From Low Carbon Legislation to Implementation

Measuring Green House Gas Emissions and Energy Consumption: Methodological approaches

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LOCSEE
Low Carbon South East Europe

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I GREEN HOUSE GAS EMISSIONS: MEASURING/RETRIEVING, TAXING, TRADING & STORING

This first part is linked to the personal experience of the author:
-as member of the Belgian Delegation to the UN Climate Conference of Kyoto (COP 3 1997) he was confronted with the geopolitics of climate
-as EU evaluator for the "Green European Capital Award" (4) for 2012 and 2013, he was confronted with the discrepancy of methods used by candidate cities to estimate GHG.
The results ranged from 3.000 to 10.000 tons/year per inhabitant, raising methodological questions.

(4) The European Green Capital Award is the result of an initiative taken by 15 European cities and was launched by the European Commission in 2008.

1.1. GEOPOLITICS OF GHG EFFECTS ON CLIMATE

Emissions reductions international agreements require harmonising political PERCEPTIONS of short-term and long-term INTERESTS by the main countries concerned:

- Some countries see themselves as global warming winners (Canada, Russia, Nordic countries)
- Some countries have large coal reserves, mainly China and India and do not wish to be corseted in their use of them.
- Some countries have large oil and gas reserves and shale gas potential, mainly the US (to be used both for domestic consumption and as potential export).
- Countries with fast demographic growth want to be able to use all supplies available.

Emerging countries with cheap labour are EXPORTING goods producing high emissions levels to old industry countries that produce fewer emissions because of lower industrial activity and more constraints. Their carbon consumption of emission producing imports replaces their own carbon emissions.

The Kyoto Protocol (1) and its implementation by the EU have reinforced this trend, setting emission reduction targets to old industrial countries but failing to set emission reduction targets for fast growing emerging countries.

(1) Kyoto Protocol (Framework Convention on Climate Change).

1.2. MEASURING

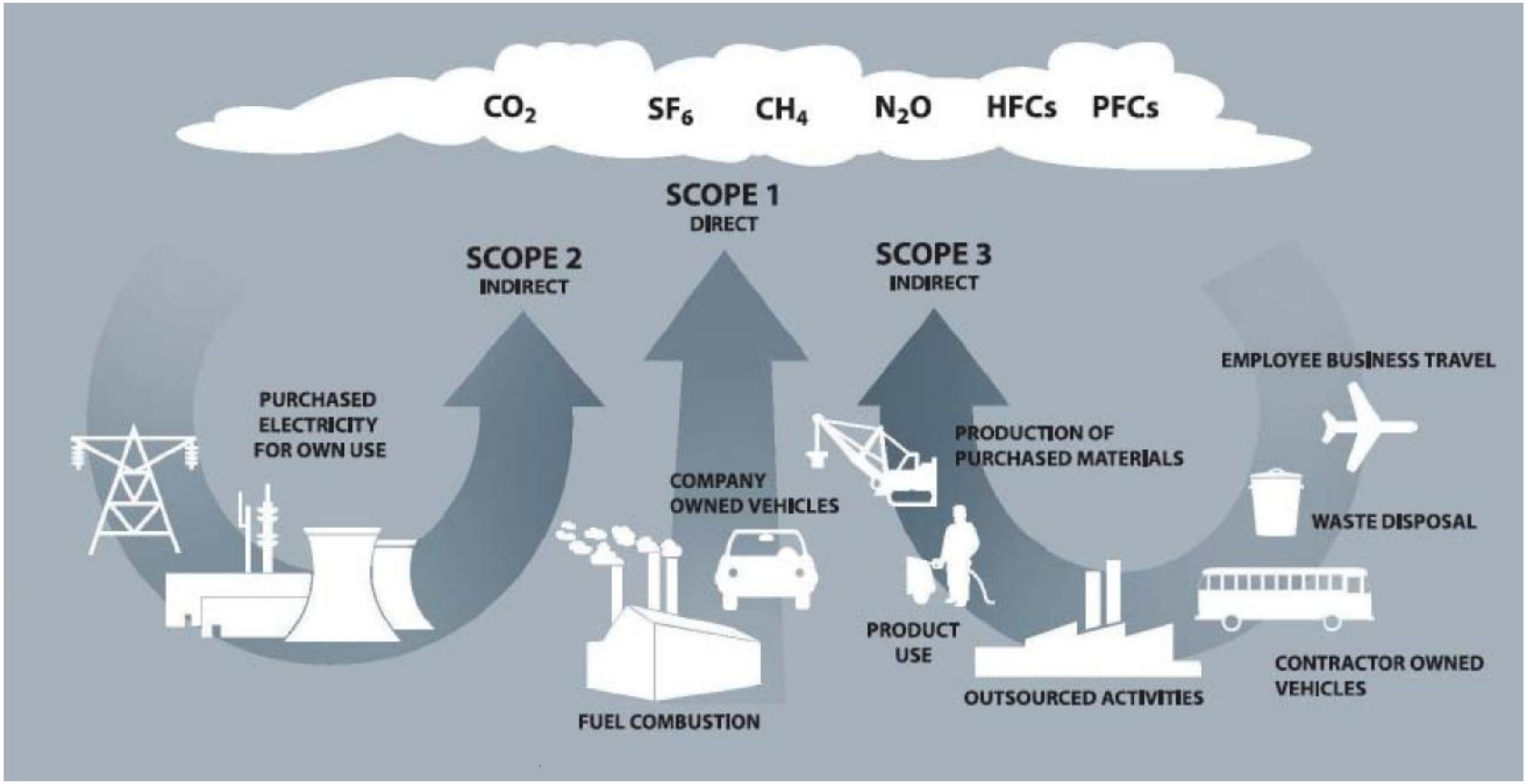
The discrepancies in ways of measuring GHG have been addressed by the literature, in particular by a Report for the College of Europe (Bader 2009), and by a study of Peter Marcotullio to be published (Marcotullio 2015).

Measuring and accounting of GHG, for a given territory, along a generally agreed method (as is the case with GNP) has proven elusive according to that study.

(2) GHG Study Report 2009, Bader N. and Bleidschwitz R., College of Europe and Institut Veolia Environment.

1.2.1. The College of Europe study (Bader 2009)

Identifying variables (gases measured, boundaries, scope, origin, sector of activity,etc.)



Analytic Tools (regrouped according to main specialised institutions)

CO2 Grobbilanz/EMSIG (Climate Alliance Austria, Energy Agency of the Regions)

ECO2Region (Climate Alliance, Ecospeed)

GRIP (Tyndall Centre, UK Environment Agency)

Bilan Carbone (ADEME)

CO2 Calculator (Danish National Environmental Research Institute, Local Government Denmark, COWI consultants)

Project 2 Degrees (ICLEI, Clinton Climate Initiative, Microsoft)

Sample results (1) - What is measured?

Different GHG's are measured:

– The six GHG of the Kyoto Protocol
– Carbon dioxide (CO2), methane and nitrous oxide only
– Carbon dioxide only

	Carbon dioxide	Methane	Nitrous oxide	Sulphur Hexafluoride	Hydrofluoro-carbons	Perfluoro-carbons	Other GHG
CO2 Grobbilanz	X	X	X				
Eco2-Region	X	(X)	(X)	(X)	(X)	(X)	
GRIP	X	X	X	X	X	X	
Bilan Carbone	X	X	X	X	X	X	X
CO2 Calculator	X	X	X				
Project 2 Degrees	X	X	X	X	X	X	

Sample results (2) - What is measured?

Different scopes of measurement:
These differences are best illustrated by the allocation of electricity emissions by point of use or by point of generation

	Point of use	Point of generation
CO2 Grobbilanz	X	
ECO2-Region	(X)	(X)
GRIP	X	
Bilan Carbone	X	X
CO2 Calculator		X
Project 2 Degrees	X	X

Sample results (3) - How are GHG measured?

Different Global Warming Potential (GWP) values are used for measuring: either the second, third or fourth IPCC (3) Assessment Reports are used

(3) Intergovernmental Panel on Climate Change

	Second Assessment Report (1995)	Third Assessment Report (2001)	Fourth Assessment Report (2007)
CO2 Grobbilanz		X	
Eco2-Region	X		
GRIP	X		
Bilan Carbone		X	
CO2 Calculator		X	
Project 2 Degrees	X	(X)	(X)

Results (4) - Lack of a common reporting standard

- Different reporting standards are used but no standard is commonly accepted.

- The standards are all based on IPCC guidelines but with variations affecting the result.

	GHG Protocol	ISO	ICLEI	IPCC
CO2 Grobbilanz				
ECO2Region	(X) a	(X) a		(X) a
GRIP				(X) b
Bilan Carbone		X		
CO2 Calculator				X
Project 2 Degrees	X	X	X	(X) c

Results Synopsis

Variable	Range of variation
GHG measured	Only CO_2 all GHGs
Global warming potential values	2^{nd} IPCC AR 4^{th} IPCC AR
Setting organizational boundaries	only operations controlled by the public authority / all activities of the city
Scope of measurement	only direct emissions / direct, indirect and life cycle emissions
Sector definitions	The IPCC 2006 guidelines group emissions into: energy, transport, industrial processes and product use, agriculture, forestry and other land use, waste and others
Quantifying emissions	Default emission factors regional/local emission factors

ATTEMPTS at potential Interoperability:

Objectives:

– ensuring interoperability of methodologies to allow cities to gauge their policies in a comparable way

– facilitate an effective action-driven decision-making process

This would require :

– enabling communication between existing tools

– development of an international standard

– adoption of a unique tool.

1.2.2. The Marcotullio study (to be published in 2015)

An experiment in adopting a unique set of quantifying tools has been made by Peter Marcotullio and his team on 50 European medium and large cities, defined in a unified way, and discussing the policy implications of alternative methodologies (Marcotullio 2015).

INVENTORIES/RETRIEVAL.

Inventories of emissions are for practical reasons (statistical availability) based on a list of products, mixing low emissions products and high emissions e.g. imported products. Inventories should preferably be based on consumption of products, analyzing their emissions content and identifying the producer.

1.3. TAXING

Agreeing on a common definition of a tax base raises the same difficulty as agreeing on measurement. Estimated values per Ton of CO2 have ranged anywhere from € 10 to 40.

The tax should have been set in proportion to the estimated external costs and be progressive to minimize harm to the small users.
It should have been both domestic and trans-border. However any EU-wide tax has been rejected by the UK and other countries.

For the sake of effectiveness it would be preferable not to tax the emissions but the emitters, identified by source of energy: coal, oil gas, renewable, nuclear etc.

1.4. TRADING

The European emissions trading system (ETS) (5) – put forward as a painless alternative to taxing – has been widely criticised (6) because of its unreliability, the numerous exemptions granted under pressure of some countries(e.g. the maritime sector) and the excessive amount of free allowances.

While the “cap and trade” is functioning for a long time in the US for sulphur emissions, which are easy to measure, in Europe the difficulty to control the validity/authenticity of the certificates and the 27 accounting systems have generated numerous frauds and a very low carbon price, undermining the system.

(5) http://ec.europa.eu/clima/policies/ets/index_en.htm
(6) "Assessing the effectiveness of the EU Emissions Trading Scheme“, Tim Laing et al.
Centre for Climate Change Economics and Policy Working Paper No. 126.
Grantham Research Institute on Climate Change and the Environment Working Paper No. 106, January 2013.

1.5. STORING/RE-USING EMITTED GHG.

STORING GHG.

In December 2008, as part of the EU Climate and Energy Package, European leaders committed themselves to building up to 12 large-scale Carbon Capture and Storage (CCS) demonstration plants in the EU by 2015. The goal was to have the technology ready to go commercial by 2020.
This commitment was meeting the interests of the industries concerned and was an incentive not to reduce fossil fuel emissions as their emissions could be captures and stored. Its preparation included technical reports such as “CO2 Capture and Storage Projects” (EUR 22574, 2007). (7)

(7) http://www.co2captureproject.org/what_is_co2_capture_storage.html

The policy instrument that was originally supposed to drive CCS was the EU's emission trading system (ETS). But the price of carbon traded in the ETS proved much too low (for the reasons indicated in 1.4).

There are also environmental objections by the populations concerned, as the GHG can resurface at some point in time (Barendrecht case of rejection http://sequestration.mit.edu/tools/projects/barendrecht.html).

The CCS technology has been very far from fulfilling its announced results.

RE-USING GHG.

A growing number of industries are making use of the GHG they produce to create added value to both industry and agriculture (Mulhall 2015).

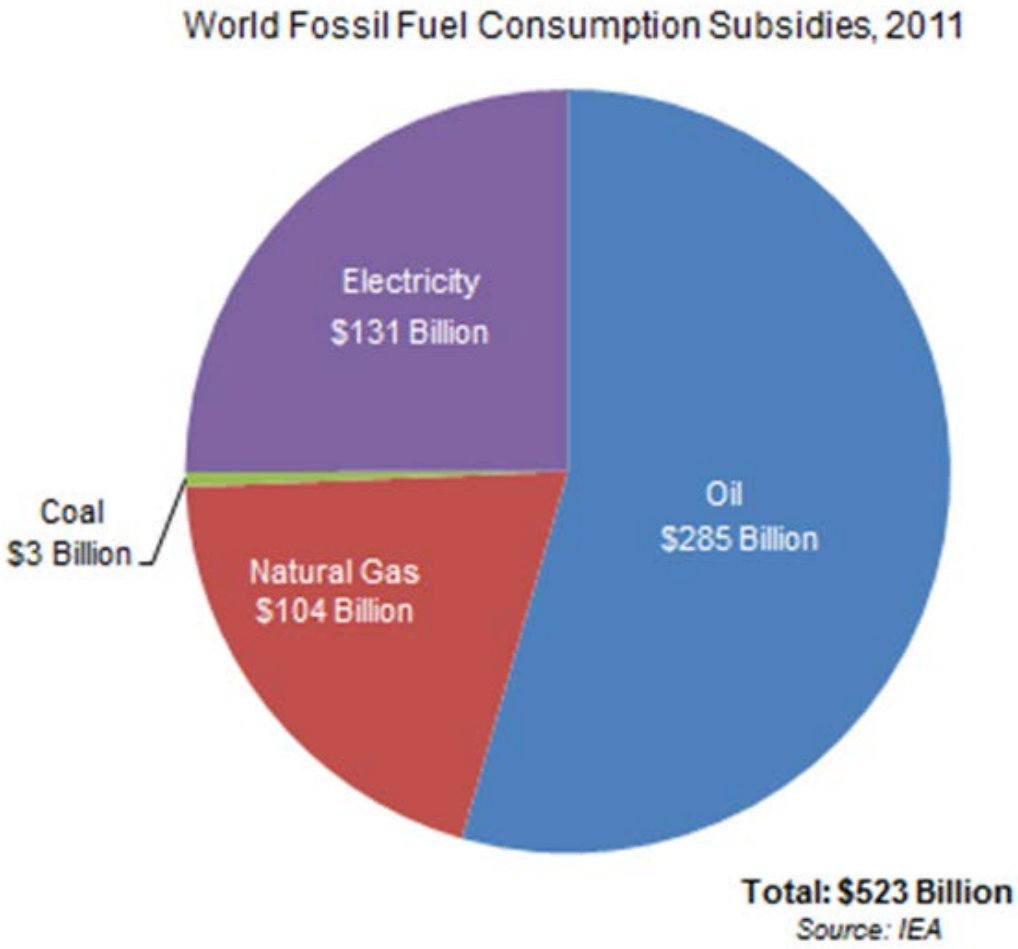
CONCLUSION of Part 1.

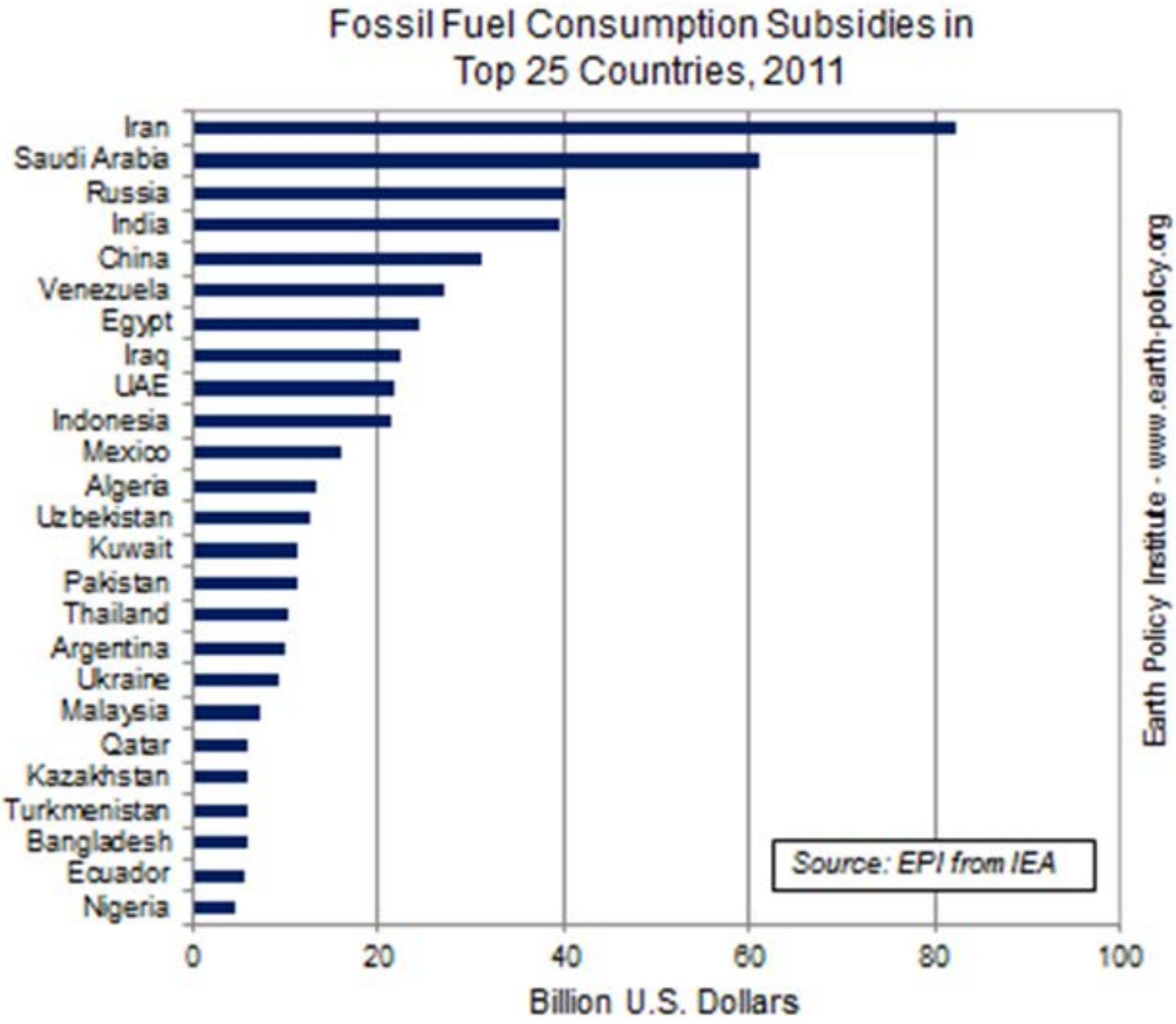
The difficulties in GHG measuring, retrieving, taxing, trading and storing, and the potential of re-using emissions suggests looking at energy, by far the main component of emissions and analysing energy policies as a policy tool. Energy policies are de facto climate policies.

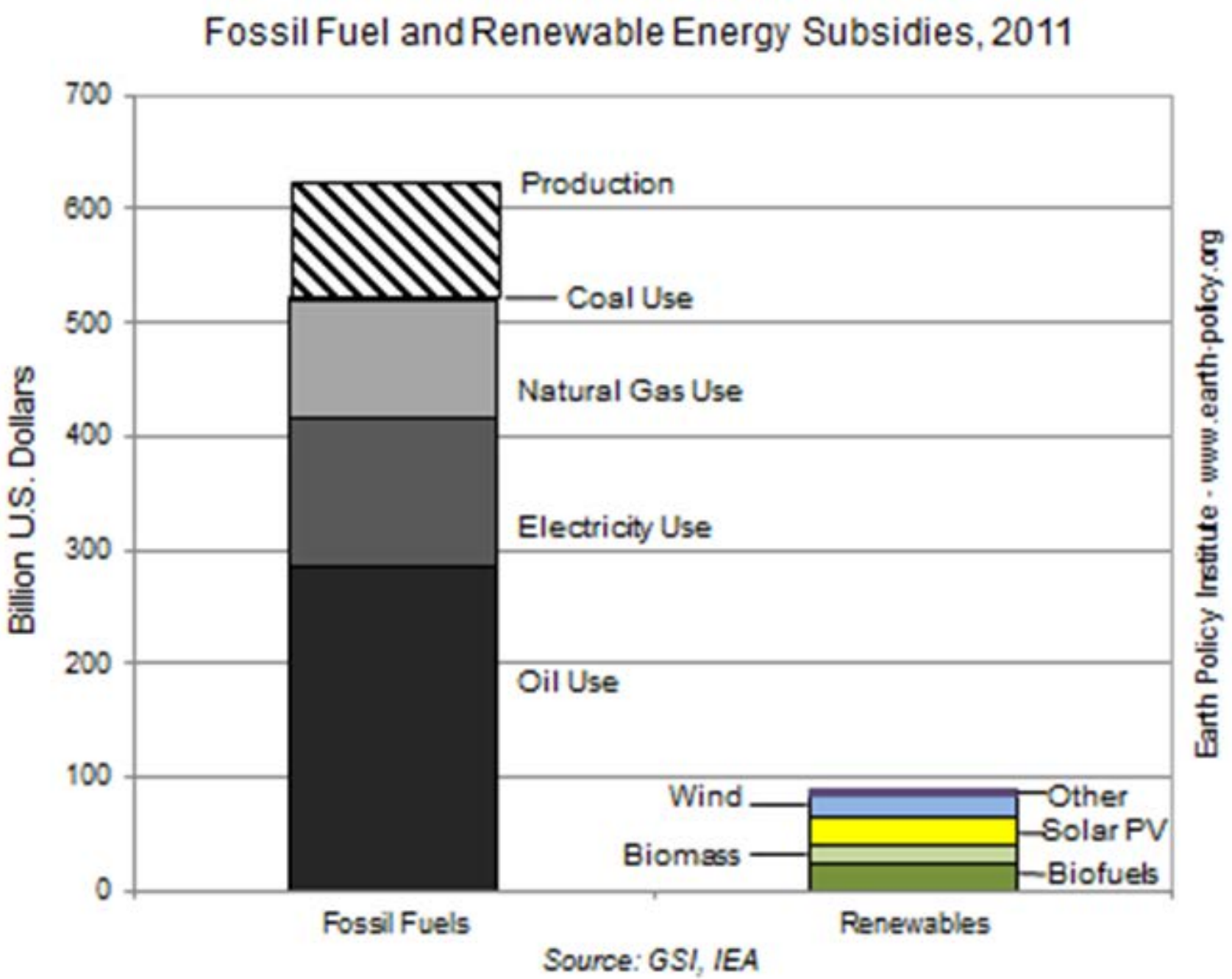
II ENERGY SUPPLY AND FOSSIL FUEL SUBSIDIES/ENERGY SAVINGS

2.1. FOSSIL FUEL SUBSIDIES (8)

(8) Earth Policy Institute - http://www.earth-policy.org/




Fossil Fuel Consumption Subsidies in Top 25 Countries, 2011
Iran
Saudi Arabia
Russia
India
China
Venezuela
Egypt
Iraq
UAE
Indonesia
Mexico
Algeria
Uzbekistan
Kuwait
Pakistan
Thailand
Argentina
Ukraine
Malaysia
Qatar
Kazakhstan
Turkmenistan
Bangladesh
Ecuador
Nigeria
0
20
40
60
80
100
Billion U.S. Dollars
Source: EPI from IEA
Earth Policy Institute - www.earth-policy.org



http://www.iea.org/

These indicate that fossil fuel subsidies are six times higher than the ones to renewables.

Not unexpectedly the main beneficiaries of oil subsidies are the oil companies themselves. In 2012, the Big Five oil companies (Royal Dutch Shell, ExxonMobil, BP, Chevron, and ConocoPhillips) together raked in $137 billion in profits (8).

(8) Earth Policy Institute.

2.2. EUROPEAN ENERGY AND TRANSPORT SUBSIDIES

ENERGY

The European Environment Agency has undertaken - with the help of Ecologic, Berlin - a detailed analysis (9) of energy subsidies for a single year, 2001.
Energy subsidies in the EU-15 have been estimated to amount to over EUR 29 billion in 2001 (excluding external costs) with almost three quarters oriented towards the support of fossil fuels, despite the pressures and threats that these fuels place on the environment.
There is no agreed definition of energy subsidies among Member States. The most transparent way of understanding them is to identify those that appear ‘on budget’ and those that are ‘off budget’.

(9) EEA Technical report Energy subsidies in the European Union: A brief overview – Report 1/2004.

On-budget subsidies are cash transfers paid directly to industrial producers, consumers and other related bodies, such as research institutes, and appear on national balance sheets as government expenditure. Grants may be given to producers, mainly to support commercialization of technology or industry restructuring, and to consumers.

On-budget subsidies also include low interest or reduced-rate loans, administered by government or directly by banks with state interest rate subsidy.

Off-budget subsidies are typically transfers to energy producers and consumers that do not appear on national accounts as government expenditure. They may include tax exemptions, credits, deferrals, rebates and other forms of preferential tax treatment. Tax deductible company cars are an off-budget subsidy that induces strong side effects on land use. They also may include market access restrictions, regulatory support mechanisms such as feed-in tariffs, border measures, external costs, preferential planning consent and access to natural resources.

Quantifying off-budget subsidies is complex, in some cases impossible. It often requires that the benefit be calculated on the basis of differential treatment between competing fuels, or between the energy sector and other areas of the economy.

TRANSPORT

The European Environmental Agency produced in 2006 the report “Urban Sprawl in Europe” (10), which claims that sprawl threatens the very culture of Europe, as it creates environmental, social and economic problems for both cities and countryside.

In its 2007 Report “Transport & environment: on the way to a new Common Transport Policy” (11) the Agency draws the attention on proposals by interest groups to shift the EU’s Common Transport Policy away from managing demand and onto transport’s environmental impacts per unit, without curbing demand. Meanwhile European freight and passenger transport grow much faster than the economy as a whole, what clearly indicates a distortion in the market in favour of transport.

(10) EEA Report No 10/2006 - Urban sprawl in Europe. The ignored challenge.
(11) European Environment Agency “Transport and environment: on the way to a new common transport policy TERM 2006: indicators tracking transport and environment in the European Union” Report No 1/2007.

This abnormal growth is triggered by the fact that transport is not paying the external costs it generates. On the contrary, as revealed in the Agency's 3/2007 Technical Report "Size, structure and distribution of transport subsidies in Europe", transport subsidies amount to €280 billion per year, some half of which go towards roads, i.e. 140 billion €.

According to the Leipzig Charter on Sustainable European Cities, proposed by the German EU Presidency (Ministerial meeting of 24 May 2007), integration of urban planning and transport are essential to reduce transport demand. Higher densities are much less energy consuming and reduce the overall need for motorized transport.

2.3. ENERGY SAVINGS THROUGH INCREASED EFFICIENCY AND DEMAND MANAGEMENT.

Passive buildings and buildings retrofitted for lower energy consumption could help reducing emissions, at the condition that the user behaviour follows the same line. This in turn requires economic incentives, such as progressive utilities tariffs. Low income consumers could thus benefit from lower tariffs.

Only a higher AVERAGE price of energy may encourage investing in ways to reduce its use and the emissions related to it.

CONCLUSION.

An energy policy is de facto a climate policy, as fossil energy consumption is the main source of CO_2 emissions. Analysis of energy production, consumption and savings potential is helping both resources and climate management.

The field of energy is dominated by strong interest groups, often interrelated. Interest groups favourable to sustainable policies could be more present in the international policy field e.g. public and non motorised transport industries and NGO's related to climate change, safety of citizens on the road, healthier life styles, etc.

References

(Adams 2013), Adams Emily E., The Energy Game is Rigged: Fossil Fuel Subsidies Topped $620 Billion in 2011 - Data Highlights, February 27, 2013 - Earth Policy Institute - http://www.earth-policy.org/

(Bader 2009), Bader N. and Bleischwitz R., “GHG Study Report – analysis of GHG local inventory tools” , College of Europe and Institut Veolia Environment 2009.

(EEA 2004), European Environment Agency, “Energy subsidies in the European Union: A brief overview” – Technical Report 1/2004.

(EEA 2006), European Environment Agency, “Urban sprawl in Europe. The ignored challenge “– Report 10/2006.

(EEA 2007), European Environment Agency, “Transport and environment: on the way to a new common transport policy TERM 2006: indicators tracking transport and environment in the European Union” – Report 1/2007.

(Laing 2013), Laing Tim et al., "Assessing the effectiveness of the EU Emissions Trading Scheme“, Centre for Climate Change Economics and Policy Working Paper No. 126.

(Marcotullio 2015), Marcotullio, P. et al., “Assessing urban GHG emissions in the European and Large Cities – Methodological Considerations”, in: Laconte, P. (Ed.), and Gossop, C (Co-Ed.) Sustainable Urban Environments in Europe – Evaluation Criteria and Practices, London: I.B. Tauris 2015.

Mulhall 2015, Mulhall D. and Braungart M., “Reusing GHG emissions” in : Laconte, P. (Ed.) and Gossop, C.(Co-ed.) Sustainable Urban Environments in Europe – Evaluation Criteria and Practices, London: I.B. Tauris 2015.

UNEP 2014, Emissions Gap Report – A UNEP Synthesis.