available for developing countries' participation, though is not explicit about which types of TOA activities would be funded.[4]

Deployment of Existing Technologies

Successful demonstrations, in which a new technology is determined to be both viable and competitive, provide market signals that larger scale commercial deployment is possible. However, particularly at the early stages of commercialization, subsidies or other support may be required to facilitate adoption: new technologies, even if ultimately proving viable, are struggling at the outset against proven and usually well-entrenched alternatives. Over time, cost reductions from learning and economies of scale can be achieved, so this support can be phased out.

G77 countries all propose that a new technology fund be established to pay for the incremental cost of deploying more expensive, environmentally sustainable technologies. Multiple reasons are cited for requiring additional funding, including costs of acquiring intellectual property rights (IPRs), which developing countries perceive as critical barriers to technology adoption. In addition to funding the incremental costs of new technology installations, many countries request that Annex I countries either donate the IPRs or provide funding to cover this additional cost. The G77 wants funds to cover the cost of licensing. China wants the UNFCCC to authorize the use of compulsory licensing – allowing the production of a patented product or use of a patented process without the consent of the patent holder – for certain environmental technologies. Australia downplays the importance of IPRs and dismisses the notion that Annex I countries alone drive the low-carbon technology markets.

Conversely, Annex I submissions, particularly those of the EU and Japan, emphasize the need for public funding to leverage private investment, including through sectoral agreements. In stark contrast to the G77's call for a fund to cover all incremental costs, Europe suggests that some developing country mitigation activities could be implemented unilaterally at low or no cost, while more ambitious ones will require more support, including from the carbon markets. The EU cites the carbon markets as the largest potential funding mechanism for mitigation – any additional public funding would complement this existing mechanism.

While Figure 2 suggests that there may be little scope for an agreement that provides technology support mechanisms across the entire innovation chain, a careful reading does offer some hope for reaching consensus. In particular, there are important cross-cutting issues on which agreement may be most promising. For example, there appears to be agreement on the requisite conditions that facilitate movement along the innovation chain, including in-country capacity (i.e. adequate expertise to enable a well-developed project pipeline), and national regulatory frameworks that create enabling environments for private sector investment. There may be scope for agreement in these areas, and they should be prioritized in the coming year of negotiations on a post-2012 agreement.

Post-2012 Negotiating Priorities

The technology and finance components of the post-2012 climate negotiations represent a significant opportunity for agreement. As of December 2008, the submissions on how developing country actions and developed country technology and financial support should be structured continue to reveal significant gaps in negotiating positions. Nevertheless the submissions reveal the core elements around which an agreement could be reached, including:

- public finance and national regulatory frameworks to leverage private investment in technology deployment,
- approaches for measuring, reporting, and verifying (MRV) for both developed country support and developing country actions,
- capacity building,
- IPR issues,
- framing an agreement around sectoral approaches, and
- institutions to fund and manage technology and finance.

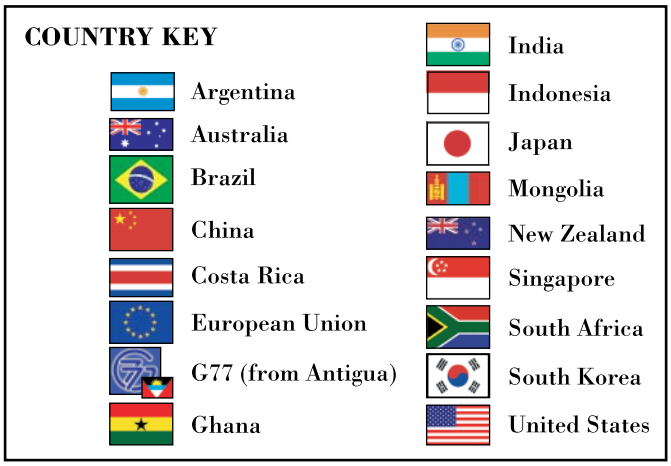
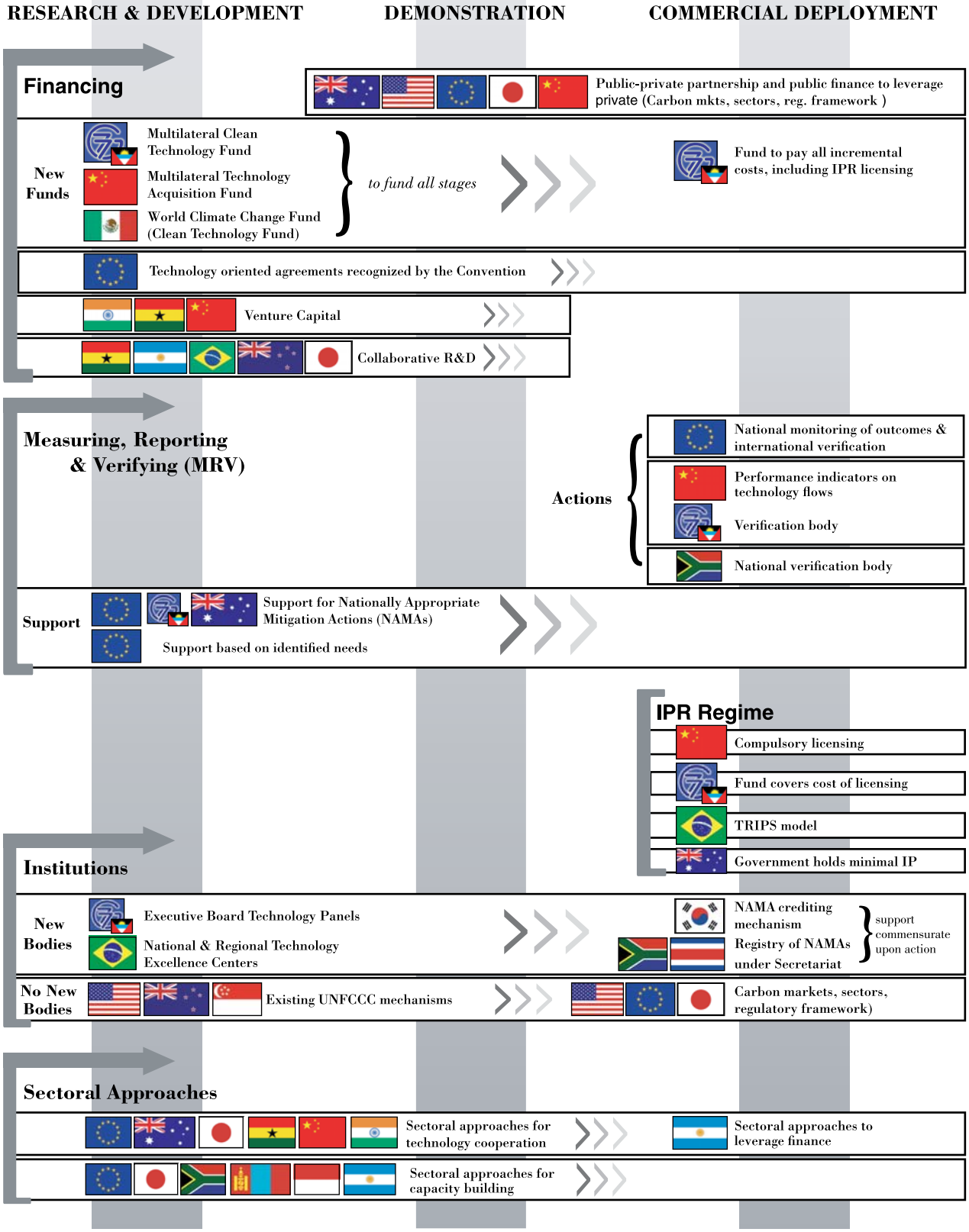


FIGURE 2 | A Synthesis of Country Submissions to the UNFCCC on Technology



Below we discuss the Party positions on each of these issues, highlighting possible areas of common ground and key remaining questions for negotiators as possible next steps.

Leveraging Private Capital with Public Finance and Appropriate Regulatory Frameworks

Nearly all parties recognize the need to use public finance to leverage private finance and investment, given that the cost of mitigation is on the order of hundreds of billions or even trillions of dollars. The G77 and China request continued emphasis on "financing that leverages private sector financial resources."[5] The proposal by China more directly suggests that "the basic idea of the financial mechanism … is to develop public private partnership by linking public finance with carbon market, capital market, and technology market and, leveraging larger amount of private finance by smaller amount of public finance [sic]."[6]

In submissions, some countries also acknowledge the importance of national regulatory frameworks and enabling environments in attracting private investment. Regulatory frameworks are standards and regulations (e.g., appliance or building efficiency standards, feed-in tariffs, etc.) that specifically promote or require investments in clean technologies, where an enabling environment describes a set of general polices (e.g., transparent and accountable government institutions, strong IPR enforcement) which generally reduce investment risk and promote technology transfer. Europe states in its pre-proposal that all Parties should improve national regulatory environments for technology through SD-PAMs, but that public finance mechanisms are also necessary in order to facilitate private investment.

Public finance mechanisms, international or national, complement supportive national regulatory frameworks and enabling environments. They may sometimes serve the same function, reducing financing barriers (for example through loan guarantees or direct subsidy). However, nothing can substitute for an enabling environment to facilitate both public and private investment. There is some agreement across the submissions on the importance of national enabling environments, but there is a distinct difference in the degree to which these are emphasized. The G77 countries are fairly silent on the subject of national regulatory frameworks but seem to voice a willingness to acknowledge their importance while requesting support for implementing enabling environments. The U.S. submission is very clear that the purpose of public-sector finance is to leverage private-sector finance and improve enabling environments for private investment. The EU is equally insistent on the importance of regulatory environments that facilitate technology deployment, but also expressed willingness to help developing countries with capacity building to implement them. It proposes scaled-up financial support for developing countries to enact "technology SD-PAMs" – "deployment schemes for low-carbon technologies and national energy and climate policies."[7]

Key financing questions for climate negotiators:

- How can public finance mechanisms be designed to best leverage an expansion of Non-Annex I mitigation actions, whether by supporting national incentive policies such as renewable portfolio standards or feed-in tariffs or by being available for private-sector investments through concessionary loans or other mechanisms?
- How can risk sharing by public institutions reduce cost and barriers, and what risks is the public sector (either in country, or through international/multilateral institutions) best positioned to help bear?
- In a true public-private partnership, there is a contractual agreement to share cost, ownership and/or risk between a company and one or more government agencies, in the development of a specific project.[8] Do parties feel that this type of joint undertaking would be mutually beneficial, and if yes, for which technologies?
- How will public and private investments be measured, reported, and verified? Will international support be restricted to a funding framework where support mechanisms are pre-approved or will it be a broader, more flexible arrangement where a range of public funding and cooperation are eligible?
- By what process will nationally appropriate mitigation actions be evaluated and prioritized for and linked to the support they need?
- [Further research question (not for negotiations): Does public investment leverage greater emissions reductions when targeted at R&D, demonstration, or deployment?]

Measurable, Reportable, and Verifiable (MRV) Support and Actions

The BAP called for an MRV framework through which Annex I and Non-Annex I countries efforts and contributions can be credibly recognized and where A1 can support NA1 mitigation actions. While the submissions reflect the language of the BAP, not much additional agreement has been reached. For

example, submissions acknowledge that financial support must be measured, reported, and verified, but there is no consensus yet on what counts as support, and parties differ on whether funding outside the UNFCCC (Official Development Assistance, World Bank funds, etc) will be recognized as new and additional support.

As of December 2008, there is little agreement in the submissions on how developing country mitigation actions will be measured, reported, and verified. This is relevant to technology financing because the process of MRV should allow countries to identify technology support needs and demonstrate outcomes of their application. Such demonstration of outcomes will help foster trust and credibility among parties. However, some countries feel that in addition to being "nationally appropriate," developing country actions should have some commonality of "character." The U.S. wants to revise the MRV provisions to include the MRV of nationally appropriate mitigation actions (NAMAs) that are "of the same character" (i.e., legally binding). Brazil holds that MRV should apply only to actions to ensure "implementation of sustainable development actions that reduce emissions," but asks for specific indicators to measure progress on technology transfer. China broadens this to also include indicators of technology barriers, which again would be specific to national circumstances. The EU proposes that NAMAs should be monitored at the national level per international guidelines, that reporting needs to be more frequent, and that verification need to occur at the international level, building on third party reviews for Annex I countries.[9]

A number of Parties speak to the institutional issues related to MRV, with broad agreement that improved reporting structures for MRV of both actions and support are required. Some parties (e.g., G77 and China) propose a verification body within a new technology mechanism to verify that developed country support is provided as offered. South Africa proposes national verification, in accordance with international guidelines, for both support and supported actions. These proposals would give the UNFCCC considerable authority in the development of international technology regimes – a proposition that so far has garnered virtually no support from Annex I Parties.

Key MRV Questions for climate negotiators:

- What will the new reporting structures and requirements look like, and how will they differ for technology support and mitigation actions? And how do they relate to existing reporting processes (e.g., national communications for Non-Annex I countries)?
- Will the level of support provided be commensurate with actions?
- How will the timing of when support is provided relate to the process of measuring, reporting, and verifying the actions?
- Which institutions will be responsible for MRV of the technological support and investment? Would some of these proposals extend the mandate of the UNFCCC to areas like verification?
- Are the MRV requirements different if NAMAs and their support are linked to the carbon markets, versus if they are not? Do MRV requirements for NAMAs apply when support comes through channels other than the UNFCCC, such as with IFI, World Bank, ADB, etc.?

Capacity Building

Country submissions converge more on capacity building than those in many other areas; all agree on the importance of building capacity in developing countries to identify and implement nationally appropriate mitigation (and adaptation) strategies, policies, and technologies. However, they differ considerably on means and definitions (see box). The U.S. endorses designing financial support that would "recognize and build on the financial and technological capacity of the recipient country."[10] The G77 proposes that financing is needed for capacity building to help developing countries "manage and generate technological change, enhance absorptive capacity, [and] create enabling conditions for activities along almost the entire technology innovation cycle (RD&D [research, development,

Defining Capacity Building

Ghana suggests that five aspects of institutional capacity building need to be met in order to manage technological change:

a. Structure – Are the institutions or organizations structured efficiently to fulfill the needs for technology development and transfer?

b. Human resources – Are they adequate in the institution, are they adequately qualified and skilled as a whole?

c. Financial resources – Are any available, are they managed efficiently in the institution, are they distributed adequately?

d. Information resources – Is the necessary information available and reliable, and is it distributed and managed efficiently within and outside the organization?

e. Technical resources – Are the necessary buildings, facilities, vehicles, computers, and specialized equipment available? Are they distributed and managed adequately?

and demonstration])." Australia notes that sectoral cooperation is a helpful avenue for capacity building and lesson sharing between countries "facing similar challenges."

Brazil offers a concrete proposal to establish "technology excellence centers," which would serve as local technology hubs and would (among other things) stimulate capacity building, improve access to information, and facilitate international cooperation.[11] Similarly, the enhanced technology information network described by the EU would aim to consolidate and expand current information flows from regional/national technology centers, with those from fora like the UNFCCC's tt:clear. It would build them up and out into a global network structured via sector-relevant Technology Information Platforms (TIPs), which would collect information on technologies best practices, IPR rights and licensing, availability, costs, abatement potentials, and manufacturers of technologies".[12]

South Africa proposes a funding mechanism for SD-PAMs and the capacity building required to implement them, including the need to "build local production, installation, operation and maintenance capacity". Under this proposal, countries would submit their mitigation actions to a register, including the capacity building needs, that is the "specific technologies, materials, equipment, techniques or practices that would be needed to implement the project".

Key capacity building questions for climate negotiators:

- What kinds of capacity building activities should be supported under the UNFCCC or promoted by the Convention for individual Party implementation?
- How should capacity building be prioritized to achieve the most emission reductions?
- How can capacity building be measured, reported, and verified?
- How can capacity building activities build and support the needed national regulatory structures?
- At what stages of the innovation chain is capacity building most critical?

Funds and Institutions

While all Parties recognize the need for institutions to promote technology development and diffusion, there is little common ground at this point regarding how those institutions should be structured or whether they must be new institutions. G77 countries generally support the creation of a new executive body and fund under the UNFCCC for technology transfer and finance, while Annex I countries thus far prefer to use or modify existing frameworks position. Several key Annex I countries have backed (and committed funds to) the Clean Technology Fund managed by the World Bank. The G77 proposal, supported in other proposals by G77 countries, outlines a technology mechanism, including a new body under the COP, to be responsible for technology transfer, including managing the Multilateral Clean Technology Fund (Antigua for G77, China, Ghana, and Brazil). Argentina adds to this a call for an expanded role for the EGTT. Some countries (South Africa and Costa Rica) propose registry mechanisms for nationally appropriate mitigation actions, including technology.

Annex I countries prefer to address the perceived problems of the existing institutions and to articulate what the institutions need to achieve before creating new ones (New Zealand, EU). They also support a broad framework that includes activities outside of the Convention (U.S.), such as bilateral assistance, support for technology agreements in regional accords or in sectoral public-private partnerships (e.g., those in the Carbon Sequestration Leadership Forum, or the Asia Pacific Partnership).

While some countries articulate exactly what funding models ought to be used (i.e., India is specific in stating that new money should only be distributed in the form of grants), most proposals lack detail and specificity on the actual mechanisms for collecting and distributing money from clean technology funds. Although some (e.g., Mexico's and Switzerland) define in some detail who would contribute money, there is little detail on who would be eligible for funding and under what

Activities of China's Multilateral Technology Acquisition Fund

China's proposal details policies and financial mechanisms that a Multilateral Technology Acquisition Fund would fund or catalyze:

- Subsidies in R&D.
- Insurance products to reduce risk in development, transfer, and deployment of new technologies.
- Loan guarantees or subsidies for export and diffusion.
- Direct investment in D&T&D of technologies through purchase of equity shares or venture capital.
- Investment in financial products related to development, transfer, and deployment of environmentally sound technologies by holding stocks, bonds and other potential financial products.
- Coverage of capacity building expenses.
- Permits, compulsory licensing for patented ESTs, etc.

conditions (the Mexican proposal is an exception in that it suggests allocating a larger share of the available funds to those countries that make "greater commitments").

As for withdrawals and expenditures, China proposes several options for funding mechanisms (see box) but how these mechanisms will operate in practice is relatively unclear. For instance, China, Ghana, and India suggest using a venture capital model, with a UNFCCC fund supporting investment in new, unproven technologies and business models that have the potential to reduce GHG emissions.

Key funds and institutions questions for climate negotiators:

- Does the UNFCCC require new institutional structures in order to provide the technology and finance support that is needed for developing country mitigation? Or can existing institutions provide adequate support?
- If new institutions are required, how will they need to be structured and how will they fit with existing structures?
- How should the UNFCCC MRV support? Are there advantages to a framework(s) that would enable formal recognition of support channeled outside of the UNFCCC?
- Will funds support capacity building in-country and the bolstering of national frameworks, or will those activities need to be done through another structure/organization(s)?
- If the overall goal of financial assistance is to support developing country actions that reduce GHG emissions, which stages of the innovation chain should be prioritized?
- How would a VC fund under the COP perform due diligence necessary to ensure sound investment, and what would the role of the private sector be?
- How will existing carbon finance (CDM and joint implementation) interact with any new funding mechanisms? Will they fund the same stages of the innovation chain and (types of) activities?

Intellectual Property Rights:

Several countries' submissions mention intellectual property rights (IPRs). The G77 proposals in particular emphasize IPRs as a barrier to technology deployment, and call for UNFCCC funding to cover the cost of licensing technologies. China calls for compulsory licensing of certain clean technologies, and Brazil cites the World Trade Organization's Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) as a model for climate mitigation technologies. Conversely, Annex I submissions make a different case: Australia, for example, points out that governments actually hold very little intellectual property relevant to the Convention (implying that compulsory licensing is not a viable option), and that it is, in fact, not always innovation in Annex 1 countries that is driving new clean technology development.

The divergent positions of G77 and Annex I countries would require significant negotiation in order to arrive at a common basis for action. However, although these proposals indicate the general preoccupation many Parties have with the IPR regime, it is important to note that IPRs are not central to any proposals, and many Parties do not mention them at all.

Key questions about intellectual property rights:

- What types of support would enable comparable levels of technology deployment and serve the same functions as Parties proposing compulsory licensing intend?
- To what extent are IPRs in fact a barrier to the deployment of clean energy technologies that have market penetration potential in developing countries?
- Are there opportunities and models for international cooperation on R&D that would create incentives for all Parties to protect sensitive IP?
- How do existing IP regimes (e.g., through WTO, TRIPS or other arrangements) play in the UNFCCC context?

Sectoral Approaches

There seems to be some agreement that sectoral approaches offer a means to address technology deployment and transfer, particularly as an opportunity for best-practice sharing and capacity building. However, it remains unclear what a "sectoral approach" would look like in practice. The EU identified several design questions (see box).

The EU favors a broadly defined sectoral approach to technology cooperation. Argentina, Australia, Norway, Indonesia, Japan, Mongolia, and New Zealand all generally share a positive view of the potential of sectoral cooperation. Argentina notes that sectoral approaches can provide "a lens through which to assist developing countries to identify their [technology] needs in particular areas," and assistance with the barriers to implementing those technologies. However, Non-Annex I countries are generally resistant to sectoral approaches for commitments, and if sectoral approaches involve binding targets, they would be rejected by Non-Annex I countries. Rather, they favor this approach as a natural way to get support for technology and financial support, particularly capacity building.

The EU on Clarifying Sectoral Approaches

The EU believes that the consideration of sectoral approaches would also benefit from a further clarification of what these approaches could be. Early interventions by Parties on this issue at AWG-LCA 1 and 2 showed that Parties have indeed very different interpretations of this concept. The EU considers that the main variables included in Paragraph 1(b)(iv) of the BAP revolve around:

a. their type: *i.e.*

i. carbon market instruments (and if so whether those instruments should include absolute caps, intensity benchmarks, or other),

ii. technology policies applied at the sectoral level, or

iii. other approaches, such as national sectoral policies based on regulation and/or standards;

b. their nature: voluntary or mandatory;

c. their scope: national, regional, or global; and

d. how to select the sectors to be addressed.

From: Submission by France on behalf of the European Community and its member states. 30 July 2008.

This concern leads G77 country proposals to focus instead on building platforms around individual technologies, through the development of a Technology Action Plan (TAPs) that would define the necessary policies, actions, and funding requirements necessary to scale up deployment of a given technology[13]. G77 countries suggest that these plan(s) for technology development could potentially be strengthened by taking a wider sectoral view, allowing for a fuller understanding of the context in which technology investment decisions are made, and the barriers to best practice technologies.

The type of data involved in these plans is almost identical to that which would be collected as part of the EU's sectoral Technology Information Platforms. The EU view that technology is inhibited in part by financing limits and transaction costs drives their proposal for "deployment schemes and roadmaps" for sector oriented agreements. This information would help to eliminate these bottlenecks, for example by helping move the CDM beyond approvals on a project-by-project basis towards standardized crediting for switching to sectoral best available technology/best practice. They also call for domestic policies to support technology, including policies to reduce transaction costs for participation in and opening carbon markets.

Key sectoral approach questions for climate negotiators:

- How do we define a sectoral approach in the context of the UNFCCC? (which sectors are most conducive); should sectoral cooperation be organized by industries (i.e., cement, steel, pulp and paper, electricity generation) or by economic sector (i.e., power sector, waste management, agricultural, forestry)?
- How can sectoral approaches support MRV? Does organizing MRV by sector facilitate action and understanding (better data, understanding of context for PAMs, etc.) in a way that isn't possible otherwise?
- What types of sectoral cooperation provide avenues for knowledge sharing and capacity building, while avoiding private-sector competitive disincentives to share commercially sensitive information?

Conclusion

Scaled-up low-carbon technology deployment, particularly in emerging economies, is critical for climate mitigation. Under the BAP, technology and finance are key components of the post-2012 negotiation. The public sector and the UNFCCC can support technology innovation and deployment in many ways and at a number of stages along the innovation chain. Arriving at a compromise position between NA1 countries' need for support and A1 countries' desire to see real emission reductions result from their financial and technology transfers will be a delicate balancing act.

Several key negotiating priorities emerge from a comparison of countries' positions on technology and finance. These priorities represent areas where further work is critical, as they represent important opportunities for negotiating a positive outcome, supporting developing country mitigation actions, and reducing global GHG emissions. Countries generally agree that using public intervention and finance to leverage private-sector investment is critical to accelerating technology deployment and thus achieving greater emissions reductions. Related to this, capacity building is a priority for most countries, so a mechanism or body to support the improvement of enabling environments and the creation of robust regulatory structures will prove essential. An agreement about MRV, possibly organized around sectors, for both support and mitigation actions will facilitate building trust and can be the framework within which the agreement is negotiated. These areas provide ground upon which to build a technology and finance component of the post-2012 climate agreement.

Glossary of Abbreviations and Acronyms:

AWG-LCA	Ad Hoc Working Group on Long-term Cooperative Action
CDM	clean development mechanism
BAP	Bali Action Plan
COP	Conference of the Parties
D&T&D	development, transfer, and deployment
EB	Executive Body
EGTT	Expert Group on Technology Transfer
G77	Non-Annex I countries
GHG	greenhouse gas
IPRs	intellectual property rights
JI	joint implementation
MCTF	Multilateral Climate Technology Fund
MRV	measure, report, and verify
NAMAs	nationally appropriate mitigation actions
OECD	Organisation for Economic Co-operation and Development
R&D	research and development
SD	sustainable development
SD-PAMs	sustainable development policies and measures
UNFCCC	United Nations Framework Convention on Climate Change
VC	venture capital

Notes

1. Wellington, et. al. 2007. *Scaling Up; Global Technology Deployment to Stabilize Emissions.*
2. TK Citations.
3. Submissions from France, for the EU. On Paris, 14 November 2008
   Subject: Enhanced action on technology development and transfer to support action on mitigation and adaptation.
4. France, for the EU. Paris, 14 November 2008 Subject: Enhanced action on technology development and transfer to support action on mitigation and adaptation.
5. Submission of Antigua and Barbuda on behalf on the G77 and China to AWG-LCA. *A Technology Mechanism under the UNFCCC.* August 27, 2008.
6. Submission of China to AWG-LCA. *China's views on Enabling the Full, Effective and Sustained Implementation of the Convention through Long-Term Cooperative Action now, up to, and beyond 2012.* 28th September 2008. http://unfccc.int/files/kyoto_protocol/application/pdf/china_bap_280908.pdf.
7. France, for the EU. Submission to AWG-LCA. Paris, 14 November 2008
   Subject: Enhanced action on technology development and transfer to support action on mitigation and adaptation.
8. For more information on public-private partnerships, see: http://www.fhwa.dot.gov/PPP/defined_default.htm.
9. France, for EU. Subject: Enhanced national/international action on mitigation of climate change.
10. Submission of the United States of America to AWG-LCA. *Finance and Technology.* September 30, 2008.
11. Submission of Brazil to AWG-LCA. *Views and Proposals on Paragraph 1 of the Bali Action Plan.* September 30, 2008.
12. France, for the EU. Submission to AWG-LCA. Paris, 14 November 2008
    Subject: Enhanced action on technology development and transfer to support action on mitigation and adaptation.
13. Submission of Antigua and Barbuda on behalf on the G77 and China to AWG-LCA. *A Technology Mechanism under the UNFCCC.* August 27, 2008.

Annex A: Party Submissions on Technology and Finance

COUNTRY	INSTITUTIONS	R&D	CAPITAL FOR DEMONSTRATION	DEPLOYMENT OF EXISTING TECHS
Antigua and Barbuda on behalf of the Group of 77 and China: A Technology Mechanism under the UNFCCC	• "Current institutional arrangements are insufficient to deliver immediate and urgent technology development, deployment, diffusion, and transfer to non-Annex I Parties." • Propose to create a Technology Mechanism under the COP -Executive Body (EB), functioning as a subsidiary body under FCCC, made up of government representatives and experts on technology transfer, with balanced regional representation. Supported by: - Strategic Planning Committee - Technical Panels - Verification Group - Secretariat - Multilateral Clean Technology Fund (MCTF)	• Technology Action Plan (developed by EB) will "accelerate research and invention through scientific and technical cooperation at all levels, including that of scientists and institutions." And will "accelerate the rate at which technologies are developed and brought into effect." • Venture capital, with public investment leveraging private capital markets for emerging technologies; • Research, development, and demonstration of new technologies, financed by venture capital and other sources; • Joint technology development.	Capital for demonstration would come from the MCTF, financed by "VC and other sources".	MCTF would fund new tech installations of" low-GHG emission technologies, including software and hardware" including cost of technical assistance, premature retirement of old equip, training, fuel switch technologies, fuel and operational costs.
Argentina: Enabling the Full, Effective, And Sustained Implementation of the Convention through Long-Term Cooperative Action Now, Up To, and Beyond 2012	• Supports G77 proposal for finance mechanism. • Need for international and national institutions. • Need for alignment of work between UNFCCC, other UN agencies and other relevant international organizations	Collaborative R&D between national and regional research centers.		Joint ventures to accelerate deployment and diffusion.
Argentina: Development & Transfer of Technology	• EGTT should further explore carbon market mechanisms that drive developed countries to finance the full incremental costs of technology application and deployment. • Review and reformulate development assistance policies of other UN agencies, international organizations and forums not directly related to climate change to "promote synergies" with UNFCCC			Carbon market mechanisms to drive developed countries to fund full incremental costs
Australia: Enhanced action on financial resources and investment				Public financial support for mitigation should be prioritized towards investment in gaps in the carbon market and private sector investment.
Australia: Emissions trading and the project-based mechanisms				Improve access and effectiveness of CDM and JI through automatic in-principle approval for technical aspects of well-recognized technologies.

CAPACITY BUILDING	NATIONAL REGULATORY FRAMEWORK	TRANSFER/IPR	MEASURABLE, REPORTABLE, VERIFIABLE (MRV)	SECTORS
• Technical panels would compile info on and for CB (policies and measures; intellectual property cooperation; assessment, monitoring and compliance), but also on IPR and would advise EB • MATF would fund capacity-building for technological change, including costs of: - Research, development and demonstration of new technologies; - Enhancing human and institutional capacity.	• Tech panels would have research on PAMs (only mention) • DDD&T requires "a continued emphasis by all Parties on the enhancement of enabling environments" among other things (i.e. also mention facilitating access to technology, and financing that leverages private sector financial resources).	Technology Action Plan (by EB) will ensure financing for technology transfer (including all available means to ensure the affordability of technologies, products and related services). Differentiates between public/private technologies saying private should be made affordable by measures to resolve IPR barriers and "addressing compulsory licensing of patented technologies." Guarantees on FDI • Funding manufacturing capacity and covering costs of licensing • Government owned technology should	Verification body MRVs financial and technical contributions (support). MRV of support: Most of what is counted as financial support must be under authority of COP/MCTF: • "An agreed proportion of contributions by developed country Parties and other Parties included in Annex II of the Convention to bilateral and regional co-operation may be considered as contributions to the MCTF, provided that such co-operation is consistent with the policies and scope of the mechanism. • Financial transfers to the MCTF shall be counted as measurable, reportable and verifiable commitments under para 1.b(ii) of the Bali Action Plan. Any funding not under the authority and guidance of the UNFCCC shall not be regarded as the fulfillment of commitments	
	National supervision and guidance of private capital and market mechanisms.	Share IPR rights among all parties involved in cooperative R&D joint ventures.	Technology development and transfer credits.	Cooperative sectoral approaches for tech cooperation.
"Urgent need" for mechanisms to enhance enabling activities such as technology information, capacity building and innovative financing		Carbon market mechanisms to drive developed countries to fund full incremental costs	Performance indicators should focus on both actions implemented and specific environmental outcomes	Sectoral approach is the "logical platform" for creating financing mechanisms for technology transfer.
	A country's enabling environment, particularly with relation to robust and transparent governance arrangements, will be a critical determinant of attracting investment flows.		MRV for provision and use of financial support.	
				Sectoral approaches should supplement the purely project-based approach of the CDM, using options such as benchmarking and no-lose targets. Such approaches could deliver broader technology and capacity benefits.

COUNTRY	INSTITUTIONS	R&D	CAPITAL FOR DEMONSTRATION	DEPLOYMENT OF EXISTING TECHS
Australia: Cooperative sectoral approaches		Collaborative sectoral approaches can facilitate joint R&D and enable world's best practice to be applied across a given sector.		
Australia: Technology Cooperation	Identifies Asia Pacific Partnership (APP) as an excellent example of technology cooperation: APP is good because promotes voluntary public private partnership.			Sectoral approaches can lower transaction and risk-associated costs and provide attractive incentives for private sector investors.
Brazil	Supports G77 proposal for new technology mechanism (including verification body) under the convention: • Mechanisms would be comprehensive (covering different stages of technology. research, development, diffusion and transfer). • Executive body and MATF. • National/regional "excellence centers for technology" – which would promote DD&T, capacity building, innovation and provide access to information.	New financing mechanism should increase the contracting of technological research in developing countries.	Establish new financing mechanisms and tools for scaling up the development, deployment and transfer of technology, in particular privately owned technology.	Establish new financing mechanisms and tools for scaling up the development, deployment and transfer of technology, in particular privately owned technology.
China	• Establish a subsidiary body under COP for Development and Transfer of Technologies with panels for technology needs assessment, dialogue and coordination for enabling policies and measures and IPR, management of financial resources for technology deployment, capacity building, and monitoring and assessment of performance. • Multilateral Technology Acquisition Fund (MTAF), paid for from developed countries' fiscal budget for R&D, fiscal revenues from taxation on carbon transaction and/ or auction of emission permit in carbon market, and revenues from energy or environmental taxation.	Support technology deployment through public private partnership by linking public finance with carbon market, capital market and technology market, in order to leverage private finance with public.	MTAF covers VC	• Support technology deployment through public private partnership by linking public finance with carbon market, capital market and technology market, in order to leverage private finance with public. • MTAF would cover Incremental costs of ESTs to be calculated via BAU cost baselines. • MTAF would cover insurance, loan guarantees, or invest via stocks, bonds and other potential financial products.
Costa Rica, El Salvador, Honduras, Nicaragua, Panama	A new system to ensure tech and financial transfer wherein: • Developed countries agree to a quota of technological and financial transfer to sustain voluntary mitigation actions in developing countries. • Developing countries establish a list of mitigation options, with costs. • Developed countries bid or select from the developing country proposals and pledge technological and financial support which will be independently verified			

CAPACITY BUILDING	NATIONAL REGULATORY FRAMEWORK	TRANSFER/IPR	MEASURABLE, REPORTABLE, VERIFIABLE (MRV)	SECTORS
Sectoral collaboration can help build capacity between Parties facing similar challenges.				•Supports sectoral approaches such as APP to expedite the RD&D of low-carbon tech and sector-specific expertise between countries and regions. • Supports sectoral agreements for international maritime and aviation.
	Parties should consider ways of improving the environment for technology diffusion, including enhanced regulatory frameworks, fostering positive environments for investment, and incentives for private sector, including strong IP protection.	Notes that it is not always A1 countries who drive low-carbon technologies (i.e., Australia imports wind turbines from China), and points out that governments hold little IP (this is the domain of the private sector).		
• Technology Excellence Centers. • Mechanism should promote capacity-building and strengthen the development and autonomous use of technology in developing countries.		• Consider the removal of barriers to transfer of mitigation and adaptation technologies to developing country Parties. • Consider TRIPs as potential model for protecting IP and facilitated technology sharing.	• MRV for A1 differs from NA1: A1 must verify QELROs under rules of convention, while NA1 must MRV "implementation of sustainable development actions that reduce the rate of emissions growth." • MRV of financial support by developed countries. • Agrees with G77 incorporation of MRV in the tech and finance mechanisms • Consider performance indicators of tech transfer to NA1.	
MTAF to fund full cost of capacity building - with human resource development as a priority-, technology needs assessment, information service, monitoring and enforcement systems, construction of policy infrastructure, among others.		Compulsory licensing of certain ESTs shall be enforced under UNFCCC, and an innovative IPR sharing arrangement shall be developed for joint development of ESTs.	• Panel under Technology body would assess performance in terms of technology flows from A1 to NA1 countries. • Nationally appropriate mitigation actions by developing countries shall be supported by new and additional, measurable, reportable, and verifiable technology transfer, financial assistance and capacity building provided by developed countries.	The aim of cooperative sectoral approaches and sector-specific action is to enhance cooperation between Parties to promote development, deployment, diffusion, and transfer of technologies, practices, and processes. No other definition or interpretation is acceptable.
			• Ready to move forward toward voluntary and nationally appropriate mitigation actions in the context of sustainable development, supported and enabled by technology, financing and capacity building, in a measurable, reportable and verifiable manner. • Developed countries must commit to a target of financial aid and technology transfer to sustain the effort of developing countries	

COUNTRY	INSTITUTIONS	R&D	CAPITAL FOR DEMONSTRATION	DEPLOYMENT OF EXISTING TECHS
EU: Enhanced National/Intl Action on Mitigation	On differentiation: diff levels of development and capabilities should determine the level of ambition, nature of NAMAs, and types of support and mechanisms available to assist parties.	Developed country Parties should scale-up their RD& D efforts.		
EU: Enhanced action on technology development and transfer to support action on mitigation and adaptation	• Proposal builds mainly on existing institutions, as such is more an enhanced framework. • TNAs are a key component. To improve TNAs and the use of them, the EU suggests that: => TNAs should be expanded taking into account the findings of the 2006 TNA review; => TNAs should be shared and publicly available to all relevant stakeholders within and outside the countries (e.g. through national communications); => TNAs' scope should be expanded to cover also more in-depth assessments of obstacles in the functioning of relevant technology innovation systems, including detailed assessment of technology capacity and markets. • FCCC has a role in ensuring that support happens. The FCCC should monitor activities outside the convention and MRV those within. COP should serve as "home" for technology info. • TT:clear and other information libraries would be enhanced and expanded to reach a wider stakeholder audience and include more information. The new form would be technology information platforms.	Under TOAs: • TOAs would include, inter alia cooperative R&D and large scale demonstration projects (e.g. energy, transport, infrastructures, CCS, concentrated solar power, adaptation-related technologies) plus more (deployment, sectors). • Existing techs still need RD&D in order to unlock massive mitigation potential, they focus on EE and RE. A future climate regime can timulate more R&D investments but must recognize and codify efforts outside the UN. • Suggests 9 principles for approaching R&D under FCCC: 1. scaling-up and optimising RD&D for both mitigation and adaptation 2. Reasonable focus on EE & RE 3. International RD&D projects and programmes should be flexible enough to accommodate different stakeholders including public-private partnerships, and varying numbers of participants. 4. Public funding will aim at leveraging private investments. 5. Consider dom RD&D plans systematically (coordination?) 6. Tech standards drive RD&D investments 7. RD&D cooperation should focus on the immediate, medium and long-term technology mitigation and adaptation objectives of the Convention. 8. Both North-South and South-South cooperation should be encouraged through consortia. 9. RD&D projects should aim to support in-country application of appropriate technologies	• Establishment and recognition under the UNFCCC of focused voluntary TOAs. • "Such cooperative TOAs would include ... R&D and large scale demonstration projects (e.g. energy, transport, infrastructures, CCS, concentrated solar power, adaptation-related technologies)... "	• TOAs would also cover technology deployment projects (e.g. on energy efficiency, renewable energy), cooperation on specific sectors or gases, such as F-gases, cooperation on climate observation and warning systems for enhancing resilience. • Deployment also depends on national regulatory environments, as such there are potential tech-oriented PAMs which can encourage deployment • Deployment also depends on national regulatory environments, as such NA1 should implement tech-oriented PAMs which can encourage deployment. • They should also expand TNAs, could also take action on technology deployment through sectors. In addition, developing countries could take action in voluntary technology-oriented agreements.

CAPACITY BUILDING	NATIONAL REGULATORY FRAMEWORK	TRANSFER/IPR	MEASURABLE, REPORTABLE, VERIFIABLE (MRV)	SECTORS
	• Cites those countries which have already formulated national climate change plans with serious mitigation; AWG-LCA should build on this. • Notes South African and Korean submissions on registries for NAMAs. • NAMAs could take form of national low-carbon development strategies or mitigation plans, and guidelines could be agreed to help individuals in countries in "developing and implementing such programs, including technology transfer, financial flows, capacity building support, and in evaluating overall level of ambition."		• Support can be most effective if based on the needs as identified by developing countries. Support may be delivered through various channels, and MRV needs to be consistent in all of those channels of relevant support. M: should be done @ national level following internationally agreed guidance, and needs to include outcomes of actions (i.e., aggregate emissions for key sectors). R: Needs to become more frequent and follow international guidance (IPCC guidelines) V: Needs to occur at international level under the UNFCCC and build on existing 3rd party reviews for A1 inventories.	• NAMAs should be enacted in those sectors where countries have: 1) capability to act, 2) major emissions. • Suggests that some NA1 parties with high capability might cover all sectors, effectively establishing an economy-wide target. • Sectoral approaches include sectoral trading and crediting • Depending on capacity, the type of actions can include "sectoral trading and crediting, carbon pricing, technology deployment programs or standards (e.g. for renewable energy), energy efficiency standards and sustainable development policies and measures (SD-PAMs)."
• Capacity building for technology should be mainstreamed within an enhanced framework, including regional centers and networks. • Build on TT:clear to create a "Development of a technology information platform (TIP), which would be continuously updated and sector-specific. • It would collect information on technologies and best practices on publicly and privately held technologies, including on intellectual property rights and licensing, availability, costs, abatement potentials, and manufacturers of technologies. "		Via TOAs, Technology Information Platform, and would require cooperation from NA1 on Enhanced TNAs, and PAMs oriented to specific technologies (for which capacity building would be available).	• FCCC has a role in ensuring that support happens. The FCCC should monitor activities outside the convention and MRV those within. COP should serve as "home" for technology info.	

COUNTRY	INSTITUTIONS	R&D	CAPITAL FOR DEMONSTRATION	DEPLOYMENT OF EXISTING TECHS
EU: Mitigation, including technology and finance	Recognizes the need for an effective institutional and organizational arrangement coordinating, supporting, enabling and managing the activities related to technology, including the recognition of activities and commitments undertaken by Parties and other actors, both within and outside the Convention.	Sector technology oriented agreements will guide technology cooperation within and outside the UNFCCC including "international R&D and large-scale demonstration cooperative projects."		• Sector technology oriented agreements will guide technology cooperation within and outside the UNFCCC including deployment schemes and roadmaps. • Carbon market cited as largest potential to fund mitigation, with innovative finance mechanisms to supplement it by leveraging private investment (cites GEERE fund).
EU: Workshop on cooperative sectoral approaches				
EU Pre-Proposal	Institutional discussions should be second to agreement on what they need to do. Institutions should support technology needs assessment, capacity building, and measuring and monitoring actions of all countries (within AND outside the convention).	Technology-oriented agreements could facilitate cooperation including international R&D.	Technology-oriented agreements could facilitate cooperation including joint demonstration projects.	Technology-oriented agreements to guide and facilitate technology cooperation, including country specific deployment plans and energy efficiency programs. EU believes the market and the private sector will deliver much of the finance for technology-related needs. Some tools and incentives however are necessary to facilitate private investment.
Ghana: Proposal on options for effective mechanisms and enhanced means for technology development and transfer	Technology Development & Transfer Board supervises Multilateral Technology Fund and reports to the COP.	• Board enacts "strategic programs" for investment in technology that have "high marginal emission reduction costs" in both developing and developed countries. • MTF to provide for joint/ collaborative R&D.	• MTF covers venture capital for tech demonstration projects. • Funding for MTF should come from Annex II countries, but should also provide incentives for private sector participation.	• Tech D&T board would study how to remove barriers & facilitate cooperation between countries to share lessons. • Board would promote market debt and uptake for already cost commercial technologies. • MTF "meet full incremental costs".

CAPACITY BUILDING	NATIONAL REGULATORY FRAMEWORK	TRANSFER/IPR	MEASURABLE, REPORTABLE, VERIFIABLE (MRV)	SECTORS
Sector technology oriented agreements will guide technology cooperation within and outside the UNFCCC including knowledge sharing platforms.	• Voluntary contributions from LCDs such as SDPAMs should be encouraged. EU indicates that financial support may be available for effective PAMS. • Copenhagen agreement should include commitments by developing countries to adopt PAMs to create enabling environments to attract domestic and international investment.		• Acknowledges need to MRV support in the form of finance, technology, and capacity building. • Seeks discussion of how developing country NAMAs can be MRVed. • Expects that particular advanced developing countries would put forward national action plans indicating what (additional) NAMAs they could implement with additional developed country support.	
Sectoral approaches can enhance implementation of national policies and enable international support and capacity building.	Sectoral approaches can enhance implementation of national policies and enable international support and capacity building.			• Defines "sectoral approaches" to include technology polices applied at sector level. • Supports exploration of non-market based sectoral approaches such as technology cooperation and/or domestic sectoral mitigation policies to remove barriers, increase tech deployment, and enhance tech R&D. • Recognizes sectoral approaches could apply to international aviation and maritime transport.
Acknowledge the need to help LDCs with capacity building on regulatory enabling environments.	All countries should implement regulatory environments to enable the technologies they need.			
• Board oversees tech expert panels made up of international experts. • MTF supports creating "enabling environments" and "endogenous capacities and technologies".	• MTF support for enabling environments. • Provide guidance for national legislations, regulations, policies, standards and codes, and enforcement and coordination mechanisms to provide greater certainty to private sector investment.	• MTF to cover licenses and cost to transfer technology knowledge • Provide incentives for private investment in transfer. • "Ensure protection of intellectual property rights that guarantees access to and use of technologies by avoiding over-protectionism". • Open access to information (especially costs and performances of technology).	• Tech development & transfer targets. • Best practice guidance and global minimum performance standards for technology development and transfer. • Rewarding/crediting technology development, deployment, diffusion and transfer.	Support mechanism for early action on sector specific technology innovation, development, demonstration, "massive deployment" and transfer.

COUNTRY	INSTITUTIONS	R&D	CAPITAL FOR DEMONSTRATION	DEPLOYMENT OF EXISTING TECHS
India: Financing Architecture	• Request annual contributions equal to 0.5% of the total GDP of the developed world for funding full incremental costs of adaptation and mitigation through resource transfers or grants. • Executive Board appointed by COP shall decide on policies, program priorities and eligibility criteria. Points to governance structure of Montreal fund and Adaptation Fund. • "A professional secretariat and appropriate technical committees that establish eligibility, evaluation and compliance criteria, in conformance with the Convention, would assist the Executive Board." • Propose several funds or "verticals" for which the only unifying force is a common architecture of governance, funding and investment policies under the direct control of and accountable to COP. Trustees voted on.	• Proposes that the Financial Mechanism have a funding "vertical" for Collaborative Climate Research Fund (a special fund under the umbrella mechanism, one of several which have quite diff roles, only unified by their governance and placement under control of the COP. • A Venture Capital Fund for emerging climate technologies.	Proposes a Venture Capital Fund for emerging climate technologies.	Suggest that full incremental costs of technology deployment (capital and lifetime) should be covered by A1s in full, by grants, while the base costs of economic and social development can be funded by a range of current or new financial instruments offered by bilateral, multilateral or domestic/ foreign market sources, including include traditional equity and loan investments, concessional loans, loan guarantees or other risk mitigation structures, and a range of funds for acquisition, development, deployment and diffusion of technologies.
India: Technology Transfer	Supports G77 Position - Proposed Technology Mechanism comprises an Executive Body and MCTF operating under the COP.	Executive body work plan begins with Technology Action Plans supporting all stages of the technology cycle, including accelerating research and innovation.	MCTF would help with: • "Venture capital, with public investment leveraging private capital markets for emerging technologies;" • Research, development, and demonstration of new technologies, financed by venture capital and other sources.	Executive body work plan begins with Technology Action Plans supporting all stages of the technology cycle, including ensuring finance for technology transfer
Indonesia				
Japan	Sectoral sub-groups should be established with participation of private sectors to examine necessary assistance measures through sharing information on progress of technology transfer, analyzing reduction potentials, and creating achievement indices as well as making assessment in a quantitative manner.	A1 and those NA1 who wish to participate should do more international tech R&D, sharing technology roadmaps		Consider how to promote private loans for tech inducement and inv related to emissions intensity and sectors. Consider labeling.
Mexico	• World Climate Change Fund (Green Fund) under the UNFCCC for mitigation, adaptation, and technology transfer and diffusion. • COP issues guidelines on what it is to fund and prioritize. • A levy on contributions to the overall Fund would go toward two smaller funds: an Adaptation Fund and a Clean Technology Fund.	Clean Tech Fund (within the WCCF - raised by a levy on all contributions) would promote "transfer and development, demonstration and dissemination of technologies that are close to acquiring commercial status.	Clean Technology Fund (within the WCCF - raised by a levy on all contributions) would promote "transfer and development, demonstration and dissemination of technologies that are close to acquiring commercial status.	Eligible activities for the Green Fund include increased efficiency, including more efficient non-renewable power generation, promotion of renewable power, CCS deployment, green building, and introduction of low-emissions vehicles, among others.
Mongolia				

CAPACITY BUILDING	NATIONAL REGULATORY FRAMEWORK	TRANSFER/IPR	MEASURABLE, REPORTABLE, VERIFIABLE (MRV)	SECTORS
		• Propose "vertical" funds including a Technology Acquisition and Technology Transfer Fund for available climate friendly technologies. • Propose funding for full cost of technology patents and license fees for low carbon technologies.		
Funding to support full cost of capacity building for research, development and demonstration of new technologies, enhancing human capital and absorptive capacity.	Capacity building for creating enabling environments.		Only MRV funds under control of COP	
				Sees sectoral approaches as an opportunity to gain access to BAT/BP and to strengthen Party cooperation on tech and finance
			New contributions should be counted from outside the UNFCCC i.e. WB CIFs, ODA, "R&D investment and investment through markets"	
Clean Tech Fund (within the WCCF - raised by a levy on all contributions) would fund Technical assistance for project preparation.			Green Fund activities should yield results that are real, measurable, reportable, and verifiable. Proposes MRVing national emissions as a way to show real reductions.	
				Sees sectoral approaches as an opportunity to gain access to best available technology and best practices.

COUNTRY	INSTITUTIONS	R&D	CAPITAL FOR DEMONSTRATION	DEPLOYMENT OF EXISTING TECHS
New Zealand	• Open to "proposed new financing options and mechanisms" for "effective financing", but "has a strong preference to avoid unnecessarily creating new funds and/or mechanisms. Problems with existing mechanisms should be addressed before adding new ones. • Suggests building on UNFCCC and also considering inclusion of work outside UNFCCC.	• Welcomes discussion and encourages scaled-up international cooperation on R&D in key sectors with large mitigation potential and where knowledge gaps exist. • Agriculture is a critical sector for R&D		
Norway: Sectoral Approaches	Establishes a framework that welcomes, promotes and contributes to funding research, innovation and implementation of all technologies that contribute to reducing emissions.			
Norway: Submission on CCS under BAP				
Russia				
South Africa: Register of nationally-appropriate mitigation actions by developing countries including Sustainable Development Policies and Measures	• Proposes new registry of NAMAs including voluntarily proposed projects and cites that existing FCCC provides for finance/ technology support of voluntary projects submitted to Convention (Art 12.4). • MRV financial and technology transfer should support all across the innovation cycle are important • Expert input, possible an expert group, may be required to help quantify the results of SD-PAMs/ NAMAs • Might engage SBSTA on developing methodologies to MRV the sustainable development benefits of SD-PAMs. SMI on reporting.	Technology development, application and diffusion, including transfer, should be supported across the technology life-cycle, including support in the form of different categories of costs (full, incremental).	Technology development, application and diffusion, including transfer, should be supported across the technology life-cycle, including support in the form of different categories of costs (full, incremental).	Proposed actions could be individual projects, programs, or national plans • SDPAMs • REDD • no lose targets • programmatic CDM
South Africa: Means of Implementation of BAP	Supports G77+China technology and finance proposals			

CAPACITY BUILDING	NATIONAL REGULATORY FRAMEWORK	TRANSFER/IPR	MEASURABLE, REPORTABLE, VERIFIABLE (MRV)	SECTORS
	• Encourages broad definition of "technology" to include "soft technology" – information and knowledge. • Regulate competitive environment with carbon price signals and the elimination of "environmentally harmful subsidies"		Finance and technology support as well as the results of actions enabled by finance and technology must be measured, reported and verified.	
			"Norway is especially interested in further exploring sector based approaches and mechanisms that can contribute to nationally appropriate mitigation actions in a measurable, reportable and verifiable manner.	"There is need to discuss and consider specific proposals from Parties for sector based approaches and mechanisms in this respect. Discussions so far in the AWG-LCA show that there are various proposals for sector based approaches, but also that there is a large degree of convergence around the basic principles that should guide sector based approaches." Crediting mechanisms, including emission trading systems, could provide incentives for developing country actions and "Sector based approaches" could be a means of financial transfer.
			Mid-term targets should have clean development indicators subject to MRV.	Mid term targets should be organized by and measured in Sectors - "a sectoral system of national commitments" with indicators of "clean development" subject to MRV.
• MRV finance and technology transfer should support technical assistance and capacity building to ensure the widespread absorption and rollout of the mitigation measures, such as the need to build local production, installation, operation and maintenance capacity. • A "facilitative mechanism" could be developed to increase in-country facility to implement NAMAs and adaptation. MRV support for enhancing absorptive capacity.	MRV finance and tech transfer should support for the practices and processes to enhance the absorptive capacity for technologies in developing countries. NAMAs can include national plans or programs.	Transfer should be supported.	Provide support in an MRV manner: • Level of mitigation effort is to be commensurate with level of support received. • NA1 countries would pledge to measure and report sustainable development benefits and GHG savings of NAMAs. Also would quantify costs of actions. • Verification could be done by national entities working to international guidelines. Details of V depend on whether undertaken unilaterally or with international support. • Developed countries to cover cost of verification with new & additional finance.	
			Coherent architecture should mobilize all sources of finance (including from international, regional and domestic sources, both public and private.)	

COUNTRY	INSTITUTIONS	R&D	CAPITAL FOR DEMONSTRATION	DEPLOYMENT OF EXISTING TECHS
South Korea	• Proposes creation of a Registry of NAMAs. Actions voluntary and non-binding. • "The Registry of NAMAs could serve as a basis of institutional framework of recognizing domestic actions of developing countries as international mitigation actions in the Post-2012 climate regime. " • NAMAs would be financed with carbon credits. • Agree on principle to finance with carbon credits at COP15 and sort out details later.			• Does not explicitly cite stages of tech innovation, only that mitigation actions would be financed via carbon markets. • "Carbon credit for NAMAs will engage private sector to play an active role. Carbon credit could provide incentives for investment in mitigation projects in developing countries. "
USA: Mitigation				
USA: Technology and Finance	No assumption that enhanced support requires creating new institutions under the FCC. Keenly interested in how any new efforts under FCC would relate to the activities beyond the COP.			

CAPACITY BUILDING	NATIONAL REGULATORY FRAMEWORK	TRANSFER/IPR	MEASURABLE, REPORTABLE, VERIFIABLE (MRV)	SECTORS
		"If Parties agree to recognize carbon credit for the verifiable mitigation from NAMAs, developing countries could have a sustainable source of financial resources and technology transfer. " (argues that carbon credits would engage private sector and pay for transfer of clean technologies)	Linking to carbon credits requires MRV of GHG savings, resulting in "verifiable mitigation from NAMAs"	
	• Main point of public sector finance is to improve enabling environments to use private sector finance. • NAMAs can be different in stringency and extent but should be "of the same" character for NA1 and A1		Want to revise the MRV articles of the Convention – to provide for more frequent information on national commitments and progress towards them. Should look at lessons from the Convention with MRV and see how they could apply to specific mitigation actions.	
	• Public finance should leverage private and US will consider any proposal looking at "what they would do to boost those national institutions and enabling environments, consistent with national plans." • Appreciate PAMs having a role in low/no cost mitigation		• Donor countries will need to be sure that resources continue to go to the highest priority actions and that there is effective performance for investments. • MRV of support - Asia Pacific Partnership and Clean Technology Fund "are consistent with Article 11.5 of the Convention".	