



GUATEMALA
Ministry of
Environment and
Natural Resources

ETSAP ANNEX IX
TECHNICAL CONFERENCE

GUATEMALA:

CLIMATE CHANGE AND ENERGY SECTOR

Energy and Environment Planning

Carlos Mansilla
Taipei, April 2005

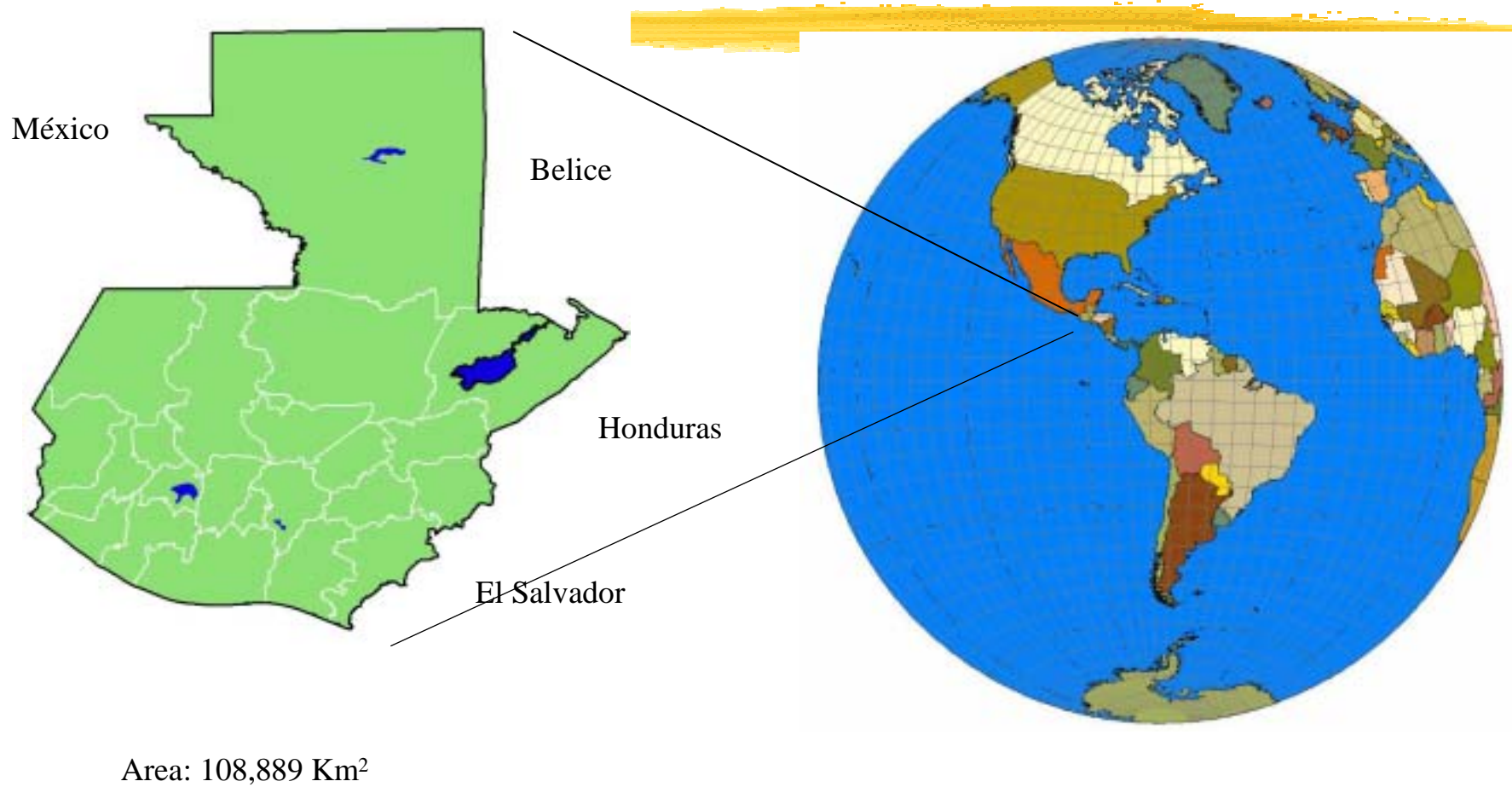
OVERVIEW

1. General Description
2. Climate Change Activities
3. Legal and institutional framework for CDM and Carbon Markets
4. Energy Sector Facts
5. GHG Inventory (1990)



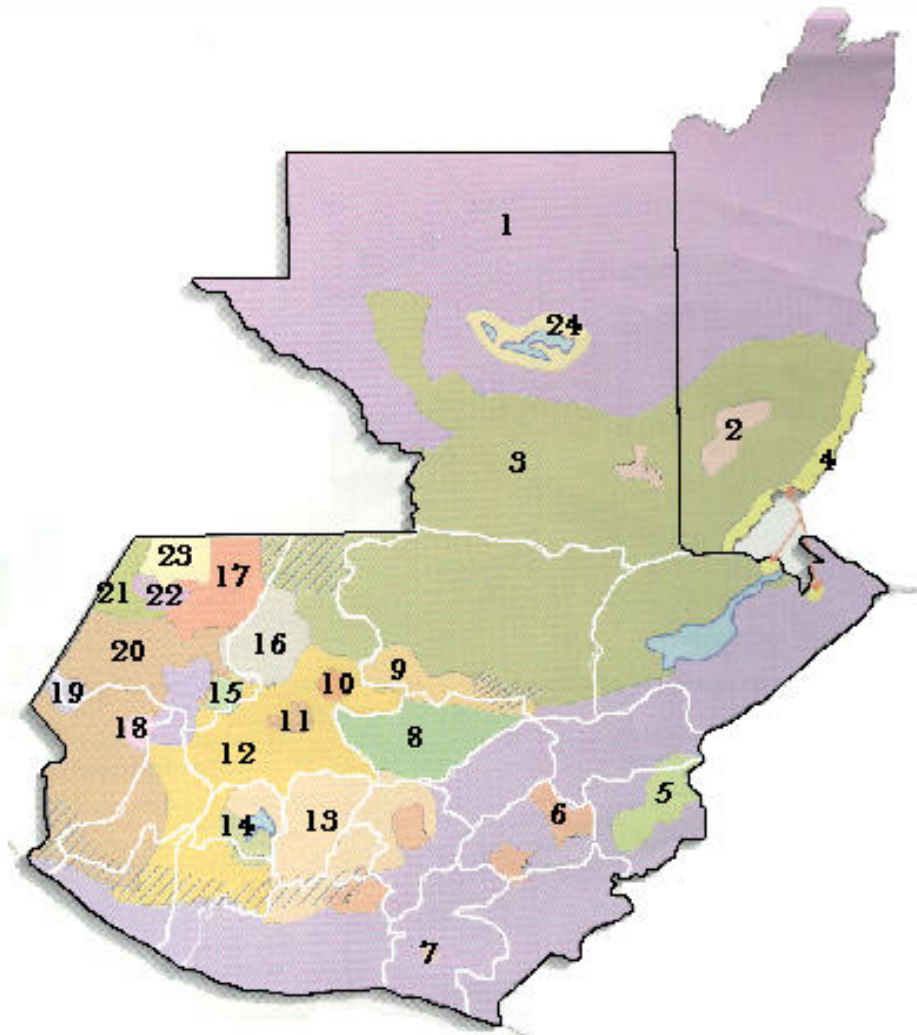
GENERAL DESCRIPTION

GEOGRAPHIC LOCALIZATION



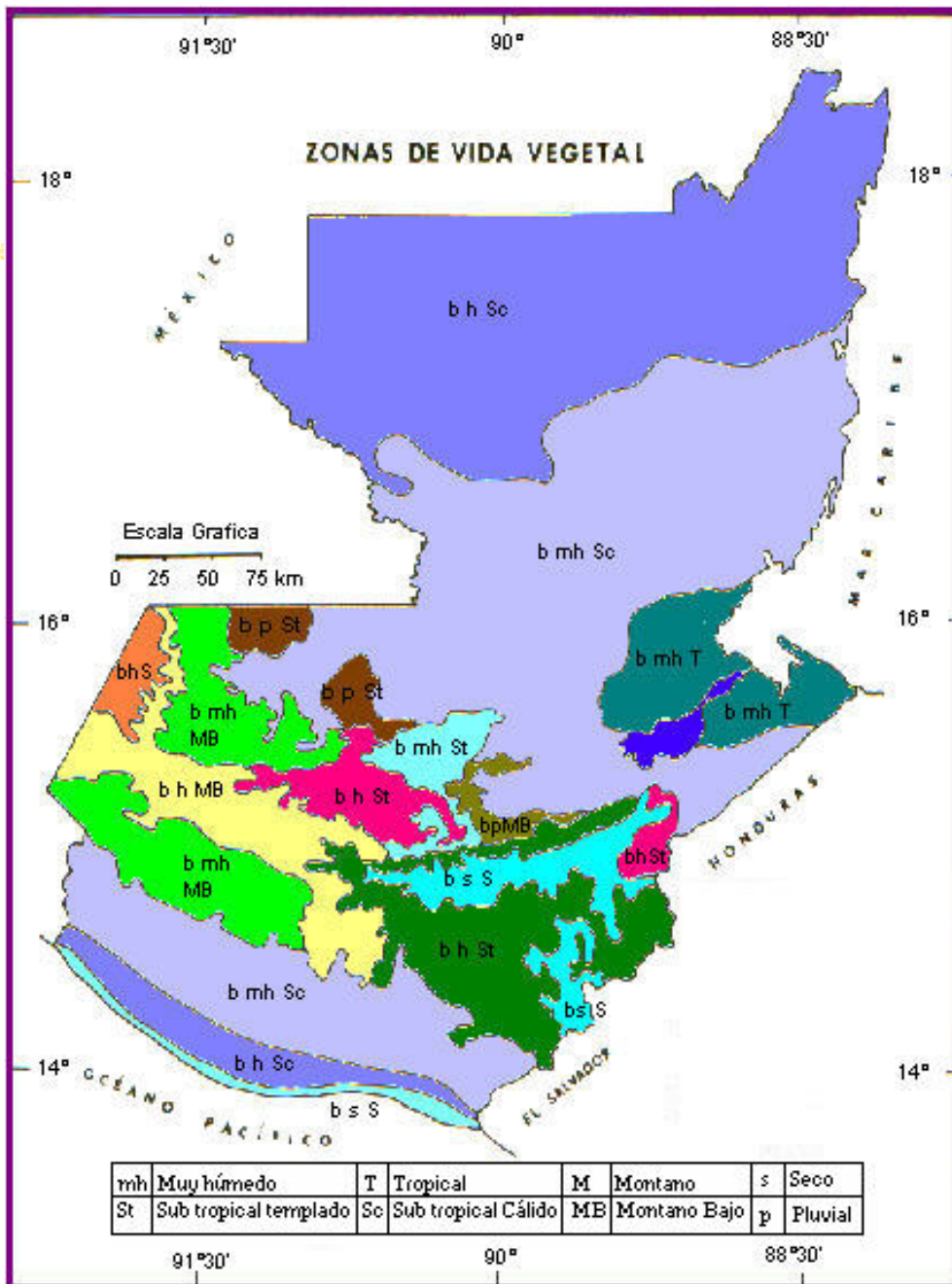
Population:	11 237 196 (estimated, 2002)
GDP (10⁶)	US\$ 24 672.9 millions (estimated, 2002)
GDP Growth	2.2 (2002)
Per capita Income	US\$ 2 195 (estimated, 2002)
GHG emissions per inhabitant	0.54 ton per capita (1996)
Ratification UNFCCC	March 28, 1995
National Communication	December 2001
Policy on Climate Change	Promotion of adaptation and mitigation activities
Ratification on Kyoto Protocol	July 9, 1999
Designated National Authority	Ministry of Environment (February 2005)
Promotional Entity for CDM Projects	Ministry of Environment and Natural Resources, Guatemalan Office of Joint Implementation,
Memorandum of Understanding	Guatemala- The Netherlands
Examples of CDM Projects	Hydroelectric power plant, reforestation
Contacts	Juan Mario Dary, Ministry (502-2423-0500)
Website	www.marn.gob.gt

LINGUISTIC DIVERSITY



- | | |
|----------------|----------------|
| 1 Castellano | 17 Q'anjob'al |
| 2 Mopan | 18 Sipakapense |
| 3 Q'eqchi | 19 Tektiteko |
| 4 Garifuna | 20 Mam |
| 5 Ch'orti' | 21 Poptil' |
| 6 Poqomam | 22 Akateko |
| 7 Xinka | 23 Chuj |
| 8 Achi' | 24 Itza' |
| 9 Poqomchi' | |
| 10 Uspanteko | |
| 11 Sakapulteko | |
| 12 K'iche' | |
| 13 Kaqchikel | |
| 14 Tz'utujil | |
| 15 Awakateko | |
| 16 Ixil | |

BIOLOGICAL DIVERSITY





CLIMATE CHANGE ACTIVITIES

CLIMATE CHANGE: ACTIVITIES DONE

1. Greenhouse gases inventory
 - 1.1 1990 base year
2. First National Communication on Climate Change (2001)
 - 2.1 Climate Change Scenarios (2100)
 - 2.2 Climate Change Impacts
 - Human Health
 - Basic Grain Production
 - Water Resources
 - Land coverture
 - 2.3 Identification of Mitigation Actions
 - Energy Sector
 - Forestry
3. Establish an Climate Change Office
4. Other Studies
 - 4.1 Emission Factor for a native forest
 - 4.2 Climate Variability (1960-2000)

CLIMATE CHANGE: ON GOING ACTIVITIES

1. National Adaptation Project on Climate Change
 - Regional Project
 - Focus in Droughts and Floods
2. Started GHG Inventory
 - 2000 as base year
 - Land Use Change and Forestry
 - Agricultural
3. Mitigation
 - Legal and Institutional framework
 - Energy and forestry projects for CDM and Carbon Market
4. Energy Policy with emphasis on Renewable and Environment



LEGAL AND INSTITUTIONAL FRAMEWORK

INSTITUTIONAL FRAMEWORK FOR CDM and Carbon Markets

- Government
 - Ministry of Environment and Natural Resources
 - Ministry of Energy and Mines
 - Ministry of Agricultural
 - National Forestry Institute
 - National Council on Protected Areas
- NGO´s
- Organized Private Sector
- Universities
- National Council on Variability and Climate Change
- CDM-Carbon Markets
 - National Office on Joint Implementation
 - National Designated Authority

LEGAL FRAMEWORK FOR CDM-CM

- National Designated Authority
- New Law Promoting Renewable Sources of Energy
- Power Law permits private electricity producer
- Wholesale market and Spot market for electricity
- Long term contracts for electricity
- Private supply of oil

PROJECTS APROVED AS JOINT IMPLEMENTATION



- **SIERRA DE LAS MINAS (SHE, forestry)**
- **MATANZAS (SHE)**
- **MARGARITAS (SHE)**
- **RIO HONDO (SHE)**
- **SAN JUAN LA LAGUNA (Forestry)**

ACTIVITIES IN THE PIPELINE AS CDM PROJECTS



- HE Las Vacas (15 MW) in operation
- HE El CANADA (54 MW) in operation
- HE CANDELARIA
- HE Rio Hondo

PROJECTS UNDER STUDY :



- Reforestation Projects
- Coffee plantations
- Municipal Solid Waste
- Landfill Projects
- Geothermal Projects



ENERGY SECTOR FACTS

Energy Sector Evolution-1

Primary Energy (Bep `000)	1990		2000		2000-1990 %
	BEP `000	%	BEP `000	%	
Primary Energy Supply	26491	100.0	39017	100.0	47.3%
Oil	4222	15.9	6659	17.1	57.7%
Mineral Carbon			1086	2.8	
Hydro energy	1330	5.0	1652	4.2	24.2%
Geothermal			126	0.3	
Fire wood	19048	71.9	23318	59.8	22.4%
Sugar cane baggaze	1873	7.1	6041	15.5	222.5%
Other	18	0.1	135	0.3	

Energy Sector Evolution-2

Secondary Energy Bep `000	1990		2000		2000-1990 %
	BEP `000	%	BEP `000	%	
Total Secondary Energy Supply	10647	100.0	24629	100.0	115.9%
Electricity	1444	13.6	3311	13.4	129.3%
GLP	784	7.4	1652	6.7	110.7%
Gasoline Motor	2381	22.4	5714	23.2	140.0%
Kerosene and Turbo jet	556	5.2	725	2.9	30.4%
Diesel Oil	3727	35.0	7470	30.3	100.4%
Fuel Oil	1229	11.5	5341	21.7	334.6%
Vegetal carbon	143	1.3	143	0.6	0.0%
Others	383	3.6	179	0.7	-53.3%
Total Energy Supply	32235		53595	100.0	66.3%

Energy Sector Evolution-3

Energy Consumption bep ` 000	1990		2000		2000-1990
	BEP ` 000	%	BEP ` 000	%	%
Final Consumption	30630		46208	86.2	50.9%
Energy Sectoral consumption	29897	100.0	44653	100.0	49.4%
Transportation	5290	17.7	10911	24.4	106.3%
Industrial	3517	11.8	6363	14.2	80.9%
Residential	20049	67.1	25332	56.7	26.4%
Commercial, public, Services	828	2.8	1415	3.2	70.9%
Agro and fishing	197	0.7	366	0.8	85.8%
Construction and others	15	0.1	265	0.6	
Non Energetic consumption	733		1555		

Framework for the Power Sector

⌘ Electricity Law

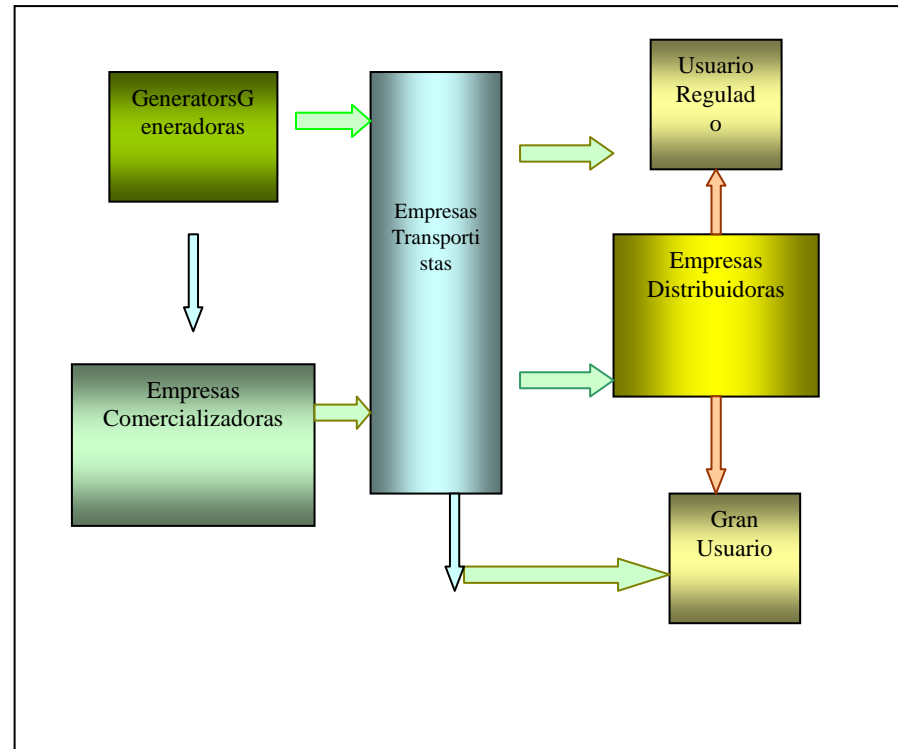
National Electricity Commission

Whole Sale Market Authority

Private and Government Generation
Transmission

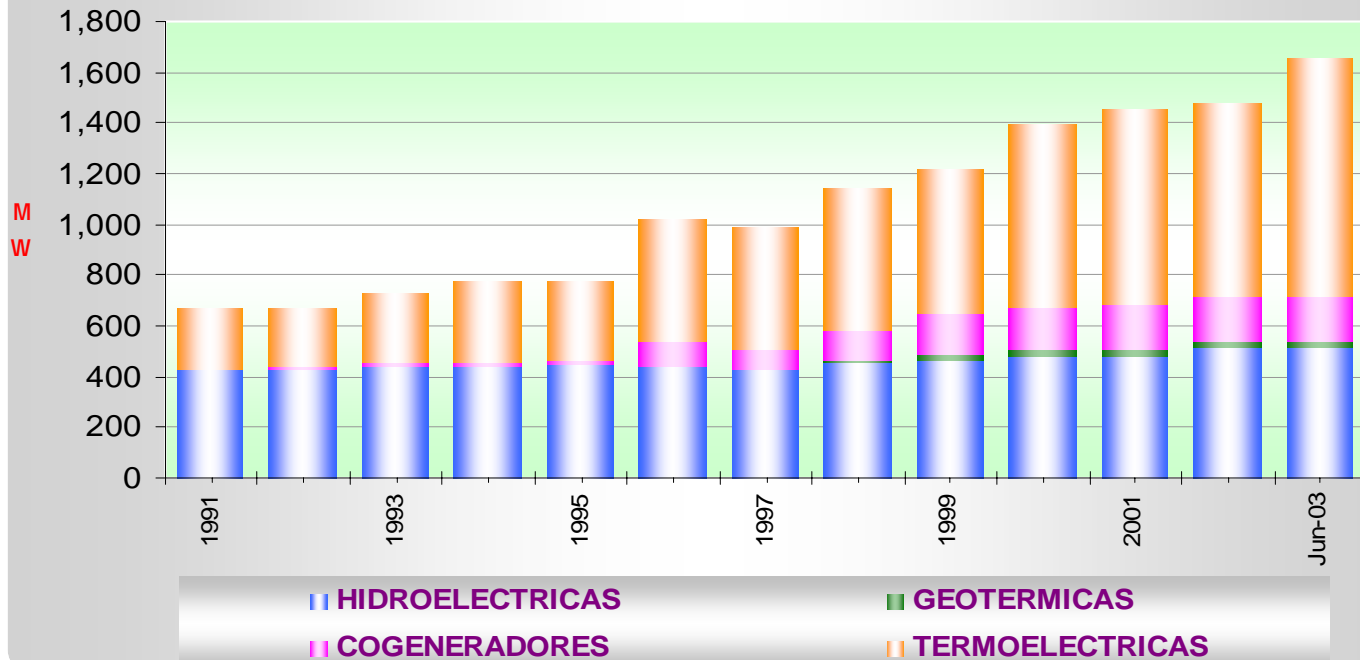
Private Distribution

Whole Sale Energy Market
Spot Market



Power Sector-1

SISTEMA NACIONAL INTERCONECTADO Capacidad Firme Declarada





Power Sector-2



GHG INVENTORY FOR 1990

GHG EMISSIONS 1990

(Gigagramos-10³ ton)

	CARBON DIOXIDE	METHANE	NITROUS OXIDE	CARBON MONOXIDE	OXIDES OF NITROGEN	NON METHANE VOLATIL ORGANIC COMPOUND	SULPHUR DIOXIDE
	CO ₂	CH ₄	N ₂ O	CO	NO _x	NM _{VOC}	SO ₂
ENERGY	3700.402	34.401	0.520	725.726	36.905	91.743	74.235
INDUSTRIAL PROCESS	544.664					14.206	0.263
AGRICULTURE		129.872	19.691	193.085	5.670		
CHANGE AND FORESTRY	3244.553	4.896	0.034	42.844	1.217		
WASTE		30.387	0.464				
TOTAL	7,489.619	199.556	20.709	961.655	43.792	105.949	74.498

UPTAKE **-42,903.73**

BALANCE **-35,414.108**