

**POLICIES for the PROMOTION of NEW and  
RENEWABLE ENERGIES**

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**CLIMATE CHANGE 2001**

*Mitigation*



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# IPCC Third Assessment Report

## Overview: Mitigation of Climate Change

### Main messages (1)

- There is a strong link between sustainable development, environmental management and climate change mitigation
- Technologies are presently available, in the short term, to stop the growth of global GHG emissions and, in the long term, to limit climate change impacts

## **Main messages (2)**

- **The problem of controlling emissions is to overcome the many political, economic, social and behavioural barriers to implement mitigation options**
- **Decision making on climate change is risk management; for low level stabilisation, early mitigation action is needed**
- **Integrating mitigation and sustainable development policies improves the prospect of achieving stabilization and sustainable development goals**

## **2010 Mitigation Potential (under \$100 per t C)**

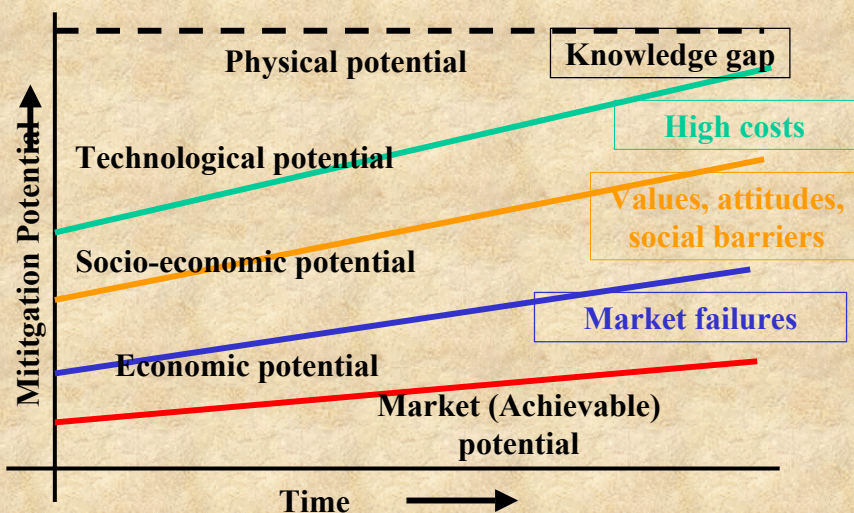
- **Energy and other technological options**  
– 1.9 -- 2.6 Gt C/yr
- **Land use, land-use change and forestry**  
– about 1 Gt C/yr



## Realizing these Potentials Requires Overcoming Many Barriers to their Implementation

- Barriers add to the cost of implementation, and reduce the realizable potential
- Removal of barriers during capital stock turnover and periods of rapid social change can minimize disruption and mitigation costs

## Opportunities and Barriers --A Classification



## **Market and Institutional Barriers (Market Failures) to Achieving Economic Potential: Examples**

- Lack of information
- Lack of access to capital, especially for smaller firms
- Absence of full-cost pricing
- Risk aversion in financial institutions, including Multilateral Development Banks
- Trade barriers, such as tariffs or export restrictions

## **Social and Cultural Barriers to Achieving Socio-economic Potential: Examples**

- Individual behavior
- Social values and preferences
- Cultural traits and norms
- Gender issues

# Policies

## Research, Development, and Demonstration

- **financing**
- **financial incentives**
- **pricing**
- **voluntary agreements**
- **regulations**
- **information dissemination and training**
- **procurement**
- **market reforms**
- **market obligations**
- **capacity building**
- **planning techniques**

## Research, Development, and Demonstration

### Examples of policy tools

**1.1 Biomass Research and Development Initiative** the Biomass Research and Development Act of 2000 and Executive Order 13134.

#### **Recommendations:**

- Fully fund the Biomass Research and Development initiative at its authorized level of \$49 million a year
- Extend the initiative from 2005 to 2010,
- Priority funding in research grants -projects for the commercialization of cellulosic ethanol and the development of energy crops.

**1.2 Utilities Compulsory Investment in Energy Efficiency and R&D**  
- Starting in 1998, the federal regulatory agency for the electric sector in Brazil requires utilities in Brazil to invest at least half of one percent of their revenues in energy R&D programs

**1.3 Japan – Importance of R&D to stimulate the learning effect**  
• To date the R&D programme has been very successful, with approximately 200 MW of PV installed in the first 18 months. Over ten thousand residential systems have been installed annually as a result of the subsidies.



## **Financing - Examples of policy tools**

**2.1 Rural Business-Cooperative Service** – RBS in United States provides financial and technical assistance to establish and sustain agricultural cooperatives.

### **Recommendations:**

- Provide grants and loan guarantees to establish cooperatives or expand existing cooperatives to undertake wind, biopower, biofuel, and bioproduct development projects.

**2.2 Commodity Credit Corporation Bioenergy Program** – CCC is the financing organization for USDA's. The Bioenergy Program provides partial compensation to producers of ethanol and biodiesel for the purchase of commodities to expand existing production

**2.3 Transmission** – Facilitate financing for Rural Electrification. Provide loan guarantees or other appropriate financing assistance for on-farm renewable energy systems, including wind turbines, solar panels and anaerobic digestion systems

**2.4 Bangladesh- seeds funding for solar home systems** - Between 1997 and 1999, Grameen Shakti sold 1500 systems Solar Home Systems and installed 2000 to 2500 systems in the year 2000 through grant from the Global Environment Facility (GEF) .

## **Financial Incentives - Examples of policy tools**

**3.1** In USA the idea is to help rural electric cooperatives participation in emerging competitive markets.

- Allow enhanced accelerated depreciation for property used in the transmission or generation of electricity.
- Encourage Federal Electricity Regulatory Commission of USA (FERC) to ensure adequate investment returns in the electric transmission system.

**3.2 Conservation Reserve Program** - CRP is part of the Farm Bill conservation programs for United States. Its mission is to preserve land for soil conservation, water quality protection, and wildlife habitat. It is recommendable to add renewable energy production to those goals.

### **Recommendations:**

- Permit the growing of biomass crops, and the harvesting of biomass, for the production of biopower, biofuels, and biobased products, on CRP lands with an appropriate reduction in rental payments\*.
- Allow wind turbines to be sited on CRP lands, where ecologically and economically appropriate.
- Give a higher priority to producers who propose to convert animal waste operations over to anaerobic digestion systems.

## **Financial Incentives - Examples of policy tools**

**(continuation)**

**3.3 Greening the Energy Sector Portfolio of Multilateral Banks: the case of ASTAE.** The goal of ASTAE was to mainstream sustainable energy in Asia by ‘greening’ World Bank lending to the power sector in this region.

## **Pricing - Reform energy prices**

**4.1 Ethanol Small Producer Tax Credit** – In the United States it is recommendable to expand this credit to include farmer-owned cooperatives.

**4.2 “Green technologies”** - The Government's programme for incentivate renewables will create a new market worth over £500 million through the Renewables Obligation, Climate Change Levy exemptions and the Non Fossil Fuel Obligation.



## **Voluntary Agreement - Examples of policy tools**

### **5.1 The Netherlands tax incentives for green investments**

- The Green Fund System (GFS) was introduced in the Netherlands in 1992, as a co-operative activity between the government and the financial sector. The basic principle behind the system is that the general public receives tax advantages for investments in 'Green Funds'. The Green Funds provide soft loans with low interest rates to green projects.

## **Regulation - Examples of policy tools**

**6.1 Rural Utilities Service – RUS** provides grants, loans, and technical assistance to rural electric and water utilities in USA

### **Recommendations:**

•**Net Metering:** Rural Electric Cooperatives (RECs) should provide net metering services to their customers (potential small residential generators) to encourage the production and use of renewable energy sources for on-farm use by their members.

•**Standardized Interconnection:** Rural Electric Co-ops should provide interconnection to their distribution systems at a fair and non-discriminatory price for their member/customers who want to generate power from renewable energy sources for their own .on farm.

## **Regulation - Examples of policy tools**

(continuation)

### **6.2 Tax treatment and duties for imported biofuels**

Very few of the new and renewable energy sources have the potential to be traded in significant amount. Removal of trade barriers is necessary for fair use of commercial practices promoted by the World Trade Organization.

### **6.3 Adopt Minimum Efficiency Standards for New Thermal**

**Power Plants** - Minimum efficiency standards could be adopted for all new gas-fired power plants that enter into operation in Brazil , meaning efficiencies of 50-60 percent achieved by state-of-the-art combined-cycle plants rather than 30-35 percent

## **Information, dissemination, and training**

### **- Examples of policy tools**

#### **7.1 RETScreen: a tool for market coherence**

**RETScreen is a global decision support and capacity building tool for assessing potential renewable energy projects developed by the Energy Diversification Research Laboratory of Canada. The tool evaluates the energy production, life cycle costs and greenhouse gas emission reductions for renewable energy projects at any geographic location around the world.**



## **Procurement - Examples of policy tools**

**8.1 Establish Federal Purchasing Programs** - Executive Order 13134 and the Agricultural Risk Protection Act of 2000 set the goal of tripling the use of biofuels and biobased products in the United States by 2010

**8.2 PROINFA – a Brazilian Federal Program** foresees raising the share of renewable energy power generation by adding 3,300 MW installed capacity of wind, small hydro and biomass based electricity generation, offering long-term contracts with special conditions through ELETROBRAS

### **8.3 PV Market Transformation Initiative in India**

The PV market in India was approximately 10 MWp/year in 1997. The PVMTI programme aims to build up financing, distribution and service capability. This will be achieved through the provision of finance for sustainable and replicable commercial PV business models, the financing of business plans with commercial loans

## **Market Reforms Examples of policy tools**

**9.1 PROALCOOL Program in Brazil** – Program introduced in 1975 with the purpose to diversify the sources of liquid fuels. To guarantee commercial space for ethanol, which at that time had a price above US\$0.60/liter, the government created a fund with resources collected from tax on conventional gasoline.

**9.2 Equipment Testing for Biofuels** - Many gasoline and diesel engine manufacturers will not certify their engines to run on higher blends of ethanol and biodiesel. USDA and the Environmental Protection Agency should provide research grants to test biofuels in higher concentrations in farm equipment, construction equipment, diesel generators, and other applications.

**9.3 Sri Lanka: the importance of IPP regulation** - In Sri Lanka, the World Bank/GEF Energy Services Delivery project had the effect of opening up the market to third party mini-hydro developers. More than 21 MW of small hydro has been financed by independent-power-producers (IPPs) as a result of the project.



## Market Obligation

### Examples of policy tools

**10.1 In September 2001, the European Union (EU)** adopted the Directive on the promotion of electricity produced from renewable energy sources in the internal electricity market. EU member states shall have their own national indicative targets (of renewables) at 12% share of gross national energy consumption by 2010 and 22.1% share of electricity generation by 2020.

**10.2 Renewable Portfolio Standard** - Establish a national Renewable Portfolio Standard that will require 20 percent of power generated in the United States by the year 2020 to be derived from non-hydro renewable energy sources. This ensures a market for renewable power, critical to the development and use of renewable energy across the country and on America's farms

## Market Obligation - Examples of policy tools

### (continuation)

**10.3 Green electricity in Italy** - In 1999 Italy introduced a quota system that obliges each power supplier from 2002 on, to feed electricity from renewable energy sources (2% of the non renewable electricity generated or imported in the previous year) into the Electrical National System. Suppliers can meet this obligation by building their own RE-plants or by buying certificates.

**10.4 German Renewable Energy Law** - The German Renewable Energy Law was passed in 2000, in order to establish a framework for doubling the market share of renewable energy sources by 2010.. It has led to the largest installed wind energy capacity in the world.

## Capacity Building

### Examples of policy tools

**11.1 Agricultural Research Service - ARS** is USDA's primary scientific research agency. The **Bioenergy and Energy Alternatives program** should:

- Increase funding within the **Bioenergy and Energy Alternatives program** for the development of biofuels and energy crops.
- Expand the mission of the **Cooperative State Research, Education, and Extension Service (CSREES)** to promote the development of renewable energy resources on America's farmland.
- Provide funding to **CSREES** to provide education and technical assistance to farmers and farmer-owned co-ops for the development and marketing of renewable energy resources, including biomass, wind, solar, and geothermal.

## Capacity Building - Examples of policy tools (continuation)

**11.2 Guidelines for national renewable energy plans in developing countries (NREL/TCAPP, 2001)**

- Drive the budgeting and policy decisions in developing countries so that the plan recommendations translate into real commitments.
- Integrate renewable energy strategies and initiatives with national and local economic, poverty alleviation, health, and environmental programs
- Engage the business and finance community in structuring and implementing initiatives to ensure that they build sustainable markets and accelerate renewable energy investment
- Provide a vehicle for co-ordinating and focusing bilateral and multilateral donor support for renewable energy programs countries
- Engage and build support from all key stakeholders in the country, (e.g. national/local government, community groups, technical institutions, businesses and finance organisations).

## **Planning Techniques**

### **Examples of policy tools**

**12.1 China Renewable Energy Plan** – The Government of China has developed 5 year plans to accelerate renewable energy development through market based policy instruments. In addition the Government will introduce VAT and income tax reduction, interest rate subsidies and government subsidies, to pay for the additional financial costs of new renewable energy capacity. Currently the government is considering:

- To create a Mandated Market Share for renewable energy in the form of a legal requirement that a specified share of electricity comes from renewable energy.
- To introduce an instrument, such as trading, to share the incremental cost and benefits among the regions in China