



MINISTRY OF NATURAL RESOURCES AND ENVIRONMENT
Department of Meteorology Hydrology and Climate Change

INTRODUCTION OF MITIGATION OPTIONS FOR GHG EMISSIONS IN VIETNAM

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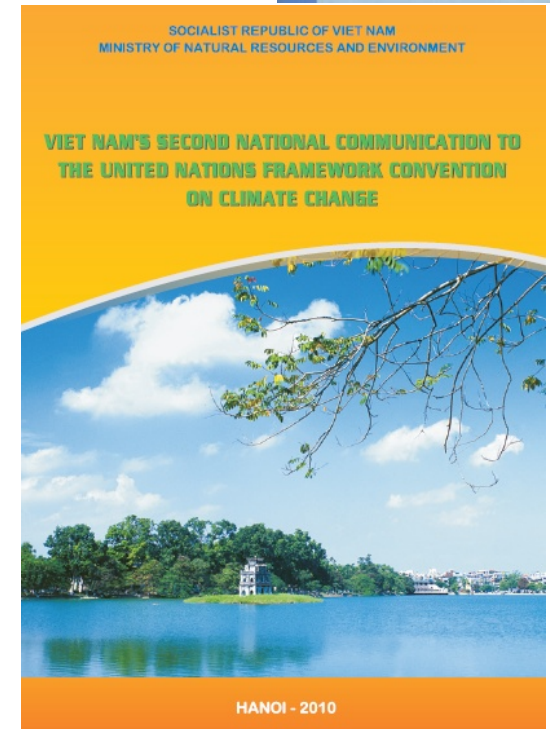
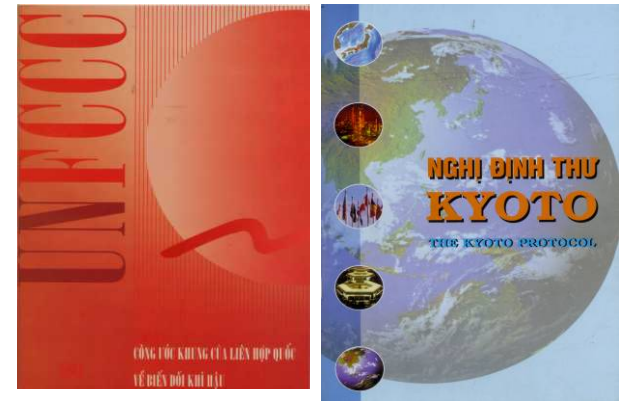
INTRODUCTION – National Circumstances



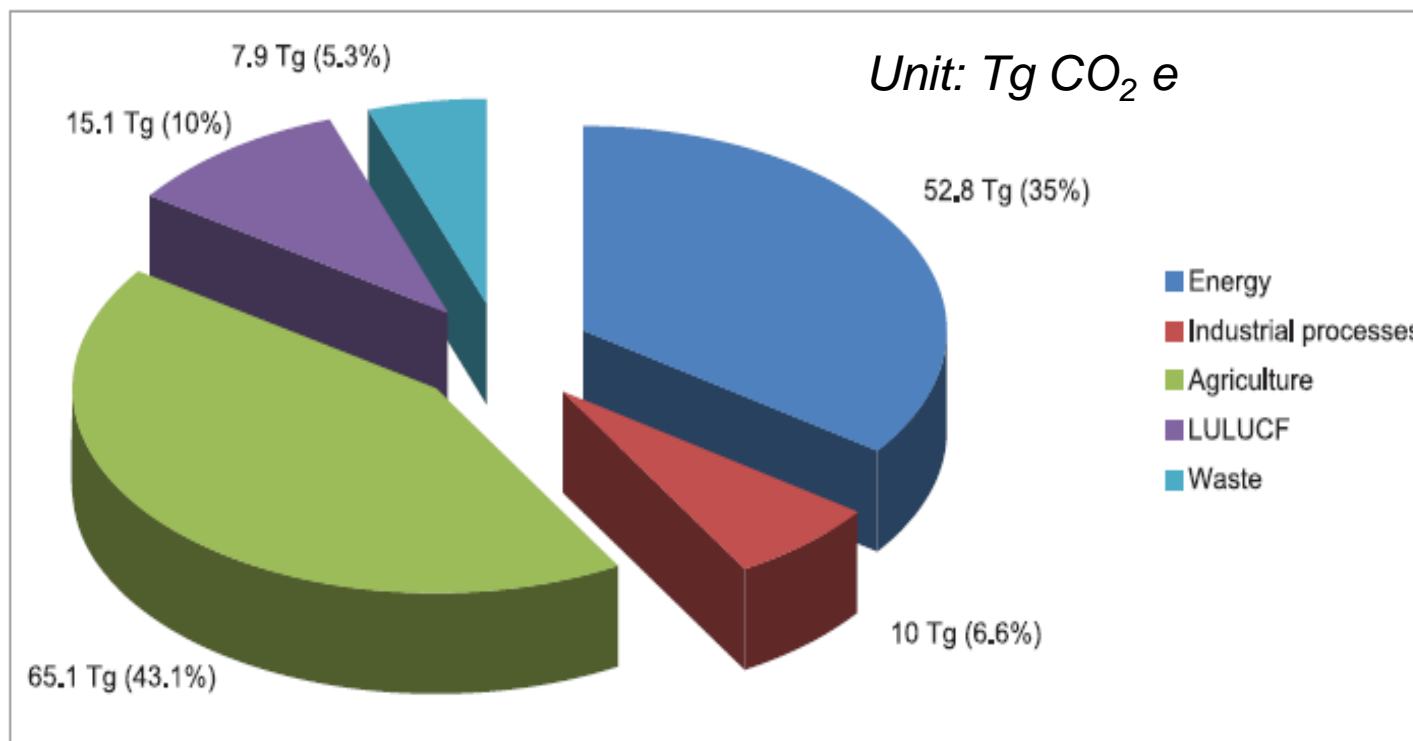
- Viet Nam located in Southeast Asia, land area of 331,051.4 km²
- Climate: monsoon tropical climate with annual mean temperature varying from 12.8°C to 27.7°C; average annual rainfall ranges from 1,400 to 2,400 mm.
- Water resources: Nine major river systems
- Population (2011): 87.84 mil.
- Agriculture land is about 9.3 mil. ha
- Forest land (2000) is about 11.6 mil. ha
- Annual industrial growth is 10-15%
- Transportation: road transportation is the dominant mode of transport
- Energy: primary energy consumption in 2000 was 32.235 KTOE
- Economic growth: 7.5% per annum between 2000-2008

INTRODUCTION

- Viet Nam ratified the United Nations Framework Convention on Climate Change in 1994 and Kyoto Protocol in 2002;
- Viet Nam: implement the obligation of development of National Communications as stated in Article 4.1 and 12.1 of UNFCCC;
- Viet Nam submitted the Second National Communication (SNC) to the UNFCCC Secretariat at the COP 16, Cancun, Mexico, December 2010

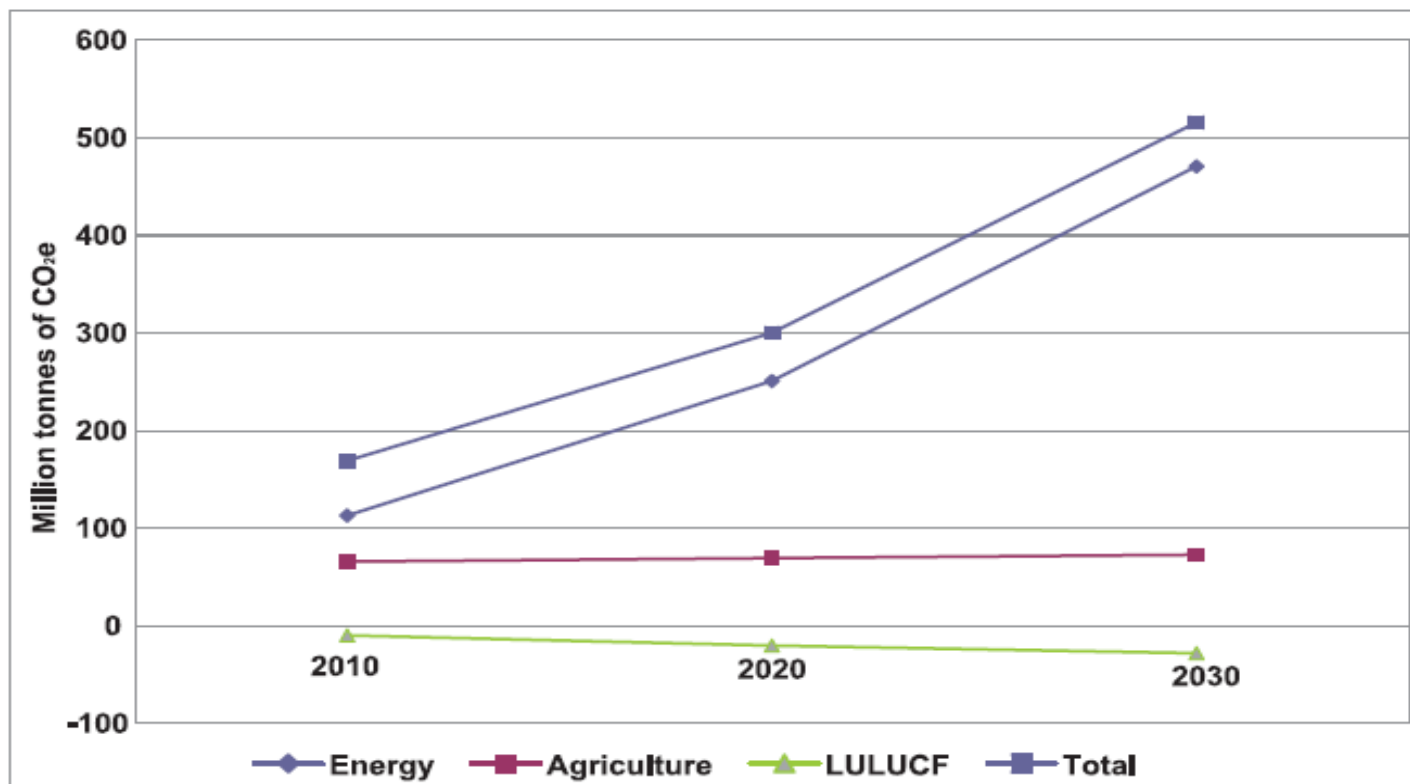


Summary of National GHG Inventory in 2000



- The National GHG inventory for the year 2000 was conducted in accordance with the Revised IPCC Guidelines [SNC,2010]

Summary of National GHG Inventory in 2000



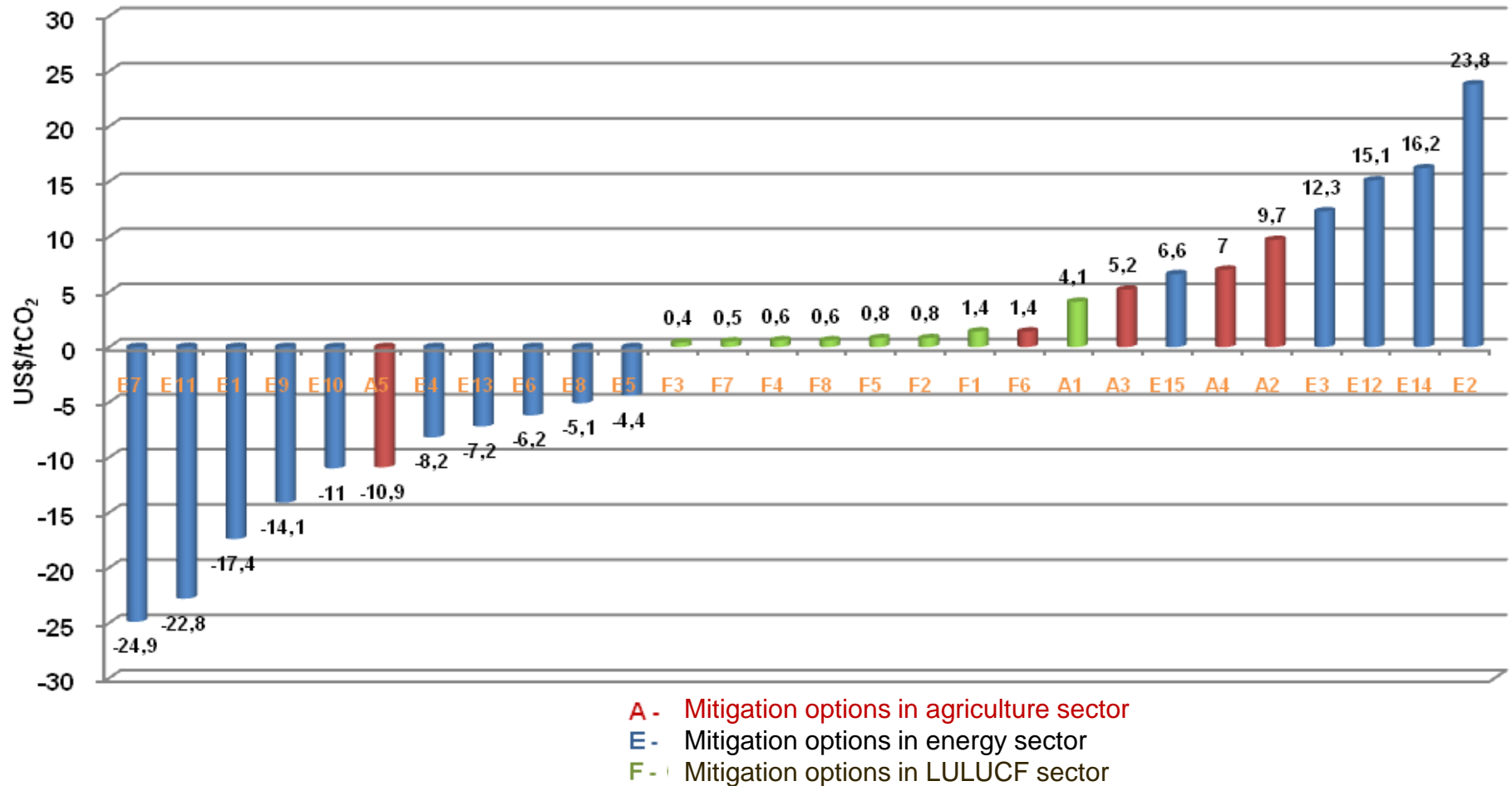
- Emissions from energy, agriculture and LULUCF sectors are projected to be 169.2, 300.4, and 515.8 Tg CO₂e in 2010, 2020, and 2030, respectively. Energy sector accounts for 91.3% of projected total emissions for 2030 [SNC,2010]

MITIGATION OPTIONS FOR SECTORS



- Based on the identification of GHG sources and sinks, GHG mitigation options were developed for three main sectors: energy, agriculture and LULUCF.
 - 15 options for energy sector (including transportation)
 - 5 options for agriculture sector
 - 8 options for LULUCF sector

MITIGATION OPTIONS FOR SECTORS



- Total mitigation potential for the 28 options is 3,270.7 Tg CO₂e. Energy contributes 192.2, agriculture 56.5, and LULUCF 3,022 Tg CO₂e [SNC, 2010]

MITIGATION OPTIONS FOR ENERGY

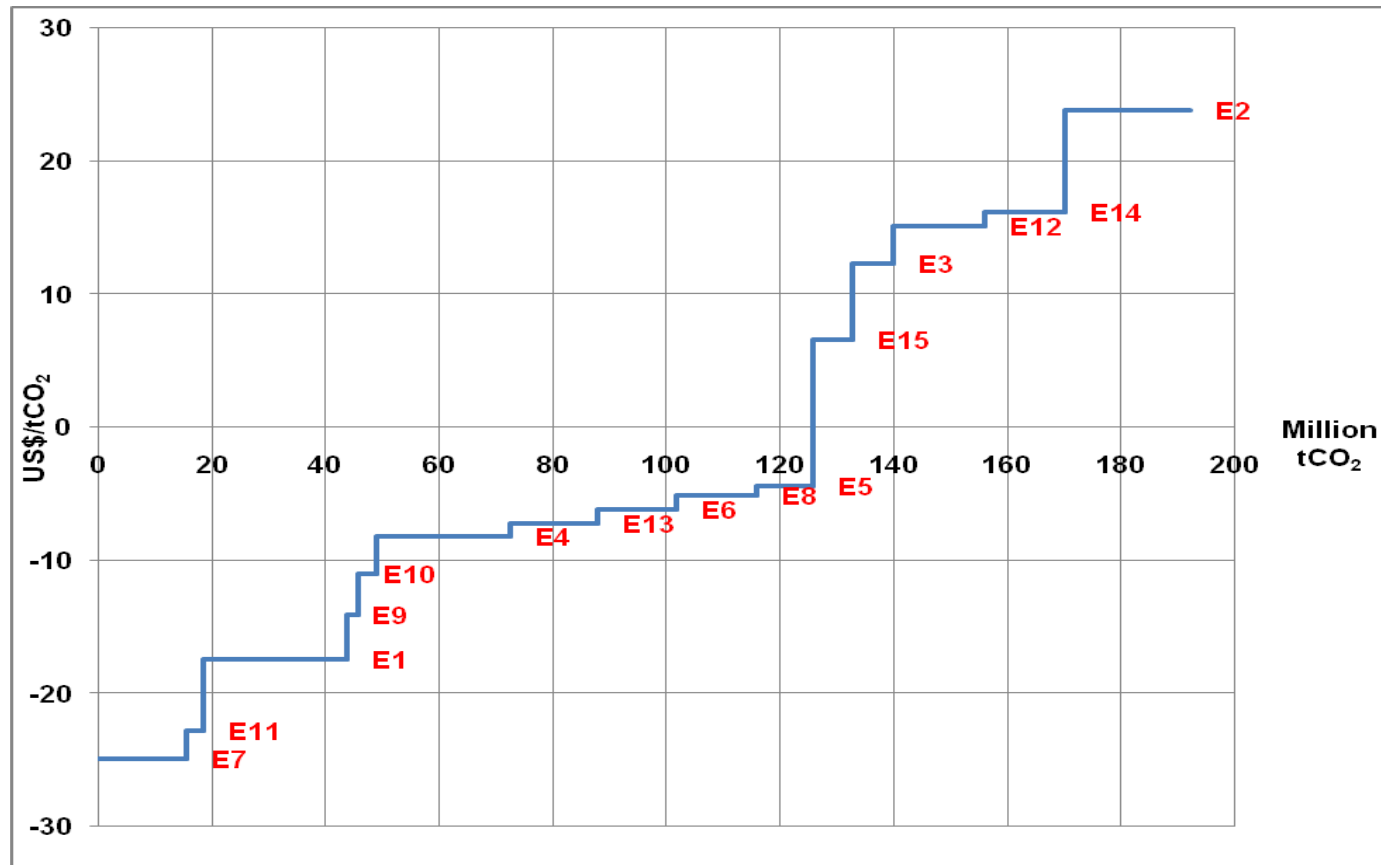


- 15 greenhouse gas mitigation options were developed and evaluated for the energy sector using the **Long-range Energy Alternatives Planning system (LEAP)** model:
 - LEAP is a modelling tool used to systematically analyze energy-environment interdependence, from primary energy development—extraction, production, transformation, distribution—to end-use energy consumption based on the assumed inputs ;
 - LEAP's main strengths reside in its flexibility, ease of use, and the capacity to analyze, assess GHG emissions from energy and choose appropriate policies ;

MITIGATION OPTIONS FOR ENERGY

- Option E1: Innovative coal stoves
- Option E2: Replacing coal with LPG in household cooking
- Option E3: High-efficiency refrigerators
- Option E4: Energy-saving compact fluorescent light bulbs
- Option E5: High-efficiency air conditioner
- Option E6: Solar water-heating appliances
- Option E7: High-efficiency electric motors
- Option E8: Innovative brick kilns
- Option E9: Switching from DO to CNG in transportation
- Option E10: LPG-fuelled cabs
- Option E11: Using high-pressure sodium lamps in public lighting
- Option E12: Switching from coal-fired to LNG thermal power
- Option E13: Small-scale hydropower replacing coal thermal power
- Option E14: Wind power replacing coal-fired thermal power
- Option E15: Rice husk power replacing coal thermal power

MITIGATION OPTIONS FOR ENERGY



- Emission reduction initiative curves (CERI) for the 15 measures are shown in Figure 4.2. Over 30 years, GHG mitigation potentials for the 15 measures total 192.2 million Tco₂ [SNC,2010]

MITIGATION OPTIONS FOR AGRICULTURE

- The **Greenhouse Gas Mitigation Assessment** guidebook by **Dr. J.Sathaye** for the development of baseline and mitigation scenarios, and the assessment of mitigation potential, mitigation options cost-effectiveness and benefits;
- The baseline scenario for agriculture is based on the sector's developmental orientation

Table 4.3. Several agricultural targets

Target	2010	2020	2030
Agricultural soils (%)	26.6	26.6	26.6
Wet-seeded rice area (million ha)	7.1	6.8	6.6
Maize area (million ha)	1.2	1.5	1.6
Dairy cattle (thousand head)	200.0	490.0	735.0
Buffalo and beef cattle (million head)	9.5	12.9	16.4
Contribution to GDP (%)	17.0	13.0	

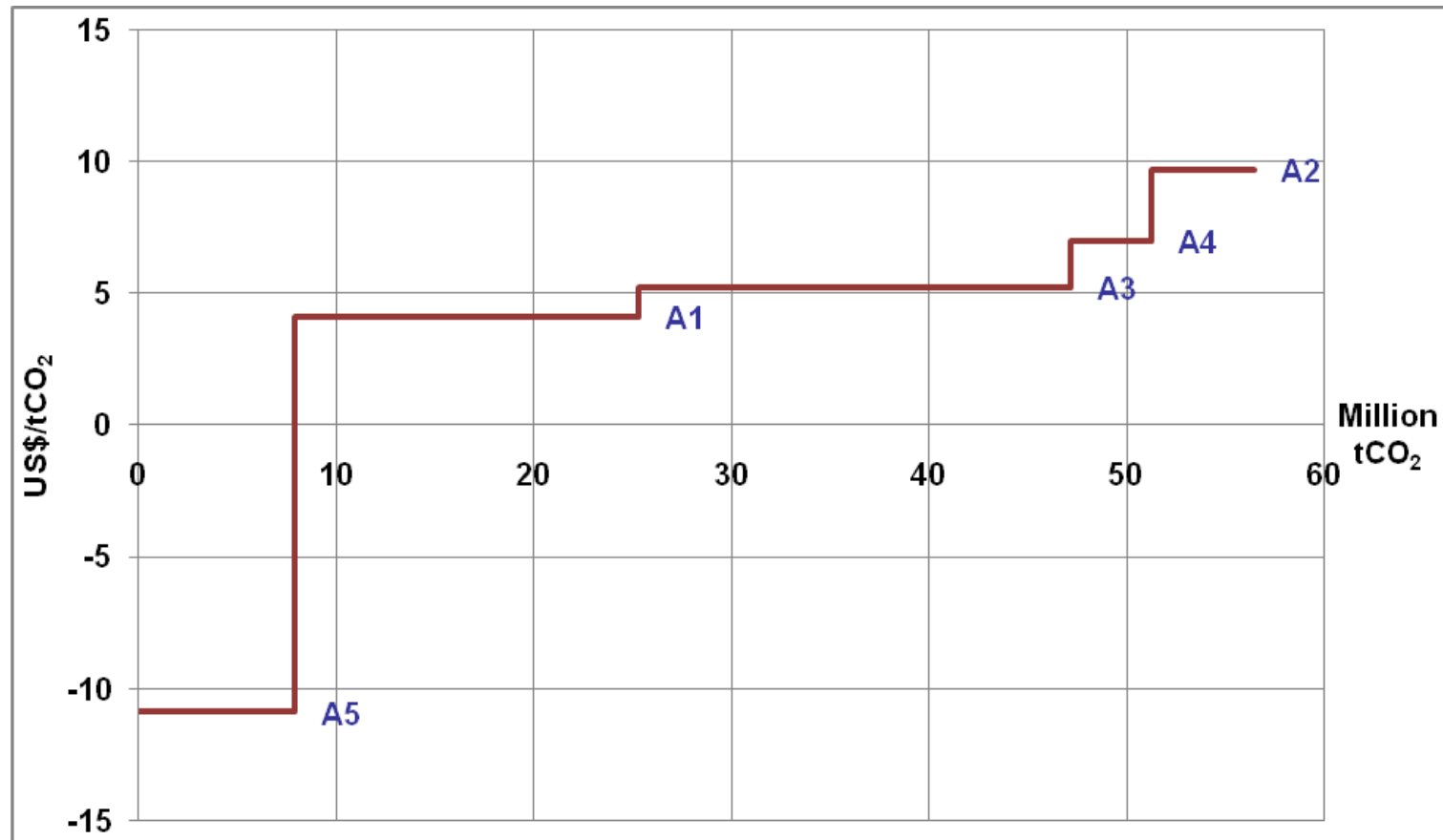
Source: Decision 150/2005/QĐ-TTg dated 20 June 2005 by Prime Minister-Government, and Statistical Yearbook 2002

MITIGATION OPTIONS FOR AGRICULTURE

- Option A1: Biogas replacing cooking coal in lowlands
- Option A2: Biogas replacing cooking coal in highlands
- Option A3: Rice paddy water drainage in the Red River delta
- Option A4: Rice paddy water drainage in the South Central Coast
- Option A5: MUB cattle feeds



MITIGATION OPTIONS FOR AGRICULTURE



- Emission reduction initiative curves for mitigation options in agriculture [SNC,2010]

MITIGATION OPTIONS FOR LULUCF

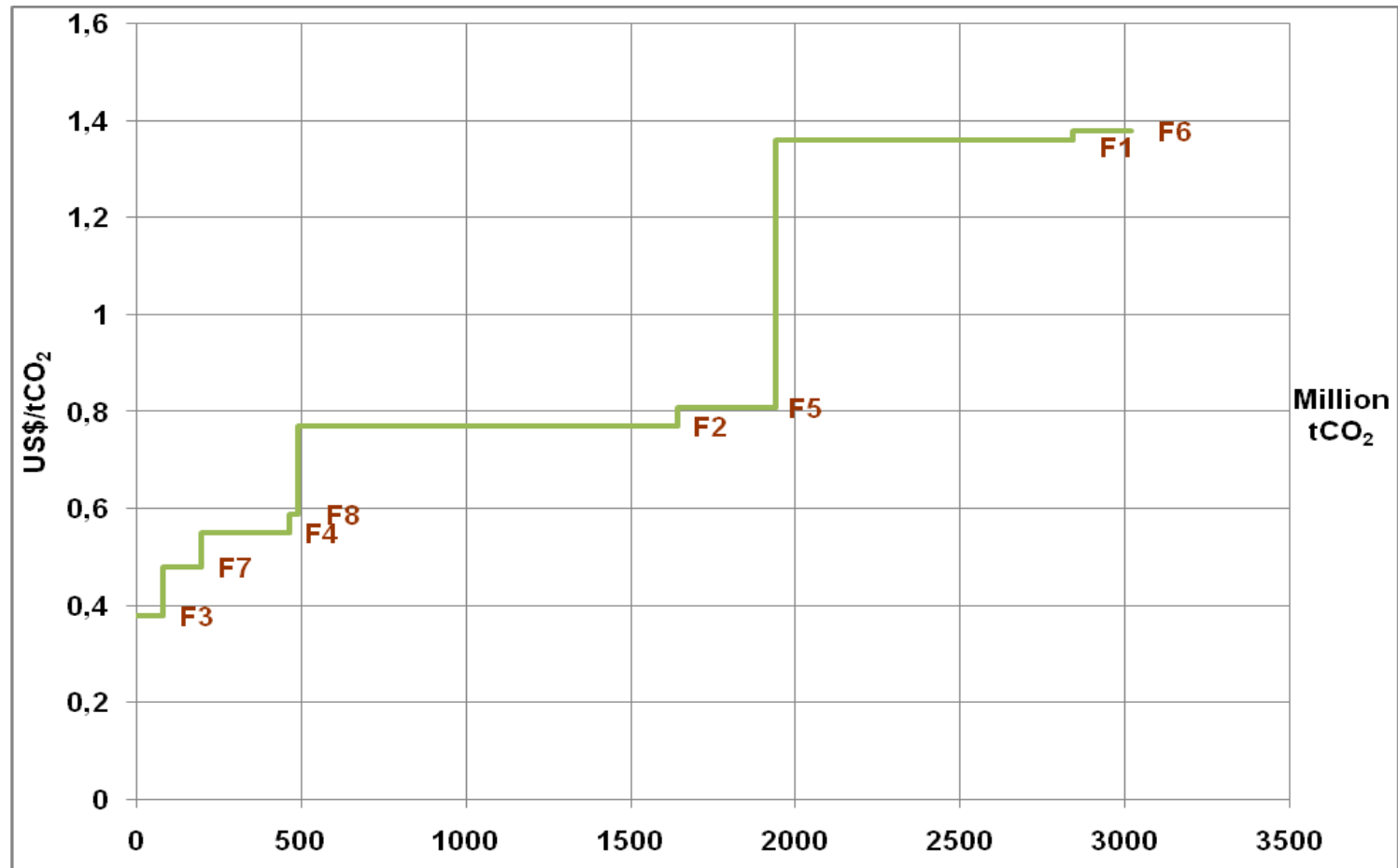
- The ***Comprehensive Mitigation Analysis Process (COMAP)*** model was used in the development and evaluation of LULUCF mitigation options;
- COMAP supports forestry sector policy and development strategy analysis, and provides basic information on changes to carbon sinks, mitigation potential, mitigation costs and cost-efficiency
- The baseline GHG emission scenario for LULUCF was built using Viet Nam's Forestry Development Strategy 2006-2020 as basis.



MITIGATION OPTIONS FOR LULUCF

- Option F1: Sustainable protection and management of existing production forests
- Option F2: Conservation of existing protection forests
- Option F3: Reforestation of large timber forests in conjunction with natural regeneration
- Option F4: Planting long-rotation large timber trees
- Option F5: Planting fast-growing trees for lumber
- Option F6: Planting short-rotation pulpwood forest
- Option F7: Growing long-rotation non-timber product forest
- Option F8: Planting melaleuca forest on alkaline wetlands

MITIGATION OPTIONS FOR LULUCF



- Emission reduction initiative curves for mitigation options in LULUCF [SNC,2010]

APPLYING ENVIRONMENTALLY-FRIENDLY TECHNOLOGY

- In Viet Nam, the efficiency of energy, material and fuel consumption is very low, owing to the continued use of old technologies and equipments as well as inadequate energy management and utilization
- The widespread use of old technologies and processes continues to increase environmental pollution and GHG emission
- In order to develop a low-carbon economy, environmentally friendly technologies are being considered for adoption

APPLYING ENVIRONMENTALLY-FRIENDLY TECHNOLOGY

- In energy supply, high efficiency coal mining and electricity generation technologies should be promoted, in conjunction with the development and application of renewable energies
- In energy consumption, energy efficiency and conservation must be prioritized
- **Application of new technology transferred through CDM projects in Viet Nam**
 - As of June 2012, Viet Nam has had 126 CDM projects registered by the EB, generating total GHG emission reductions of 56 million tCO₂e

APPLYING ENVIRONMENTALLY-FRIENDLY TECHNOLOGY

- The CDM projects have used the following technologies:
 - Recovery and utilization of associated gases from oil extraction as fuels for gas turbines in geothermal power plants, such as Phu My, Ca Mau, Nhon Trach
 - Recovery and utilization of methane in solid waste and/or wastewater treatment for electricity generation
 - Recovery of waste heat in cement production for electricity generation
 - Utilization of wind, solar power and small-scaled hydroelectricity such as Binh Thuan Wind Power Plant



Limitations and Constraints

- Insufficient long-term planning information and data
- Some IPCC emission factor (EF) defaults for energy technologies may not be suitable, the national EFs have not been well-developed yet
- Technical capacity in development of mitigation options
- Little information about know-how techniques
- Insufficient investment and technical experts for transferring and application of modern, environmentally sound technologies

Next steps

- Implementing **National Climate Change Strategy** (Decision 2139/QD-TTg dated 5 Dec 2011):
 - Specific objective: Consider low-carbon economy and green growth as principles in achieving sustainable development; GHG emission reduction and removal to become a mandatory index in social and economic development
 - Specific tasks:
 - *Development of new and renewable energies*
 - *Energy saving and efficiency in Industrial production, construction and Transportation*
 - *Agriculture*
 - *Solid waste management*
- Application of new models for adaptation and mitigation assessments with support from international organizations
- Education, training and public awareness on Climate Change at all levels

THANK YOU FOR YOUR ATTENTION

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