

**10<sup>th</sup> Annual Global Conference on Environmental Taxation  
Lisbon 2009**

**ARPA Emilia-Romagna and University of Bologna**



**RAMEA, a shared environmental accounting tool to control  
and monitor regional environmental taxes**

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# Beyond economic indicators



UE Conference “*BEYOND GDP*”



OECD “Global Project on Measuring Progress of Societies”

Paris, 2007



FRANCE “Measuring economic performance and social progress”

Established in 2008 by the French President N. Sarkozy and chaired by Prof. J.E. **Stiglitz** and Prof. A. **Sen**



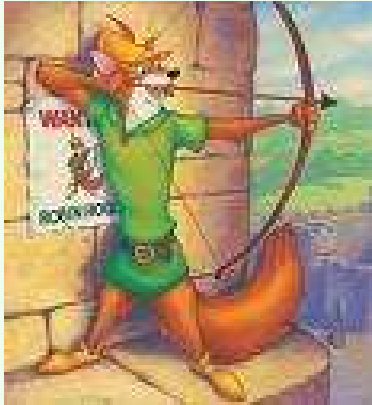
Eurostat - Statistical Programme Committee “Revised European Strategy for Environmental Accounting” Luxembourg, 2008

➤ **NAMEA** (**N**ational **A**ccounting **m**atrix **i**ncluding **E**nvironmental **A**ccounts) and environmentally related transactions such as **eco-taxes**



EC COMMUNICATION: “GDP and beyond. Measuring progress in a changing world”

# Our goal



Our goal is to move toward a sustainable economy, by investigating the **use of ecotaxes coordinated with RAMEA** in order **to improve policy makers' knowledge**

by integrating **RAMEA air-emissions**  
(*Regional Accounting matrix including Environmental Accounts for Emilia-Romagna*)  
with **ecotaxes**, so emphasizing the role of RAMEA as a tool to look into the regional structure



The study has been carried out thanks to the cooperation between **Arpa Emilia-Romagna** and **University of Bologna**, with the support of *Italian Ministry of Economics* and *Istat* (Italian Statistics Office)

# What is RAMEA?






**It is a regional development of NAMEA:**

Regional Accounting Matrix including Environmental Accounts



## Pillars:



-  coherency with NAMEA tools
-  internationally standardized systems
-  official statistics data



ALMA MATER STUDIORUM  
UNIVERSITÀ DI BOLOGNA



**Research partnership in Emilia-Romagna**

PhD

# Overview of Emilia-Romagna region (Italy)

- **Economy and Society**

- 4 205 400 inhabitants, 22 117 km<sup>2</sup>, 193.7 inhab/km<sup>2</sup>
- GDP 128.1% (EU-27=100%), the 3rd richest region in Italy
- Unemployment rate 3.2%
- Key sectors: Agriculture and Food Industry, Mechanical and Automotive, Ceramic, Tourism

- **Environment: urgent questions**

- GHG emissions
- PM and NO<sub>x</sub> emissions, Ozone
- Water scarcity (summer)
- Hydrogeological risk and coastal erosion
- Subsidence
- Urban sprawl



# RAMEA simplified scheme

	RAM (Regional Accounts)				EA (Environmental Accounts)			
Industry Classification (NACE 1.1)	Input-Output table (EUR)	Output (EUR)	Value Added (EUR)	Employment (ftes)	Air emissions of industries (tons)	Energy, water consumption of industries	Waste generation of industries	Env. taxes of Industries (EUR)
Household (COICOP)	Household consumption (transport, heating) (EUR)				H/hold air emissions (tons)	Household energy, water consumption	Household waste generation	H/hold env. taxes (EUR)

**RAMEA in EMILIA-ROMAGNA (adapted from Eurostat Guideline)**

**Unavailable indicators:** gray boxes

**Years of reference:** Input-Output table 1995-2000, Output 1995-2000

**Value Added** 1995-2000-**2005**; **Employment** 2000-**2005**

**Household consumption** 1995-2000-**2005**

**Air emissions** 1995-2000-**2005**; **Environmental taxes** **2005** 6

# RAMEA air emissions

## Emilia-Romagna (2005, %)

### Environmental accounts (air emissions)

### Economic activities

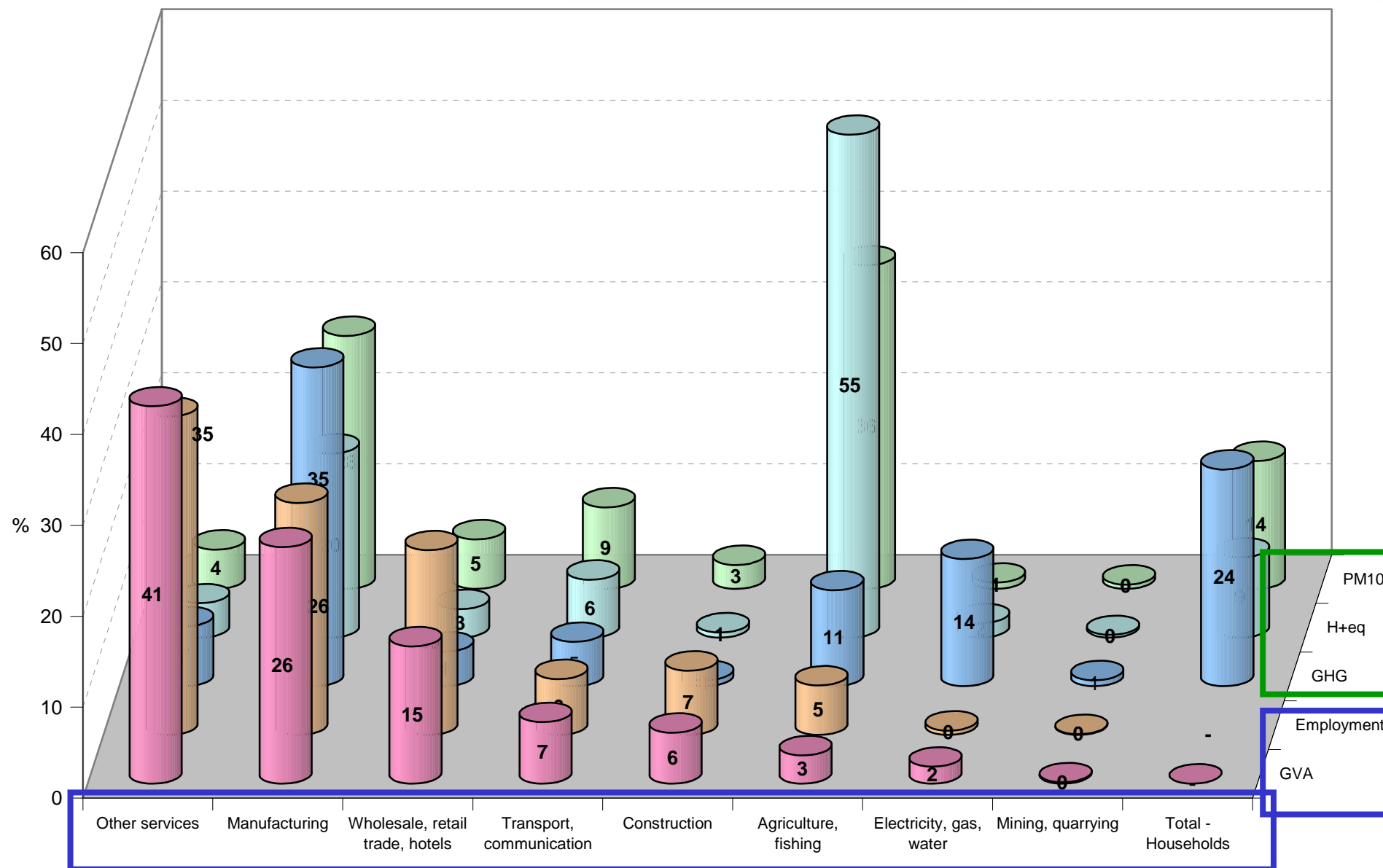
### Regional accounts

EMILIA-ROMAGNA 2005		Value Added - basic prices	Final Consumpt.	Employment	Global Warming	Acidification	PM10	NMVOC	CO
NACE/ COICOP	Economic activities/Household consumption (%)								
A	Agriculture, hunting and forestry	3,0		5,2	10,4	55,0	35,1	3,2	10,2
B	Fishing	0,1		0,2	0,1	0,3	0,5	0,1	0,1
C	Mining and quarrying	0,1		0,1	0,7	0,3	0,5	0,4	0,1
D	Manufactures activities	26,0		25,5	35,1	20,2	27,8	31,6	5,6
E	Electricity, gas and water supply	1,9		0,5	14,0	1,6	0,7	4,7	0,8
F	Construction	5,6		7,1	0,7	0,6	2,6	7,2	0,4
G	Wholesale and retail trade	11,6		14,0	3,3	2,7	4,9	3,2	1,5
H	Hotels and restaurants	3,5		6,3	0,6	0,4	0,6	0,1	0,2
I	Transport, storage and communication	6,8		6,1	4,9	6,4	9,0	2,2	3,7
J	Financial intermediation	4,9		2,4	0,2	0,2	0,2	0,1	0,1
K	Business activities, R&D and IT	20,8		11,1	1,2	1,1	1,9	0,4	0,6
L	Public administration	3,8		3,7	0,5	0,6	0,9	0,3	2,0
M	Education	3,3		4,5	0,1	0,1	0,1	0,0	0,0
N	Health and social work	5,4		6,1	0,7	0,2	0,2	0,1	0,1
O	Other community, social and personal service activities	2,5		4,3	3,8	1,7	1,0	3,0	0,2
P	Domestic services	0,9		2,8	-	-	-	-	-
	Economic activities - Total	100,0		100,0	76,2	91,2	85,9	56,5	25,7
CP02	Household - Transport		13,8		8,4	5,6	7,8	27,6	64,5
CP04	Household - Heating		18,6		15,3	3,2	6,3	2,3	9,8
other	Household - Other		67,6		0,1	-	-	13,5	-
	Household consumption - Total		100,0		23,8	8,8	14,1	43,5	74,3
	Total (Economic activities + Household)	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0

### Household consumption

Data Source: Istat (Italian Statistics Office) and Ispra (National Environment Agency)

# Key sectors and "hot spots" (2005, %)



**Economic activities + Household**



# Regional ecotaxes

In Italy **3** kinds of environmental taxes are available at the national level following **NACE classification** (split up into economic activities and household consumptions):



**Energy taxes**  
including the CO<sub>2</sub>  
taxes (the most  
relevant)



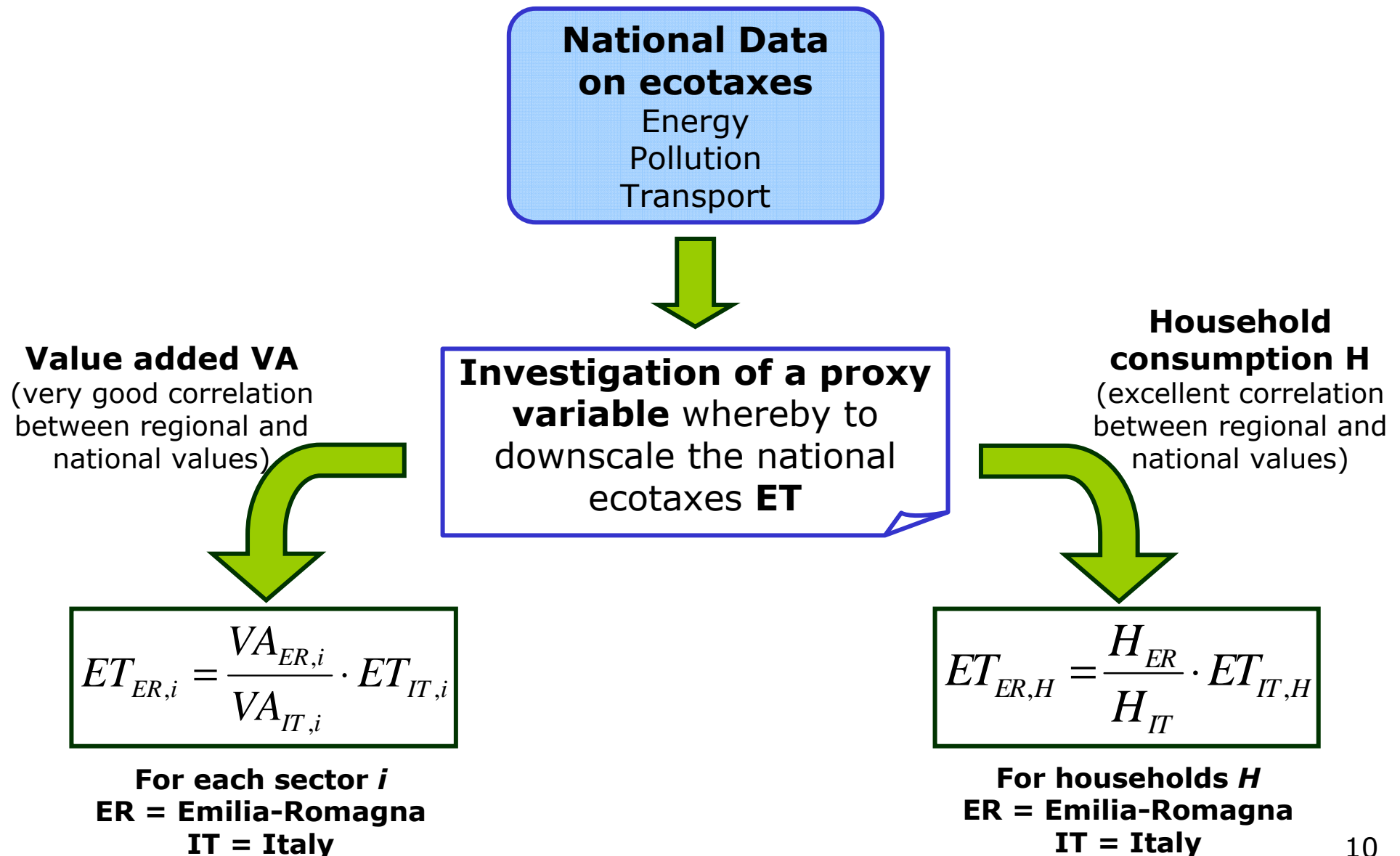
**Pollution taxes**  
including taxes on  
estimated emissions  
to air, water and  
solid waste



**Transport taxes**  
dealing with taxes  
related to vehicles  
trade (sails and  
insurances)

Regional data are not available yet

# How to estimate regional ecotaxes (2005)?



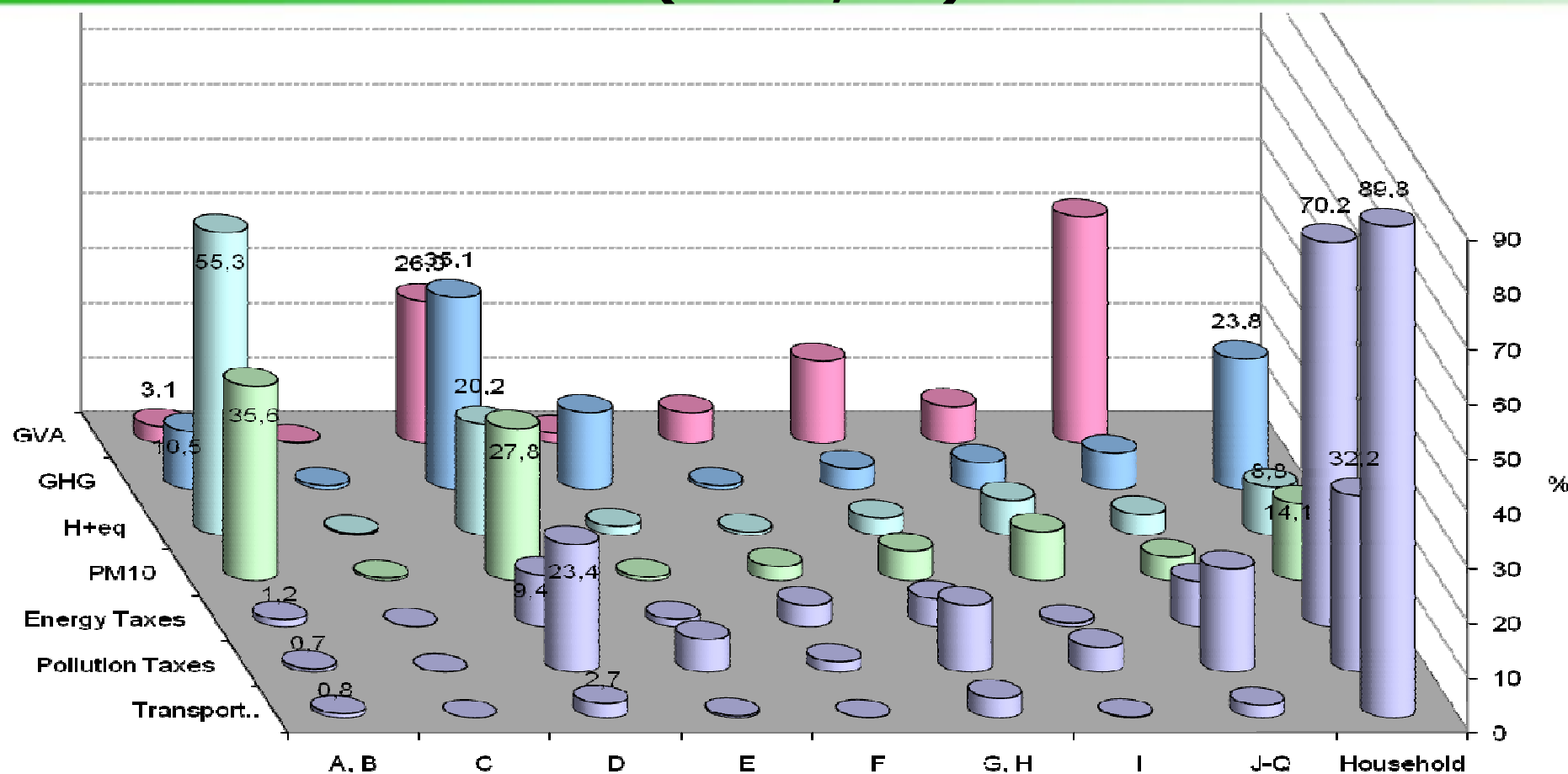
# RAMEA & ecotaxes (2005, MLN €)

## Ecotaxes

		Value Added - basic prices	Final Consumpt.	Employment	Global Warming	Acidification	PM10	NM VOC	CO	Energy taxes	Pollution taxes	Transport taxes
NACE/COICOP	Economic activities/Household consumption	MEUR	MEUR	fte	M tonn CO2eq	tonn H+eq	tonn	tonn	tonn	MEUR	MEUR	MEUR
A	Agriculture, hunting and forestry	2.954,2		109,4	5.259,6	3.204,0	4.873,5	2.911,7	22.932,0	57,6	0,3	8,6
B	Fishing	51,9		3,9	51,1	15,0	72,6	107,7	238,3	3,2	0,0	0,2
C	Mining and quarrying	145,6		1,6	335,6	16,2	66,5	356,7	117,2	2,9	0,0	0,2
D	Manufactures activities	25.245,3		531,9	17.652,2	1.178,4	3.868,0	29.126,4	12.601,4	461,1	12,0	28,8
E	Electricity, gas and water supply	1.799,5		9,9	7.039,4	91,8	96,1	4.299,9	1.875,0	64,0	3,1	4,3
F	Construction	5.434,4		147,1	330,5	32,3	366,7	6.649,5	852,0	191,5	1,0	0,8
G	Wholesale and retail trade	11.226,8		291,7	1.637,3	158,5	678,0	2.920,1	3.363,5	62,6	4,9	13,7
H	Hotels and restaurants	3.424,8		131,5	280,9	23,7	77,7	126,1	516,3	184,8	1,4	25,9
I	Transport, storage and communication	6.561,6		128,0	2.452,7	369,9	1.244,9	2.044,7	8.309,6	32,5	2,3	2,3
J	Financial intermediation	4.755,9		51,0	100,4	8,8	34,3	52,8	189,9	239,9	1,5	8,0
K	Business activities, R&D and IT	20.177,0		231,6	626,9	63,0	258,8	384,9	1.381,4	12,0	1,9	1,6
L	Public administration	3.676,7		77,5	248,2	32,9	131,7	268,8	4.514,5	76,6	1,5	9,7
M	Education	3.185,2		93,5	75,1	4,3	8,6	16,4	76,2	20,0	0,0	1,4
N	Health and social work	5.221,9		128,1	333,1	14,3	30,9	63,9	285,7	7,9	0,9	0,6
O	Other community, social and personal service activities	2.420,5		90,2	1.935,2	96,4	135,6	2.724,0	549,5	23,6	4,0	2,6
P	Domestic services	844,2		57,7	-	-	-	-	-	23,3	-	2,7
	<b>Economic activities - Total</b>	<b>97.174,3</b>		<b>2.084,6</b>	<b>38.358,2</b>	<b>5.309,4</b>	<b>11.943,9</b>	<b>52.053,6</b>	<b>57.802,4</b>	<b>1.463,6</b>	<b>34,7</b>	<b>110,7</b>
CP07	Household - Transport		8.806,9		4.248,7	324,8	1.079,3	25.424,5	145.243,0	-	-	-
CP04	Household - Heating		11.822,0		7.706,5	188,3	877,9	2.130,6	22.129,0	-	-	-
other	Household - Other		42.967,4		45,7	-	-	12.457,7	-	-	-	-
	<b>Household consumption - Total</b>		<b>63.598,8</b>		<b>12.000,9</b>	<b>513,0</b>	<b>1.957,1</b>	<b>40.012,8</b>	<b>167.372,0</b>	<b>3.453,8</b>	<b>16,5</b>	<b>973,9</b>
	<b>Total (Economic activities + Household)</b>	<b>97.174,3</b>	<b>63.598,8</b>	<b>2.084,6</b>	<b>50.359,1</b>	<b>5.822,4</b>	<b>13.901,0</b>	<b>92.066,4</b>	<b>225.174,4</b>	<b>4.917,4</b>	<b>51,1</b>	<b>1.084,6</b>

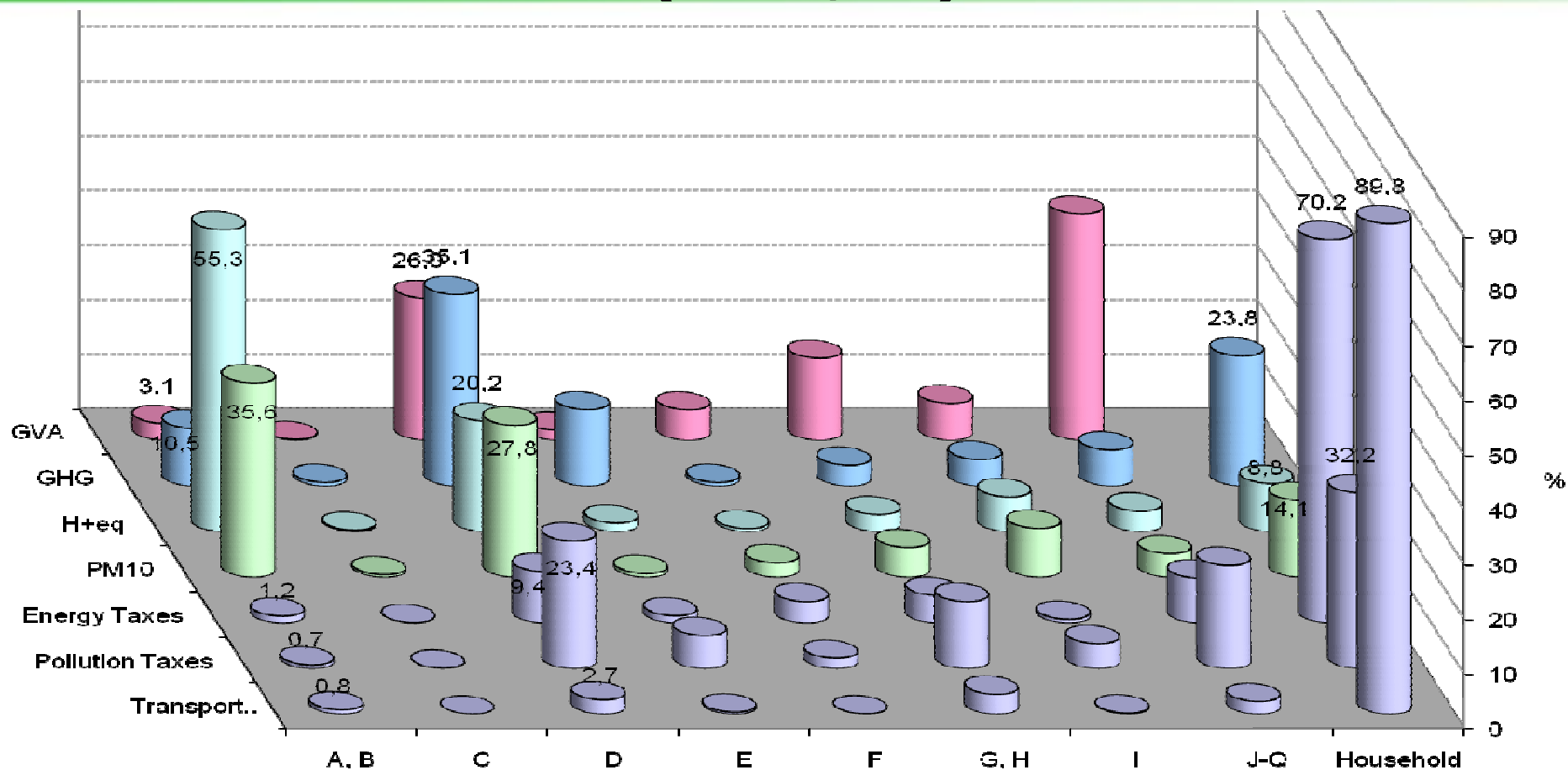
Data Source: Istat, Ispra and personal estimates from national data

# Key sectors, hot spots and related ecotaxes (2005, %)



1. Manufactures (D): a discrete amount of polluting emissions (mainly GHGs) despite a non adequate environmental taxes level.

# Key sectors, hot spots and related ecotaxes (2005, %)



2. Agriculture and Fishing (A,B): a non adequate level of ecotaxes correspond to high level of PM10 emissions and acidifying pollutants

# Shifting taxation from labour to polluting activities



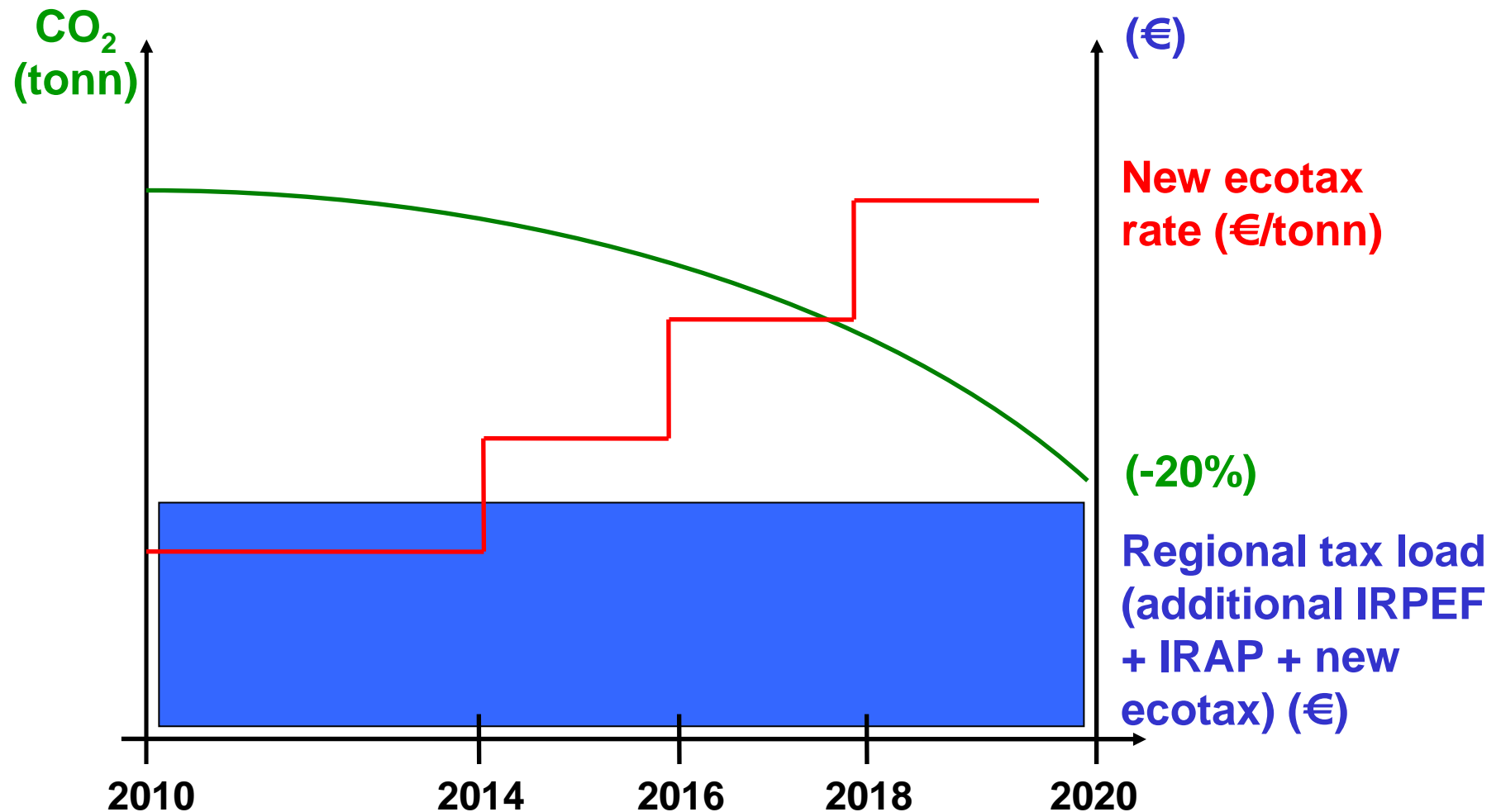
The study has been expanded to include a **new ecotax** as a compensative measure (changing the tax base) derived from the simultaneous reduction of income taxes, in order to link the new tax to natural resource use (CO<sub>2</sub>eq), leaving the regional tax load and the competition unaffected.

This intensifies the positive repercussion on **equity** (increase of occupation) and on **efficiency** (improvement of resources allocation, reducing market distortions)

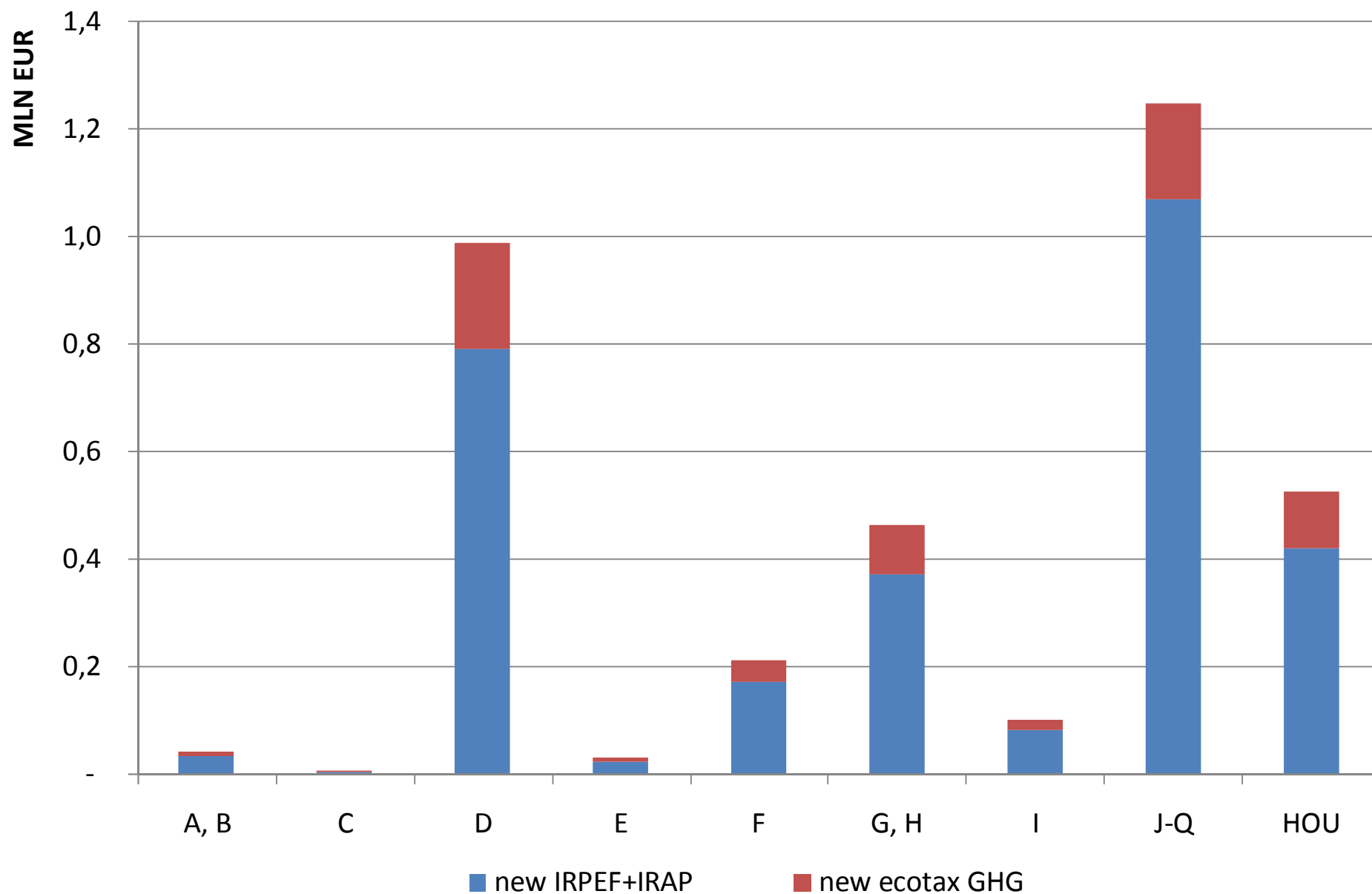
*"Ecological Tax Reform can help us to realign a European economy that is still characterised by an **insufficient use of labour resources** and an **excessive use of natural resources**."*

*Prof. Jacqueline McGlade  
Executive Director of the European Environment Agency<sup>14</sup>*

# New environmental tax on GHGs: the progressive rate



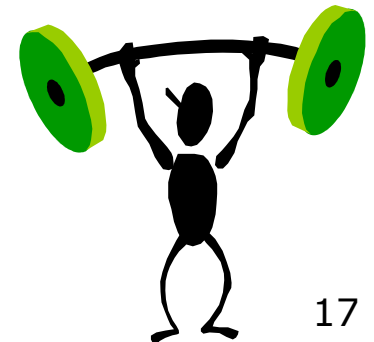
# The new composition of the regional tax load





# RAMEA & ecotaxes: strengths

- environmental accounting system (linked and reliable indicators) strictly related to ecotaxes, following official classification
- it pursues the strengths of the basic RAMEA: to monitor regional environmental economic performances and provide detailed databases
- taxes alone are not an effective economic tool yet. So this composite tool aims to clarify the ecotaxes, by enhancing eco-behaviour change and monitoring the effects of a green fiscal policy (new ecotax)
- through the internalisation of the externalities, the ecotaxes charge the use of natural resources to the beneficiary consumers (increasing the equity level in the society) and reduce the markets distortion (improving the efficiency of the economic system)



# RAMEA & ecotaxes: weaknesses

- These regional ecotaxes are only an estimate and further research is needed
- It was not possible to break down the total regional ecotaxes because we couldn't isolate ecotaxes related to air emissions considered in RAMEA
- Lacking definite national guidelines and strong involvement in environmental accounting
- Need of cooperation among national institutions for available updated data



# Opportunities in supporting regional policies

## RAMEA & ecotaxes as:

- a ***monitoring*** system:

to identify the “**hot spots**” in terms of environmental pressures by using this knowledge on the regional econ.-env. performances provided by RAMEA and enforcing the role of ecotaxes in promoting sustainable behaviour

to control the effects of a green fiscal policy (e.g. new ecotax) on the economic system (VA and employment) and air quality consumption (CO<sub>2</sub>)

- a ***forecasting*** tool to evaluate the effects of the policies and to plan combined uses of ecotaxes in order to achieve a more efficient tax policy, starting from the databases provided by RAMEA

## RAMEA & ecotaxes as:

- an ***evaluation tool*** that, together with input-output matrixes, bottom up analysis,.. can help the assessment of fiscal policy effects on the regional system (econ.-env.) and the identification of what are the most eco-efficient sectors
- an ***enforcing tool*** that strengthens the feature of ecotaxes in creating incentives in order to move away from environmentally damaging behaviours; thanks to RAMEA ecotaxes can be applied in a clear way, considering also sector econ.-env. performances and so aiming, in the long term, to make sure the polluter pays

**Thank you for your attention!**

[www.ramea.eu](http://www.ramea.eu)

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