CSD-14/15 Matrix

(as of 25 April 2007)

What is the Matrix?

The Matrix is **an information tool** developed by the Secretariat. It aims to provide user-friendly information on practical experiences in implementation in the thematic areas of energy for sustainable development, industrial development, air pollution/atmosphere, and climate change. It is based on information submitted by Governments, including through national reports; and by UN agencies and Major Groups. It takes into account information contained in Secretary-General's reports and Partnerships for Sustainable Development registered with the CSD Secretariat, as well as information emerging from the regional implementation meetings.

The Matrix is not an official document of the CSD. As an information tool, it is a work in progress. This version has been updated to reflect discussions during CSD-14. The Secretariat will continue to update the Matrix as more information on implementation is made available.

Governments, UN agencies, and Major Groups, as well as other relevant regional and international organizations, are welcome to submit comments and inputs to the Matrix, at **CSDMatrix@un.org**.

Structure of the Matrix

The Matrix seeks to provide the user with a convenient overview of concrete experiences in addressing barriers and constraints identified in the areas of energy for sustainable development, industrial development, air pollution/atmosphere, and climate change. It consists of four columns and is structured as follows:

- *Barriers/Constraints* – Information in this column is based on the Secretary-General's Reports, national reports, reports of Regional Implementation Meetings, and inputs from Major Groups and CSD Partnerships.
- *Case studies* – Case studies are drawn from the Secretary-General's Reports, national reports, Reports from Regional Implementation Meetings, and inputs from Major Groups, CSD Partnerships, and case studies submitted at CSD-14.
- *Lessons learned, best practices or results* – This column provides a snapshot overview of the lessons learned, best practices or results of the particular case study.
- *Key implementation actors* – This column indicates key implementation actors, based on information contained in the case studies.

I. Theme: Energy

A. Energy Access [A21.9.12.(a); JPOI. Para 9, Para 20 (g), (o)

FINANCE AND BUSINESS MODELS

1) Inadequate private sector investment	**(a) GVEP Capacity Development Support** http://www.gvep.org/gvep_c.aspx?id=118 http://webapps01.un.org/dsd/partnerships/public/partnerships/188.html	Capacity Development aims to increase access to energy services by enhancing policy frameworks, entrepreneurial development, consumer organization, and credit systems, expanding the number and the capabilities of enterprises operating in rural markets.	International partnerships, government, entrepreneurs and local communities
	(b) Nicaragua – Tecnosol www.EandCo.net www.tecnosol.us	Tecnosol promotes solar, wind and hydroelectric energy services for businesses and communities in rural unserved areas of northern and central Nicaragua. Lessons learned: Business development services, pre and post investment, are essential to the success of an enterprise. A clean energy enterprise requires access to financing.	E+Co, USAID , Biomass Users Network-Central America (BUN-CA)
2) Lack of incentives/resources for service providers to expand service	**(a) India, Ahmedabad - Slum Electrification** http://pdf.usaid.gov/pdf_docs/PNADB219.pdf	The municipality adopted an innovative approach to dealing with the lack of land tenure and issued "no objection" certificates, which provided sufficient security for the utility to build infrastructure in the slum area. The partnership between the utility, municipality, and NGOs was key to gaining community trust and facilitating project implementation.	Ahmedabad Electricity Company, Ahmedabad Municipal Corporation; Self Employed Women`s Association, USAID
	(b) Creating a Link between Energy Services and Income Generation, using Innovative Financing as a Catalyst http://www.reeep.org/index.cfm?articleid=1402&parentid=915 See also Case Studies for Sustainable Development Database: http://webapps01.un.org/dsd/caseStudy/public/displayDetailsAction.do?code=447	The project aims to promote innovations to increase access of energy services to rural poor by focusing on income generation, innovative financing mechanisms and service delivery mechanisms. Among the challenges faced by the project convincing traditional bankers of the benefits of energy services and the ability of entrepreneurs/employees to identify the right energy service for particular interventions. Lessons learned: A "One size fits all" approach does not work for rural energy service enterprises. Each energy service solution is customised and has to be delivered to the doorstep of the customer. Financing that is available	SELCO Solar Light (P) Ltd., REEEP, local financial institutions, Self Employed Women's Association (SEWA)Bank

Barriers/Constraints	Case Studies	Lessons learned, Best Practices, Results	Key implementation actors
		locally and with lower transaction costs is important to increase the development of the market for household energy systems. It is important to link energy services to financing that is need-based and ensure that energy services are directed towards income generation.	
3) *Inadequate governance structures for managing energy services*	**(a) Local Capacity Development for Better Energy Governance- the Caucasus Environmental NGO Network-** http://www.erranet.org/index.php?name=OE-eLibrary&file=download&id=3602&keret=N&showheader=N – See also Case Studies for Sustainable Development Database: http://webapps01.un.org/dsd/caseStudy/public/displayDetailsAction.do?code=22	Improving relations between energy companies and consumers can lead to improved energy efficiency, sector governance, service reliability and coverage.	Caucasus Environmental NGO Network, USAID, TELASI, GNERC, energy consumers
	(b) Colombia: Electricity Market Reform Enercol 2005, Carlos Caballero Argaez, "A manera de memoria: Una reforma a mitad de camino"	A middle of the road approach or "controlled" privatization was implemented which resulted in a 50/50 mix of public and private sector entities in generation and distribution and brought the best of both sectors to the integrated system.	Government, electric utilities, electricity regulatory bodies, consumer groups, private power producers
	(c) Electricity Governance Toolkit for the Electricity Sector http://pubs.wri.org/pubs_description.cfm?PubID=4040	The Toolkit incorporates industry best practices in a decision support tool addressing policies, regulatory frameworks and environmental/social aspects.	World Resources Institute, National Institute for Public Finance and Policy, USAID
4) *Lack of capacity/viable business models for off-grid services*	**(a) South Africa - RE concessions in rural areas** http://www.gnesd.org/Downloadables/RETs/ERC%20RETs%20final%20version.pdf	To make solar home systems affordable to the rural poor, the Government provided per-household capital subsidy of R3500 for first five years, also a R40 per month subsidy for electricity use, lowering monthly service charge to R18. For the very poor, however, even that can be difficult to afford.	Government, private enterprises, local authorities
	(b) Global Network for Energy for Sustainable Development www.gnesd.org	"Renewable Energy Technologies" theme includes a series of technical reports on local barriers to renewable energy.	Global Network for Energy for Sustainable Development, research institutions, UNEP Risoe Centre

Barriers/Constraints	Case Studies	Lessons learned, Best Practices, Results	Key implementation actors
	(c) Nepal-Microcredit for Biogas Plants http://www.un.org/esa/sustdev/csd/casestudies/biogas_usa.pdf See also Case Studies for Sustainable Development Database: http://webapps01.un.org/dsd/caseStudy/public/displayDetailsAction.do?code=24	Providing access to credit through rural micro-finance institutions is making purchase of biogas plants within the means of the rural poor and alleviating indoor air pollution and pressure on limited forest fuelwood resources.	Nepal Rastra Bank (Central Bank), Alternative Energy Promotion Center, microcredit lenders, USAID
	(d) Indian Solar Loan Programme www.unep.fr/energy/act/fin/india/	An interest rate subsidy for solar home loans through traditional financial institutions can dramatically improve the market. The three-year programme has helped finance 17,300 systems through more than 2000 participating bank branches, giving 100,000 people access clean, renewable energy, and prompting 20 other Indian banks to develop similar credit offers.	UNEP, banks
	(e) e-Commerce and Renewable Energy (eCARE) www.ecareghana.org.gh	Bringing modern communications to rural areas can have a dramatic positive impact on communities. eCARE works with small entrepreneurs to establish rural business centres powered by renewable energy to sell voice telephony, Internet, and clean energy products and services. Currently, 37 eCARE Centres are successfully bringing modern communications to 300,000 people with plans for 200 Centres by the end of 2008, offering telecom services to more than one million Ghanaians.	National telecommunications provider, local development organizations, UNEP, UNF
	(f) Rural Energy Enterprise Development Programme (REED) Africa: www.areed.org Brazil: www.b-reed.org China: www.c-reed.org	Nurturing new, clean energy enterprises in developing countries needs providing enterprise development services and early stage seed finance. REED has invested more than $US 2 million in 45 clean energy enterprises serving more than 200,000 people.	Local development organizations, E+CO, UNEP, UNF
REGULATORY AND POLICY FRAMEWORKS			
1) Energy access not prioritized/integrated into development strategies	**(a) China – National township and village electrification programmes** http://www.nrel.gov/docs/fy04osti/35788.pdf	China made provision of electricity to rural villages a national priority. In a first phase it installed 290MW of village power systems in about 1000 villages in 6 remote provinces through a strong public private partnership.	Governments, local authorities, renewable energy industry enterprises, local communities

Barriers/Constraints	Case Studies	Lessons learned, Best Practices, Results	Key implementation actors
	(b) South Africa - Eskom Electrification Program http://www.wbcsd.org/includes/getTarget.asp?type=DocDet&id=606 See also Case Studies for Sustainable Development Database: http://webapps01.un.org/dsd/caseStudy/public/displayDetailsAction.do?code=252	Strategies and planning for energy access should include defined targets, a technology plan, a centralised approach, and customer knowledge. Tariffs and technologies should be matched to customer requirements.	National and local Governments, private sector (Shell International Renewables Ltd.), public utilities, local rural communities
	(c) Nepal - Rural Energy Development Programme http://www.redp.org.np/	Energy programmes work best when they are included in integrated approaches to community development involving both women and men, and establish central networks to address the problem of repetition and duplication of works prevalent in the energy sector.	National, district and local governments, community organizations, research institutes, women, private sector, World Bank, UNDP, IUCN
	(d) ECOWAS and UEMOA - White Paper for a Regional Policy: Geared towards Increasing Access to Energy Services for Rural and Peri-Urban Populations in order to Achieve the Millennium Development Goals http://www.energy4mdg.org http://www.energie-omd.org See also Case Studies for Sustainable Development Database: http://webapps01.un.org/dsd/caseStudy/public/displayDetailsAction.do?code=221	ECOWAS Member States have decided to engage on an ambitious regional policy in order to increase access to modern energy services. In that process, their objective is to allow at least half of the population to have access to modern energy services by the year 2015. That is 36 million extra households and more than 49 000 extra localities with access to modern energy services.	Economic Community of West African States (ECOWAS), West African Economic & Monetary Union (UEMOA), UNDP, French Ministry of Foreign Affairs, Major Groups (ENDA, KITE)
2) *Regulatory frameworks not suitable/customized for un-served areas*	**(a) EU Energy Initiative for Poverty Eradication and Sustainable Development (EUEI)** http://www.euei.org	The EUEI is a framework for policy dialogue with developing countries and the creation of specific financial instruments., including the: 220 million Euro ACP-EC Energy Facility that will co-finance energy service delivery in rural areas; the 4 million Euro Partnership Dialogue Facility that supports upstream policy dialogue; and the 17 million Euro COOPENER programme that supports capacity building in energy efficiency and renewable energy. Together these instruments now support activities in more than 50 developing countries. In addition, the Africa-Europe Partnership for Infrastructure will help to improve access to energy by facilitating investments in cross-border and regional energy cooperation and trade.	The European Commission, EU Member States, Governments in developing countries, private sector, civil society and international organisations

Barriers/Constraints	Case Studies	Lessons learned, Best Practices, Results	Key implementation actors
	(b) Amazonia Energy Initiative http://www.reeep.org/index.cfm?articleid=1412&parentid=915 See also Case Studies for Sustainable Development Database: http://webapps01.un.org/dsd/caseStudy/public/displayDetailsAction.do?code=440	The Amazonia Energy Initiative is aiming to create an adequate framework for community-managed, independent power production using small-scale renewable energy systems. A local NGO (PRISMA) is operating power plant and selected productive uses to serve a typical remote Amazonian community. Nationally, a new regional market agent will be established to balance the relationship between the small independent power producers (PRISMAs) and the big players, as well as guarantee that technical assistance, commercial and financial instruments and tools are available for wide replication of the PRISMA Model. Lessons learned: Institutional models and a facilitating policy environment is critical to solving energy access issues. Financing and access to finance is a key barrier to energy access.	Winrock is working in cooperation with local partners, supported by the Ministries of Mines and Energy (MME) and Science and Technology (MCT), REEEP and USAID
HOUSEHOLD ENERGY			
1) Insufficient awareness and access to new technologies or fuel	**(a) Australia – Bushlight** http://www.bushlight.org.au	To improve the livelihood choices for remote indigenous communities in Australia through access to sustainable renewable energy services. A key element in the success of the Bushlight programme has been a focus on improving community capacity and confidence to choose and manage renewable energy services. Bushlight has developed a participative approach to energy planning and capacity building at the community level.	Government, indigenous communities
2) Inadequate electricity services	**(c) Tanzania – Access to Electricity Program Eases Poverty** http://www.wbcsd.org/includes/getTarget.asp?type=DocDet&id=14048 See also Case Studies for Sustainable Development Database: http://webapps01.un.org/dsd/caseStudy/public/displayDetailsAction.do?code=249	A bottom-up approach focusing on affordability works best in providing access to electricity to low-income communities.	ABB Engineering, WWF, local governments, private sector, NGOs, aid agencies, civil society
	(d) Philippines Off-Grid Renewable Energy http://www.un.org/esa/sustdev/csd/casestudies/renewableEnergyy_USA.pdf	With electrification, villagers now have increased opportunities for productive activities such as mat weaving, sewing, light for extended study time and household work.	U.S. Department of Energy, USAID, Government of Philippines, Autonomous Region in Muslim Mindanao and Mirant Philippines.

Barriers/Constraints	Case Studies	Lessons learned, Best Practices, Results	Key implementation actors
	See also Case Studies for Sustainable Development Database: http://webapps01.un.org/dsd/caseStudy/public/displayDetailsAction.do?code=13		
	(e) Bolivia - Cooperative Development Case Study: *Cooperativa Rural de Electrificación* (CRE) http://www.nrecainternational.coop/News/Publications.htm http://www.nrecainternational.coop/News/files/MASTERCaseStudy.pdf	Lessons learned: (1) the fundamental importance of leadership and community involvement; (2) need for investment discipline to expand electric service in areas of highest population density to those with lower population density, always focusing on recovery of cost of service; (3) need to secure favorable, long-term financing to expand electric service to more marginal areas; (4) need to establish robust technical design & construction standards, to systematize implementation of these standards, and to update them over time; and (5) the cooperative model with its focus on consumer ownership and participation in governance/management of the electric system can be immensely successful if the cooperative is able to maintain a focus on the principles of democratic control. On-going member outreach is essential to assure that board members represent the interests of cooperative members, effort as well as regular rotation of the cooperative leadership.	USAID, National Rural Electric Cooperative Association (NRECA), political & business leaders of Santa Cruz
	(f) Bangladesh - Cooperative Development Case Study: Rural Electrification Board (REB) http://www.nrecainternational.coop/Countries/Bangladesh.htm http://www.reb.gov.bd/	Lessons learned:(1) Comprehensive standardization governed by a disciplined and autonomous implementing agency such as the REB can drive large-volume rural energy access; (2) a firm and abiding national policy commitment is an essential step for maintaining continuity and consistency especially in terms of financial sponsorship over rural electrification's typically long economic gestation period (- but the benefits can be large and pervasive); (3) the adoption and implementation of low cost RE design and construction standards contributes to rural electric affordability; (4) a comprehensive training program in all aspects of utility operations and management is vital to ensure that local institutions can effectively and efficiently operate and administer a functioning and economically viable utility; (5) the cooperative's democratic character based on member participation contributes to good local governance, local initiative, and commercial sustainability; and (6) local women's participation in co-op development, acceptance and governance is important to program success.	USAID, National Rural Electric Cooperative Association (NRECA), REB, PBSs, as well as 17 funding partners.

Barriers/Constraints	Case Studies	Lessons learned, Best Practices, Results	Key implementation actors
	(g) Uganda-Solar PV for Public Buildings and Health Clinics in Uganda See Case Studies for Sustainable Development Database: http://www.un.org/esa/sustdev/csd/casestudies/solar_usa.pdf See also Case Studies for Sustainable Development Database: http://webapps01.un.org/dsd/caseStudy/public/displayDetailsAction.do?code=27	Solar electrification of the Kakuunto Hospital, where the AIDS epidemic was first identified, now allows refrigeration of vaccines and medicine, operation of medical equipment, and pumping of clean drinking water.	Solar Light for Africa, Kakuunto Hospital, Global Environment and Technology Foundation., USAID
	(h) Australia – Rural Electrification http://www.bcse.org.au http://www.greenhouse.gov.au	To provide rural communities in Australia access to reliable, renewable energy systems. The Australian government and industries undertook the following initiatives in order to facilitate the adoption of new renewable energy technologies by rural communities: Demonstration projects (including solar and wind power for telephone and electricity services); development of training and standards; introduction of innovative renewable technology to remote areas (including hybrid technologies); diesel replacement in remote areas; electricity market reform; and access to finance. Several lessons: First, adequate training for designers and installers of alternative rural electrification technologies is essential. Second, cross-subsidies should not disadvantage alternative technologies. Third, ensuring that these technologies are financed and maintained on a similar basis to conventional rural electricity options should go a long way to facilitating widespread adoption of alternative rural electrification technologies.	Government, private sector
3) Difficult to change traditional cooking practices	**(b) Solar Cooker Dissemination in Kenya** http://solarcookers.org/	Project impact: Fuelwood savings, improved health, economic opportunities for women, profits of $1.25 or more per sale of solar cooking kits, capacity building and community awareness of solar cookers as a complement to traditional and improved cook stoves and as a cost-effective water treatment method. Lessons learned: The awareness creation process was well executed though drawn out over too long a timeframe with indifference to the solar cooking message starting to set in. SCI should have consulted more widely with Kenyan-based social marketing experts in the initial	Solar Cookers International (SCI)

Barriers/Constraints	Case Studies	Lessons learned, Best Practices, Results	Key implementation actors
		stages. Solar cooker representatives must be selected rigorously with clear income generation expectations. A full market assessment is needed before establishing fixed sales points for solar cookers. Mobile sales are more promising. Expectations that solar cookers should be given away at no cost can be overcome by having local woman at the forefront of sales who establish trust.	
REGIONAL ENERGY TRADE			
1) Limited electricity interconnection between countries	**(a) Southeast Europe Cooperation Initiative Transmission System Planning Project** http://www.usaid.gov/locations/europe_eurasia/press/success/high_voltage_grids.html	A regional strategic approach resulted in new investments in electric interconnections, increased coordination among electricity dispatch centers and increased coordination with European institutions.	Governments, regional energy associations, electric transmission companies
	(b) Ethiopia - Nile Basin initiative - Eastern Nile Power Trade Investment Program http://www.nilebasin.org/entro/powertrade.htm http://webapps01.un.org/dsd/partnerships/public/partnerships/1013.html	In some of the Eastern Nile (EN) countries, lack of electricity is further exacerbated by shortages of imported fuel, wood/charcoal, and other forms of energy. One way to increase access to electricity is through power trade and the co-operative development of hydropower and transmission interconnection investment projects. There is substantial untapped hydropower potential in Ethiopia and Sudan. Egypt is developing thermal power generation and is interconnected to countries in the Mediterranean rim	Egypt, Ethiopia, Sudan
	(c) Egypt - Mediterranean Ring project http://www.energybusinessreports.com/shop/item.asp?itemid=807	The goal of the ongoing Mediterranean Ring project is to provide interconnection of electric power transmission grids among the countries and regions that encircle the Mediterranean Sea. The concept involves linking electric power grids from Spain to Morocco through the remaining Maghreb (North African and Western Arab) countries, on to Egypt and the Mashreq, (Eastern Arab) countries, and from there up to Turkey. From Turkey the Ring would then link back into the European grid via Greece or through the newly interconnected Eastern European country grids.	Governments, electric transmission companies

Barriers/Constraints	Case Studies	Lessons learned, Best Practices, Results	Key implementation actors
2) *Limited gas interconnections (pipelines) between countries*	**West African Gas Pipeline (WAGP)** http://www.eia.doe.gov/emeu/cabs/wagp.html	In 1982, The Economic Community of West African States (ECOWAS) proposed the development of a natural gas pipeline throughout West Africa s one of its key regional economic policies. A feasibility report, prepared for the World Bank in the early 1990's, deemed that a pipeline to transport Nigerian natural gas to Benin, Togo and Ghana was commercially viable. In 2003, the four nations signed an agreement on the implementation of the WAGP. The treaty, which is for a 20-year period, provides for a comprehensive legal, fiscal and regulatory framework, as well as a single authority for the implementation of the project. The World Bank estimates that Benin, Togo and Ghana can save nearly $500 million in energy costs over a 20-year period as WAGP-supplied gas is substituted for more expensive fuels in power generation. Construction started in 2005. It is set for completion later in 2007.	WAGP consortium (Chevron, Nigerian National Petroleum Corporation, Shell, Ghana's Volta River Authority, Societé Beninoise de Gaz, Societé Togolaise de Gaz), ECOWAS Secretariat, USAID
B. Renewable Energy A21.9.12 (d), (f), (g), (i); JPOI 20 (c), (d), (e)			
1) *High relative capital cost of renewable energy*	**(a) "Indian Renewable Energy Development Agency Limited (IREDA)"** http://www.iredaltd.com/	IREDA is a Public Limited Government Company established in 1987, under the administrative control of Ministry of New and Renewable Energy (MNRE) to promote, develop and extend financial assistance for renewable energy and energy efficiency/conservation projects.	Ministry of Non-conventional Energy Sources, industry
	(b) Argentina - Biofuel Law http://www.sagpya.mecon.gov.ar/new/0-0/agricultura/otros/biodiesel/trabajos.php	The Argentine Senate approved a bill that will grant tax incentives to the producers of biofuels while guaranteeing them a share of the market for 15 years. The new legislation grants tax exemptions to farmers who use vegetable oil to produce biodiesel, sugar cane or corn to produce ethanol, or organic waste to produce biogas.	Government
	(c) Morocco - Electrifying Rural Households http://www.wbcsd.org/includes/getTarget.asp?type=DocDet&id=15051 See Case Studies for Sustainable Development Database:	In regions containing disparate communities where grid extension is not economically feasible, electricity services can be provided through the creation of small, locally run companies that overcome the cost barrier of renewable energy by providing a range of basic services (electricity, water, gas and communications) for the required investment and this has proven popular with end-use	Governments, Electricité de France, Tenesol, Total, private sector, donors, IFIs, local communities

Barriers/Constraints	Case Studies	Lessons learned, Best Practices, Results	Key implementation actors
	http://webapps01.un.org/dsd/caseStudy/public/displayDetailsAction.do?code=253		
2) *Lack of policy support for increased RE application*	**(a) Germany – Renewable Energy Sources Act 2000** http://www.erneuerbare-energien.de/inhalt/6465/36356/	The Renewable Energy Sources Act is crucial for the expansion of renewable energies in the electricity sector. It is based on a feed-in regulation to grant plant operators fixed compensation normally over 20 years. The level of compensation depends on the energy source and the year in which the plant started operation, as it is reduced each year for new plants (degression).	Government, private sector
	(b) Australia – Renewable Energy in National Parks: Queensland Parks & Wildlife Service http://www.epa.qld.gov.au/parks_and_forests/managing_parks_and_forests/renewable_energy/	This program has demonstrated that there are significant ongoing savings to be gained from installing renewable energy systems in remote areas, despite high initial capital cost. Specialised training and expertise are required in the installation and servicing of these systems, with ongoing skills training for users important in enabling the acceptance and adoption of these new technologies. Solid policy implementation and structures, such as the Government subsidy scheme available for this project, are a major incentive in implementing remote renewable power systems.	Government
	(c) China – National Renewable Law 2005 http://www.nrel.gov/docs/fy04osti/35786.pdf	The law provides incentives to encourage the development of renewable technologies and provide market opportunities for renewable energy companies.	Government, research institutes, academia
	(d) Barbados - Promotion of solar water heating systems http://www.sidsnet.org/successstories/11.html	The promotion of solar water heating systems in Barbados resulted from concessions granted by the Ministry of Finance, which enabled manufacturers to import materials duty-free, and provide consumers with partial or full tax deductions for the cost of the heaters. The solar water heating industry saves Barbados about $US 6.5 million per year in imported fuel.	Government, private sector
	(e) Compiling RES Legislation for Kazakhstan http://www.reeep.org/index.cfm?articleid=1379&parentid=916 http://www.undp.kz/projects/start.html?se	Objective: To generate support for renewable energy for inclusion in the legislation of Kazakhstan. Challenge: Influence of the government climate policy on the renewable energy legal framework.	UNDP-Kazakhstan, REEEP

Barriers/Constraints	Case Studies	Lessons learned, Best Practices, Results	Key implementation actors
	arch_url=1&simple=Energy+%26+Environment+-+General&n0_filter=1&n0_filtervalue[]=4 See also Case Studies for Sustainable Development Database: http://webapps01.un.org/dsd/caseStudy/public/displayDetailsAction.do?code=442	Lessons learned: It is important to engage the industry and investors while developing the renewable energy legislation to guarantee succesful implementation. Legislative frameworks should be followed by plans for implementation to ensure the targeted level of renewable energy market development.	
	(f) **Renewable Energy & Energy Efficiency Policy and Action Plan of Liberia** http://www.reeep.org/index.cfm?articleid=1381&parentid=916 See also Case Studies for Sustainable Development Database: http://webapps01.un.org/dsd/caseStudy/public/displayDetailsAction.do?code=443	Objective: To increase national awareness on RE & EE and remove barriers to investment and market development through a national policy instrument. Challenges: Government commitment and support to the project and the associated administrative delays. Achieving broad-based stakeholder participation, especially of those from rural Liberia. Lessons learned: Post-conflict situations sometime provide good opportunities for development of a sustainable energy framework. National Policy development initiatives led by NGOs face more difficulties in gaining acceptance by the Government.	Center for Sustainable Energy Technology, REEEP, Government of Liberia
	(g) **Barriers to Diffusion of Solar Thermal Technologies** http://www.iea.org/Textbase/publications/free_new_Desc.asp?PUBS_ID=1827	This case study notes that despite technical maturity, solar thermal technology receives insufficient attention from the public and policy-makers. Solar thermal technologies a currently provide a greater contribution to global energy demand than solar electricity – photovoltaic (PV) and concentrating solar power (CSP). Lessons learned emphasize the need to pursue a policy that simultaneously addresses issues such as educating the public, providing incentives, developing certification, and training installers.	IEA/OECD
3) *Limited investment and financial support*	(a) **South Africa- Solar Water Heating for Municipal Infrastructure Delivery in South Africa-** http://www.un.org/esa/sustdev/csd/casestudies/swhs_usa.pdf See also Case Studies for Sustainable Development Database: http://webapps01.un.org/dsd/caseStudy/public/displayDetailsAction.do?code=28	Subsidized SWH systems were provided through a pilot project to demonstrate demand for this application. Now local financial institutions are providing soft credit terms that are affordable to the poor.	Winrock International, municipal housing authorities, engineering companies, financial institutions, USAID

Barriers/Constraints	Case Studies	Lessons learned, Best Practices, Results	Key implementation actors
	(b) Germany – Market Incentive Programme http://www.kfw-foerderbank.de/foerderbank/EN_Home/Umweltschutz/RenewableE.jsp http://www.bafa.de/1/de/aufgaben/energie/erneuerbare_energien.php (German) http://www.iea.org/textbase/pamsdb/detail.aspx?mode=gr&id=83	Under this scheme, individuals and small and medium-sized businesses may apply for grants and soft loans for solar collectors, biomass boilers, biogas plants and geothermal heating systems. In addition, schools may apply for grants to install photovoltaic plants.	Government, private sector
	(c) JREC Patient Capital Initiative http://europa.eu.int/comm/environment/jrec	The Patient Capital Initiative analyzed the nature of the risk capital funding gap. A feasibility study was conducted to assess the options of creating an innovative public-private financing mechanism that could blend public and private funding and deliver 'patient risk capital' to business development in developing countries and economies in transition at affordable terms. Work is ongoing to implement a Global Energy Efficiency and Renewable Energy Fund that will leverage public funds with a factor 10.	European Commission, Triodos Fund Management, E+Co, JREC
	(d) Wind Energy and Rural Development: Innovative Farmer-Ownership Models http://www.state.gov/g/oes/sus/csd/2006/inter/66148.htm#40	This financing model features a wind turbine owned by a group of individuals who have purchased shares, thus insulating investors from liability. This model also maximizes the applicants' ability to use tax credits and other incentives while maintaining local benefits and generating new income for farmers. The 7 turbines each produce a nameplate average of 5.75 MW of renewable energy per year.	Farmers, local community bank, USDA Rural Development
	(e) Mediterranean Renewable Energy Partnership (MEDREP) http://www.medrep.info	MEDREP launched PROSOL Tunisia in April 2005, a solar loan facility to help thousands of Tunisian households acquire solar water heaters. Since the launch, three partner banks have lent almost US$6 million in the Programme for the installation of 22,000 square metres of solar panels in 8,000 systems. PROSOL Tunisia is on track to install 55,000 square metres of panels by the end of 2006. A similar programme for hotels, PROSOL Morocco has targeted 80 hotels with 17 hotels currently in the pipeline for new solar water heater systems.	Italian Ministry of Environment and Territory, UNEP, Tunisian and Morocco governments
	(f) Seed Capital Access Facility (SCAF)	Helps early stage sustainable energy enterprises access start-up seed capital from mainstream energy investors.	Asian Development Bank, African Development Bank, UNEP

Barriers/Constraints	Case Studies	Lessons learned, Best Practices, Results	Key implementation actors
	www.uneptie.org/energy/act/fin/docs/SCAF_brief.pdf	Through SCAF, the finance community will be able to play a more direct role to accelerate growth in the renewable energy sector. SCAF will be operational by early 2007 and jointly implemented through.	
	(g) Support for Establishing a Renewable Energy/Energy Efficiency Finance Facility in Brazil http://www.reeep.org/index.cfm?articleid=1393 See also Case Studies for Sustainable Development Database: http://webapps01.un.org/dsd/caseStudy/public/displayDetailsAction.do?code=445	Objective: To establish a dedicated private equity investment fund for renewable energy and energy efficiency. Challenge: A requirement for the investment fund to limit its activities to a certain geographical area within Brazil, corresponding to the concession area of the distribution utility. Lessons learned: The local electricity utilities should have an interest and stake in the power project to ensure its success. While the fund is set out to make investments in biomass, energy efficiency and hydro power, it has since focused on hydro power to take advantage of the current opportunities in Brazil.	LaGuardia Foundation, REEEP, Blue Moon Fund
	(h) Development of a Sustainable Energy Policy Framework for Guatemala http://www.reeep.org/index.cfm?articleid=1374&parentid=916 See also Case Studies for Sustainable Development Database: http://webapps01.un.org/dsd/caseStudy/public/displayDetailsAction.do?code=444	Objective: Preparation of a proposal to the Government of Guatemala for a long-term national energy policy, with emphasis on renewable energy, energy efficiency and environment. Challenges: Lack of general energy consumption knowledge in country, which leads to preparation of a basic energy document. Preparation of energy sector information in simple terms for overall comprehension. Lessons learned: Policy development initiatives lead by NGOs find it difficult to gain acceptance from the Governments. Lobbying prospective candidates during a general election could be an interesting option to promote renewable energy and energy efficiency legislation.	Fundacion Solar, REEEP, GVEP-GAP, UNDP-GEF
	(i) Manure-Digester-Fueled Generators: Dairyland Power Cooperative http://www.state.gov/g/oes/sus/csd/2006/inter/66148.htm#43	Dairyland Power Cooperative supplies wholesale electricity to locally owned cooperatives and municipal utilities in Wisconsin , Iowa , Minnesota , and Illinois . At each of its five facilities, cow manure undergoes a process called anaerobic digestion that produces methane gas that, in turn, powers a 775 kW generator. Water pollution and clean air issues associated with manure disposal are significantly reduced; the heated, de-watered byproduct of the digestion process can be used as natural bedding; and the liquid can be used as a fertilizer by farmers, thus reducing the dependence on chemical fertilizers.	Electric cooperative, USDA rural Development, Department of Energy, U.S. Environmental Protection Agency, and local energy cooperatives, and farmers

Barriers/Constraints	Case Studies	Lessons learned, Best Practices, Results	Key implementation actors
4) *Lack of investment by government and private sector in RE R&D*	**(a) Denmark's wind energy hub** http://www.windpower.org/en/industry.htm	This industrial success story stems from an unrivalled cluster of knowledge where manufacturers, suppliers, research and educational institutions combine expertise, innovation and advanced technology into a strong industry.	Governments, private sector, public-private partnerships
	(b) International Partnership for the Hydrogen Economy (IPHE) http://www.iphe.net/	The International Partnership for the Hydrogen Economy was established in 2003 as an international institution to accelerate the transition to a hydrogen economy. By creating the IPHE, the Partners have committed to accelerate the development of hydrogen and fuel cell technologies to improve their energy security, environmental security and economic security.	(members of Partnership) Australia, Brazil, Canada, China, European Commission, France, Germany, Iceland, India, Italy, Japan, Republic of Korea, New Zealand, Norway, Russian Federation, United Kingdom, United States
5) *Inability of the rural and urban poor to pay high upfront costs*	**Bangladesh – Grameen Shakti solar home systems** http://www.lged-rein.org/solar/solar_gs.htm	Grameen Bank has provided innovative microfinancing for solar home systems that now makes such systems affordable to the poor. Children's education has improved due to better quality of light. Men and women reported increase in income due to extended working hours after dusk. Living standard of users has also improved.	NGOs, micro-credit institutions, community based organizations, renewable energy service providers
6) *Lack of information about RE resources and applications at all levels*	**(a) REN21 – Global status of information on RE resources, policies and tools** http://www.ren21.org/globalstatusreport/download/RE_GSR_2006_Update.pdf http://webapps01.un.org/dsd/partnerships/public/partnerships/1596.html	A source for global information on renewable energy technologies, markets, investment and policies.	Governments, international institutions and organisations, partnerships, policy makers
	(b) REEEP – Actors' Catalogue http://www.reegle.info/home.1.htm http://webapps01.un.org/dsd/partnerships/public/partnerships/198.html	This information gateway provides the catalogue of over 600 institutions and companies active in renewable energy development	International partnerships and governments
	(c) IEA – Global Renewable Energy Policies and Measures Database http://renewables.iea.org	Provides unbiased information and analysis on energy policies and measures for use by decision-makers, policy experts, researchers and industry, as well the broader public.	Governments, international organisations

Barriers/Constraints	Case Studies	Lessons learned, Best Practices, Results	Key implementation actors
	(d) Sri Lanka and Maldives-Renewable Resources Assessment for Stimulating Investment http://www.nrel.gov/environment/sri_lanka_maldives.html See also Case Studies for Sustainable Development Database: http://webapps01.un.org/dsd/caseStudy/public/displayDetailsAction.do?code=26	Making critical information on renewable energy resources available to government planners and investors at an early stage will greatly enhance and accelerate investments in renewable energy technologies.	U.S. National Renewable Energy Laboratory, governments
	(e) Solar and Wind Energy Resource Assessment http://swera.unep.net http://www.uneptie.org/energy/act/re/fact_sheet/docs/swera.pdf	SWERA is an international collaboration to map the solar and wind energy resources of 13 developing countries in South America, Central America, Africa and Asia. Mapping of renewable energy resources is critical for successful development. After a successful initial phase, SWERA is expanding its mapping and analysis services, including a new Geospatial Toolkit that allows wind and solar maps to be combined with electrical distribution grids and other data to provide high quality information that supports energy planning and policy development, while lowering the risk for renewable energy project developers and reducing project lead times.	UNEP, research institutes, governments
	(f) Germany - Technical Expertise for Renewable Energy Application (TERNA) http://www.gtz.de/en/themen/umwelt-infrastruktur/energie/6657.htm	Closing the knowledge gap in developing countries, the wind energy programme TERNA supports partner countries in the assessment and utilisation of their wind energy potential for generating grid-connected electricity. Where the assessment is positive, this leads to the initiation of wind energy projects that are ready for investment to begin. As an parallel measure, the German development cooperation advises partner countries on the establishment and improvement of energy policy frameworks.	Governments, utilities, private sector
	(g) International Action Programme (IAP) for Renewable Energies http://www.renewables2004.de/en/2004/outcome_actionprogramme.asp	The IAP includes almost 200 initiatives from all the regions of the world, it covers: expansion targets, favourable political framework conditions, private and public financing, developing capacities in training, research and development. It is estimated that implementation of the IAP will in 2015 reduce the worldwide emission of CO2 1.2 billion tons/year (around 5% of global CO2-emissions), provide access to energy for an additional 300 million people, provide 163 GW additional installed electrical capacity	Governments, international organisations, IFIs, private sector, NGOs

Barriers/Constraints	Case Studies	Lessons learned, Best Practices, Results	Key implementation actors
		from renewable energies and create investments at the level of USD 326 billion.	
	(h) Uganda- The Uganda Photovoltaic Pilot Project for Rural Electrification http://www.un.org/esa/sustdev/csd/casestudies/e9_e2_uganda.pdf See also Case Studies for Sustainable Development Database: http://webapps01.un.org/dsd/caseStudy/public/displayDetailsAction.do?code=35	The project aimed at popularizing the use of photovoltaics in the rural areas where the hydropower grid has not reached. The following are some of the capacity building achievements: (i) Awareness was increased in rural areas among decision makers on environmental issues of energy use and the important role of the PV systems. (ii) Adequate capacity was built in the Ministry of Energy and Mineral Development to promote, monitor and evaluate PV projects and review policies which promote the solar industry.	Government
	(i) UNEP/Daimler Chrysler Biofuel Initiative http://www.unep.fr/energy/act/tp/index.htm	Initiative promotes the use of biofuels, establish standards for 10 percent biofuel blends for biodiesel and bioethanol, and develop criteria for the sustainable cultivation of biomass for biofuels.	UNEP, Daimler Chrysler
	(j) International Database of Renewable Energy & Energy Efficiency Law http://www.reeep.org/index.cfm?articleid=1369	Objective: The International Sustainable Energy Assessment will identify and analyse the impact of international energy agreements on energy efficiency, energy conservation, and renewable energy technologies; the project will also increase international understanding of optimal ways to configure and utilise international energy agreements to achieve the goal of a sustainable global energy future. Challenges: Difficulties in obtaining data on various international energy agreements. Lessons learned: A collection of on-line searcheable database of international energy agreements will help governments to consider the work in the past while planning future initiatives.	University of Colorado, REEEP
	(k) Johannesburg Renewable Energy Coalition (JREC) renewable energy policies and measures database http://europa.eu.int/comm/environment/jrec	Enhanced reporting and awareness of existing renewable energy policies and measures is conducive to the development of local, national, regional and global renewable energy markets. Better information also helps in attracting local and international funding. The global renewable energies database is available online and covers already over 600 policies and measures enacted by some 50 countries. The database will ultimately achieve global coverage.	International Energy Agency, European Commission, JREC members

Barriers/Constraints	Case Studies	Lessons learned, Best Practices, Results	Key implementation actors
C. Advanced and Cleaner Technologies A21.9.12 (e), (f), (k); JPOI 20 (d), (e), (i), (j), (k)			
1) *Inadequate R&D*	**(a) Combined Heat & Power Partnership** http://www.epa.gov/chp/pdf/CHPPFactSheet.pdf http://www.epa.gov/chp/pdf/Ethanol_Factsheet_Final%20Draft%20Jan05.pdf http://www.epa.gov/chp/pdf/catalog_entire.pdf	A number of Governments are supporting R&D and deployment of. cogeneration that can double efficiency for power generation and district heating,, thereby reducing the amount of fuel burned, and pollution created, per unit of energy.	US EPA, US DOE, US Combined Heat & Power Association, various industries and state governments.
	(b) Australia – Coal21 http://www.coal21.com.au/	Objectives: Create a national action plan to scope, develop, demonstrate and implement near zero emissions coal-based electricity generation. Facilitate the demonstration, commercialisation and early uptake of technologies identified in the plan. Promote relevant Australian RD&D. Foster greater public awareness.	Government
	(c) Australia - Low Emission Technology http://www.dpmc.gov.au/publications/energy_future/	The *Energy Transformed* flagship for the development of energy technologies for brown coal, black coal and the geological storage of CO_2. The *Low Emissions Technology Demonstration Fund* supports the demonstration of new low emissions technologies with the aim of encouraging private sector investment. This initiative is supported by the *Renewable Energy Development Initiative* that aims to promote the commercialisation of renewable energy technologies, systems and processes. Further funding allocated for the development of advanced electricity storage technologies. The progress made towards developing and implementing low emissions technology in Australia has illustrated the need for a multidisciplinary approach, with close involvement of the government, research and industry. The right policy settings are required in order to direct resources into and encourage technology driven approaches.	Government, private sector

Barriers/Constraints	Case Studies	Lessons learned, Best Practices, Results	Key implementation actors
	(d) Asia-Pacific Partnership on Clean Development and Climate http://www.asiapacificpartnership.org/	New effort to accelerate the development and deployment of clean energy technologies. The founding partners agreed to work together and with private sector partners to meet goals for energy security, national air pollution reduction, and climate change in ways that promote sustainable economic growth and poverty reduction. The Partnership will focus on expanding investment and trade in cleaner energy technologies, goods and services in key market sectors.	Australia, China, India, Japan, Republic of Korea, United States
	(e) Sustainable Development Technology Canada (SDTC) http://www.sdtc.ca/	A not-for-profit foundation that finances and supports the development and demonstration of clean technologies which provide solutions to issues of climate change, clean air, water quality and soil, and which deliver economic, environmental and health benefits to Canadians.	Government
	(f) China Hi-tech R&D Support Programme http://www.863.org.cn/english/annual_report/annual_repor_2001/200210100030.html	This successful program provides financial and policy support to R&D, demonstration and deployment of sustainable energy and clean coal technologies.	Government, industry, financial institutions, research institutes
2) *Lack of financial resources and investment*	**(a) Methane to Markets Partnership** www.methanetomarkets.org http://webapps01.un.org/dsd/partnerships/public/partnerships/1551.html	This public private partnership is more effective than previous government-only efforts in leveraging resources for advanced technologies related to methane recovery from mines, landfills and oil and gas systems.	17 governments and various organizations with experience in methane recovery
	(b) Landfill Gas-To-Electricity Project http://www.state.gov/g/oes/sus/csd/2006/inter/66148.htm#42 See also Case Studies for Sustainable Development Database: http://webapps01.un.org/dsd/caseStudy/public/displayDetailsAction.do?code=233	The Washington Electric Cooperative, Inc. successfully guided, implemented, and established a landfill gas-to-electricity generating plant, rated at 4.8 MW, through an integrated process of land use assessment, feasibility analysis, permitting, and regulatory compliance. Through a team approach to regional planning and coordination the project was able to serve the community's and the utility's members best interests in turning landfill methane gas into useful electricity over the next 25 years, while reducing the health risks of methane gas emissions.	Electric cooperative, USDA Rural Development, U.S. Environmental Protection Agency, and National Rural Utilities Cooperative Finance Corporation.

Barriers/Constraints	Case Studies	Lessons learned, Best Practices, Results	Key implementation actors
	(c) Central America- Clean Energy Financing in Central America See Case Studies for Sustainable Development Database: http://webapps01.un.org/dsd/caseStudy/public/displayDetailsAction.do;jsessionid=DFC7D386EBE4D1C44A5A62356C3857E9?code=15 http://www.un.org/esa/sustdev/csd/csd14/lc/presentation/singer.pdf	Creating confidence within local banks is essential to financing clean energy projects. If successful, then financing can readily be scaled-up and the fund design adapted for other developing markets and small- to medium-scale infrastructure projects.	E+CO, Inter-American Development Bank, USAID, Central Bank for Economic Integration, BIO, FinnFund and the Triodos Renewable Energy for Development Fund.
	(d) Generation IV International Forum http://gif.inel.gov/	Ten countries are working together to lay the groundwork for the fourth generation nuclear reactor. The next generation of nuclear energy systems - generation IV. - must be licensed, constructed and operated in a manner that will provide a competitively priced supply of energy. They must consider an optimum use of natural resources, while addressing nuclear safety, waste and proliferation resistance and public perception concerns of the countries in which those systems are deployed.	(members of Forum) Argentina, Brazil, Canada, Euratom, France, Japan, Republic of Korea, South Africa, Switzerland, United Kingdom, United States
	(e) Facilitating Access to Finance for the Biodiesel Industry in Southern Africa http://www.reeep.org/index.cfm?articleid=1397&parentid=915 See also Case Studies for Sustainable Development Database: http://webapps01.un.org/dsd/caseStudy/displayInitAction.do?code=441	Objective: To assist small and medium enterprises (SMEs) gain access to institutional funding for biodiesel production in SADC countries with a focus on Zambia, Lesotho and Tanzania. Challenges: Little or undeveloped government policies on biofuels. Little or no experience of biofuel industry within financing institutions, particularly at small scales. Risk of falling oil prices to the sustainability of biofuels production. Lessons learned: A balanced policy framework and proper business planning are critical to the success of bio-fuel projects in Southern Africa.	African Sustainable Fuels Centre (ASFC), REEEP, WISIONS/SEPS
	(f) South Africa -Efficient Use of Energy and Water in Municipal Water Utilities in South Africa http://www.usaid.gov/our_work/economic_growth_and_trade/energy/publications/projects/safrica_watergy.pdf	Improved water pressure management, leak reduction, biogas capture from waste treatment and auto-generation of electricity are measures that can significantly enhance water sector efficiency.	Alliance to Save Energy, USAID, local authorities

Barriers/Constraints	Case Studies	Lessons learned, Best Practices, Results	Key implementation actors
	See Case Studies for Sustainable Development Database: http://webapps01.un.org/dsd/caseStudy/public/displayDetailsAction.do?code=18		
	(g) Prospects for Hydrogen and Fuel Cells http://www.iea.org/textbase/nppdf/free/2005/hydrogen2005.pdf	This study quantifies the costs, benefits, and policy needs associated with the use of hydrogen and fuel cells in energy scenarios over the coming decades. It focuses on three principal objectives: -Quantifying the prospects for technical improvement and cost reduction in hydrogen and fuel cell technologies. -Exploring the technical, economic and policy issues important to a transition to a hydrogen energy system. -Analyzing the long-term perspectives of a fully developed market for hydrogen and fuel cells, and their impact on emissions and energy security.	International Energy Agency
3) *Lack of technology transfer to developing countries*	**(a) U.S. Environmental Protection Agency's Voluntary Methane Program** www.epa.gov/methane/voluntary.html See Case Studies for Sustainable Development Database: http://webapps01.un.org/dsd/caseStudy/public/displayDetailsAction.do?code=19	Improved technical reliability of anaerobic digesters, growing concern of farmers about environmental quality, an increased number of state and federal programs funding programs, and new state energy policies designed to expand renewable energy have combined to rapidly ramp up methane capture in agriculture.	US Environmental Protection Agency, farmers
	(b) Carbon Sequestration Leadership Forum http://www.cslforum.org/	The Carbon Sequestration Leadership Forum is an international climate change initiative that is focused on development of improved cost-effective technologies for the separation and capture of carbon dioxide for its transport and long-term safe storage. The purpose of the CSLF is to make these technologies broadly available internationally; and to identify and address wider issues relating to carbon capture and storage. This could include promoting the appropriate technical, political, and regulatory environments for the development of such technology.	(members of Forum) Australia, Brazil, Canada, China, Colombia, Denmark, European Commission, France, Germany, Greece, India, Italy, Japan, Republic of Korea, Mexico, Netherlands, Norway, Russian Federation, Saudi Arabia, South Africa, United Kingdom, United States

Barriers/Constraints	Case Studies	Lessons learned, Best Practices, Results	Key implementation actors
D. Energy Efficiency A21.9.12 (c), (e), (h), (i), (j), (k), 9.15 (a), (b); JPOI 20 (b), (h), (i)			
FINANCE			
1) Lack of financing for public sector energy efficiency projects	**(a) Bulgaria-Credit Facility for Municipal Energy Efficiency** http://www.un.org/esa/sustdev/csd/casestudies/DCA_usa.pdf See Case Studies for Sustainable Development Database: http://webapps01.un.org/dsd/caseStudy/public/displayDetailsAction.do?code=20	Special credit facilities are needed where conditions are not yet suitable for commercial lending and, where successful, can leverage large lending programs of IFIs.	United Bulgaria Bank, USAID, local authorities, ESCOs and IFIs
	(b) Developing Financial Intermediation Mechanisms for Energy Efficiency Projects in Brazil, China and India http://www.unep.fr/energy/projects/cp-ee/cpee_project.htm	Project aimed to remove barriers for energy efficiency lending in Brazil, China and India, and increase the capability of new and existing financial institutions to package energy efficiency investment projects. The Project also focused on the development of energy service companies (ESCOs); the exploration of equity funding for energy efficiency projects; and assessments of the need for guarantee facilities to facilitate these loans.	UNEP, World Bank
	(c) Financing Energy-Efficient Street Lighting in India http://www.reeep.org/index.cfm?articleid=1387 See also Case Studies for Sustainable Development Database: http://webapps01.un.org/dsd/caseStudy/public/displayDetailsAction.do?code=453	Objective: Support the implementation of an innovative financing mechanism, in order to reduce by 30-40% the consumption of the street lighting network in the cities of Madhya Pradesh. Challenges: Persuading the MPSEB and the Municipal Corporations to reach an agreement for the arrears and ongoing payments of the electricity bills. Persuading the Municipal Corporations and the ESCO to reach an agreement on the guarantee of reimbursement of the agreed savings. Achieving the project within the timeframe. Lessons learned: Capacity building at the city level is important to realising more city level energy initiatives; regional and city level sustainable energy initiatives provide a good starting point to have maximum impact; revenues from carbon finance has the potential to improve the business prospects of ESCOs.	Econoler International, REEEP, Asian Electronics Ltd., Central DISCOM, municipal corporations

Barriers/Constraints	Case Studies	Lessons learned, Best Practices, Results	Key implementation actors
	(d) Hungary Energy Efficiency Co-Financing Project (HEECP) http://lnweb18.worldbank.org/ESSD/envext.nsf/46ByDocName/IFCHEECPProjectModels/$FILE/IFCHEECPProjectModels04.pdf	Co-financing models a range of applications, including installation of energy efficient lighting via ESCOs, installation of co-generation units and modernization of boilers for district heating companies.	IFC, GEF, municipalities, public housing associations, district heating companies, ESCOs
2) Lack of financing for private sector energy efficiency projects	**(a) Hungary- Support to ESCO industry** http://econolerint.com/en/PDF/HUNGARY_ESCO_final.pdf	Energy sector restructuring, good institutional and banking sector reforms and structured aid programs can lead to important positive results in countries in transition in the energy performance contracting business. Energy service companies (ESCOs) and third party financing can play an important role in achieving energy efficiency goals if a nurturing business environment is provided.	Government, International Finance Corporation and GEF, financial institutions, ESCO industry association
	(b) China Energy Conservation Program China Energy Conservation Project Appraisal Document China Energy Conservation II Project Appraisal Document www.emca.cn/en/index.html	The first China Energy Conservation Project created three pilot energy management companies (EMCs) and created a market-based information dissemination center. The second project created a major EMC training program, created a EMC association and loan guarantee program to support EMC projects. The pilot EMC approach was instrumental in allowing China to test a new market-based approach to energy efficiency and resolve legal, tax/accounting and other issues before promulgating the business model across the country. Developing simple contractual arrangements, rather than complicated monitoring and verification protocols, etc. can help the market in the early years. To date, dozens of EMCs have been created across China and about $250 million of EMC projects have been financed, saving 18 million tons of coal equivalent (tce) and over 12 million tons of CO_2.	China State Economic Trade Commission (SETC), World Bank, GEF, U.K. Department for International Development, China National Investment & Guaranty Company, China Energy Management Company Association
	(c) Bulgarian Energy Efficiency Fund (BgEEF) www.bgeef.com	Succinct summary (approx. 50 words) of lessons learned, or best practices that have emerged/were applied. A dedicated energy efficiency fund managed by knowledgeable experts can bring a lot of added value to help develop a market based energy efficiency market in an emerging market economy. Detailed reports and background can be made accessible via the web link. Information can be found on the BgEEF website as well as on the World Bank and GEF web sites.	The project was developed by the World Bank and has received financial support by the GEF, the government of Austria and the government of Bulgaria. The fund is currently managed by a private sector consortium managed by Econoler International of Canada, with EnEffect and Elana of Bulgaria. An independent board

Barriers/Constraints	Case Studies	Lessons learned, Best Practices, Results	Key implementation actors
			whose members are named by the ministry of energy of Bulgaria is responsible for the fund good operation.
	(d) Mexico-Innovative Financing for Energy Efficiency http://www.conae.gob.mx/work/sites/CONAE/resources/LocalContent/2962/1/images/17_esmapnadbank.pdf	It is useful to have development banks take the first step with a clear strategy of moving to commercial lending of EE projects after proof of concept.	US-DOE, World Bank ESMAP, North American Development Bank, SENER, CONAE, Mexican NGOs
	(e) Performance Contracting Applied to Water Supply in South Africa www.watergy.org/resources/casestudies/ www.ase.org/section/country/southafrica	This project is an example of performance contracting applied to water supply. Of all water flowing into homes in the project area—a former black township in Emfuleni, South Africa—80% was lost through leaking plumbing fixtures. A water engineering company acted as an ESCO, applying pressure management technology that reduced water losses by over 30%. The project paid for itself in less than three months, with the municipality keeping 80% of the savings in water waste and the private firm keeping 20%, over a five-year contract. Annual savings are: US$ 3.8 million, 14 million kWh and 8 million kL of water; 12,000 tonnes of CO2 are avoided per year.	The project was made possible with technical assistance from the Alliance to Save Energy, which provided assistance in conceptualization, planning, procurement, contracting and legal arrangements, negotiations, contract management and the statistical determination of future water supply projections (the baseline).
	(f) United States - Energy Efficiency Industry Partnership Program (EEIP) of the Alliance to Save Energy in Thailand http://www.ase.org/content/article/detail/612	The Alliance's program in Thailand centers on providing technical, strategic, and fundraising assistance to both new and established NGOs. The Alliance assists energy efficiency and related organizations to develop concise mission statements and strategic plans, identify key legislative issues impeding the spread of energy efficiency, and leverage funding from multilateral, bilateral, and foundation sources.	Government, international partnership
REGULATORY & POLICY FRAMEWORKS			
1) *Weak regulatory framework for energy efficiency in the building sector*	**(a) Poland – Energy Efficient Building Codes** http://www.worldenergy.org/wec-geis/publications/reports/eepi/a1_newbuildings/polanddata.asp	Very significant thermal renovation of existing houses lead to decline in energy consumption. This was encouraged by provision of subsidised credits for renovations and removal of oil price subsidies, and was hindered by high interest rates for credit.	Government, engineering and architecture associations

Barriers/Constraints	Case Studies	Lessons learned, Best Practices, Results	Key implementation actors
	(b) Partnerships for Home Energy Efficiency http://www.hud.gov/energy/library/newsletters/march2007.cfm http://www.huduser.org/publications/destech/energyefficiency.html	Residential homes account for about 21% of U.S. energy use and cause about 17 % of total U.S. greenhouse gas emissions. The Partnership aims to reduce energy consumption in existing homes by 10 % by 2015. Meeting this goal would save $20 billion a year in utility costs, increase home affordability and comfort, reduce demand for natural gas by nearly 1% of total U.S. energy demand, and avoid greenhouse gas emissions equivalent to those from over 25 million vehicles. The combined efforts of the three agencies have improved the energy efficiency of more than 337,000 homes and apartments across the United States over the past year. Through a partnership with the private sector, this project has invested close to $350 million in energy improvements as of 2006. Energy savings resulting from these contracts are valued at $37 million annually.	U.S. Dept of Housing and Urban Development (HUD), U.S. Department of Energy (DOE), the U.S. Environmental Protection Agency (EPA), Energy Star, Local government public housing authorities. Financing the low-income: Private sector partners: AMERESCO, NORESCO, Honeywell, Siemens, Water and Energy Savings
	(c) Barrier Removal for Residential Energy Efficiency http://www.reeep.org/index.cfm?articleid=1367 See also Case Studies for Sustainable Development Database: http://webapps01.un.org/dsd/caseStudy/public/displayDetailsAction.do?code=449	Objective: To improve the institutional capacity of local and national governments to formulate policies that promote the development and implementation of residential energy efficiency projects, especially for multifamily buildings where there is a high concentration of vulnerable (low income) households. Challenges: Limited empirical examples of end-use EE projects in the residential sector. Failure to pass and/or implement pending or new legislation related to EE policy and incentives (esp. energy pricing) for improving residential end-use efficiency. Lessons learned: Home owners associations and housing management and maintenance companies have a key role in promoting buildings energy efficiency. There are limited incentives for improving energy efficiency in the Newly Independant States and subsidised energy prices distort the markets. Limited number of examples of how energy efficiency in buildings have been achieved in the region.	REEEP, USAID
	(d) Promoting Low-Energy Building Programme in China http://www.reeep.org/index.cfm?articleid=1405&parentid=916 See also Case Studies for Sustainable Development Database:	Objective: Increase energy efficiency and reduce GHG emissions in the building sector of China. Challenges: Acceptance of the national policy recommendations report by the Chinese government.	China National Engineering Research Center for Human Settlements, REEEP, Ecofys, CADREG

Barriers/Constraints	Case Studies	Lessons learned, Best Practices, Results	Key implementation actors
	http://webapps01.un.org/dsd/caseStudy/public/displayDetailsAction.do?code=450	Policy recommendations for low energy building programmes in China will be developed in 2007.	
	(e) Building Energy Efficiency Codes in Russia and Kazakhstan http://www.reeep.org/index.cfm?articleid=1413&parentid=916 See also Case Studies for Sustainable Development Database: http://webapps01.un.org/dsd/caseStudy/public/displayDetailsAction.do?code=451	Objective: Improve compliance with new building energy codes and provide training and resources to enable designers to go beyond compliance. Help building officials to better implement and enforce the codes. Challenges: Building code officials may fail to improve code enforcement and implementation. Codes may expire or be negatively amended by authorities. There may be turnover among trained building officials. Lessons learned: Enforcement and implementation of building codes by officials is more important than development of the codes. Training has to be carried out for officials who enforce the codes as well as architects who design buildings for building codes to be effective. Building codes should be made user-friendly to encourage and ensure uptake and implementation.	REEEP, US Environmental Protection Agency, Research Institute for Building Physics (Moscow), NRDC
	(f) High Rise Refurbishment: The Energy Efficient Upgrade of Multi-Story Residences in the EU http://www.iea.org/Textbase/publications/free_new_Desc.asp?PUBS_ID=1836	This study identifies a Europe-wide cost-effective energy saving potential of 28% from energy-efficient refurbishment of the high-rise residential building stock. Attainment of this potential would imply a 1.5% reduction of Europe's total final energy demand and annual CO2 emissions savings of 35 Mt.	IEA, EU, European Alliance of Companies for Energy Efficiency in Buildings
2) *Weak regulatory framework for appliance efficiency*	**(a) Collaborative Labeling and Appliance Standards Program (CLASP)** http://www.clasponline.org/main.php http://webapps01.un.org/dsd/partnerships/public/partnerships/179.html	Standards and labeling programs can produce very large energy savings, can be very cost effective, treat all manufacturers equally, and the resulting energy savings are generally assured, comparatively simple to quantify, and readily verified.	Collaborative Labeling and Appliance Standards Program (NGO), governments, foundations, USAID, MGs, UN agencies
	(b) Australia - Improving Appliance Energy Efficiency http://www.energyrating.gov.au/rf1.html See also Case Studies for Sustainable Development Database: http://webapps01.un.org/dsd/caseStudy/public/displayDetailsAction.do?code=315	The Equipment Energy Efficiency Programme (EEEP) is a collection of coordinated end-use energy efficiency programs in Australia and New Zealand. The main tools are mandatory Minimum Energy Performance Standards (MEPS), energy efficiency labeling (enforced by law) and voluntary measures, including endorsement labeling, training and support to promote the best available products. A combination of strong policy initiatives and industry consultation has led to improved consumer	

Barriers/Constraints	Case Studies	Lessons learned, Best Practices, Results	Key implementation actors
		awareness regarding energy consumption of refrigerators and freezers.	
	(g) Raising the Profile of Energy Efficiency in China: Case study of standby power efficiency http://www.iea.org/textbase/papers/2006/StandbyPowerChina19Sep06.pdf.	In its 11th Five Year Programme, the Chinese government has given priority to energy efficiency to achieve its economic goal. Detailed action plans and activities are necessary to implement this plan. Drawing on the OECD experience, this paper demonstrates concrete activities and actions that China could draw on to improve standby energy efficiency. This paper concludes that promoting energy efficient standby devices in China would be financially and economically viable. It would avoid or postpone investment in 8 or 9 large power plants.	OECD, Government
3) Lack of market incentives for energy efficiency	**(a) Efficient Lighting Initiative in Poland, Argentina, Czech Republic, Hungary, Latvia, Peru, Philippines, South Africa, Vietnam-** http://www.ifc.org/ifcext/enviro.nsf/Content/EfficientLighting	Applying a range of measures (public education, standards, financial incentives, linking with utility DSM programs, credit, etc) is the most effective way to transform a market to higher efficiency.	Governments, IFC, partnerships, manufacturers, electric utilities, retailers, lighting professionals, and designers
	(b) The Czech – German Initiative on Environmental Tax Reform (ETR) in the Czech Republic, experiences about to be transferred to Poland and Estonia http://www.czp.cuni.cz/ekoreforma/EDR_diseminace/english.htm	Through a cycle of workshops (bringing together the German and the Czech stakeholders) between 2003-2006 the societal support was created for the introduction of an ETR. The market-based incentives for more employment and for more energy efficiency and renewables has turned out to be very successful in Germany hence there is broad interest from abroad to benefit from these experiences by creating similar incentives.	Governments, community organizations (major stakeholders of the society as trade unions, industry etc.), private sector
	(c) Energy Efficiency Mexico	Objectives: 30 percent increase in sales of highly energy efficient motors, compressors and lighting between 1998 and 2003. Rebates for those equipments were provided. Results: 100 percent market penetration of efficient motors in 2003. Lessons learned: Even if companies and ESCOs were willing to implement energy efficiency measures, the banks were not willing to take any risks which were out of their area of competence. During the project this issue was analyzed and in coordination with NAFIN (Nacional Financiera S.N.C.) and FIDE (Fideiscomiso para el ahorro de energia) some guarantee mechanisms were developed.	IDB, FIDE, NAFIN, CFE (comision federal de electricidad)

Barriers/Constraints	Case Studies	Lessons learned, Best Practices, Results	Key implementation actors
	(d) Watergy: Taking Advantage of Untapped Energy and Water Efficiency Opportunities in Municipal Water Systems http://www.watergy.org/resources/publications/watergysummary.pdf http://webapps01.un.org/dsd/partnerships/public/partnerships/1286.html www.ase.org/section/country/ - **Mogale City, South Africa** - **Soweto, South Africa** - **Pune, India** - **Vishakhapatnam, India**	Large water and energy savings can accrue from relatively low cost investments. Where local capacity and access to capital is limited, new financial mechanisms can be successfully adapted. In South Africa a two-pronged approach: effective water demand management program established with improved infrastructure and staffing capabilities, and a focus on instilling responsibility among residents to pay for water they consume and to maintain their meters and connections. Both conventional and pre-payment metering were successfully used, where prior strong public opposition to payment for water had existed. In India, as a result of training provided to municipal engineers, they implemented additional low and no cost energy efficiency measures at water pumping stations beyond what was planned in the energy audit.	Alliance to Save Energy, USAID, local, state, and national government bodies; water utilities; private equipment suppliers and service providers; local NGOs and partner contractors.
	(e) Policy Advances on Municipal Energy Efficiency in the Indian State of Karnataka www.watergy.org/resources/casestudies/ www.ase.org/section/country/india/	After the enormous benefits of energy efficiency applied to municipal water supply (Watergy) were demonstrated over the course of several years, the State of Karnataka issued two Government Orders during 2006 to promote municipal energy and water efficiency. Also, Energy Management Cells are now operational in both the Karnataka Urban Infrastructure Development Finance Corporation and the Karnataka Urban Water Supply and Drainage Board, to help municipalities become more energy efficient. The demonstrations convinced the Asian Development Bank and World Bank to alter their municipal infrastructure projects to incorporate Watergy improvements.	The Alliance played an instrumental role in persuading the Karnataka State Government to release the two landmark policy directives, both through work with municipalities on Watergy improvements, and by working directly with state government agencies.
	(f) Barriers to Technology Diffusion: The Case of Compact Fluorescent Lamps (CFLs) http://www.iea.org/Textbase/publications/free_new_Desc.asp?PUBS_ID=1826	The study provides five case studies of programmes designed to enhance CFL penetration in Brazil, California, China, South Africa and the UK. Among the key lessons learned is that successful programmes addressed multiple barriers relating to cost/technology, structure of the lighting sector, and consumer behavioural/information.	IEA, country programmes analysed

Barriers/Constraints	Case Studies	Lessons learned, Best Practices, Results	Key implementation actors
4) *Inefficient transport sector*	**(a) UK-London Green Transport Strategy** http://www.camden.gov.uk/ccm/content/transport-and-streets/transport-strategies/camdens-green-transport-strategy.en	The strategy has been successful in reducing road traffic, supporting public transport, cycling and walking as transport options, and promoting substitution by cleaner fuels.	London Borough of Camden – a UK local authority
	(b) SPAIN - Sustainable Mobility Strategies http://www.istas.ccoo.es/	This project is part of a wide program 'Climate and Workers', based on three main lines of action: information, training, and creating spaces for debate and exchange of experiences. The project promotes workers' behavioral change as well as the implementation of programs and measures by government and enterprises.	Instituto Sindical de Trabajo, Ambiente y Salud – ISTAS – CC.OO. Trade Unions, Employers, Local Authorities
	(c) New Energy Efficient Technologies in Transportation: The Hybrid Car http://www.hybridcars.com	The purchase of more fuel efficient hybrid vehicles is a function of consumers' sensitivity to high gasoline prices, government incentives and mandates.	Automobile manufacturers, consumer organizations
INFORMATION, COMMUNICATION & AWARENESS			
1) *Lack of public sector awareness and organizational incentives for energy efficiency*	**(a) Hungary: Public Sector Energy Efficiency Programme** http://www.un.org/esa/sustdev/csd/casestudies/e3_e11_hungary.pdf See also Case Studies for Sustainable Development Database: http://webapps01.un.org/dsd/caseStudy/public/displayDetailsAction.do?code=101	Over 700 energy audits of municipal institutions have provided a clear picture of municipal energy consumption and have proven to be a crucial tool in implementing a municipal energy rationalisation strategy and investment program.	Government, Energy Centre Hungary, UNDP, 14 NGOs and for-profit companies; national and international municipal associations, energy service companies
	(b) German Energy Agency (dena) http://www.dena.de/en/	The German Energy Agency – dena was founded as a competence centre for energy efficiency. Its objective is to promote pioneering approaches to and achieve provable successes in increasing energy efficiency. Examples of activities: Initiatives on efficient electricity use, coordination of energy efficiency pilot projects within the building sector, international cooperation and capacity building for energy efficiency within several countries.	Government, German Development Bank (KfW)

Barriers/Constraints	Case Studies	Lessons learned, Best Practices, Results	Key implementation actors
	(c) Capacity Building in Energy Efficiency and Renewable Energy Regulation and Policy-Making in Africa http://www.reeep.org/index.cfm?articleid=1470&navarticleId=30 See also Case Studies for Sustainable Development Database: http://webapps01.un.org/dsd/caseStudy/public/displayDetailsAction.do?code=448	Objective: Enhance capacity of regulators and policy makers of Ghana, Tanzania and Zambia in terms of energy efficiency and renewable energy and adapt the REEEP 'Regulation and Sustainable Energy' training package to the context of developing countries. Challenges: Lack of capacity and knowledge between developing countries policy-makers and regulators on how to foster a policy and regulatory environment supportive of energy efficiency and renewable energy. Lessons learned: Existing energy regulatory frameworks were heavily skewed towards electricity regulation and for developed electricity markets. These need to be adapted to the needs of developing countries.	UNIDO, REEEP
	(d) Promoting an Energy-efficient Public Sector (PEPS) www.pepsonline.org http://webapps01.un.org/dsd/partnerships/public/partnerships/1416.html	By focusing government investment, procurement, and operating practices on energy-efficient buildings, products, and services, the public sector can create a strong, sustained, buyer-led shift in the market toward energy efficiency.	Lawrence Berkeley National Laboratory, USAID, international NGOs, governments, local authorities
	(e) Promoting an Energy-efficient Public Sector (PEPS)-China Purchasing http://www.pepsonline.org/countries/china.html	This effort to identify and promote energy-efficient products for Chinese government purchasing received a big boost when Premier Wen Jiabao endorsed the public sector approach in 2003. Consequently, a government directive was enacted in late 2004 urging adherence to the program's guidance. The program has since expanded from its pilot stage covering nine products to now including over twenty. A more binding regulatory directive is expected soon.	Lawrence Berkeley National Lab teamed with the China Standards Certification Center, CSC (under the National Development Reform Commission, NDRC)
	(f) Promoting an Energy-efficient Public Sector (PEPS)- Mexico Purchasing http://www.conae.gob.mx/wb/CONAE/Programa_PEPS_ICLEI http://www.conae.gob.mx/wb/CONAE/Publicaciones_y_Recursos	Started in 2004 as an eight-city pilot to promote the purchase of nine different types of energy-efficient products in Mexican municipalities, the PEPS-Mexico purchasing program has expanded to forty cities and three states. Documented savings from just 11 municipalities reporting in 2006 revealed over US$1M in annual savings.	Lawrence Berkeley National Lab teamed with ICLEI-Local Governments for Sustainability on the program. LBNL had experience with EE purchasing programs and ICLEI had a small group of willing Mexican municipalities in its Cities for Climate Protection campaign.

Barriers/Constraints	Case Studies	Lessons learned, Best Practices, Results	Key implementation actors
	(g) Vietnam Demand Side Management and Energy Efficiency Project http://www-wds.worldbank.org/servlet/WDSServlet?pcont=details&eid=000112742_20030605154040	The project includes a utility demand-side management component under the national utility, Electricity of Vietnam (EVN) and a commercial energy efficiency component under the Ministry of Industry (MOI). EVN includes lighting programs, time-of-use meters and direct load control programs. MOI includes ESCO training and grants to support energy audits and energy project implementation. To date, EVN has distributed almost 1 million CFLs to households across the country, saving over 34 GWh/year. MOI has trained about 40 ESCOs, completed over 60 audits and implemented 5-10 commercial projects to date. A key lesson is that small grants can be effective at stimulating a market when there is no commercial lending culture that would support a financing program directly. Also, bulk purchase of CFLs is very effective in creating a change in the market without the need for subsidies	Electricity of Vietnam (EVN), Ministry of Industry of Vietnam (MoI), World Bank, GEF
	(h) UK – Trade Union Committees GreenWorkplaces project http://www.sustainableworkplace.co.uk	This project encompasses projects at different workplace, including public sector, private service sector and also heavy industrial users. The project aims to identify areas where there is particular scope for measurable improvements in energy efficiency. It includes: training courses, open days, designing joint surveys and other benchmarking, setting up frameworks for negotiating and representing members on environmental issues. The project is based on the principle that union involvement is crucial both in pushing management to take urgent action, encouraging behavior change amongst the workforce, and taking collective action through workplace action.	Trade Unions
	(i) UK - Cleaning the workplace – http://www.unison.org.uk/acrobat/B3119.pdf	UNISON's Conference on greening the public services (January 2007), The main theme of the conference was how changing the way we work can help to stop climate change. UNISON's environmental bulletin 'Green UNISON', intended to be a way of keeping in touch on environmental issues and helping to promote greener workplaces.	Public Sector Trade Unions UNISON , Public Administrations
	(j) Belgium- FEDESCO-Federal Energy Service Company http://www.cidd.fgov.be/fedesco/fedesco	The Belgian Federal Plan for Sustainable Development, spanning the period 2004–2008, calls upon the Government to lead by example and reduce the	Government

Barriers/Constraints	Case Studies	Lessons learned, Best Practices, Results	Key implementation actors
	.htm	environmental impact of its own operations. In this context, the Belgian Federal Investment Company established a public limited company, FEDESCO, to provide third-party financing for energy efficiency improvements in buildings, focusing initially on Government buildings. To this end, FEDESCO sponsors energy audits to identify potential interventions and provides pre-financing to carry them out. FEDESCO clients are required to earmark all savings resulting from energy efficiency gains for reimbursing the costs FEDESCO incurs, which ensures that there is an incentive for both parties to achieve the maximum gains in the shortest time possible.	
2) *Lack of awareness among households and businesses*	(a) **China Energy Conservation Week** http://www.chinacp.com/newcn/chinacp/setc-rccu.htm	Every year during the first week of November, China organizes a national energy conservation week to enhance public awareness via mass media, exhibits, conferences, etc.	Government, media, NGOs, business sector
	(b) **Demand Side Management – Cape Recovery Programme** http://www.eskom.co.za/content/Integration%20Plan%20Ver12.0~1.doc	In response to supply shortages experienced in the Western Cape Province of South Africa, a multi-pronged demand side management (DSM) programme was rolled out between March and August 2006.The target to conserve 400MW per day was met through a combination of measures, including distribution of energy efficient compact fluorescent light bulbs, switching to gas for cooking/heating and insulating blankets for water heaters. To promote voluntary conservation, consumers were provided with near real-time information on the status of the electricity grid, allowing them to influence the situation by reducing their electricity use.	Government, local authorities, media, utility, industrial consumers, households
	(c) **Energy efficiency – Pick the low-hanging fruit** http://www.forumfor.no/v_bibliotek/Energy.pdf	A publication featuring 13 practical examples that address the energy efficiency potential and benefits to be gained from more sustainable consumer products and buildings. They include examples of technological innovation and of the use of known technology in new contexts.	Government, donors, communities, households
	(d) **"Light's Labour's Lost"** http://www.iea.org/textbase/npsum/lll.pdf	A publication covering the barriers facing the adoption and deployment of efficient lighting technologies. Among the barriers identified: - End-users and market actors are often unaware of the savings potentials and lighting-quality advantages; - Some efficient lighting has higher initial costs; - Most lighting is not installed and directly paid for by the end-user, thus different cost incentives exist for installers	International Energy Agency

Barriers/Constraints	Case Studies	Lessons learned, Best Practices, Results	Key implementation actors
		and users; and - Most public and private organizations manage their equipment and operations budget separately and thereby create an incentive to minimise equipment costs at the possible consequence of higher operating costs. Policies need to be ambitious, broadly based and effectively implemented to realise their potential.	
	(e) Energy Star Product Labeling http://www.energystar.gov/ http://www.energystar.gov/ia/news/downloads/annual_report2005.pdf	There is a large potential for cost-effective energy efficiency that is not being fully realized in businesses and households due to a number of informational, institutional and practical obstacles that hinder greater investment.	US EPA, US DOE, manufacturers, retailers, utilities, states, home builders, etc.
R&D, DEMONSTRATION & DIFFUSION			
1) Inadequate R&D, deployment and technology transfer	**(a) Federal Energy Management Program (FEMP)** http://www1.eere.energy.gov/femp/about/index.html	The U.S. government is the largest energy consumer in the world. FEMP works to reduce the cost and environmental impact of the Federal government by advancing energy efficiency and water conservation, promoting the use of distributed and renewable energy, promoting alternative fuels and alt fuel vehicles, procuring only appliances that meet EnergyStar standards and improving utility management decisions at Federal sites. To accomplish its goals FEMP utilizes instruments such as energy savings performance contracts, in combination with expert technical assistance.	US Department of Energy, USG federal facilities

Barriers/Constraints	Case Studies	Lessons learned, Best Practices, Results	Key implementation actors

II. Theme: Industrial Development

A. Strengthen Domestic Capabilities A21.9.18; JPOI 10 (a), (c), (f)

1) *Industrial development is not self-sustaining*	(a) **Inserting Local Industries Into Global Value Chains And Global Production Networks** http://www.unido.org/file-storage/download/?file_id=33079	Participating in GVCs and GPNs helped developing country producers to enter foreign markets, earn more foreign exchange, diversify their exports, and most importantly get new skills, knowledge and technology.	Transnational corporations, domestic industrial enterprises, Ministries of trade, trade associations, financial institutions
	(b) **Global - Decent work/decent life campaign (ITUC/CSI)** http://www.ituc-csi.org/spip.php?rubrique69	Decent Work for Decent Life is a joint campaign led by the International Trade Union Confederation, the Global Progressive Forum and Solidar which aims to build awareness of Decent Work amongst citizens, decision makers and key institutions; Show that Decent Work is the only sustainable way out of poverty and is fundamental to build democracy and social cohesion; Place Decent Work at the core of development, economic, trade, financial and social policies at the national, European and International level.	Trade Unions, NGOs
2) *Industrial competitiveness is low*	(a) **Sri Lanka: Development of Industrial Competitiveness** http://www.unido.org/doc/4192	Establishment of institutional support networks for assisting entrepreneurs and training specialists in industrial production was essential for project success.	Industrial, financial and academic institutions, as well as industry associations
	(b) **Nigeria – Strengthening technical and human resources to carry out standardization, quality assurance and testing** http://www.unido.org/doc/3622	The ability of small- and medium-scale enterprises (SMEs) to meet ISO 9000 standards was crucial to allow them to compete in international markets.	National standards organizations, industry associations
3) *Untrained work forces in some countries*	**Penang Skills Development Centre** http://www.psdc.com.my/	Public-private partnership can be effective in overcoming the incentive problems associated with firm-financed training, especially where large numbers of private firms have similar skill demands.	Public and public-private training institutions, industrial enterprises including SMEs, UNIDO, ILO

Barriers/Constraints	Case Studies	Lessons learned, Best Practices, Results	Key implementation actors
B. Enabling Environment A21.9.18; JPOI 10 (a), (d), (e)			
1) *Unfavourable business climates in some countries*	**Mexico: Starting a Business** http://www.doingbusiness.org/documents/DB_Mexico_English.pdf	Countries differ significantly in the way they regulate entry of new businesses. In some, the process is straightforward and affordable. In others, the procedures are so cumbersome and costly that there are strong incentives for corruption and business informality.	Government ministries of trade and industry, industrialists and researchers, and partnerships for technology transfer
2) *Weak transportation and other infrastructure (ports, roads, rails, telecommunications)*	**China: Private Financing of Infrastructure** http://www.unido.org/doc/4190	Industrial infrastructure can be successfully improved through international private investment, particularly in the energy, water supply and transportation sectors.	Government planning commissions, water and energy industries
3) *Electricity supply inadequate for needs of industry*	**(a) Spain – Electricity Supply through Industrial Cogeneration** http://www.p2pays.org/ref/17/16372.pdf	Government can support cogeneration through offering technical advice on cogeneration projects, disseminating information on new technologies at technical conferences, round tables, cogeneration fairs, publications etc., as well as providing a share of the investment needed to implement cogeneration projects through third-party financing.	Government, research institutes, industrial enterprises, electricity regulatory bodies
	(b) Mali – Multifunctional Platforms http://www.undp.org/energy/reducmali.htm See also Case Studies for Sustainable Development Database: http://webapps01.un.org/dsd/caseStudy/public/displayDetailsAction.do?code=260	The acquisition of a multifunctional platform was affordable to 96 percent of the requesting communities in Mali. About 99 percent of clients are women. They buy milling, de-hulling, and/or water services once or twice a day for domestic purposes. Men's use of multifunctional platform services might typically be for welding and battery charging.	Women, youth, UNDP, UNIDO
C. Cleaner Industrial Production A21.9.18; JPOI 16			
1) *High levels of industrial pollution*	**(a) Denmark – Industrial Ecology in Industrial Parks** http://www.bsdglobal.com/viewcasestudy.asp?id=77	Clustering of industries can enhance by-product synergy where one industry's waste stream can be used by another as a primary resource, creating enormous potential for reducing waste volumes and toxic emissions to air and water, as well as cutting operating costs.	Industrial parks, local authorities

Barriers/Constraints	Case Studies	Lessons learned, Best Practices, Results	Key implementation actors
	(b) Chile – Cleaner Production in the Textile Industry http://www.bsdglobal.com/studiesbycountry.asp?cid=4	The resulting environmental benefits included water, energy and chemical conservation, and reduced emissions and effluent-borne solids. Most of the measures adopted had payback periods of two years or less.	Textile companies
	(c) Australia - Opportunities and Challenges of Industrial Symbiosis: The Kwinana Industries Council (KIC) http://www.kic.org.au/ See also Case Studies for Sustainable Development Database: http://webapps01.un.org/dsd/caseStudy/public/displayDetailsAction.do?code=317	In 1991, Kwinana's core industries established the KIC to organise air and water monitoring collectively for local industry in response to increased government and community expectations as well as safety considerations. KIC has since evolved into a coordinating body that assists and promotes industrial symbiosis in the area. The KIC is also contributing to research to identify further examples. Industrial symbiosis harnesses market forces to deliver economic and environmental benefits. However, there are a number of factors which are preventing markets from utilising the concept of industrial symbiosis to its full potential. These include a lack of information, transaction costs and institutional arrangements. This highlights the importance of having a body such as the Kwinana Industrial Council to act as a broker to tackle these market impediments, to contribute to ongoing research, and to share experiences of the challenges and opportunities of industrial collaboration.	Private sector, government
	(d) Australia - Datong Cleaner Environment Project, China http://www.un.org/esa/sustdev/csd/casestudies/i5_australia.pdf http://www.ausaid.gov.au/anrep04/s2a.html See also Case Studies for Sustainable Development Database: http://webapps01.un.org/dsd/caseStudy/public/displayDetailsAction.do;jsessionid=DFC7D386EBE4D1C44A5A62356C3857E9?code=6	To improve the environmental and economic management of China's Datong Coal Gasification Corporation plant in order to reduce greenhouse gas emissions and improve the efficiency of the plant. The project has provided a sound basis for the long-term sustainable development of water resources. Improved water standards have helped to raise the quality of life of the local community. This project has exceeded expectations, largely through the production of a breakthrough technology that can be applied far beyond the reach of the project. This technology has been supported by the development of policies, strategies and procedures at a local and regional government scale.	Governments
	(e) Case Studies for Sustainable Development in the Coal Industry http://www.iea.org/textbase/papers/2006/CIAB_Case_Studies_2006.pdf	Particularly important when assessing coal-related activities is the balance between each of the three objectives of sustainable development: economic development, environmental quality and social equity..	International Energy Agency, IEA Coal Industry Advisory Board (CIAB), Government, industry

Barriers/Constraints	Case Studies	Lessons learned, Best Practices, Results	Key implementation actors
		While coal clearly makes an important and continuing contribution to the economic and social objectives of sustainable development, there is recognition that environmental enhancement remains a key issue. Faster and more dramatic improvement in environmental performance in coal use is technically, and often economically, feasible now and should continue to be a high priority of industry and government to enhance coal's contribution to the environmental objective of sustainable development.	
	(f) Spain - Instituto Sindical de Trabajo, Ambiente y Salud – ISTAS: Chemical Management http://www.istas.ccoo.es/	Research and information about chemical products, promoting the progressive elimination of products such as POPs, and its substitution at workplace. ISTAS created two databases (RISCTOX and Alternativas) with accessible information about the use and risk of more than 5,500 chemical substances.	Trade Unions
	(g) Transfer of Environmentally Sound Technologies (TEST) to Reduce Transboundary Pollution in the Danube River Basin http://europeandcis.undp.org/WaterWiki/index.php/Transfer_of_Environmentally_Sound_Technologies_%28TEST%29_to_Reduce_Transboundary_Pollution_in_the_Danube_River_Basin	Enterprises in the countries of the middle and lower Danube River basin face numerous challenges in their move towards market economies, as well complying with environmental objectives. The TEST approach has been introduced at selected industrial hot spots to demonstrate that it is possible to comply with environmental norms of the Danube River Protection Convention while at the same time taking into account the needs to remain competitive and to deal with the social consequences of major technology upgrading.	UNDP/GEF, UNIDO, Governments, cleaner production centres, industry
2) Limited capacity of SMEs to finance pollution control technology	**(a) Morocco – Improving Technology Transfer to SMEs** http://www.wbcsd.org/plugins/DocSearch/details.asp?type=DocDet&ObjectId=MTY3NTM See also Case Studies for Sustainable Development Database: http://webapps01.un.org/dsd/caseStudy/public/displayDetailsAction.do?code=253	Instead of further burdening the limited resources of SMEs, it is important to promote technologies linked to eco-efficiency in a way that encourages business to search for environmental improvements that yield parallel economic benefits.	Chemical companies, SMEs, UNIDO, UNEP

Barriers/Constraints	Case Studies	Lessons learned, Best Practices, Results	Key implementation actors
3) *Poor hazardous waste management*	**(a) Reducing Hazardous Waste in Industry** http://www.wbcsd.org/plugins/DocSearch/details.asp?type=DocDet&ObjectId=MTc5NTY	In response to rising hazardous waste treatment and disposal costs, often the most efficient approach is to reduce the volume of hazardous waste. This should be an integral part of the management cycle, with emphasis on precautionary measures.	Private corporations, industry associations, NGOs, local authorities
	(b) Global Partnership for Capacity Building to Implement the Globally Harmonized System for Chemical Classification and Labeling http://www.unitar.org/cwg/ghs_partnership/index.htm http://webapps01.un.org/dsd/partnerships/public/partnerships/210.html	Capacities should be strengthened at all levels, in particular in developing countries, to ensure a higher degree of chemical labeling and related precautionary measures for industrial chemicals, agricultural chemicals, chemicals in transport and consumer chemicals.	Governments, UN agencies, international programmes on chemical safety and chemical hazards, industry associations, trade unions

D. Corporate Social Responsibility A21.4.19, 4.26; JPOI 18

Lack of corporate environmental social responsibility and accountability	**(a) UK- Donetsk Business Commitment to the Environment** http://www.pece.co.uk/en/documents/pecelaunch-groundwork.pdf See also Case Studies for Sustainable Development Database: http://webapps01.un.org/dsd/caseStudy/public/displayDetailsAction.do?code=45	Eco-efficiency offers a lucrative entry point for corporate social responsibility. It is achieved through the delivery of competitively priced goods and services that satisfy human needs and bring quality of life while progressively reducing environmental impacts of goods and resource intensity throughout the entire life-cycle to a level at least in line with the Earth's estimated carrying capacity.	UK DEFRA, Local Government International Bureau, Donetsk Chamber of Commerce and Industry (DCCI), and local NGOs
	(b) VadeRegio - A European Project - How Regional and Local Authorities can promote Corporate Social Responsibility http://www.csrvaderegio.net/	The exchanging of information on CSR in relation to local governmental bodies and deeper analysis of what works and why was seen as important for successful implementation of regional and national CSR-policies. Activities such as sustainable public procurement, and public education were seen as prospective "first picks" in many regions.	Scotland-AGENDA, Novia Salcedo Foundation, Trivisi Project, and Euro Associazione
	(c) Sweden – Recycling through a Product's Life Cycle Value-Chain http://www.bsdglobal.com/viewcasestudy.asp?id=65	Electrolux believes its investment in Natural Step initiatives has been the best financial investment it has ever made. It entails an assessment of the value added or lost at each stage of production, use, and disposal or recovery. The company's aim for the future is production where product take-back is the norm.	Industrial enterprises

Barriers/Constraints	Case Studies	Lessons learned, Best Practices, Results	Key implementation actors
	(d) Australia - Queensland Environmental Protection Agency's (QEPA) ecoBiz Program http://www.epa.qld.gov.au/environmental_management/sustainability/industry/ecobiz_queensland/	An industry partnership program designed to provide businesses with methods to scrutinise inputs, internal processes and outputs of the business in pursuit of environmental and economic efficiencies.	Private sector, government agencies
	(e) USA – Dupont Corporate Social Responsibility http://www.bsdglobal.com/viewcasestudy.asp?id=123	One of Dupont's core CSR strategies is engaging stakeholders on global issues that affect its work. It has formed partnerships with the World Resources Institute, the Environmental Defense Fund, the Pew Center for Global Climate Change and the Keystone Center.	Industrial enterprises, NGOs, Foundations, research institutes
	(f) Brazil - Social Service of Industry (SESI) http://www.sesi.org.br/ (Portuguese)	The SESI programme, established 60 years ago, aims to enhance the quality of life for workers and their families through education, healthcare and recreation, while also encouraging socially responsible management by industrial enterprises. SESI helps industries incorporate sustainable development in their management practices through deploying Corporate Social Responsibility (CSR).	Government, industrial enterprises, workers

Barriers/Constraints	Case Studies	Lessons learned, Best Practices, Results	Key implementation actors
III. Theme: Air pollution/atmosphere			
A. Promoting Environmental Controls A21.9.8, JPOI.56			
1) Weak policy framework for air pollution control	**(a) Sub-Saharan Africa- Initiative for phase-out of leaded gasoline** http://www.cleanairnet.org/ssa/1414/article-33978.html http://www.cleanairnet.org/ssa/1414/article-69331.html See also Case Studies for Sustainable Development Database: http://webapps01.un.org/dsd/caseStudy/public/displayDetailsAction.do?code=25	The importance of government leadership and of including all relevant stakeholders in making the decision to go unleaded and in developing comprehensive strategies to do so.	NGOs, international development agencies, local authorities, World Bank, Nordic Trust Fund, WHO, USAID
	(b) Bangladesh Clean Cities Initiative http://www.eere.energy.gov/cleancities/bangladesh.html	Introducing alternative fuels such as CNG in urban transport requires effective regulatory environments, appropriate fiscal and financial incentives, integrated market development, adequate infrastructure and public awareness campaigns.	U.S. DOE, U.S. AID, Bangladesh Ministries, local authorities
	(c) Review of Air Quality Community Education http://www.aries.mq.edu.au	This report reviews recent air quality community education programs both nationally and internationally to identify those factors which could improve effectiveness.	Government, Macquarie University
2) *Lack of knowledge about pollution control technologies*	**Nepal – Vertical Shaft Brick Kiln Technology Transfer Program** http://www.vsbknepal.com/ See also Case Studies for Sustainable Development Database: http://webapps01.un.org/dsd/caseStudy/public/displayDetailsAction.do;jsessionid=DFC7D386EBE4D1C44A5A62356C3857E9?code=408	Emission from the brick kilns are the major source of pollution in the Kathmandu Valley. The introduction of Vertical Shaft Brick Kiln technology results in the consumption of 40% less energy and emits 90% less pollution as compared to existing brick firing technologies in Nepal. One lesson learned is that a major problem of any technology transfer is the uneven spread of costs among early starters. It is often difficult to find pilot entrepreneurs who are willing to take over the higher risks. Therefore, a technology transfer has to reduce initial costs and risks to get technology started.	Government of Nepal, Swiss Agency for Development and Cooperation; private sector, NGOs and CBOs

Barriers/Constraints	Case Studies	Lessons learned, Best Practices, Results	Key implementation actors
3) *Lack of public awareness regarding health risks of pollution*	**Indonesia- Lead Information Center (Partnership for Clean Fuel and Vehicles)** www.Kpbb.org (in Bahasa Indonesia) See also Case Studies for Sustainable Development Database: http://webapps01.un.org/dsd/partnerships/public/partnerships/178.html	Lack of public awareness about the dangers posed by leaded gasoline is a significant obstacle to change. Public outreach campaigns, once implemented, can be easily scaled up and transferred from one region or target audience to others.	U.S. Environmental Protection Agency, USAID, Joint Committee for Leaded Gasoline Phase Out, Partnership for Clean Fuels and Vehicles, Indonesian Ministry of Environment
B. Urban and Indoor Air Pollution A21.9.8; JPOI.39 and 56			
1) Limited use of cleaner fuels	**(a) Mexico City- Heavy-Duty Diesel Retrofit (Partnership for Clean Fuels and Vehicles)** http://www.unep.org/pcfv/Regact/LAC/LAC.htm See also Case Studies for Sustainable Development Database: http://webapps01.un.org/dsd/partnerships/public/partnerships/178.html	Setting up a senior-level, multi-stakeholder planning process through an advisory board and technical committee helped advance project development and operation.	Government of Mexico City, USAID, USEPA, local transport authorities, WRI/Embarq, industry, NGOs and academia
	(b) Brazil – Ethanol from sugar cane www.eclac.cl/dmaah/noticias/paginas/5/23775/poppe.pdf See also Case Studies for Sustainable Development Database: http://webapps01.un.org/dsd/caseStudy/public/displayDetailsAction.do?code=246	The use of biofuels, such as ethanol, can significantly increase employment opportunities in rural areas and agribusiness. The use of ethanol in Brazil has resulted in complete elimination of lead additives in gasoline and reduced greenhouse gases emissions.	Government, agricultural community, major groups, industry
	(c) Improving the Quality of Australian Transport Fuels http://www.deh.gov.au/atmosphere/fuelquality/publications/mce.html See also Case Studies for Sustainable Development Database: http://webapps01.un.org/dsd/caseStudy/public/displayDetailsAction.do?code=1	The success of Australia's fuel standard initiatives is based on strong policy settings and awareness of technological development. Consultation was vital in developing and implementing fuel standards – without an understanding of the importance of the issue, it is difficult to gain public and industry support. As the impacts of transport pollution and emissions are global in nature, it is essential to assist other countries and harness available resources and expertise in order to achieve the goals of reducing air pollution and greenhouse gas emissions.	Government, private sector

Barriers/Constraints	Case Studies	Lessons learned, Best Practices, Results	Key implementation actors
	(d) Network for Environmentally Sustainable Transport in Latin America and the Caribbean, (NESTLAC) www.uneprisoe.org/NESTLAC	NESTLAC promotes the benefits of sustainable transport to politicians, decision makers and other stakeholders in Latin America.	GEF, UNEP, URC, Latin American governments
	(e) CNG – fuel substitution in Pakistan http://www.hdip.com.pk/index.php?id=6	Compressed natural gas (CNG), a lead-free fuel with negligible sulphur and particulate emissions, emits 70 per cent less carbon monoxide and 87 per cent less oxides of nitrogen than gasoline does. It produces 25 per cent lower carbon dioxide emissions, as compared to petrol and diesel oil. The Government of Pakistan has offered a number of incentives for encouraging the use of CNG, including priority of natural gas connection to CNG stations and exemption/reduction of import duty and sales tax on import of machinery and equipment. As of March 2007, more than 1.3 million vehicles CNG-fuelled vehicles are on the road 1300 CNG stations are operational.	Government, owners of CNG stations, private sector equipment installers and marketers
2) *Continued use of inefficient and un-vented cook stoves*	**(a) South Africa - LP Gas Rural Energy Challenge** http://www.undp.org/energy/lpg.htm See also Case Studies for Sustainable Development Database: http://webapps01.un.org/dsd/partnerships/public/partnerships/197.html	The partnership attracted high-level government officials and key officials from the local LP Gas supply industry and led to a clearer identification of needs and roles of the public and private sectors.	Government, World LPG Association, UNDP, local authorities, consumer groups
	(b) Pakistan- Fuel-Efficient Smokeless Stoves http://sgp.undp.org/download/SGP_Pakistan1.pdf	Previous government and donor programs overemphasized technology, without considering the need to affect behavior change and to address market access and health impacts. The role of women in stove diffusion and the use of local construction materials were two factors leading to program success.	NGOs, women, foundations, community-based organizations.
	(c) Bangladesh and Peru- Integrated Program Models for Cleaner Cooking in Bangladesh and Peru- http://www.usaid.gov/our_work/economic_growth_and_trade/energy/publications/projects/cleaner_cooking.pdf	By utilizing more efficient stove and ventilation technologies, switching fuels and changing cooking practices, poor women can significantly reduce indoor air pollution and its consequent health impacts.	USAID, Winrock International, local NGOs and financial institutions.

Barriers/Constraints	Case Studies	Lessons learned, Best Practices, Results	Key implementation actors
	See also Case Studies for Sustainable Development Database: http://webapps01.un.org/dsd/caseStudy/public/displayDetailsAction.do;jsessionid=DFC7D386EBE4D1C44A5A62356C3857E9?code=16		
	(d) China and India - Searching for sustainable solutions to indoor air pollution http://www.wbcsd.org/includes/getTarget.asp?type=DocDet&id=16163 See also Case Studies for Sustainable Development Database: http://webapps01.un.org/dsd/caseStudy/public/displayDetailsAction.do?code=267	The most successful pilots use a public-private model that combines centralized component production, quality control and supply-chain management with decentralized installation and assembly of products, linked to a network of social service providers (such as local NGOs), which provide the link to communities, social marketing and awareness raising.	Shell Foundation, NGOs, Government agencies
C. Capacity Building for Improved Monitoring and Management A21.9.8; JPOI.38 (g), (h)			
1) Lack of capacity for air quality management in cities	**(a) Cities – Clean Air Initiative** http://www.cleanairnet.org/ See also Case Studies for Sustainable Development Database: http://webapps01.un.org/dsd/caseStudy/public/displayDetailsAction.do?code=269	City-wide action plans addressing in an integrated manner air pollution, poverty, health and emission control measures are successfully improving policies, regulatory frameworks and enforcement.	Local authorities, international development agencies, NGOs, academia, private sector
	(b) Spain - Instituto Sindical de Trabajo, Ambiente y Salud – ISTAS: Sustainable Mobility Strategies http://www.istas.ccoo.es/	This project is part of a wide program 'Climate and Workers', based on three main lines of action: information, training, and creating spaces for debate and exchange of experiences. The project promotes the change of behaviour of workers as well as the implementation of programs and measures by government and enterprises.	Trade Unions
	(c) Cities-World Carfree Day http://www.worldcarfree.net	A well-planned Car Free Day provides a practical demonstration of how quality of life can be improved in a city centre through active involvement of government, businesses, NGOs and citizens working together.	Local authorities, NGOs

Barriers/Constraints	Case Studies	Lessons learned, Best Practices, Results	Key implementation actors
2) *Lack of information on transboundary air pollution from ozone, particulates and persistent organic pollutants*	**(a) Convention on Long-range Transboundary Air Pollution** http://www.unece.org/env/lrtap/	The success of the Convention may be found in the way that it works: science and technology networks; science-policy interaction; focus on innovative solutions for environmental problems that allow differences in national policies; and a lean bureaucracy with most work undertaken by lead countries or by programme centres.	Governments, UN-ECE
	(b) Air pollution policy in effect in the European Union http://europa.eu.int/comm/environment/air_en.htm	Air pollution directives presently apply to stationary sources (including energy plants and industry), mobile sources and products. National emissions ceilings to cap total emissions have been set and air quality standards as well as policies on transport modes such as shipping are in effect. The involvement of the stakeholders in the programmes and in the preparation of legislation has been a key factor in its success. A major lesson learnt is to consider all sectors that contribute to the problem so that cost effective measures can be taken.	UN-ECE Convention on Long-Range Transboundary Air Pollution, governments, industry, NGOs
	(c) Australia – Ozone Protection http://www.deh.gov.au/atmosphere/ozone/	Australia's strong policy and legislative settings have led to a very successful phaseout of ODS and improved management of SGGs. Australian industry are strong supporters of this approach and have worked closely with the Australia Government to develop the consistent requirements for SGGs and end use controls to minimise emission of these ODS and SGGs. The industry was closely consulted in the 2001 review of the *Ozone Protection Act 1989,* in developing the amended legislation and end use controls for refrigeration and air conditioning, fire protection and methyl bromide fumigation, and will continue to be involved as the remaining end use controls are developed. Australia's international involvement, particularly through contributions to the multilateral fund of the *Montreal Protocol*, has also assisted other countries in the global phaseout of ODS.	Government
	(d) Australia - National Halon Program, India http://www.deh.gov.au/atmosphere/ozone/ods/halon/index.html#strategy See also Case Studies for Sustainable Development Database: http://webapps01.un.org/dsd/caseStudy/public/displayDetailsAction.do?code=10	To decrease the impact of halons on the ozone layer by assisting India in developing a National Halon Management and Banking Program. This program has illustrated the need for strong national policy frameworks in order to assist countries to develop environmentally sustainable capabilities. In this case, strong technical and policy support has enabled the project to be completed successfully.	Governments

Barriers/Constraints	Case Studies	Lessons learned, Best Practices, Results	Key implementation actors
3) Impacts of air pollution and future risks of different development pathways are not always clear	**(a) BenMAP International-Model to Estimate Health Benefits of Air Quality Improvement** http://www.epa.gov/ttnecas1/benmodels.html See also Case Studies for Sustainable Development Database: http://webapps01.un.org/dsd/caseStudy/public/displayDetailsAction.do?code=14	Emphasize follow-up and technical assistance after training sessions to support incorporation of findings into urban air pollution strategies and mitigation efforts.	USEPA, governments (national and regional), academic institutions, research institutes,
	(b) Clean Air For Europe (CAFÉ) and a Thematic Strategy on Air Pollution http://europa.eu.int/comm/environment/air/cafe/index.htm	The CAFE program has been highly successful in using the knowledge base approach to analyse policy options for air pollution control. An important lesson learnt has been the importance of consultation with all affected stakeholders and the provision of free and open access of information for all stakeholders in the process.	Governments and national authorities, industry, NGOs

Barriers/Constraints	Case Studies	Lessons learned, Best Practices, Results	Key implementation actors

IV. Theme: Climate Change

A. Mitigation Efforts A21.34.18, 34.22; JPOI.38

1) Insufficient mitigation measures	**(a) China- Energy Efficient Refrigerators** http://www.un.org/esa/sustdev/publications/energy_casestudies/section1.pdf See also Case Studies for Sustainable Development Database: http://webapps01.un.org/dsd/caseStudy/public/displayDetailsAction.do?code=126	The combination of measures to "push" manufacturers toward technological innovation and "pull" consumers through public education programmes greatly increased both energy savings and GHG reductions.	China State Environment Protection Administration , GEF, UNDP, UN-DESA, industry, NGOs, Media companies
	(b) Bulgaria – Pleven District Heating Company – AIJ project http://www.rec.org/Climate/casestudies/CaseStudies.PDF	Two lessons learned for project success**:** Involve the public and key stakeholders in establishing criteria for selection and development of projects; Take steps to improve the investment climate in order to attract financing partners.	Technical organizations, research institutes, local authorities
	(c) Local Governments – Cities for Climate Protection Campaign http://www.iclei.org/ http://webapps01.un.org/dsd/partnerships/public/partnerships/1670.html	A campaign is composed of five milestones with an underlying methodology that provides a simple, standardized means of calculating greenhouse gas emissions, establishing targets to lower emissions, reducing greenhouse gas emissions and monitoring, measuring and reporting performance. Its flexible framework can accommodate varying levels of analysis, effort, and availability of data, which increases transferability amongst local governments and has contributed to its worldwide success.	ICLEI, over 650 local governments from all regions
	(d) United Kingdom - Climate Change Levy (CCL) http://www.netregs.gov.uk/netregs/275207/1018642/?version=1&lang=_e	The UK government has put in place financial incentives for UK businesses to use fossil fuels more efficiently, and reduce emissions of carbon dioxide (CO2). One of these incentives is the CCL. The CCL is a surcharge on your business energy bill. The exact CCL rate depends on the type of fuel used.	Government

Barriers/Constraints	Case Studies	Lessons learned, Best Practices, Results	Key implementation actors
	(e) U.S. Climate Change Technology Program - CCTP http://www.climatetechnology.gov/	The CCTP's multi-agency organizational structure provides an opportunity to develop, across the Federal government, a comprehensive, coherent, multi-agency, multi-year R&D program plan for the development of climate change technology, tied to specific climate change goals and objectives. As part of these activities, the CCTP will help to inform near- and long-term technology planning activities, including scenario analyses and visioning exercises, aided by modeling.	Government
	(f) Australia - Compact Fluorescent Lamps http://www.apec-esis.org/www/cfl/ See also Case Studies for Sustainable Development Database: http://webapps01.un.org/dsd/caseStudy/public/displayDetailsAction.do?code=5	The goal: To reduce greenhouse gas and waste resulting from lighting by delivering higher quality and lower cost Compact Fluorescent Lamp (CFL) lighting products to consumers worldwide. What have we learnt? We have learnt that it is not enough to just develop new technologies – they need to be supported by sound national policy frameworks and international goodwill. They need strong technical support as well as policy support. They need to be accessible, available, cost effective and reliable.	Government
	(g) Hornsby Shire Sustainable Energy Policy http://www.hornsby.nsw.gov.au/uploads/documents/93080_HSC_SES_Report.pdf	Under the Council's policy, which is part of the ICLEI's Cities for Cities for Climate Change initiative, the Hornsby Shire Council has adopted the strategic intent to reduce 20% of its own and the local communities' greenhouse gases by 2010. Its actions have included the conclusion of a comprehensive local government energy performance contract and an Australian first cogeneration air conditioning system.	Local government, private sector, households, NGOs.
	(h) Forum of Adriatic and Ionian Cities and Towns - Adriatic Action Plan 2020 CO_2 Indicator http://www.a21italy.it/a21italy/enviplans/documentation/Brochure_en.pdf	A methodology was developed for calculating CO_2 emissions from cities forming part of the Adriatic Action Plan 2020. The Plan aims to encourage and manage the implementation of Agenda 21 through the involvement of local governments in the whole Adriatic region. through a participative process.	Local government, private sector, households, NGOs
	(i) Belgium - Energy Conservation Fund - Fédération General du Travail de Belgique	The Belgian government agreed to a plan proposed by the Federation Generale du Travail de Belgique (FGTB) to establish an energy conservation fund for the housing sector, aimed to help household invest in energy efficiency. The fund will provide pre-financing and support during the preparation execution and maintenance stages of the energy saving projects provided by the investments.	Trade Unions; federal government

Barriers/Constraints	Case Studies	Lessons learned, Best Practices, Results	Key implementation actors
	(j) Germany - Alliance for Work and Environment	This programme aims to renovate 300,000 apartments, contributing to climate protection by a reduction of 2 million t/y CO2 emissions, while creating 200,000 sustainable jobs. Financing for the project is provided by the German government (US$1,8 in a 5 year period). In addition, a total of US$8 billion would be available through credits at favorable rates of interest.	Trade Unions; national government; environmental NGOs; employers' federations.
	(k) Certainty versus Ambition: Economic Efficiency in Mitigating Climate Change http://www.iea.org/Textbase/publications/free_new_Desc.asp?PUBS_ID=1821	A key issue for policy makers is how to choose a climate change policy that recognises the uncertainties in the costs and benefits of abatement actions. This paper reviews the economic literature relative to the choice of the economic instruments that could be used to mitigate climate change, concluding that flexible instruments would be more economically efficient than fixed quotas.	IEA/OECD
2) *Slow deployment of clean technology*	**(a) Iceland commits to hydrogen economy** http://www.un.org/esa/agenda21/natlinfo/countr/iceland/energy.pdf	Countries with abundant renewable energy resources can use them to economically produce hydrogen and thus speed the transition to a clean hydrogen-fuelled economy.	Government, industry, academia, research institutes, electric power utilities
	(b) Romania - Sawdust 2000, Fuel Switching Project http://unfccc.int/files/meetings/cop_10/at_the_kiosk/07_dec_tuesday/application/pdf/trusca_2004.pdf	Results include: illegal dumping from wood processing industry was curtailed; reduction of heat energy prices; development of business opportunities in wood waste and biomass energy; five towns have operational District Heating systems, CO2 reductions of 700K Emission Reduction Units (ERU) and Assigned Amount Units (AAU)	Danish Environmental Protection Agency (DEPA), Romanian Ministry of Environment and Water Management
B. Adaptation Efforts JPOI. 38			
1) *Insufficient funding for adaptation efforts*	**GEF Funding Assistance to Adaptation** http://www.gefweb.org/projects/focal_areas/climate/documents/GEF_Support_for_Adaptation_to_Climate_Change.pdf	The GEF has created 4 funds to address adaptation to climate change. They will address 3 stages, namely: planning through studies to identify vulnerabilities, policy options, and capacity building; identifying measures to prepare for adaptation and further capacity building; and promoting measures to facilitate adaptation, including insurance and other interventions.	Governments, Major Groups, UN System, IFIs

Barriers/Constraints	Case Studies	Lessons learned, Best Practices, Results	Key implementation actors
2) *Inadequate access to adaptation technologies*	**Canada – Agricultural adaptation to climate change** http://adaptation.nrcan.gc.ca/perspective/agri_4_e.php	Assessment of adaptation options and technologies should consider six key questions: To what climate variables is agriculture most sensitive? Who needs to adapt (e.g., producers, consumers, industry)? Which adaptation options are worth promoting or undertaking? What is the likelihood that the adaptation would be implemented? Who will bear the financial costs? How will the adaptation affect culture and livelihoods?	Government, farmers, water supply/irrigation experts, agriculture extension services, meteorologists, scientific community
3) *Degradation of natural resources that can reduce people's vulnerability*	**Increasing Community Resilience to Climate-Related Disasters** http://www.iisd.org/pdf/2003/envsec_livelihoods_1.pdf	Protecting and enhancing natural services through activities such as watershed restoration, mangrove reforestation and rangeland rehabilitation, can help poor communities secure their livelihoods and improve their capacity for adapting to the impacts of climate change.	Government, poor communities, sustainable livelihood experts, experts in environmental degradation
4) *Uncertainty relating to timing, scale of impacts*	**Monsoon Variability and impacts in the Southwest Indian Ocean** http://www.un.org/esa/sustdev/csd/casestudies/c2_2_seychelles.pdf	There is a lack of knowledge on the near equatorial convection in the region during the southeast monsoon. Many models are incorrectly predicting the transient convective waves during the southeast monsoon. There are also few studies on climate variability and its socio-economic impacts in the region.	Seychelles Meteorological Services, government, private sector, NGOs, GEF Adaptation Fund ,
5) *Lack of integration of climate policy and adaptation actions into national sustainable development strategies*	**(a) UK – National Sustainable Development Strategy for Climate Change** http://www.sustainable-development.gov.uk/publications/pdf/strategy/Chap%204.pdf	In 2003, the UK Government committed to the long-term goal to reduce carbon dioxide emissions by some 60 per cent by about 2050 with real progress by 2020. To achieve this long term goal, it has developed a detailed strategy on how to address climate change across various economic sectors.	Government, financial institutions, private sector, NGOs, research institutes
	(b) UNEP Adaptation and Climate Vulnerability Project http://www.feem.it/Feem/Pub/Programmes/Climate+Change/Activities/200606-UNEP.htm	Project develops a methodological framework for integrating climate change into national and sectoral development programmes, including a set of indicators that link major development goals and climate change to poverty reduction, food production, water resources, energy access, health issues and education. Specific case studies include climate change impacts for large railways systems in India, health issues related to malaria in Tanzania, and disaster management in Peru.	URC, UNEP

Barriers/Constraints	Case Studies	Lessons learned, Best Practices, Results	Key implementation actors
	(c) Overcoming the barriers: Mainstreaming climate change adaptation in developing countries http://www.tearfund.org/webdocs/website/Campaigning/Policy%20and%20research/Overcoming%20the%20barriers%20briefing%20paper.pdf	This report reviews what progress has been made by developing country governments and donor agencies in mainstreaming climate adaptation into development planning. It examines barriers to further progress and provides recommendations on how these barriers can be overcome.	Government, donors, NGOs, research institutions
6) *Climate observation systems and networks need strengthening*	**U.S. – Global Change Research Program: Observation and monitoring of climate systems** http://www.usgcrp.gov/usgcrp/ProgramElements/recent/obsrecent.htm	The complexity of the Earth system and the interconnections among its components make it a complex scientific challenge to document change, diagnose its causes, and develop useful projections of how natural variability and human actions may affect the global environment in the future.	Government, research institutes
C. Regional/Global Market-based Mechanisms for Emissions Reduction			
1) Weak carbon markets	**(a) EU-Emission trading scheme** http://www.co2-info.com/eu_emission_trading.htm	Begun in January 2005, emissions trading provides an economic basis for lowering emissions. It will make sure that emissions are cut where it is cheapest and will stimulate innovation.	Governments, industry
	(b) Act Locally, Trade Globally http://www.iea.org/textbase/nppdf/free/2005/act_locally.pdf	Emissions trading promises to foster reductions at the lowest possible cost. However, short-term emissions objectives discourage investments in more ambitious GHG reductions, which can only be cost-effective over the course of decades.	International Energy Agency, Governments
	(c) Industrial Competitiveness Under the EU Emissions Trading Scheme http://www.iea.org/Textbase/publications/free_new_Desc.asp?PUBS_ID=1046	This analysis provides a set of static estimates of the cost impacts of the EU ETS on some key industrial sectors. It shows that, for the most part, the scheme is not likely to lead to major negative impacts in the near term.	IEA/OECD, EU

Barriers/Constraints	Case Studies	Lessons learned, Best Practices, Results	Key implementation actors
2) *Weak domestic institutional frameworks for participation in Clean Development Mechanism*	**(a) Uganda – CDM capacity building** http://www.un.org/esa/sustdev/csd/casestudies/c5_uganda.pdf See also Case Studies for Sustainable Development Database: http://webapps01.un.org/dsd/caseStudy/public/displayDetailsAction.do?code=32	The role of the government is to establish the institutional framework for the CDM process; then awareness raising is needed in the private sector for development of CDM project opportunities.	Government, UNEP, DANIDA, private sector
	(b) Capacity Development for the CDM (CD4CDM) Project www.cd4cdm.org	An initiative to help twelve developing countries participate fully as equal partners in the CDM. Nine additional countries are now participating from June 2006 to the end of 2008.	UNEP, URC, Government of the Netherlands
	(c) Belgium - Social Criteria & Trade Union Involvement http://www.klimaat.be/jicdmtender/indexB.htm	A set of social criteria has been incorporated within the terms of its call-for-tenders to purchase greenhouse gas emissions quotas thereby following recommendations of a technical committee composed of government, trade union, employer and NGO representatives. To be accepted, project proponents must respect the principles of the OECD's Guidelines for Multinationals, the basic conventions of the ILO Declaration on Fundamental Principles and Rights at Work, among other ILO conventions. Projects must show compliance to labour standards, and must develop a plan for monitoring environmental, social and economic impact. When pre-financing is desired, trade unions must be involved in a monitoring process that fosters worker involvement and trade union action.	Trade Unions, government, NGOs, employers' federations.
	(d) Securing Financing for RE/EE Projects in Southern Africa through Gold Standard CDM http://www.reeep.org/index.cfm?articleid=1394&parentid=915 See also Case Studies for Sustainable Development Database: http://webapps01.un.org/dsd/caseStudy/public/displayDetailsAction.do?code=456	Objective: This project aims to facilitate the financing of smaller renewable energy and energy efficiency (RE/EE) CDM projects in Southern Africa using the Gold Standard (GS) as leverage. Challenges: There is a very low level of education on CDM in the two partner countries. The complexity of CDM financing is therefore not yet finding much traction amongst stakeholders. In addition, the mixture of high risk, low return and conceptually new projects, together with the bureaucracy of public financing make achieving financial closure particularly challenging. Lessons learned: While CDM revenues could catalyse	SouthSouthNorth, REEEP, Gold Standard, UNDP Millennium Development Goal Carbon Facility, GED, TaTEDO

Barriers/Constraints	Case Studies	Lessons learned, Best Practices, Results	Key implementation actors
		project development it cannot substitute project financing. A project which is feasible for the CDM project cycle may not always be feasible as a stand-alone project.	
	(e) **Carbon Finance for Sustainable Energy in Africa (CF-SEA)** www.uneprisoe.org/CFSEA	CF-SEA develops carbon finance and institutional capacity in the five Saharan Africa countries of Ghana, Zambia, Mali, Cameroon, and Mozambique. During 2006, CF-SEA has helped all five countries establish and operate Designated National Authorities that administer CDM activities, as well as the design of sustainable development criteria and the adoption of a simple project appraisal and approval process.	World Bank's Community Development Carbon Fund (CDCF), UNEP, and URC
3) *Implementation arrangements for Activities Implemented Jointly (AIJ) need strengthening*	(a) **Poland – 3 AIJ projects, Fuel switching, Energy Supply, Sustainable heat and power** http://www.rec.org/Climate/casestudies/CaseStudies.PDF	Develop strategy for environmental policy implementation, adopt criteria for monitoring of JI results, encourage transparent procedures and efficiency of projects.	Governments, GEF, local authorities, energy and district heating industries
D. Capacity Building Needs A21.40.7, 40.8, 40.9; JPOI.38			
1) Gaps in climate knowledge exist	(a) **World Climate Research Programme** http://wcrp.wmo.int/	To address the many gaps in climate knowledge, the WCRP and the larger scientific community are developing a strategy for the next decade to strengthen our knowledge and increase our capabilities with regard to climate variability and change and their prediction. This strategy is known as the Coordinated Observation and Prediction of the Earth System (COPES).	WMO, ICSU, UNESCO, scientific community
	(b) **UNFCCC Education and Outreach Program** http://unfccc.int/cooperation_and_support/education_and_outreach/items/2529.php	This 5-year program aims to engage all stakeholders and major group to improve understanding of technical, economic and policy issues related to climate change	UNFCCC, governments, scientific community, Major Groups
	(c) **Caribbean Community Climate Change Centre (CCCCC)** http://www.caricom.org/jsp/community/cccc.jsp?menu=community	The Centre implements projects designed to prepare for and to reduce the harmful effects of climate change and sea level rise and seek ways in which the Community can benefit from any opportunities that may result from	CARICOM

Barriers/Constraints	Case Studies	Lessons learned, Best Practices, Results	Key implementation actors
		climate change. Additionally, the CCCC is intended to position the Region to maximize benefits from new and additional resources arising from the United Nations Framework Convention on Climate Change (UNFCC). The Centre is located at the University of Belize (Belmopan Campus).	
	(d) Advancing Capacity to Support Climate Change Adaptation (ACCCA) http://www.acccaproject.org	The ACCCA project will bring together stakeholders and scientific communities of the developing world to enable and support effective adaptation decisions to reduce vulnerability to climate and environmental changes while also promoting sustainable development. Eleven high-quality pilot projects have been short-listed for the ACCCA programme.	Government, donors, communities, scientific institutions and local centers of excellence.
2) Lack of public awareness related to climate change	**(a) Brazil – Awareness Raising - Central Unica dos Trabalhadores – CUT** http://www.cut.org.br	Five training courses during 2005, in each Brazilian Region, along with the FASE (Federação de Órgãos para Assistência Social e Educacional) . UNFCCC was introduced along with other environmental issues.	Trade Unions, Government
	(b) UK - TUSDAC (Trade Unions for Sustainable Development Advisory Committee) www.sustainableworkplace.co.uk	TUSDAC (Trade Unions for Sustainable Development Advisory Committee) is joint union body chaired by a member of the TUC General Council, and Minister for Food, Farming and Sustainable Energy. It works through a wide range of strategic policy issues to tackle climate change. It was set up in 1998 as the main forum for consultation between Government and Trade Unions on sustainable development and environmental issues. For the unions a key issue is to strengthen union engagement, both in the workplace and at a strategic policy level covering energy and climate change issues. TUSDAC published a consultation report 'Greening the Workplace' (2005) and a 10-points guide for union activist (2006), and has supported several initiatives related to energy, clean coal and transportation.	Trade Unions, Government
	(c) Spain - CC.OO. and UGT - Tripartite Climate Change Plan	In 2005, a trend-setting agreement to institutionalize joint oversight of national compliance to the Kyoto Protocol was adopted by the government, along with leading business organizations and trade unions: Confederacion de Comisiones Obreras (CC.OO.) and Union General de Trabajadores (UGT). It creates a platform for tripartite dialogue on climate change, bringing the parties together through a 'Social Dialogue Table' that undertakes the responsibility for monitoring and assessing issues to guide national	National government (environment, labour and industry Ministries), Trade Unions and Business organizations

Barriers/Constraints	Case Studies	Lessons learned, Best Practices, Results	Key implementation actors
		compliance of the Kyoto Protocol. In 2006 the first round of the Social Dialogue Table was held, followed by seven Dialogue tables, one for each industrial sector.	
	(d) Canada - United Transportation Union – UTU	Training of facilitators in each province on issues related to climate change. These facilitators are expected to deliver similar training programs to a wider union audience. The program consist on modules dealing with Kyoto Protocol, climate change, government and union programs and methods for engaging in union action on climate change. These training modules also include a focus on transitional employment provisions that would help facilitate the introduction of changes to the industry and workplaces.	Trade Uninos
3) Insurance markets and arrangements are inadequate to deal with stronger weather events associated with climate change	**Institutional Investors Summit on Climate Risk** http://www.unfoundation.org/features/2005_inst_investor_summit_climate_risk.asp	Investors want to protect their portfolio values against the financial risks due to the impact of climate change. But they also want to channel their capital toward any opportunities emerging from climate change and its mitigation so that they can realize a return on their investments.	UN Foundation, Financial institutions, insurers, pension funds