

# The 5th Workshop on GHG Inventories in Asia (WGIA5)

6-8 September 2007, Kuala Lumpur, Malaysia

## Country Experiences in GHG Inventory Preparation: Viet Nam



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**International Cooperation Department  
MONRE**

# Viet Nam - 2006



- Real GDP Growth 8.1%
- Average last 5 years 7.5%
- Forecast to 2010 (yoy) 8.2%
- Industrial Production Growth 17.2%
- Forecast Production Growth to 2010 12.7%
- CPI 6.5%
- Export Growth last 5 years 17%
- New FDI compared to last YTD 30%
- Ranked 3<sup>rd</sup> in global retail attractiveness
- Market and legal reform- ascension to WTO

UNFCCC



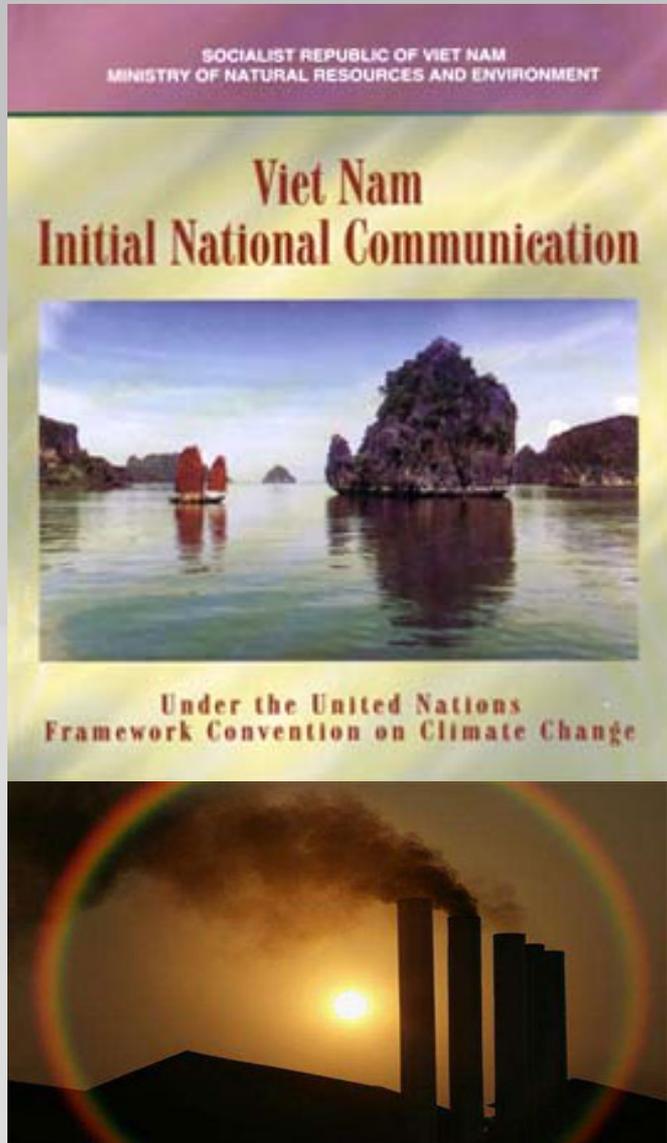
WORLD TRADE ORGANIZATION



# Viet Nam - Non Annex I Country

- Viet Nam signed the United Nations Framework Convention on Climate Change (UNFCCC) on 11 June 1992 and ratified it on 16 November 1994. Viet Nam also signed Kyoto Protocol (KP) on 03 December 1998 and ratified it on 25 September 2002.
- The Ministry of Natural Resources and Environment (MONRE) was assigned by the Government of Viet Nam as National Focal Agency for taking part in and implementing UNFCCC, KP and Clean Development Mechanism (CDM).
- The Initial National Communication (INC) of Viet Nam was completed and submitted to UNFCCC Secretariat in November 2003.
- Viet Nam: Preparation of Second National Communication under the UN Framework Convention on Climate Change (UNFCCC) from 2006 - 2009

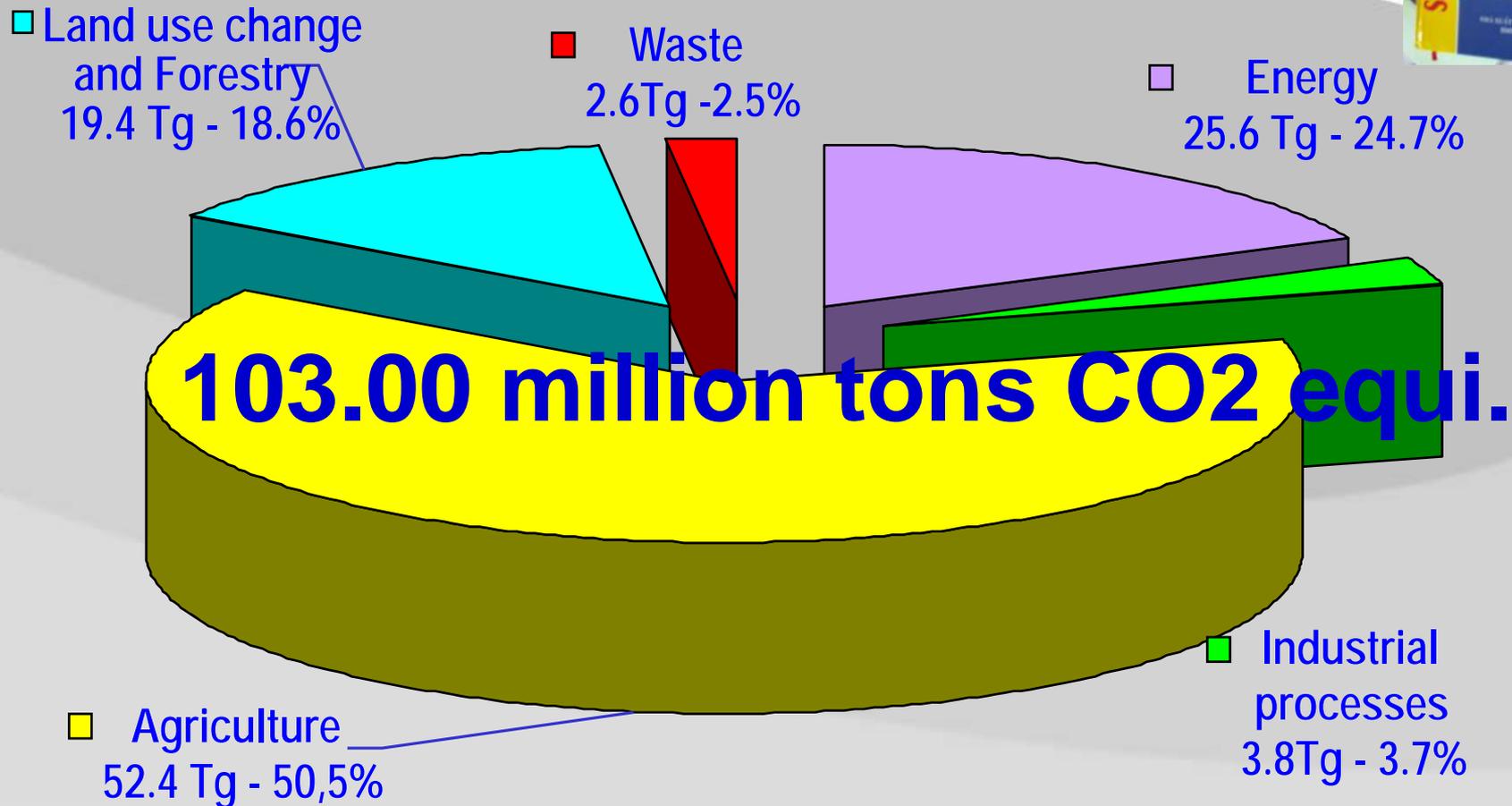
# The GHG Inventory Experience



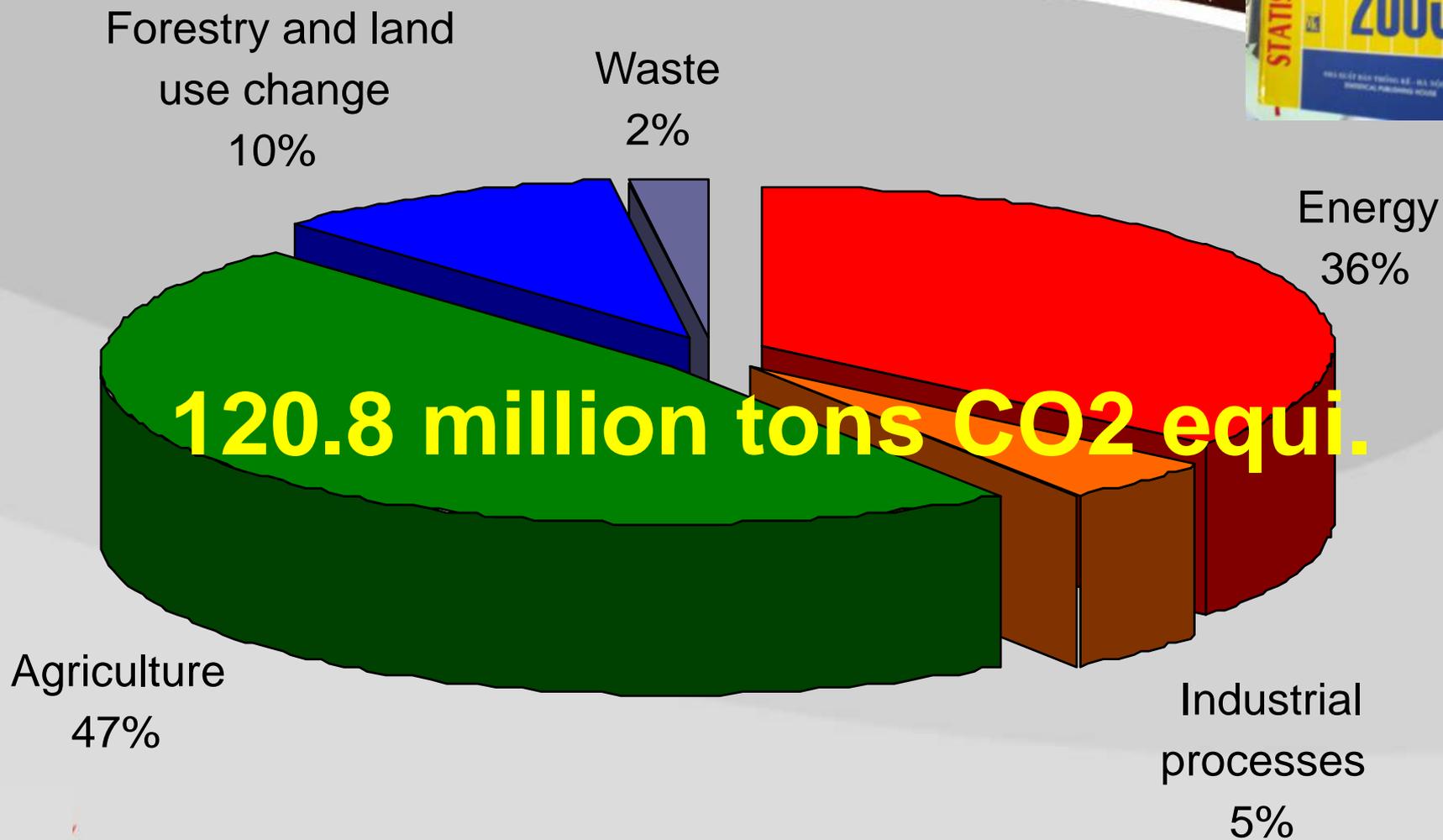
- Completed National GHG Inventories for 1990, 1993, 1994 and 1998.
- National GHG Inventories focused on CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O in: Energy, Industrial Processes, Agriculture, Land Use and Land Use Change and Forestry (LULUCF), Waste
- The Methodology of GHG emission inventory followed the guidance of the IPCC revised version 1996
- Data: The data mainly is collected from General Statistics Office, Ministries (development strategies, master plans, ...), some data and information come from researches reports governance institutions.



# National GHG Inventory in 1994



# National GHG Inventory in 1998



# Institutional framework for the SNC



**MINISTRY OF NATURE  
RESOURCES AND  
ENVIRONMENT  
(MONRE)**

**National Project  
Director**

**Project  
Stakeholders**

**Ministries  
Academia  
NGOs  
Private sector**

**National  
Project Coordinator  
International Cooperation  
Department**

**Implementation Team**



**National GHG  
Inventory**

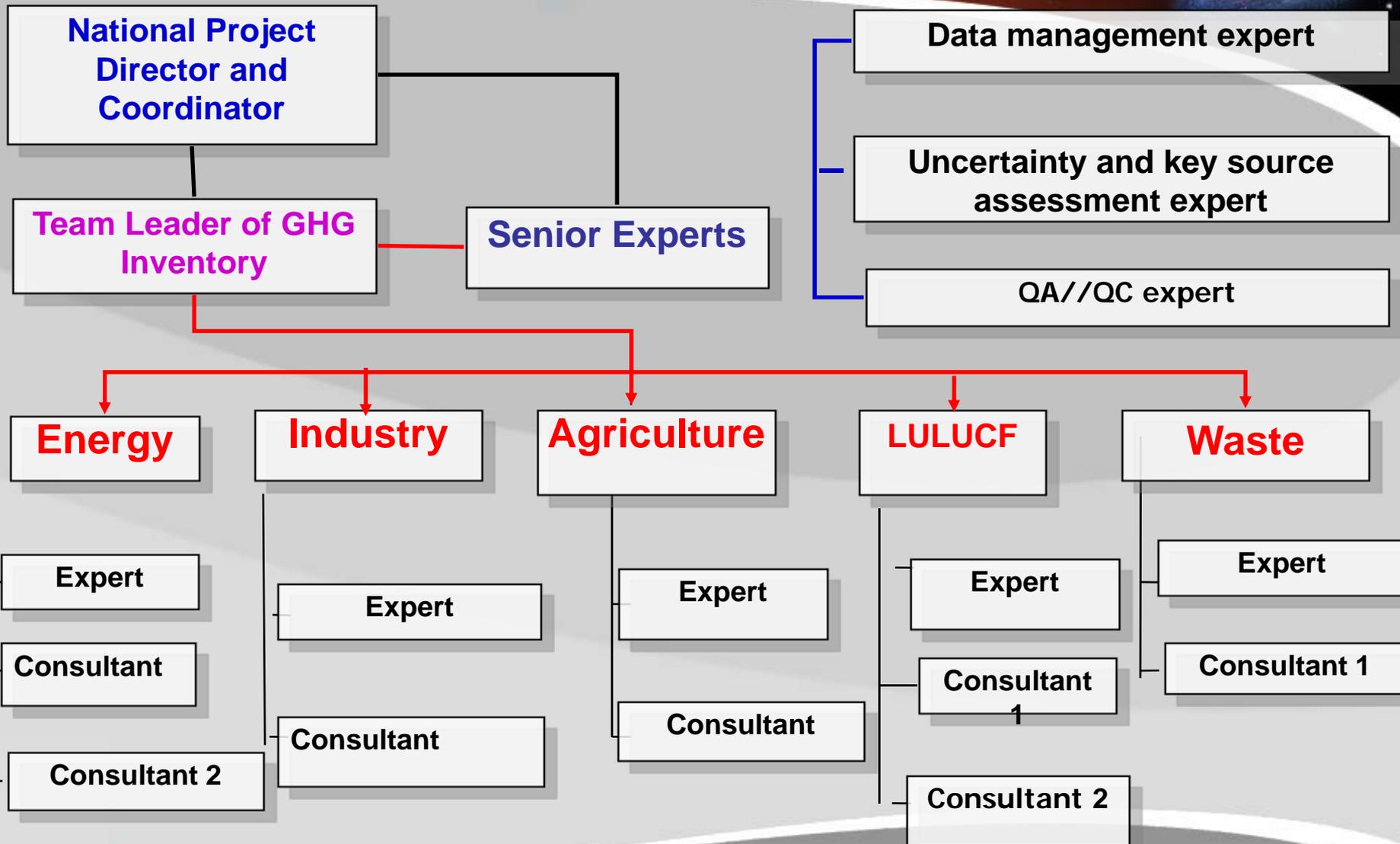
**V&A  
Assessment**

**Mitigation  
Assessment**

**Research&Syste-  
matic Observation**

**Other Related  
Components**

# GHG Inventory - WG structure



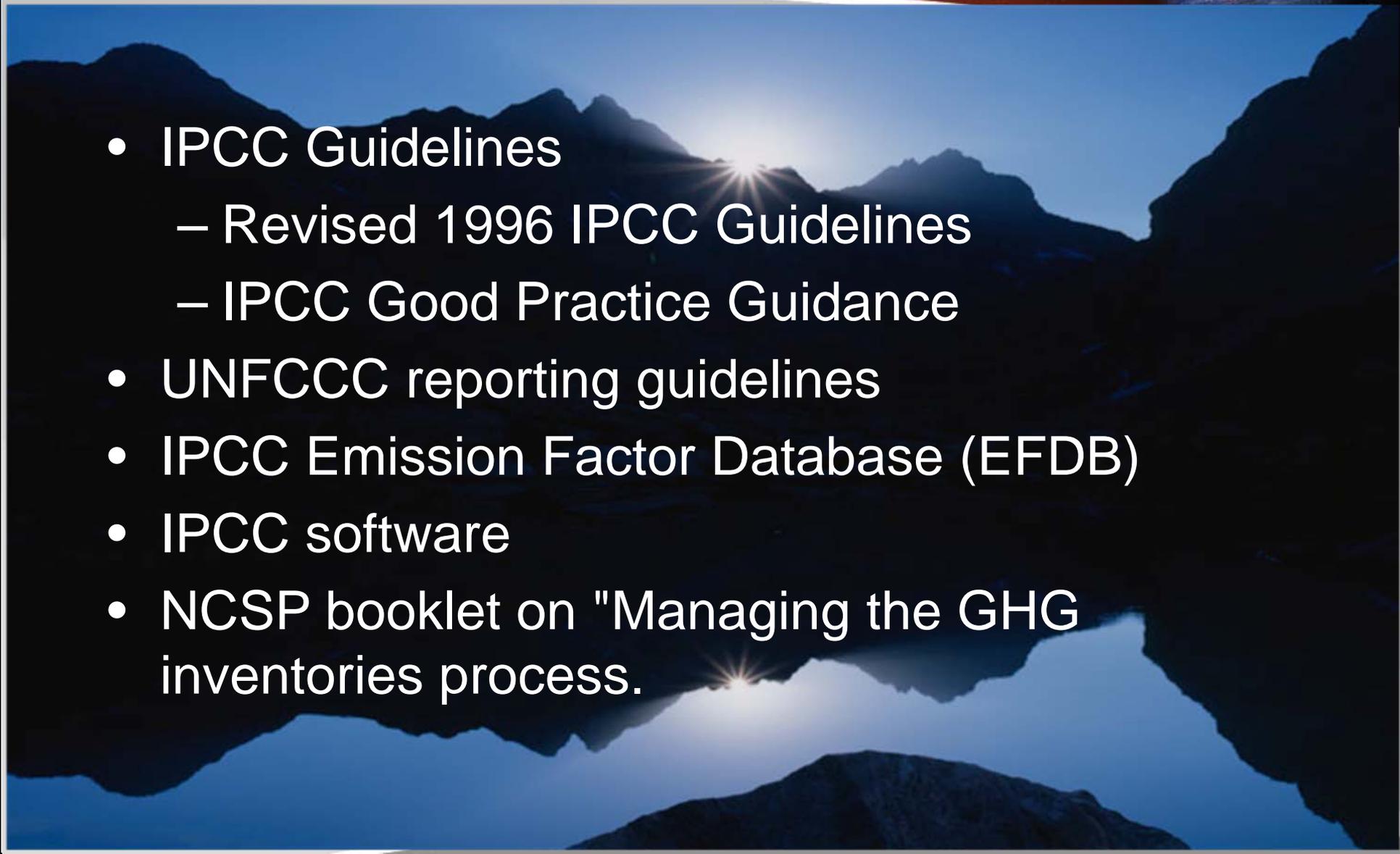
# Partnership and Knowledge sharing

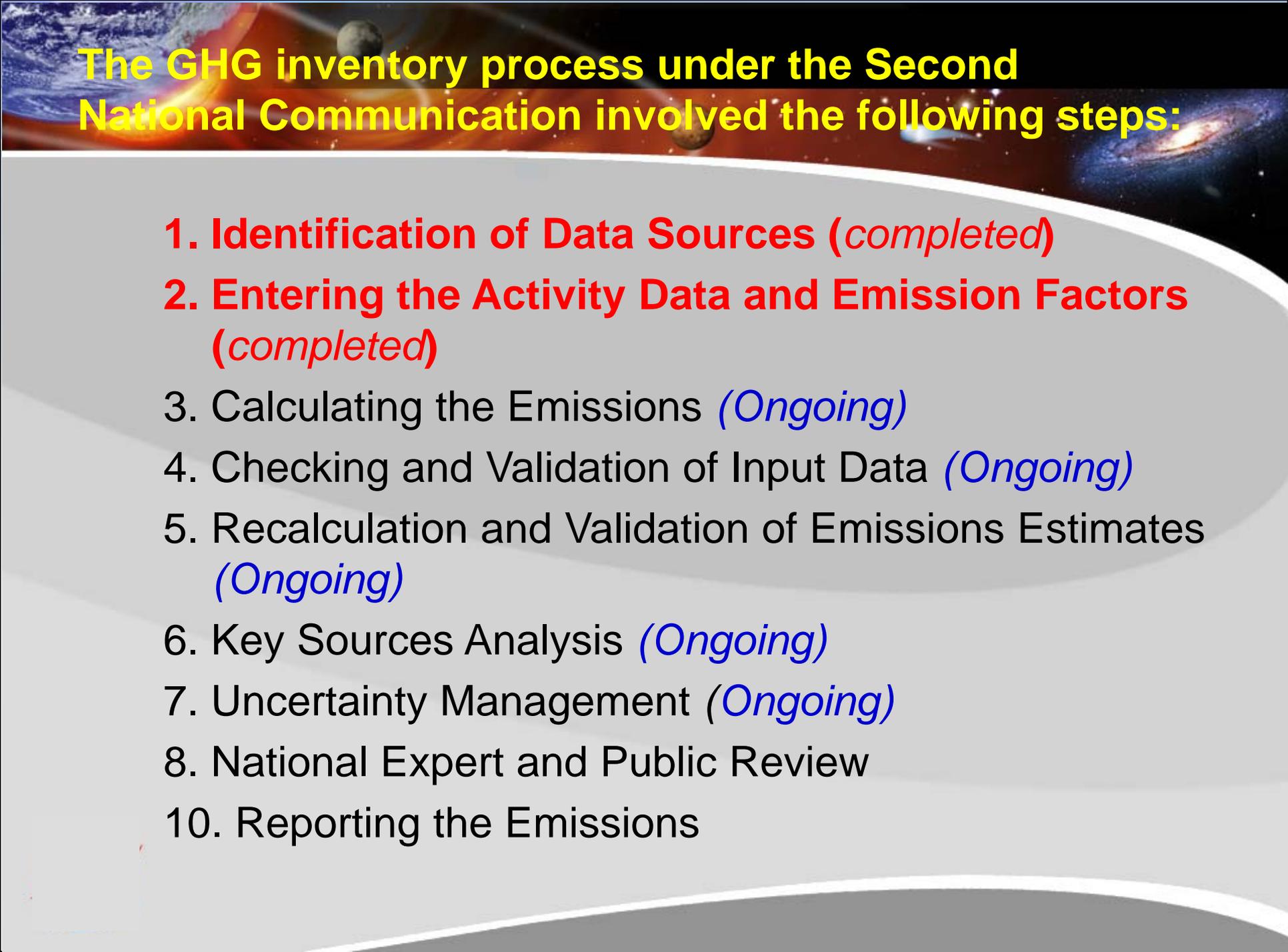


National Inventory Team established and procedures for systematic inventory preparation, implementation, data processing and reporting.



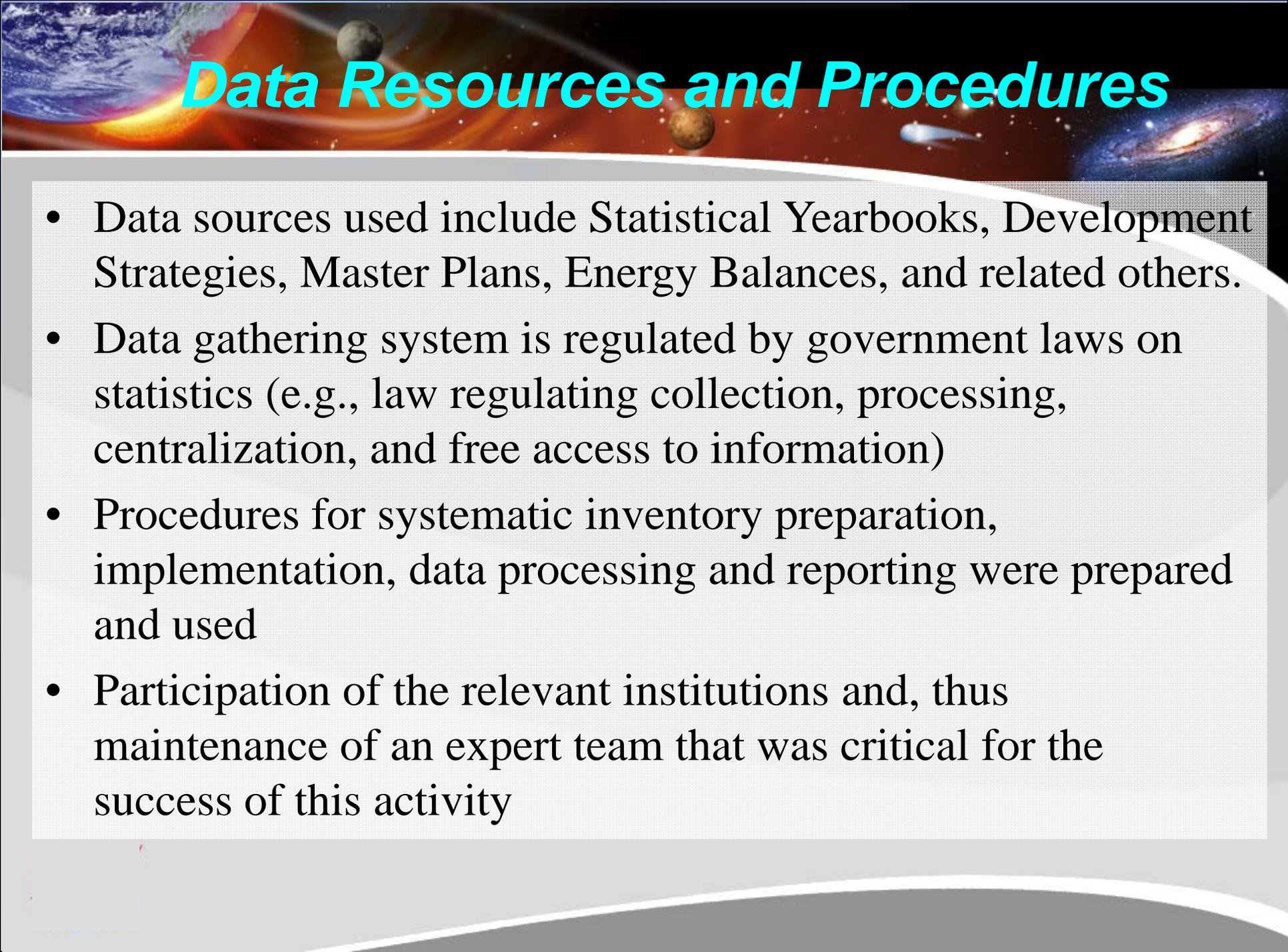
# Resources

- 
- IPCC Guidelines
    - Revised 1996 IPCC Guidelines
    - IPCC Good Practice Guidance
  - UNFCCC reporting guidelines
  - IPCC Emission Factor Database (EFDB)
  - IPCC software
  - NCSP booklet on "Managing the GHG inventories process."



## The GHG inventory process under the Second National Communication involved the following steps:

1. Identification of Data Sources (*completed*)
2. Entering the Activity Data and Emission Factors (*completed*)
3. Calculating the Emissions (*Ongoing*)
4. Checking and Validation of Input Data (*Ongoing*)
5. Recalculation and Validation of Emissions Estimates (*Ongoing*)
6. Key Sources Analysis (*Ongoing*)
7. Uncertainty Management (*Ongoing*)
8. National Expert and Public Review
10. Reporting the Emissions



# *Data Resources and Procedures*

- Data sources used include Statistical Yearbooks, Development Strategies, Master Plans, Energy Balances, and related others.
- Data gathering system is regulated by government laws on statistics (e.g., law regulating collection, processing, centralization, and free access to information)
- Procedures for systematic inventory preparation, implementation, data processing and reporting were prepared and used
- Participation of the relevant institutions and, thus maintenance of an expert team that was critical for the success of this activity

# GHG Inventory – *Current Institutional Arrangement*

<b>Sector</b>	<b>Number of key persons</b>	<b>Institutions/Personnel</b>
<b>Energy</b>	<b>4</b>	Vietnam Academy of Science and Technology; Institute of Energy; Department of Science and Technology of Ministry of Transportation; Research Center for Energy and Environment
<b>Industry processes</b>	<b>2</b>	Department of Oil and Gases (MOI); Institute of Industry and Chemical Safety Technology
<b>Agriculture</b>	<b>4</b>	Research Center for Climate Change and Sustainable Development; Hanoi Agricultural University; Institute of Agricultural Economy; Agriculture Department of MARD
<b>LULUCF</b>	<b>4</b>	Assistance for Natural Conservation and Community Development Center; Institute of Forestry Science, MARD; Research Centre for Forest Ecology and Environment, MARD; Center for Community Forestry
<b>Waste</b>	<b>3</b>	Hanoi University of Technology; Urban Environment Corporation and related others

# Completed Reports on Collection and Analysis of Data for GHG Inventory in 2000 and forecast to 2010, 2020, 2030

<b>Sector</b>	<b>Data Index</b>	<b>Data Inventory</b>
<b>Energy</b>		Fuel Combustion: Energy industries, Manufacturing Industries, Construction, Transport, other sectors,... Fugitive emission from fuels: Coal, Oil and Gas, Biomass, ...
<b>Industry processes</b>		Cement production, Lime manufacturing, Use of hydrated lime, Soda production and consumption, Steel manufacture, Paper and pulp production, Beverage and Softdrink, Food processing industries;...
<b>Agriculture</b>		Rice cultivation, Livestock (Enteric fermentation manure, Waste management), Agricultural soil land, Prescribed burning of Savanna, Field burning of agriculture residues
<b>LULUCF</b>		Forest ecosystems, Plantation forest, Plantation industry (oil palm and rubber), Protected forest, Non-forest trees/ Urban planting; Absorption by biomass growth, Land use change, Absorption by natural regeneration, Emission from soil
<b>Waste</b>		Solid waste disposal site, Domestic, commercial waste water, Industrial waste water, waste incineration, Emission from human,, others ... ..

# Data Reports for GHG Inventory

## Bé Tjui Nguy<sup>a</sup>n vjư M<sup>k</sup>i tr - ê ng

Dù , n UNEP/GEF: "Vi<sup>o</sup>t Nam: Chu<sup>u</sup>ên B<sup>p</sup>Th<sup>u</sup>ng b<sup>u</sup>o qu<sup>o</sup>c gia l<sup>o</sup>n t<sup>h</sup>o hai cho C<sup>o</sup>ng - i c kh<sup>u</sup>ng l<sup>o</sup>p n<sup>h</sup>i p<sup>o</sup> qu<sup>o</sup>c v<sup>o</sup> Bi<sup>o</sup>n S<sup>u</sup>ai kh<sup>u</sup>Y<sup>h</sup>Eu "

Thu t<sup>h</sup>êp, t<sup>u</sup>ang h<sup>i</sup> p<sup>h</sup>o<sup>n</sup> t<sup>u</sup>ch t<sup>h</sup>«ng t<sup>i</sup>n s<sup>e</sup> l<sup>i</sup>o<sup>u</sup> ph<sup>o</sup>c v<sup>o</sup> ki<sup>o</sup>m k<sup>h</sup> kh<sup>u</sup>Y<sup>h</sup>n<sup>u</sup> k<sup>u</sup>Y<sup>h</sup>n<sup>h</sup> m 2000 vjư - i c t<sup>u</sup>Y<sup>h</sup> ph<sup>u</sup> t<sup>h</sup>q<sup>i</sup> cho 2010, 2020, 2030 kh<sup>u</sup>v<sup>u</sup>c n<sup>u</sup>ng nghi<sup>o</sup>p<sup>e</sup> Vi<sup>o</sup>t Nam ph<sup>o</sup>c v<sup>o</sup> dù , n Th<sup>u</sup>ng b<sup>u</sup>o qu<sup>o</sup>c gia s<sup>e</sup> hai



## Agriculture



H<sup>u</sup> Néi, t<sup>h</sup>ng 03 n<sup>h</sup> m 2007



## LULUCF



## Industry Process



## Waste

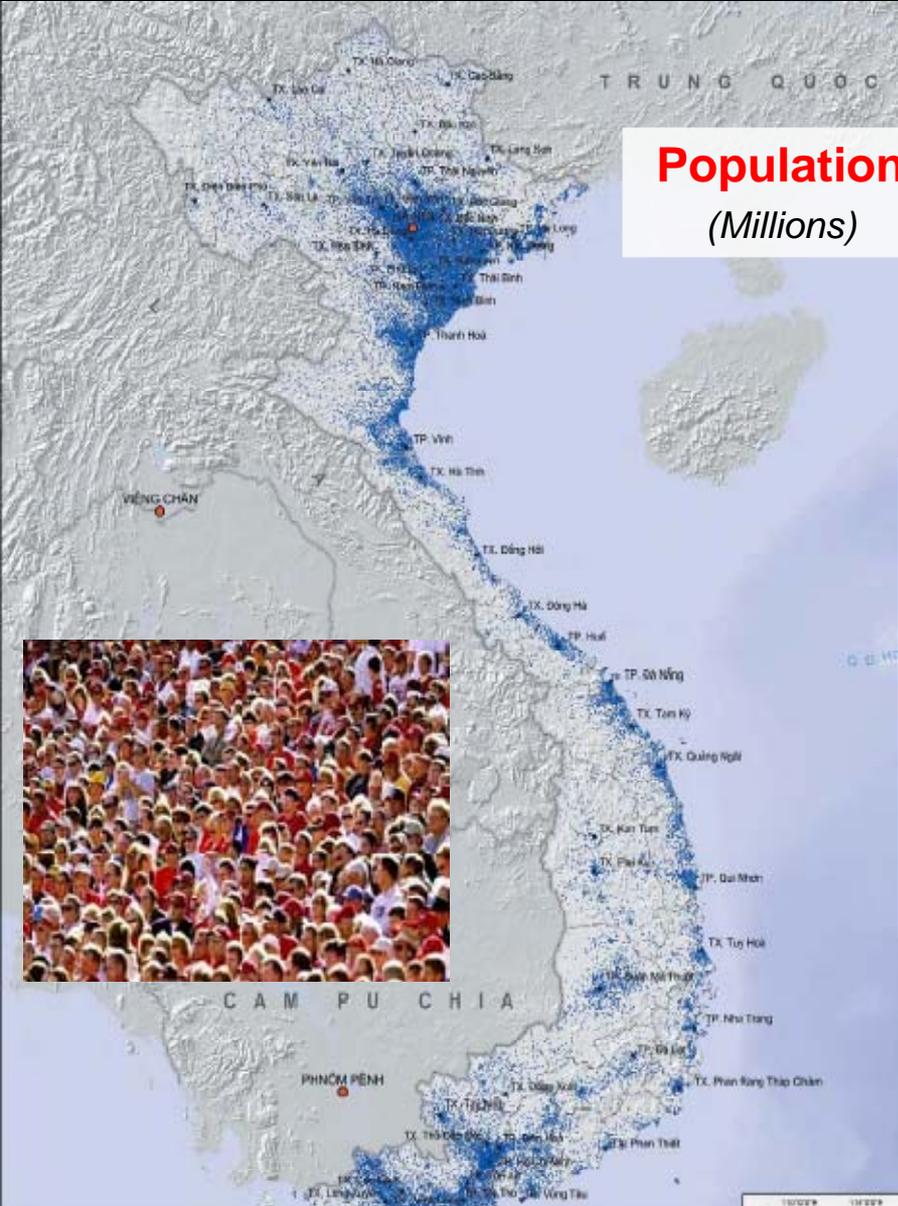


## Energy

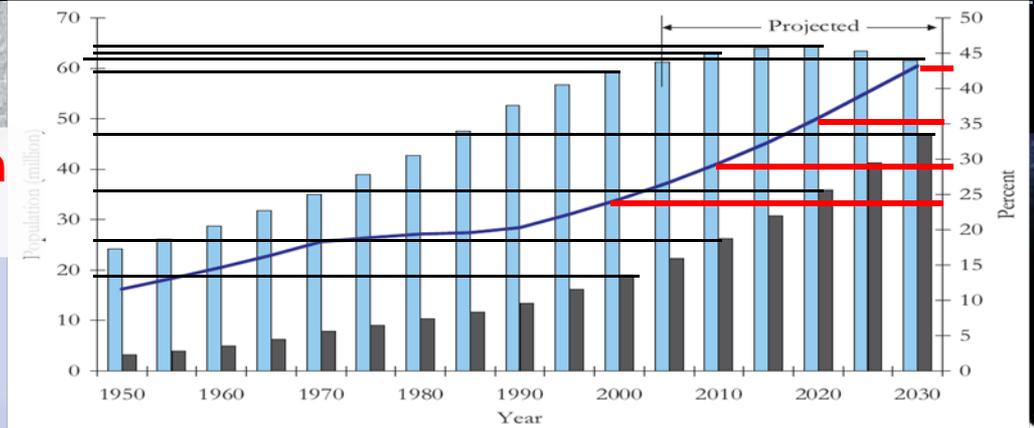
# Waste Management in Vietnam at a Glance



Municipal solid waste generation (tons/yr)	
<ul style="list-style-type: none"> <li>National</li> <li>Urban areas</li> <li>Rural areas</li> </ul>	<p>12,800,000</p> <p>6,400,000</p> <p>6,400,000</p>
Hazardous waste generation by industries (tons/yr)	128,400
Non hazardous waste generation by industries (tons/yr)	2,510,000
Hazardous healthcare waste generation (tons/yr)	21,000
Hazardous waste from agriculture (tons/yr)	8,600
Amount of stockpiled agricultural chemicals (tons)	37,000
Municipal waste generation (kg/pers/day)	
<ul style="list-style-type: none"> <li>National</li> <li>Urban areas</li> <li>Rural areas</li> </ul>	<p>0.4</p> <p>0.7</p> <p>0.3</p>
Collection of waste (% of waste generated)	
<ul style="list-style-type: none"> <li>Urban areas</li> <li>Rural areas</li> <li>Among urban poor</li> </ul>	<p>71%</p> <p>&lt;20 %</p> <p>10-20%</p>
No. of solid waste disposal facilities	
<ul style="list-style-type: none"> <li>Dumps and poorly operated landfills</li> <li>Sanitary landfills</li> </ul>	<p>74</p> <p>17</p>
Capacity for hazardous healthcare waste treatment (% of total).	50%



**Population**  
(Millions)



■ Rural population (millions) ■ Urban population (millions) — Urban population (percent)

Region or City	Degradable Organic Component (kg BOD/1000 persons/yr)			
	2000	2010	2020	2030
Red River Delta	998.00	1497.00	2245.50	3368.25
North East Region	120.00	180.00	270.00	405.00
North West Region	5.00	6.00	7.20	8.64
North Central Coast	282.00	423.00	634.50	951.75
South Central Coast	493.50	740.25	1110.38	1665.56
Central Highlands	2.00	3.00	4.50	6.75
South East Region	1292.50	1938.75	2908.13	4362.19
Mekong River Delta	2.56	3.84	5.76	8.64

Region or City	Fraction of Wastewater Treated by the Handling System			
	2000	2010	2020	2030
Red River Delta	0.05	0.1	0.5	0.8
North East Region	0.01	0.02	0.1	0.16
North West Region	0	0.01	0.05	0.08
North Central Coast	0.02	0.04	0.2	0.32
South Central Coast	0.03	0.06	0.3	0.48
Central Highlands	0	0.01	0.05	0.08
South East Region	0.05	0.1	0.5	0.8
Mekong River Delta	0.02	0.04	0.2	0.32

**METHANE EMISSIONS FROM DOMESTIC AND COMMERCIAL WASTEWATER AND SLUDGE**

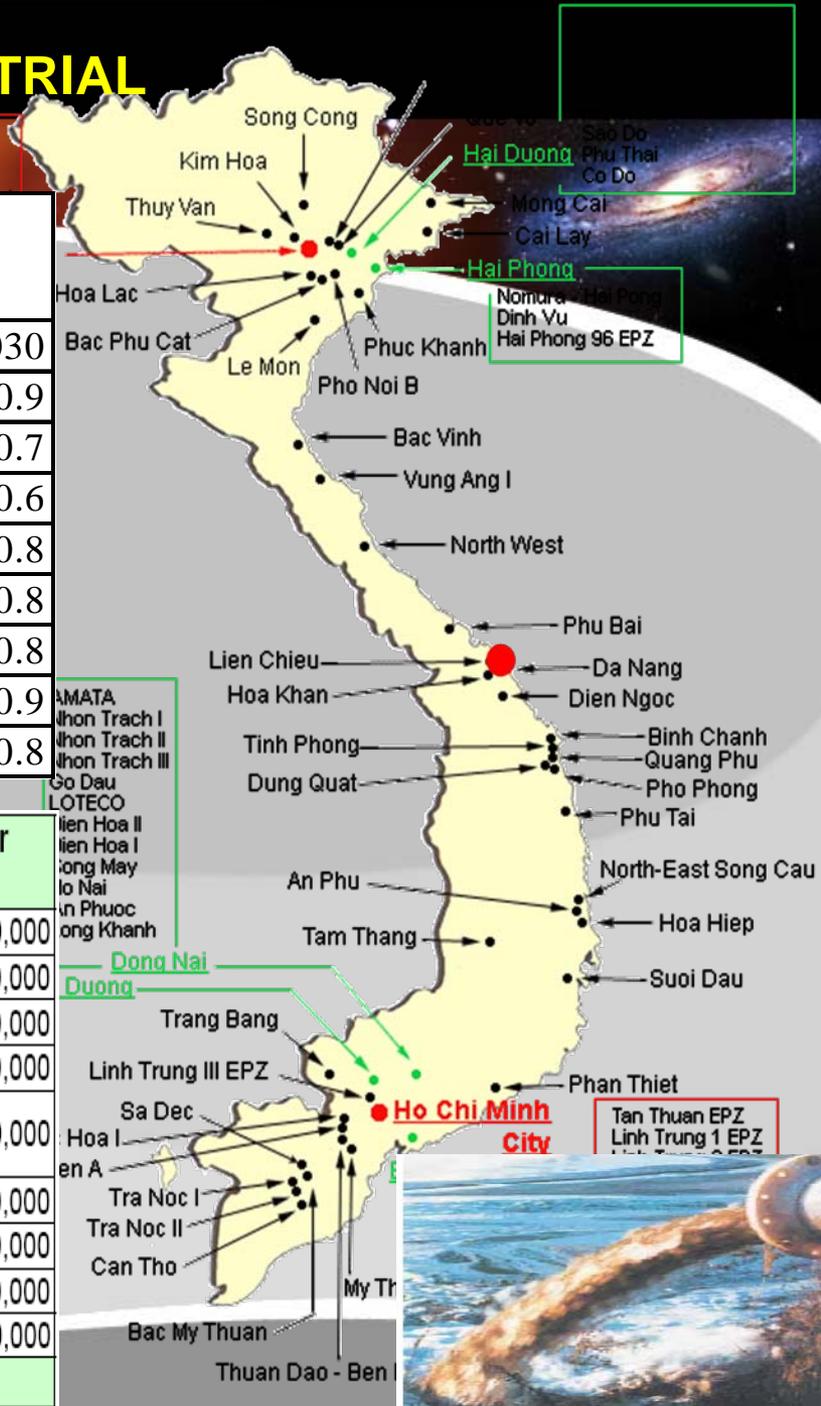
# METHANE EMISSIONS FROM INDUSTRIAL WASTEWATER TREATMENT

Fraction of Wastewater Treated by the Handling System

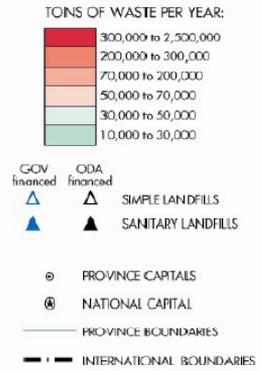
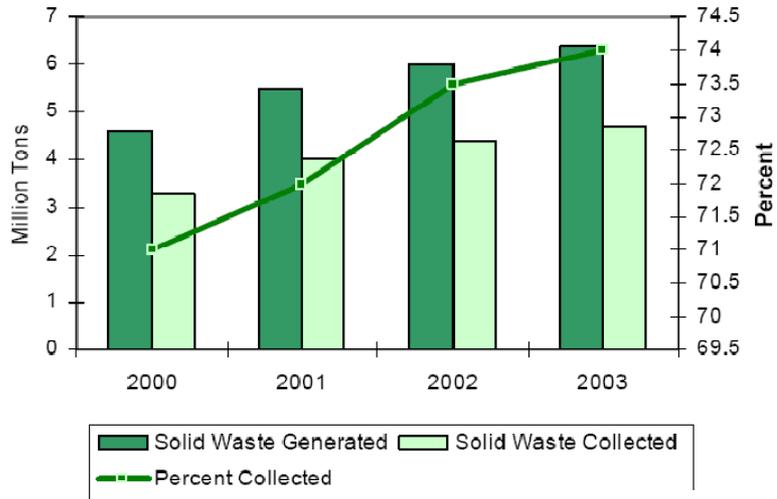
	2000	2010	2020	2030
Red River Delta	0.2	0.6	0.8	0.9
North East Region	0.1	0.3	0.6	0.7
North West Region	0	0.2	0.4	0.6
North Central Coast	0.2	0.4	0.6	0.8
South Central Coast	0.1	0.3	0.6	0.8
Central Highlands	0.1	0.3	0.5	0.8
South East Region	0.2	0.6	0.8	0.9
Mekong River Delta	0.1	0.3	0.5	0.8

Industry	Estimated Treatment Cost (VND)	Volume of Wastewater (m3/Year)
Pulp production	77,214,500,000	110,000,000
Textile	4,250,000,000	25,000,000
Leather production	73,500,000,000	70,000,000
Chemical industry	51,900,000,000	300,000,000
Alcohol, wine and soft-drink production	20,425,000,000	19,000,000
Sugar production	5,430,000,000	30,000,000
Aquatic product processing	70,380,000,000	92,000,000
Milk production	25,687,500,000	250,000,000
Total	328,787,000,000	896,000,000

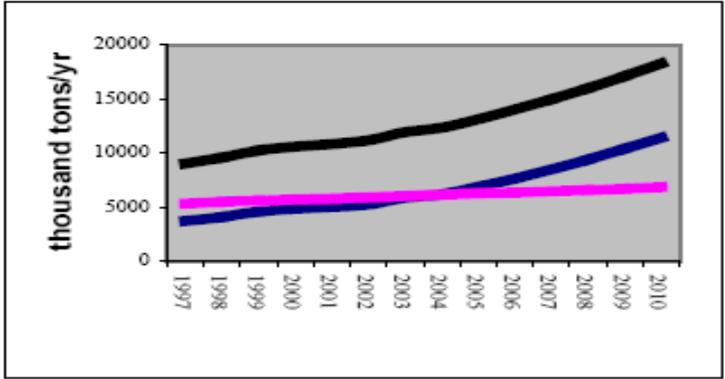
Source: Compiled from Reports of The Ministry of Industry, 2003



# MUNICIPAL SOLID WASTE GENERATION 2000 IN VIET NAM

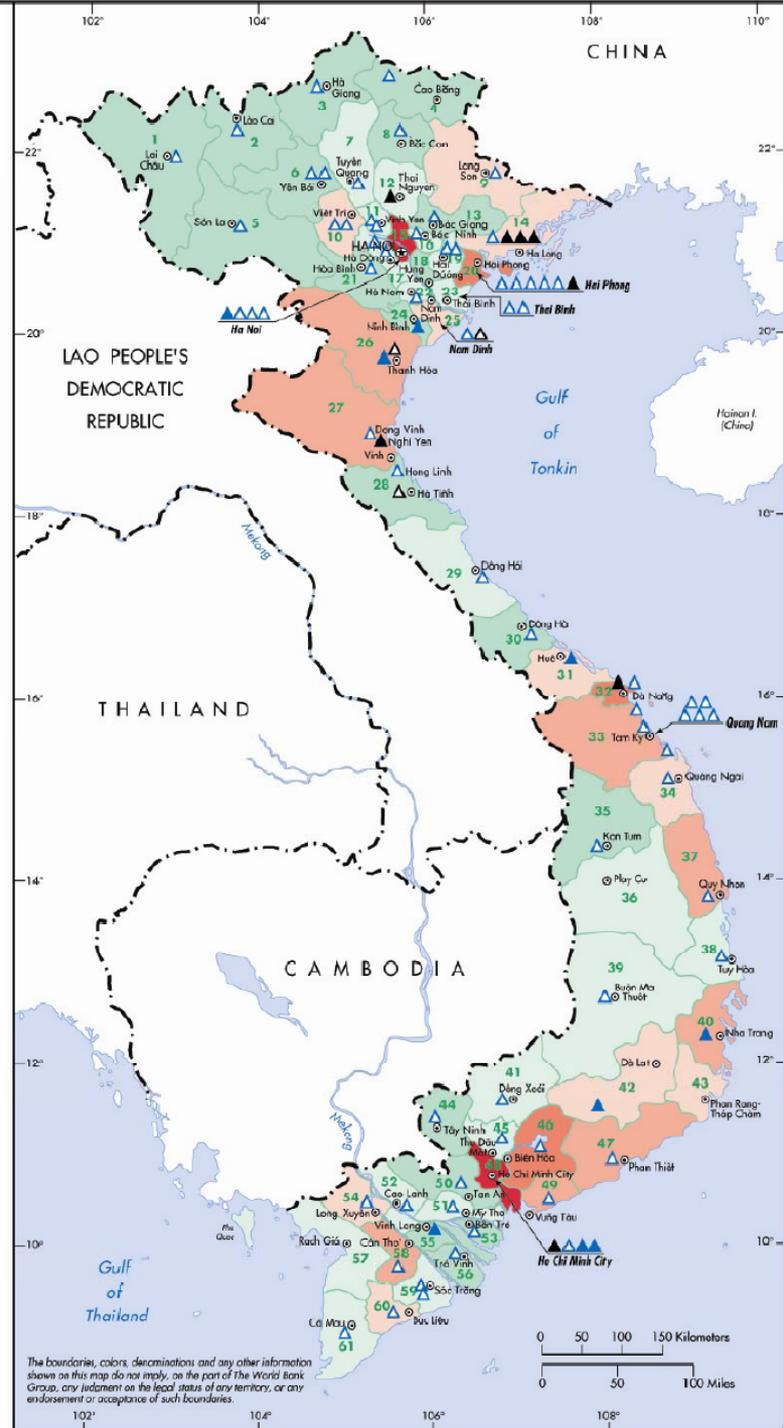


## Municipal Waste

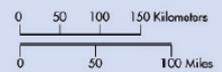


**2004:**  
12 millions tons  
(50 percent urban)

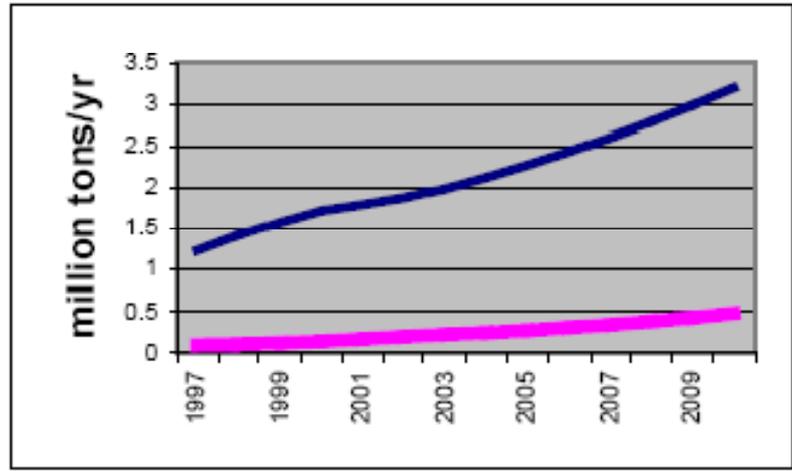
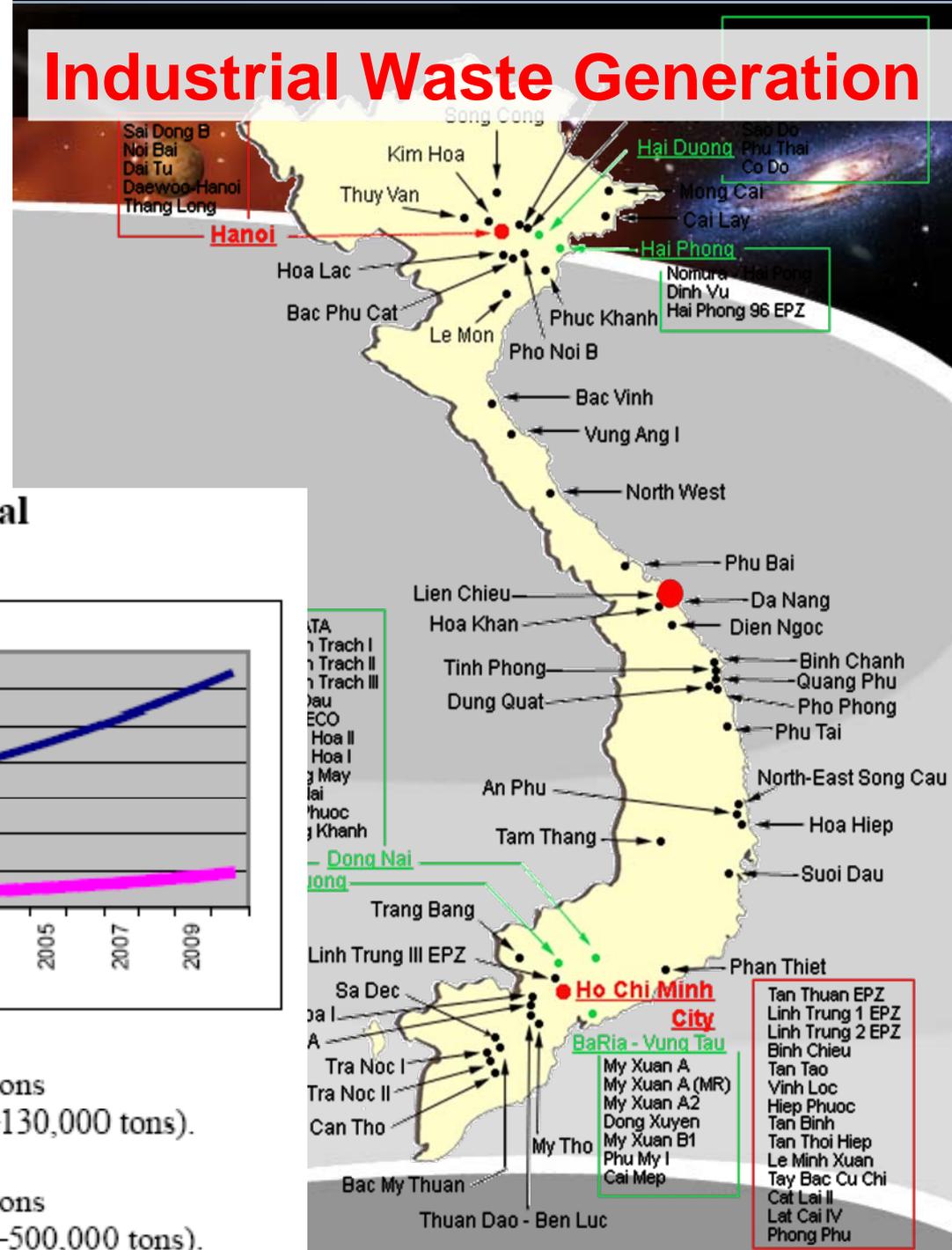
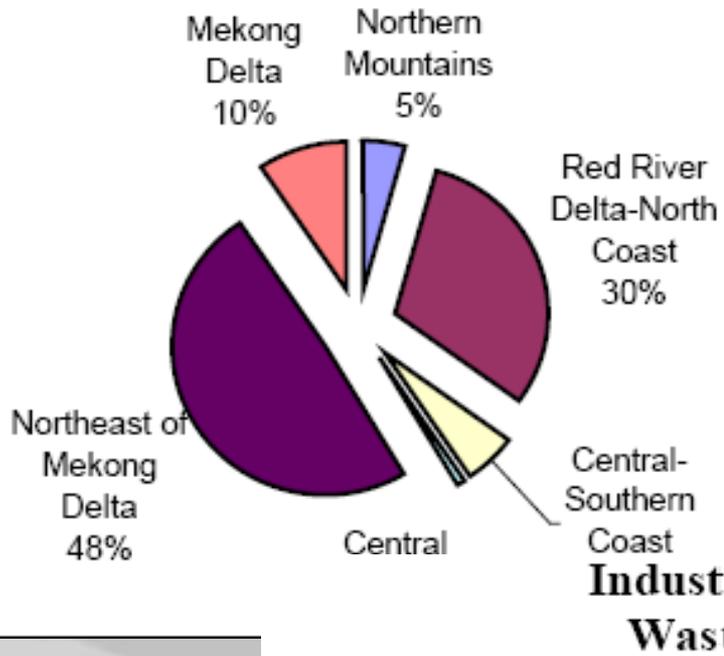
**2010:**  
20 million tons  
(63 percent urban)



The boundaries, colors, denominations and any other information shown on this map do not imply, on the part of The World Bank Group, any judgment on the legal status of any territory, or any endorsement or acceptance of such boundaries.



# Industrial Waste Generation



**2004:**  
2.2 million tons  
(6 percent hazardous—130,000 tons).

**2010:**  
3.2 million tons  
(15 percent hazardous—500,000 tons).

- Tan Thuan EPZ
- Linh Trung 1 EPZ
- Linh Trung 2 EPZ
- Binh Chieu
- Tan Tao
- Vinh Loc
- Hiep Phuoc
- Tan Binh
- Tan Thoi Hiep
- Le Minh Xuan
- Tay Bac Cu Chi
- Cat Lai II
- Lat Cai IV
- Phong Phu



# *GHG Inventory for the year 2000*

Ongoing activities in the National GHG Inventory for the year 2000 in Viet Nam under Viet Nam SNC to UNFCCC:

- ✓ A national inventory for CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, CO, NO<sub>x</sub>, NMVOC and SO<sub>2</sub> will be undertaken for the year 2000 in 5 source categories: energy, industrial processes, agriculture, land-use change and forestry and waste;
- ✓ Emissions of CH<sub>4</sub> and N<sub>2</sub>O from international bunkers and aviation will also be estimated for the year 2000;
- ✓ The activity data of hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF<sub>6</sub>) will also be collected for the same base year where available;
- ✓ New emission factors for specific activities will be applied;
- ✓ The database for CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, NO<sub>x</sub>, CO, NMVOC and SO<sub>2</sub> will be updated and improved. New inventory data for HFCs, PFCs, SF<sub>6</sub> (where available) for the year 2000 will be established and used as a basis for assessment and selection of mitigation options;
- ✓ The COP8 Guidelines will be used for reporting the National GHG Inventory;

# GHG Inventory Planning

Activities	June				July				August				Sept.			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1. Complete of data for GHG inventory: Energy, Industry process, Agriculture, LULUCF, Waste	Blue															
2. Survey, Calculate of EF for GHG Inventory in Agriculture, LULUCF, Energy and Waste	Yellow															
3. Data Test and Uncertainty Analysis					Orange		Orange	Orange								
4. The Emission and Silk Estimate of GHG based on IPCC Guideline 1996									Dark Red		Dark Red	Dark Red	Dark Red			
5. Reporting GHG Inventory in 2000 for 5 sectors													Cyan	Cyan	Cyan	
6. Completed Inventory and Report on GHG Inventory in 2000																Red



**Viet Nam: Preparation of Second National Communication under the  
UN Framework Convention on Climate Change (UNFCCC)**

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