



# *Current Status and Prospects of Energy Efficiency and Renewable Energy in Latin America & Caribbean*

*Manlio F. Coviello*  
Chief, Energy & Natural Resources Unit  
ECLAC, United Nations

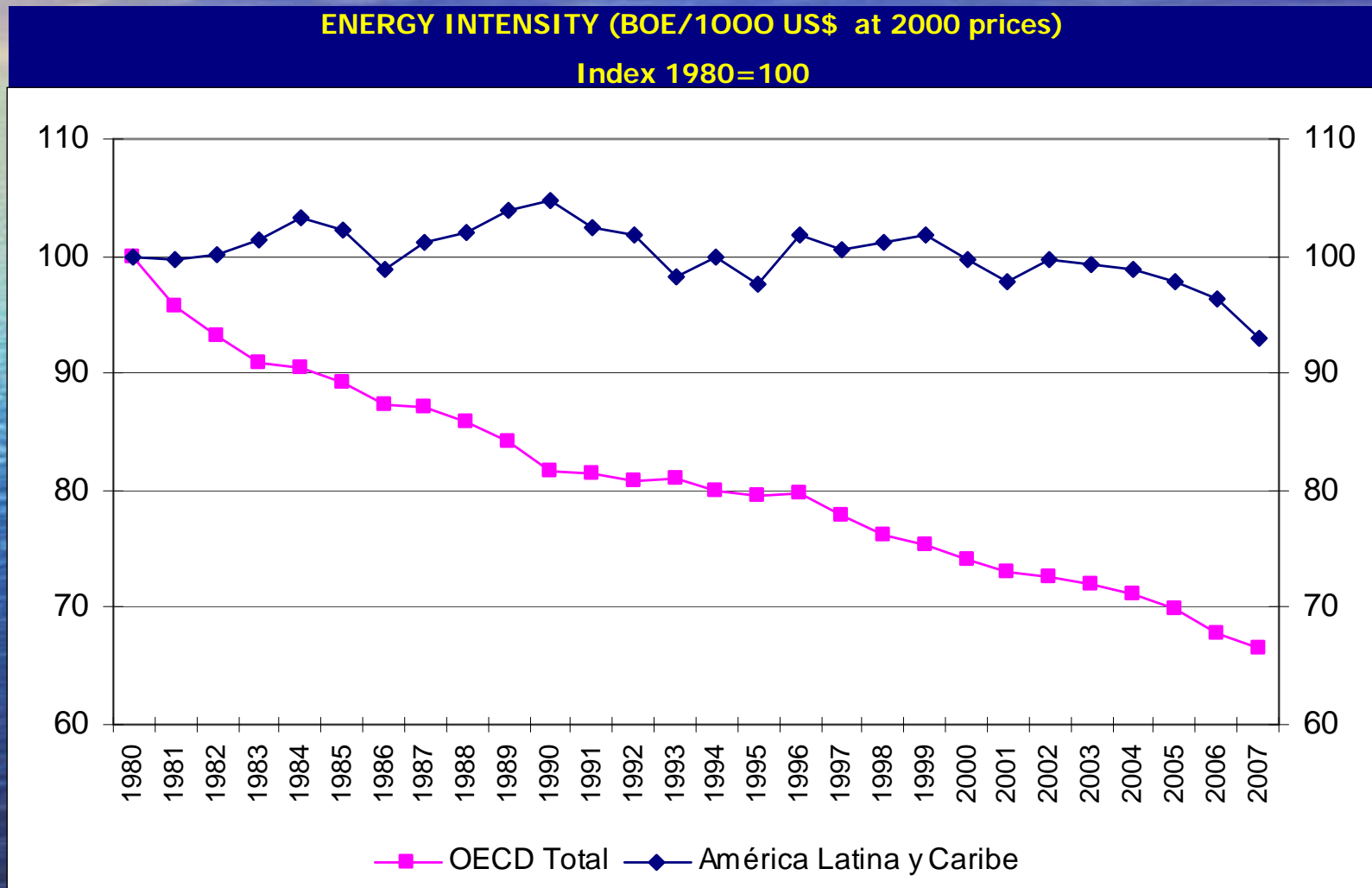


***ENERGY EFFICIENCY***

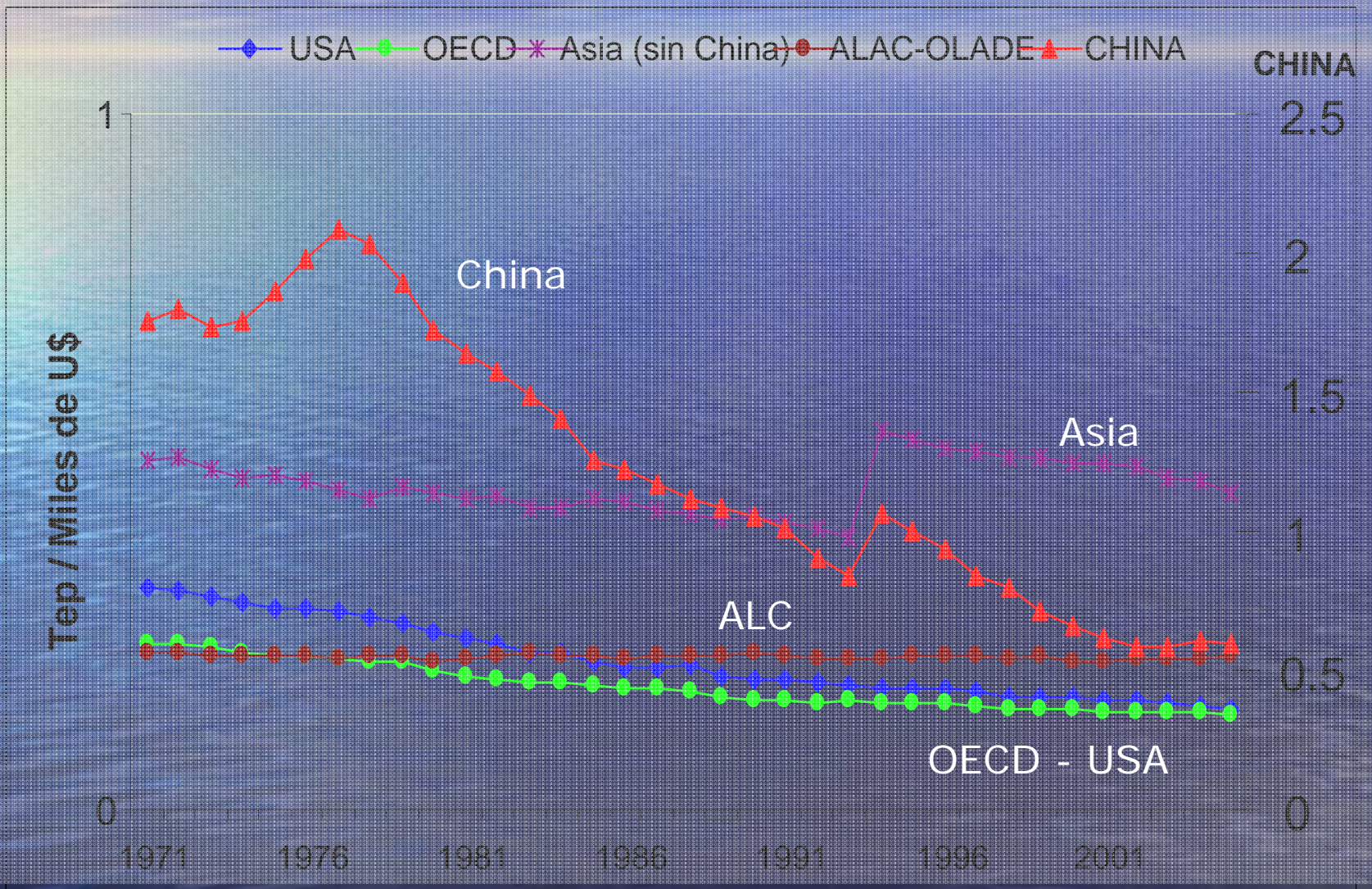


***Latin America and the  
Caribbean in the  
global energy context***

Changes in productive structure, in sectoral composition of consumption and in the share of the sources, explain the *non-desirable pathway* of the Energy Intensity in LAC...

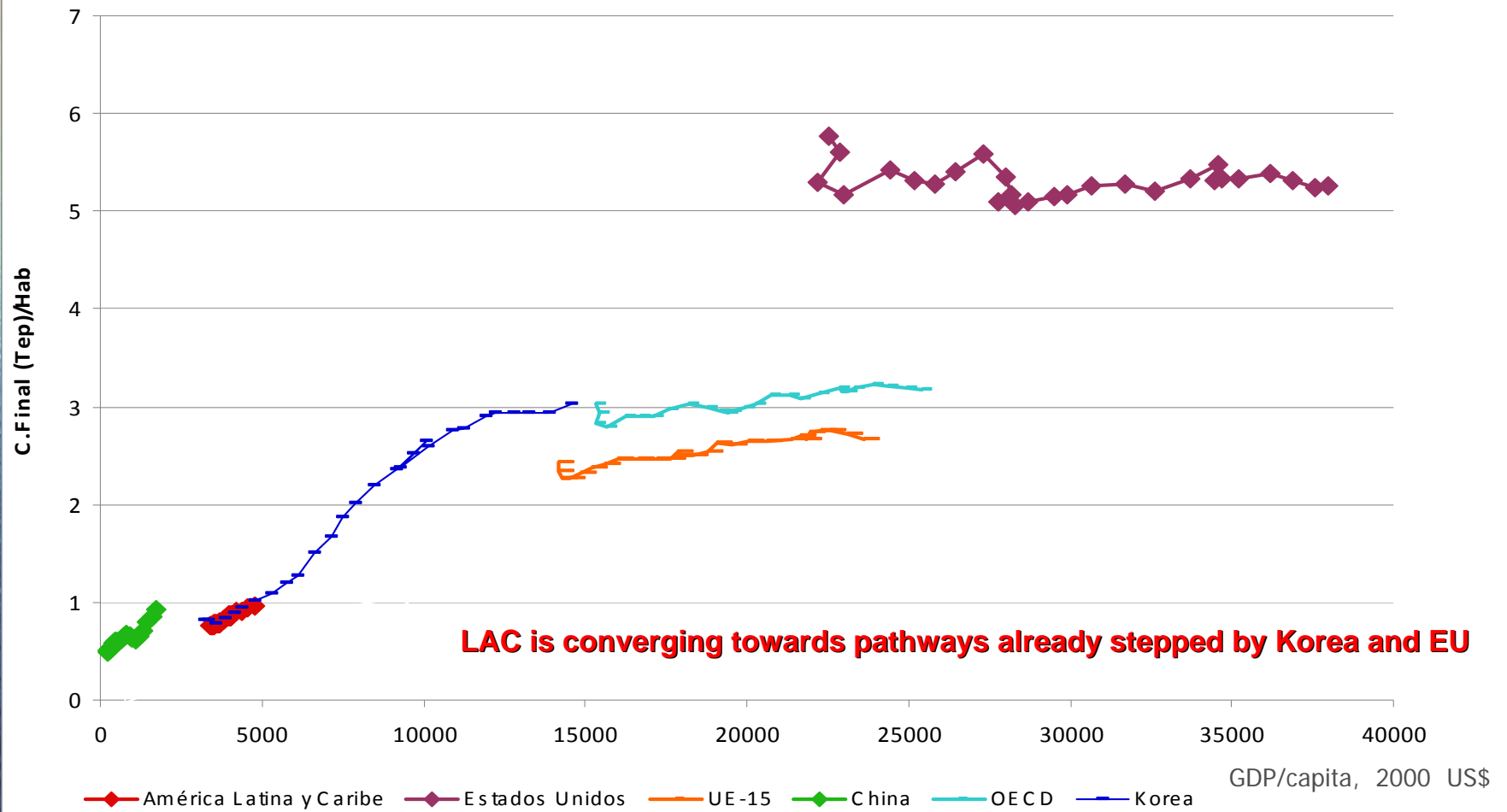


The EI's trajectory of LAC is not far from OECD's, even with a different concentration of primary industry (i.e. the natural resources exploitation in LAC)



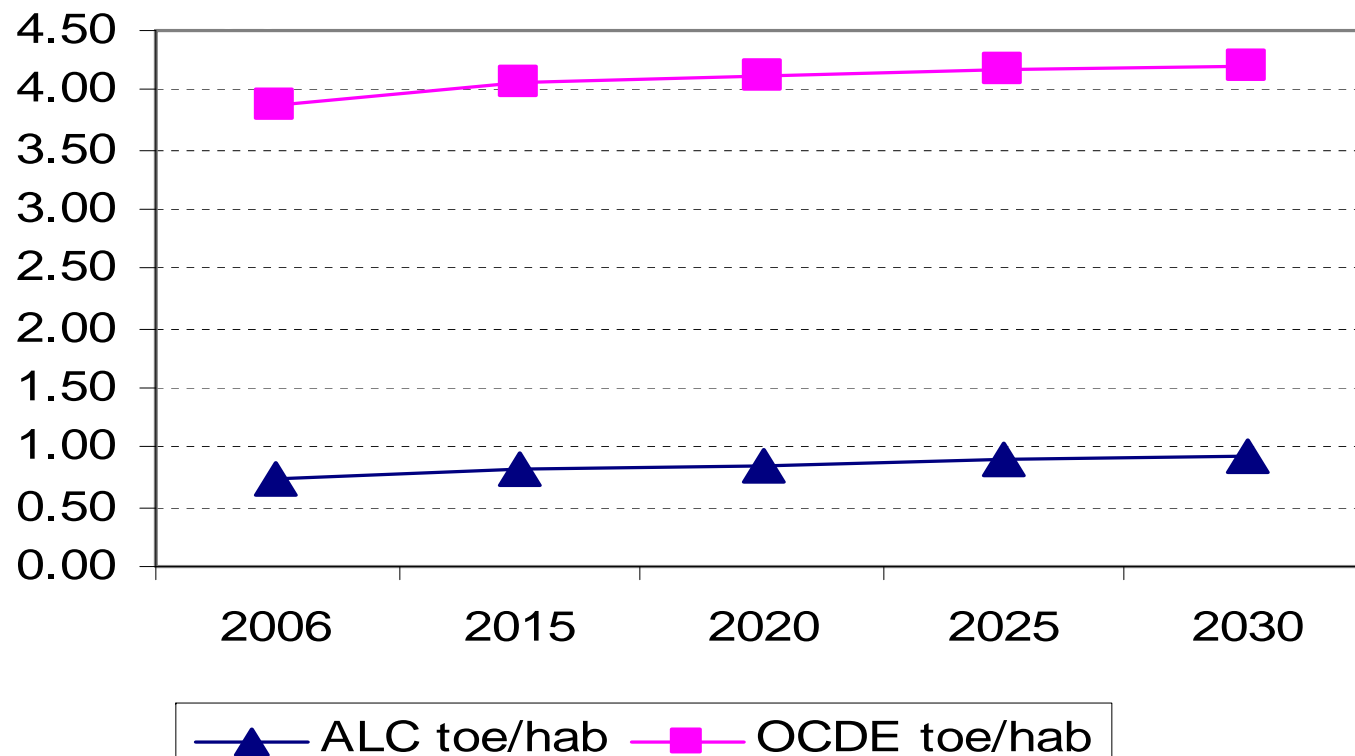
# Oil consumption in Transport VS Economic Growth

1980 - 2007



In the IEA's WEO Reference Scenario 2010-2030, the energy consumption of ALC keeps its relative position, if referred to OECD ( i.e 4 times less...)

Per-Capita Final Energy Consumption ( toe/hab)





**Promoting Energy Efficiency  
in Latin America & Caribbean:**  
*pending issues and challenges*

## EE IN LAC: AN OVERVIEW

The region is **characterised by specific obstacles** to the implementation of EE investment, both by private businesses and the public sector.

Notably:

1) In many countries, the **climate of political instability** has led to a general **uncertainty of the normative context**, hindering the feasibility of such long-term investments ( as the EE-related..)

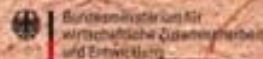
## EE IN LAC: AN OVERVIEW

- 2) the fact that most countries are either energy exporters or control utilities market, **removes in many cases the incentives to reduce the consumption of energy through EE investment**, since taxation on energy consumption represents a massive source of revenue, at little political cost
- 3) the rather **clean energy mix** consumed by the economies of the region (thanks to biofuels and hydroelectric power) makes **environmental concerns less urgent**

## *Main EE programs in LAC*

- **URE** (Rational Energy Use) in **Argentina** ('92-'99)
- **PUREE** (Energy Efficiency Project) in **Argentina** since 2006
- **PROCEL** (National Elect. Conservation Progr.) in **Brazil** since 1985
- **CONPET** (Rational Use of Oil and Gas Programme) in **Brazil** since 1991
- **PPEE** (Energy Efficiency Country Programme) in **Chile** since 2005
- **PROURE** (Progr. for the Rational Use of Energy) in **Colombia**
- **PRONACE** (Nat. Energy Conservation Progr.) in **Costa Rica** since 1994
- **PAEC** (Cuba Electricity Conservation Programme) in **Cuba** since 1997
- **PAE** (Energy Saving Programme) in **Ecuador**
- **PESIC** (EE in Commercial and Industrial Sector) in **Honduras** since 2004
- **CONAE** (National Commission for Energy Efficiency) in **Mexico** since 1989
- **FIDE** (Electricity Conservation Trust) in **Mexico** since 1990
- **PAE** (Energy Saving Project) in **Peru** since 1994
- **PAE** (Energy Saving Project) in **Uruguay** since 2004

# SITUATION AND PERSPECTIVES ON ENERGY EFFICIENCY IN LATIN AMERICA AND THE CARIBBEAN



Coordinated by

**H. Altomonte & M. Coviello**

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**downloadable at:**

<http://www.cepal.org/drni/>

# MAIN FINDINGS OF THE STUDY

Based on the results of the the study, **10 fundamental conclusions** could be obtained **at regional level**, as follows:

**Conclusion #1)** Situation of Energy Efficiency programs, projects and **initiatives in LAC are very different** depending on the country analyzed

# CONCLUSIONS OF THE STUDY

*Conclusion #2)* The regulatory and institutional contexts are very different and cannot be addressed with a similar approach. A **strong process of “local adaptation”** must be done in order to be successful

*Conclusion #3)* It is **not possible** or convenient to merely **copy foreign regulations**. They must be “taylor-made” for LAC countries

*Conclusion #4)* In several countries of the Region, **lack of continuity** in Energy Efficiency policy regulations has been (and still is...) critical

# CONCLUSIONS OF THE STUDY

*Conclusion #5)* This discontinuity generates the **risk of losing experienced technical teams**. In fact, counting on trained national experts able to manage national Energy Efficiency programs, requires a long time and continue efforts

*Conclusion #6)* In most countries investigated (except Mexico) **do not exist local financial sources** focused to specifically support Energy Efficiency programs

# CONCLUSIONS OF THE STUDY

*Conclusion # 7)* a relevant difficulty in monitoring the results of energy efficiency programs, is evident.

The **introduction of Performance Indicators** for monitoring Energy Efficiency Program, turns out to be a key-issues in every region's country

The most recent **ECLAC's Flagship study** on EE is attacking this specific issue

# CONCLUSIONS OF THE STUDY

*Conclusion #8* ) The mere existence of **compulsory energy efficiency laws** or regulations **does not guarantee** at all the success of a national Energy Efficiency Program

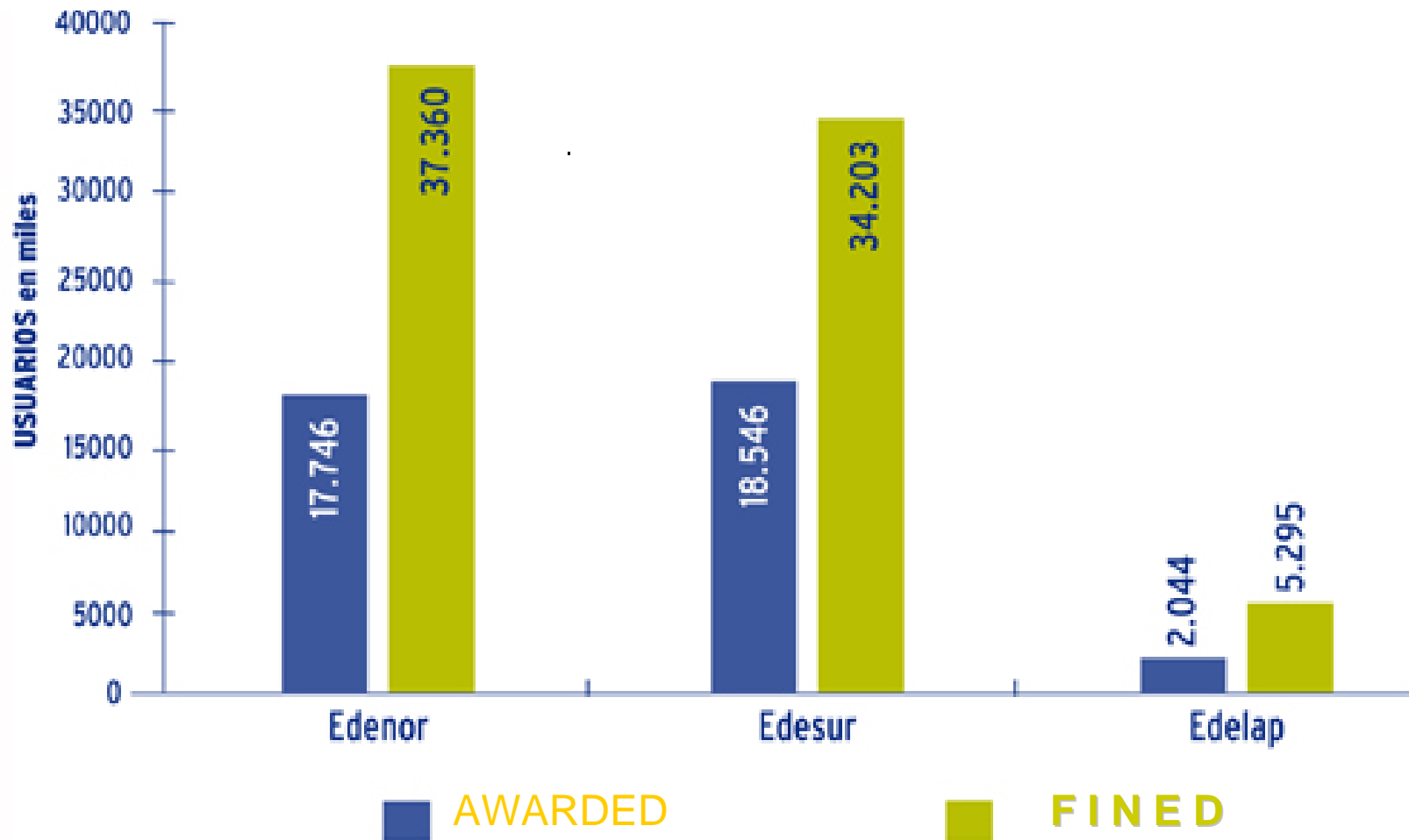
An interesting example to this regards is the **PUREE program in Argentina**. Under its compulsory framework, it gives **\$ awards** to users that show – at least – a **10%** in energy saving with respect to 2004 levels.

And establishes **\$ fines** to users that don't reach the target.

The results of all this have been..... 

## PUREE/Argentina – Amount of awarded and fined users

*June 2005 – December 2008*



Users **preferred to pay fines** instead of saving energy !!  
This, is strictly related to the **very low price of energy** in Argentina

# CONCLUSIONS OF THE STUDY

**Conclusion #9** ) National Energy Efficiency programs **still depend excessively on international support**, although volatility of energy prices are starting to trigger some local investing initiatives

**Conclusion #10** ) Barriers referred to **lack of information for energy consumers**, aiming at being be more efficient in using energy, are still high

## The ECLAC's proposals for more effective EE Public Policies

- To correct **price distortions** that “fight” against the sustainable management of energy demand
- To actively promote and **finance national EE programs**
- To put in place transport, urban infrastructure and territorial **policies to reduce fuel consumption & pollution**
- The EE and Renewable sources policies must be part of an **integrate energy policy**, conceived from the perspective of the sustainable development

## The ECLAC's proposal for more effective EE Public Policies

- All the above, calls for the **proactive participation** of different actors, mainly the **energy companies**
- Nevertheless the **leadership of the Government** – in its role of planner, promoter and regulator – **is fundamental**
- Though the State must lead the process, EE policy constitutes **a national responsibility** in this respect
- From there, the **need to generate a political “dialogue”** inside and between region's countries, aiming at exchanging experiences and jointly advance towards a sustainable path

# The new ECLAC's challenge: the EE Policy Dialogue

With the support of the German Cooperation (BMZ/GTZ) ECLAC is launching a new initiative aiming to **stimulate & coordinate a deeper discussion about the need for more sustainable and sustained energy efficiency policies** in Latin America & Caribbean

Project's overall objective: to contribute to strengthen the horizontal & international cooperation in EE in LAC, establishing:

1. An **Energy Efficiency Policy Dialogue** (1<sup>st</sup> EEPD: November 18 & 19<sup>t</sup>, Santiago, Chile); and
2. an "ad-hoc" **Regional Fund** for Energy Efficiency (Energy Efficiency Fund)

## **OBJECTIVES OF "UNECE-GEE21" FULLY MATCH WITH ECLAC'S WORKPLAN !!**

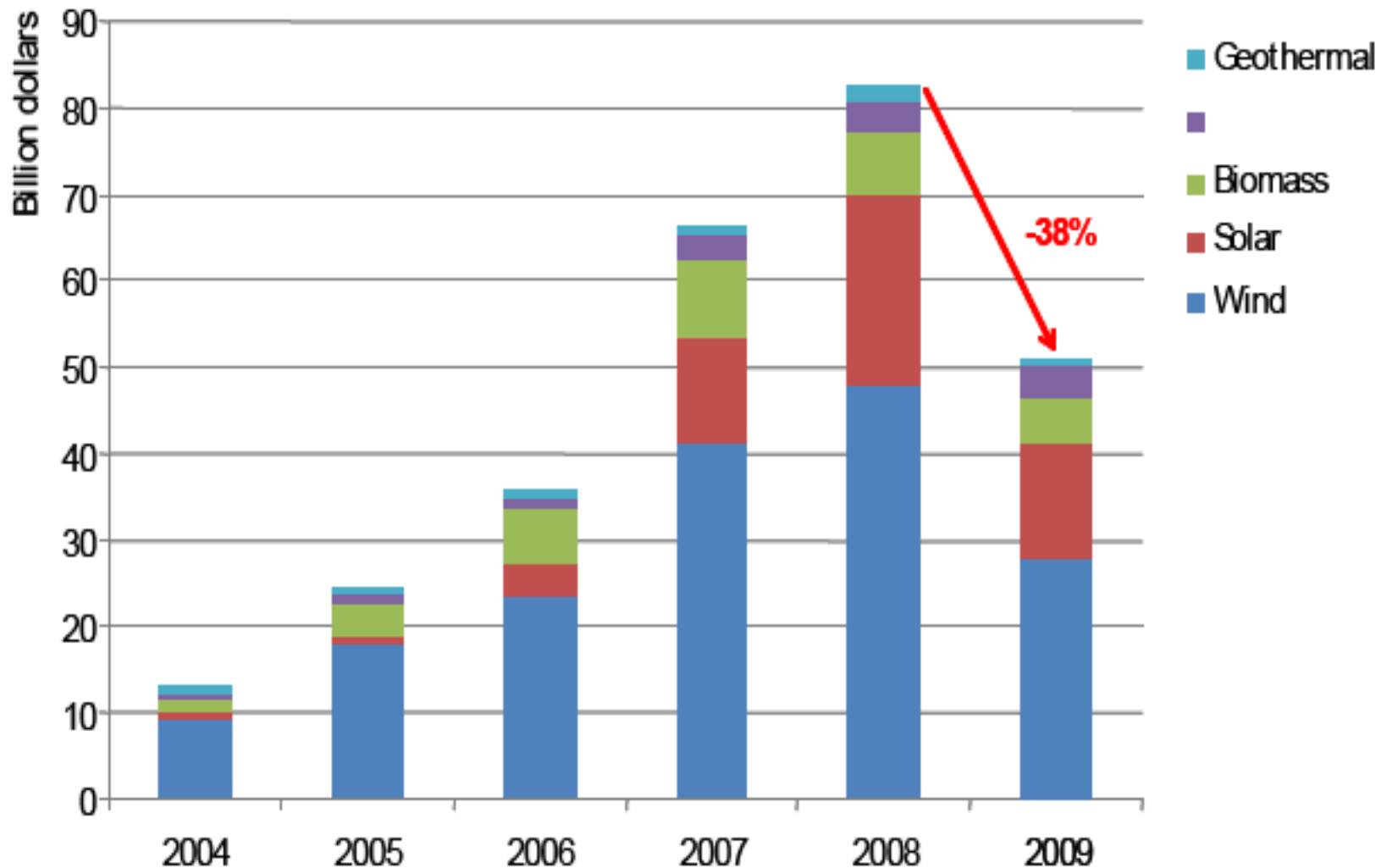
Given the overall situation and the bottlenecks presented above, ECLAC is strongly interested in a **more systematic exchange of experience on capacity building, policy reforms and investments project finance** with countries of other regions

The experience accrued by with **UN-ECE** the **EE 21** project and the expected accomplishments of **GEE21** programme, are **unsurpassed opportunities** in this sense, that **ECLAC is seriously intended to support and take advantage of**



**RENEWABLE ENERGY**

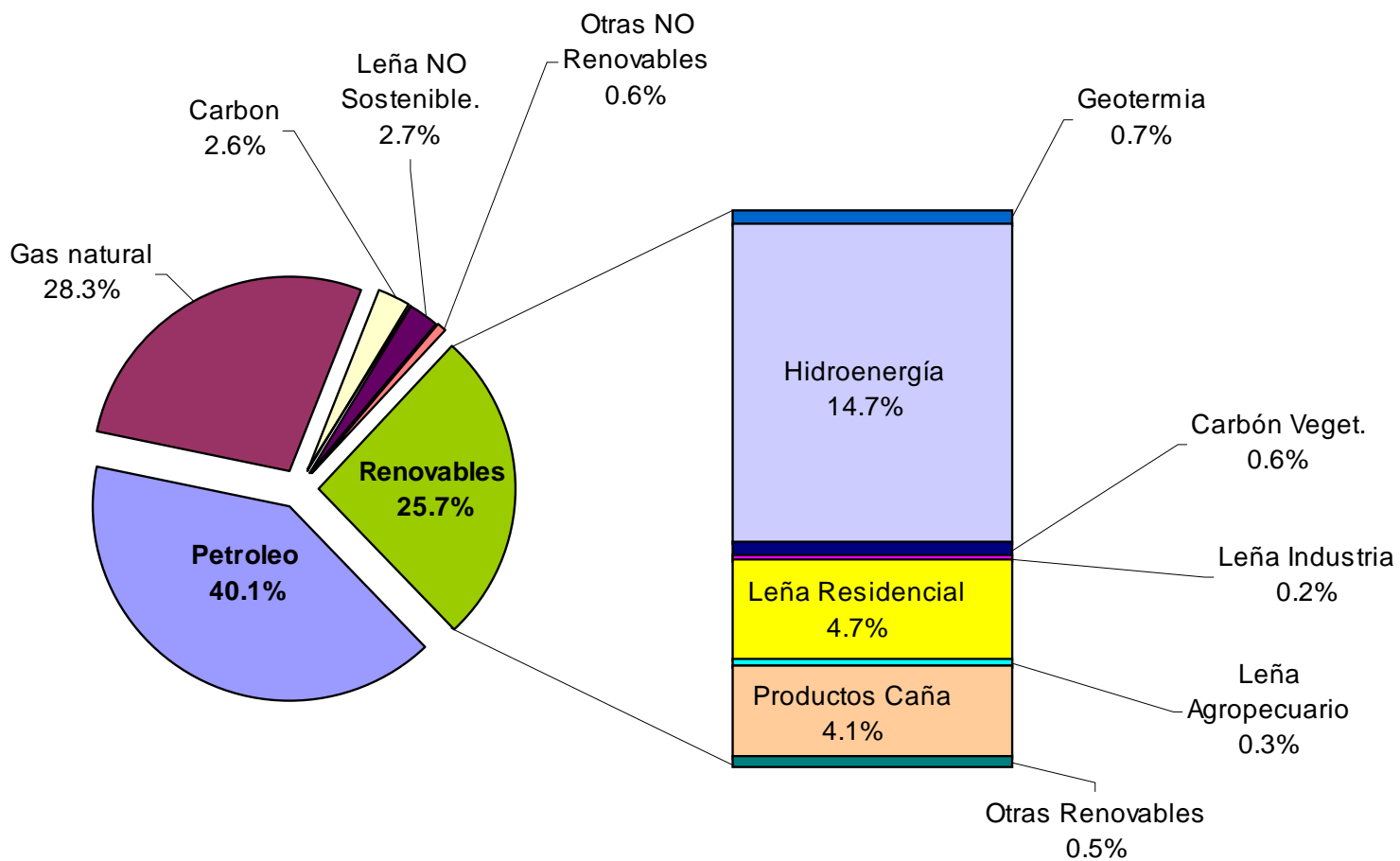
In 2009, world investments in renewables have simply collapsed, due to the financial crisis...





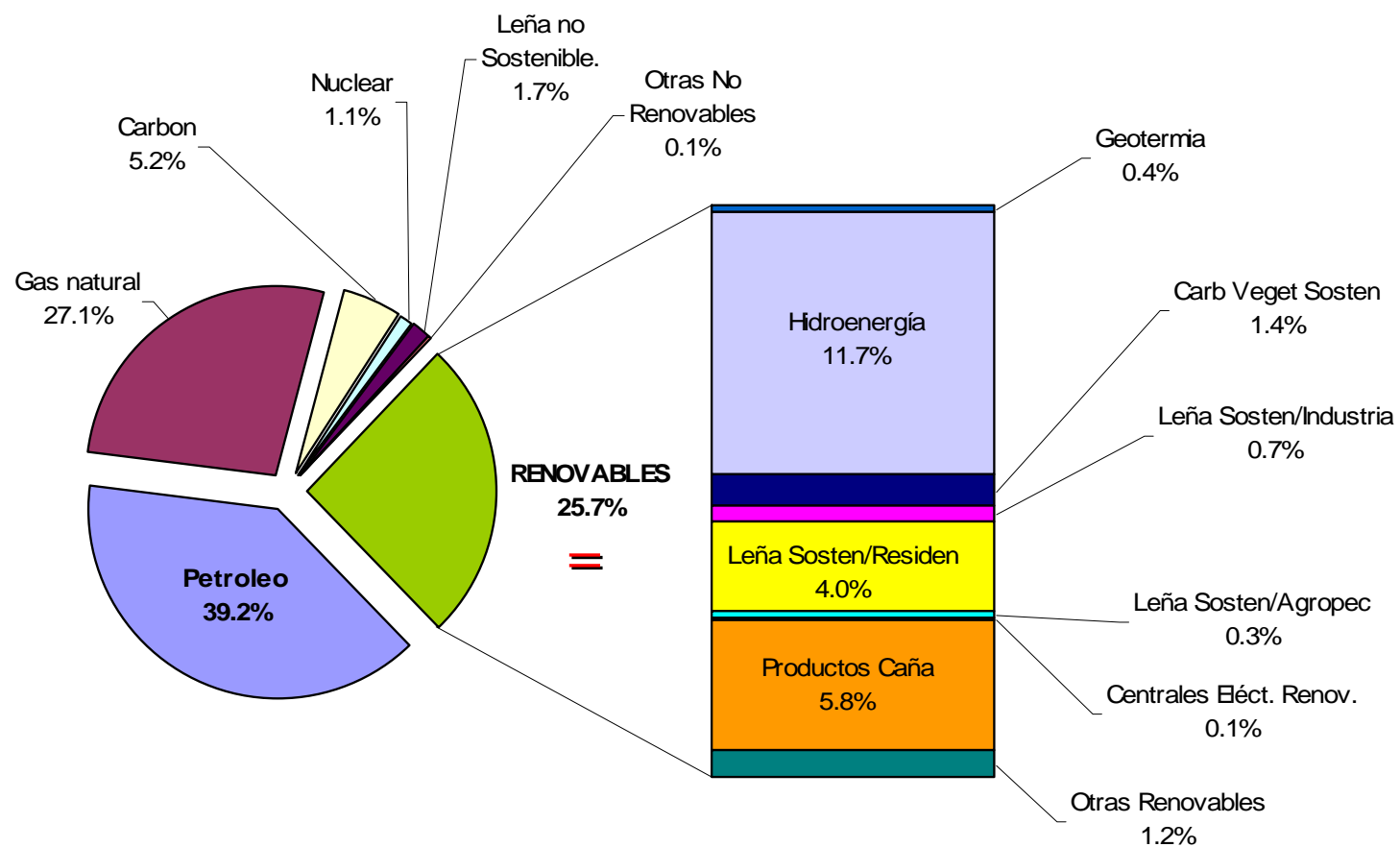
*...and Renewable Energies  
do not **"take-off"** in the  
Latin america either...*

## LATIN AMERICA AND THE CARIBBEAN – TOTAL ENERGY SUPPLY - 2002



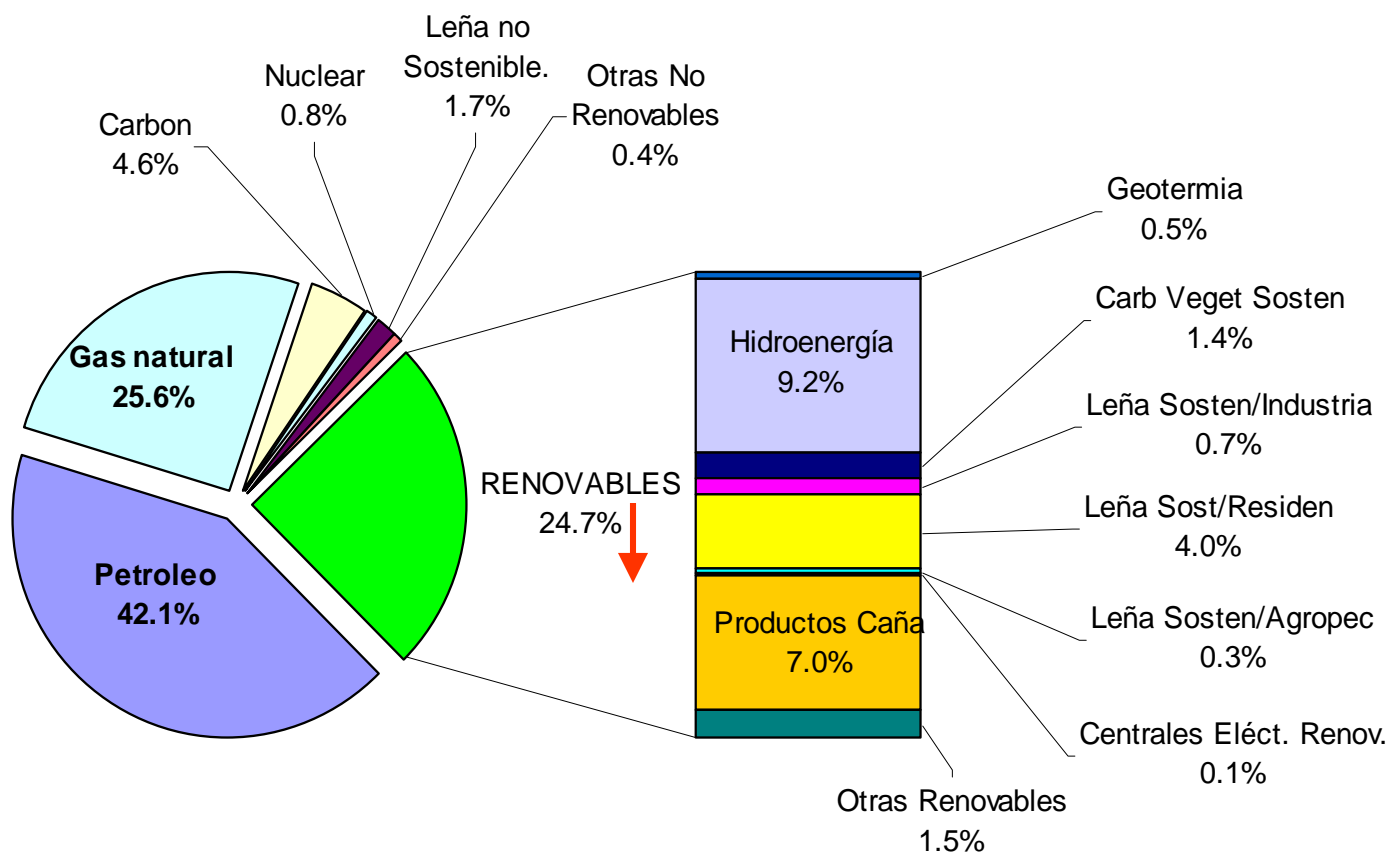


## LATIN AMERICA AND THE CARIBBEAN – TOTAL ENERGY SUPPLY - 2005

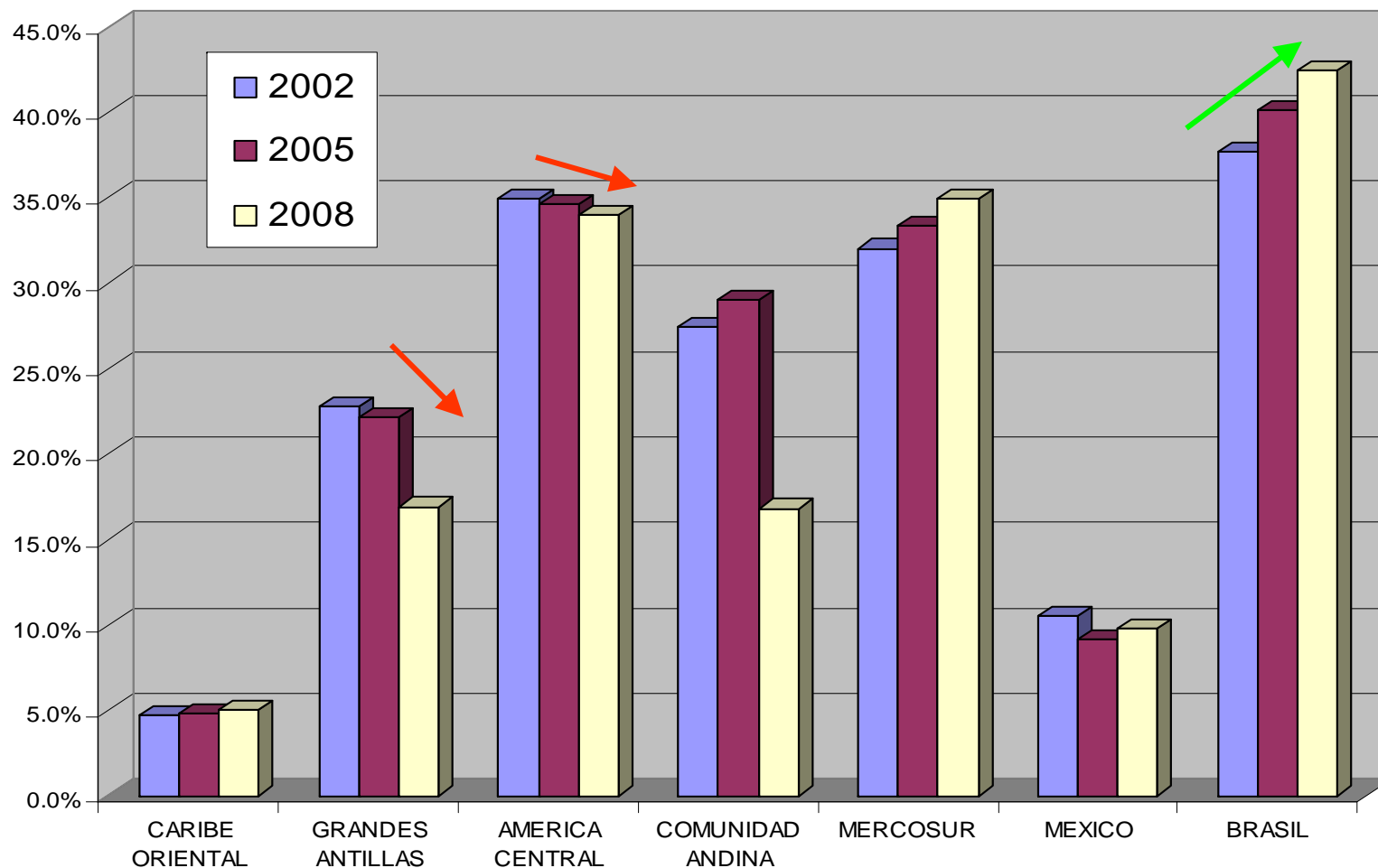




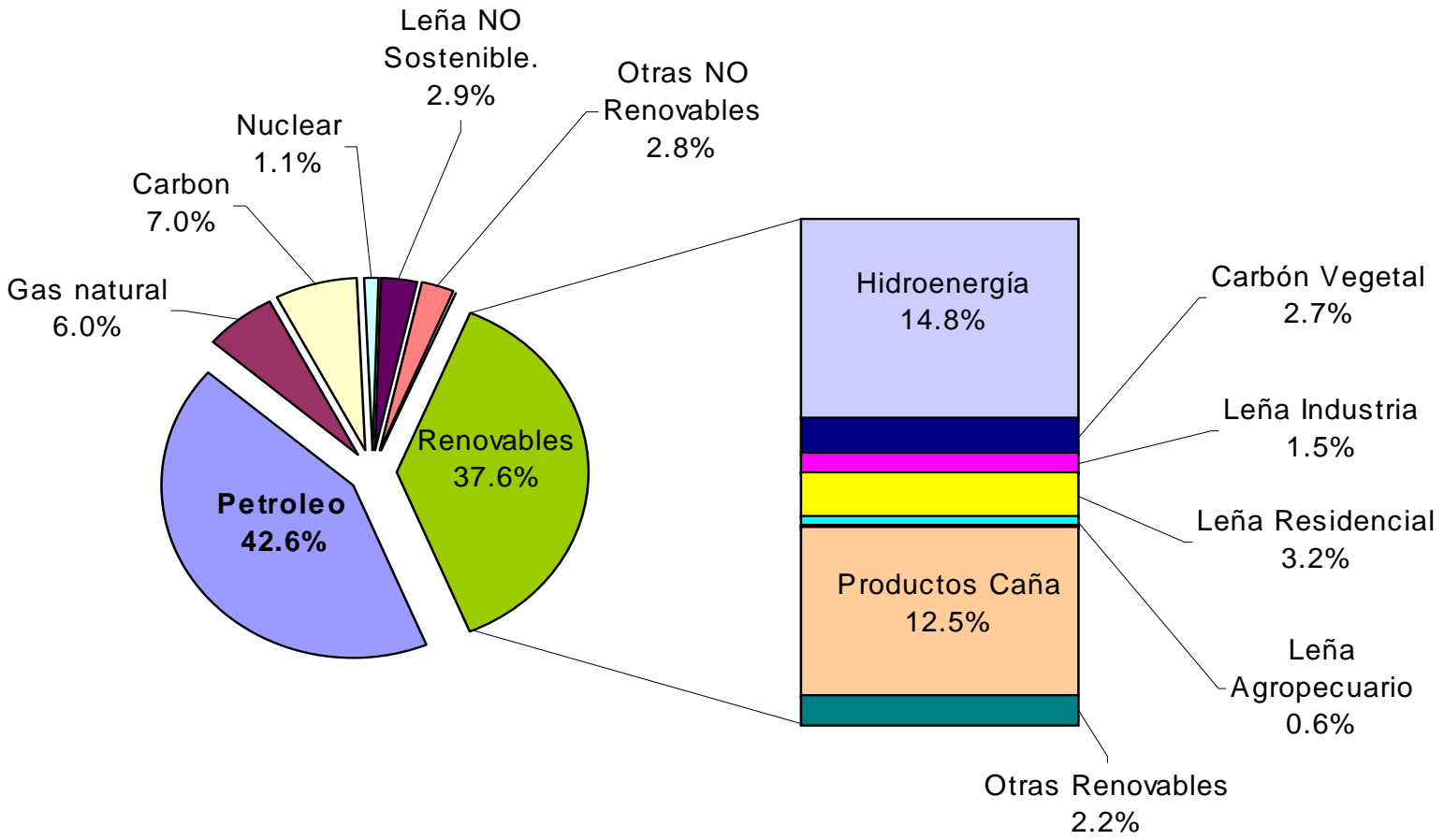
### LATIN AMERICA AND THE CARIBBEAN – TOTAL ENERGY SUPPLY - 2008



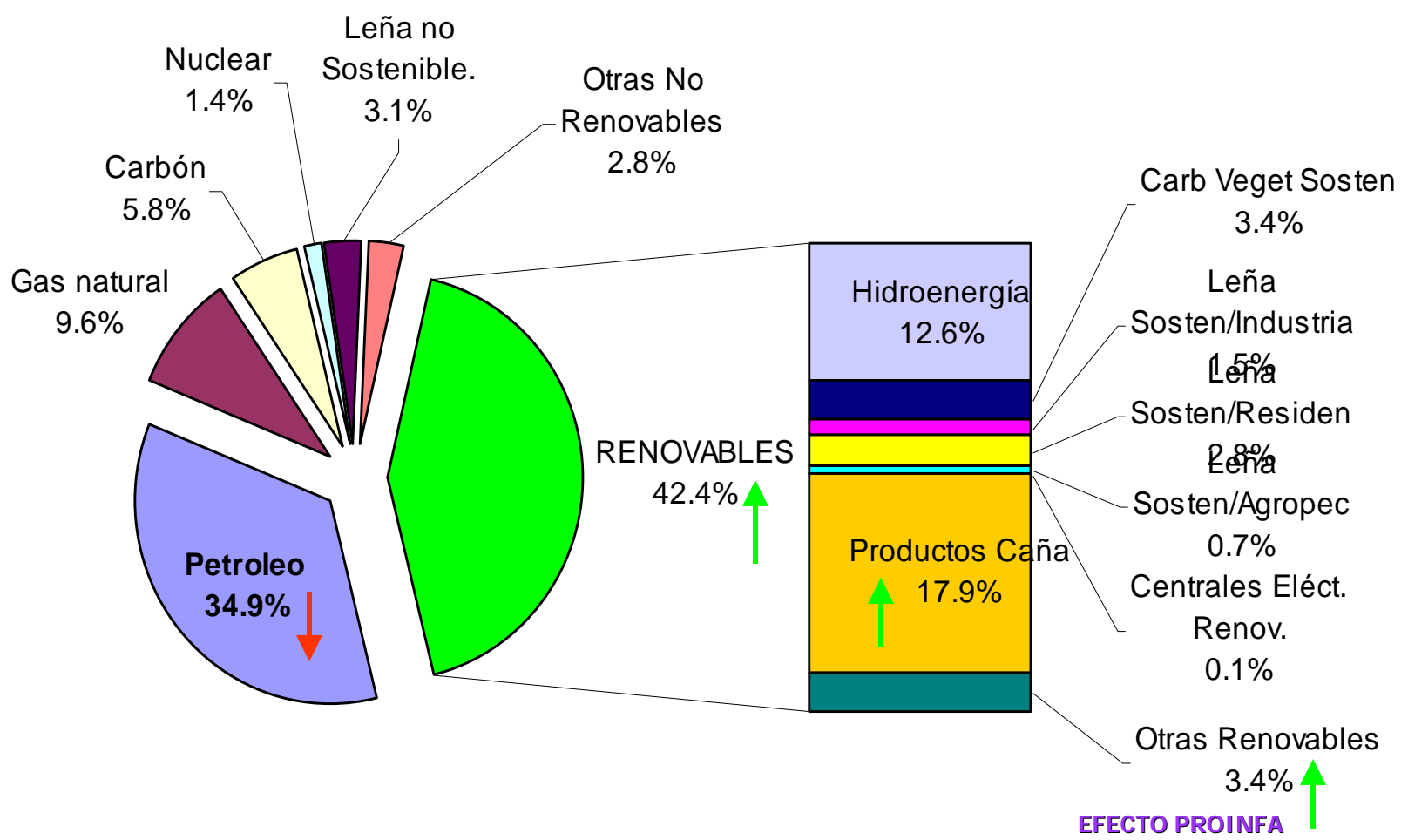
## RENEWABILITY INDEX (Renewables Supply / Total Energy Supply)



### BRAZIL – TOTAL ENERGY SUPPLY - 2002



### BRAZIL – TOTAL ENERGY SUPPLY - 2008



EFFECTO PROINFA ↑

**RENEWABLE ENERGY  
SOURCES  
IN LATIN AMERICA  
AND THE CARIBBEAN**  
SITUATION AND POLICY  
PROPOSALS



UNITED NATIONS

**ECLAC**





*Some steps towards a more  
"stimulating" regulation  
have been taken, though...*

	LAW	YEAR	MECHANISMS / INCENTIVES
<b>ARGENTINA</b>	Law N. 26190	2006	A <b>Fiduciary's Fund</b> is created; managed and allocated by the Electric Energy Federal Council. Pays up to <b>1,5 cents US\$/kWh</b> wind, solar, biomass and geothermal power.
<b>BRASIL</b>	Law N. 10438/02 (PROINFA)	2002	<b>Direct incentives</b> to the national grid connection of biomass thermal electricity plants, wind power plants and small hydroelectric plants.
<b>CHILE</b>	Law N. 20.257:	2008	It has been set, for electric operators, a minimum level of electric generation through renewable energies ( <b>5%</b> ) - " <b>Renewable Portfolio Standard System</b> ".
<b>COLOMBIA</b>	Law N. 697 – 2001	2001	<b>PROURE program</b> is created to promote the Rational Use of Energy and the non-conventional energy sources.
<b>ECUADOR</b>	Regulación N. 004/04	2005	Regulates the operation of the renewable energy generation units installed in the country, as the parameters to set the tariffs (" <b>feed-in tariff</b> " system).
<b>GUATEMALA</b>	Decree N. 52-2003.	2003	Economical and fiscal <b>incentives</b>
<b>EL SALVADOR</b>	Law "LIFFER"	2007	A <b>Revolving Fund</b> to Promote the Renewable Energies (Fomento de las Energias Renovables - FOFER) will grant soft credits, securities and assistance to financing feasibility studies.
<b>MEXICO</b>	Law "LAFRE"	(in process)	Creates a <b>55 MM US\$</b> annual <b>Trust</b> that will allow the renewable energies to cover the 12% of national generation in 2012.
<b>NICARAGUA</b>	Law N. 532	2005	It establishes a 10 years period with tax benefits to the investor company. It guarantees a <b>payback for renewable sources of energy</b> between 5.5 y 6.5 cents US\$/kWh.
<b>PERU</b>	Law Decree N. 1002	2008	It fix a " <b>Bonus</b> " for renewable energies on electric tariffs, in order to guarantee a minimum profitability (12%) to renewable generators.
<b>DOMINICAN REPUBLIC</b>	Law N. 57-07	2007	It guarantees a 100% exemption from tax on machineries imported by companies ; moreover the companies are <b>exonerated from the the Income Tax</b> during 10 years.
<b>URUGUAY</b>	Decree N. 77/006	2006	It authorizes <i>UTE ( Govt'l Electric Utility)</i> to subscribe <b>special purchase agreements</b> on energy with national suppliers that produce energy through renewable sources.



*Which barriers still prevent  
the “take-off” of the  
renewables in Latin  
America?*

# FINANCIAL BARRIERS

- Limited availability of the **promotion credits/loan**
- High **transaction costs**
- Lack of financial **international cooperation** mechanisms

# TECHNICAL BARRIERS

- Insufficient technical-economical **information** about national resources
- Limited **technical capacity** to design and develop projects
- Limited development of **supply and service** system chains in “off-grid” zones

# REGULATORY BARRIERS

- Shorter periods of **contracts for purchasing** energy (max 36 months)
- Limits to the **installed capacity** of renewable projects

# SOCIAL BARRIERS

- **Social rejection** of hydro projects with reservoir
- Reduced **payment capacity** of low-income sectors (rural areas, remote, poor city areas)

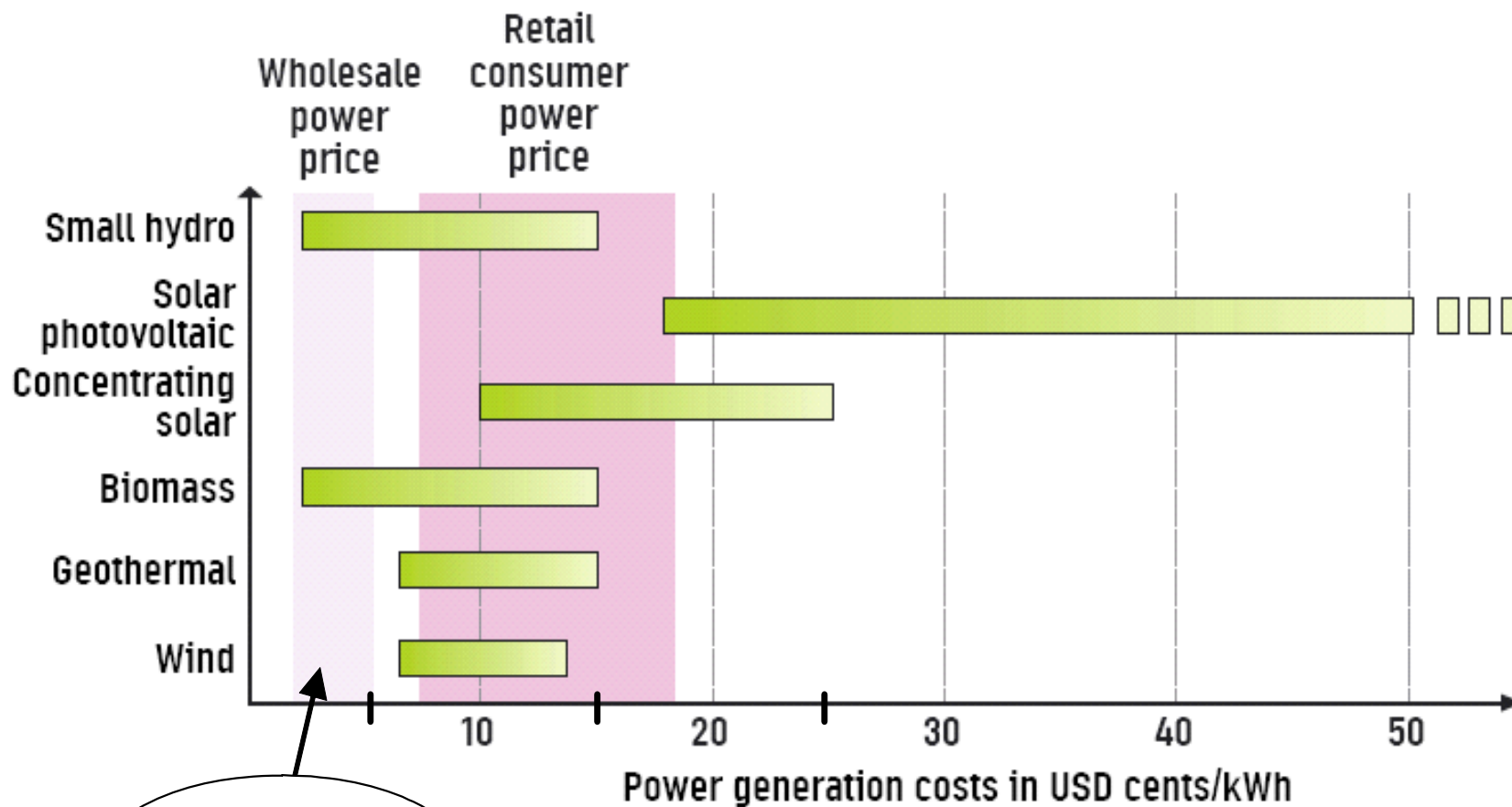
# **POLITICAL / ECONOMIC BARRIERS**

- Weak insertion of renewables in the **energy policies** and in the national **regulatory frameworks**

- Regardless the huge volatility of hydrocarbon price, the renewables continue having **economic competitiveness problems** VS conventional energies (see next graph)

The renewable energies' insertion requires solid (i.e. **\$\$\$\$** ....) promotion mechanisms !!!

## Cost-competitiveness of Selected Renewable Power Technologies



- Medium-Big Hydro
- Natural Gas
- Oil & Coal

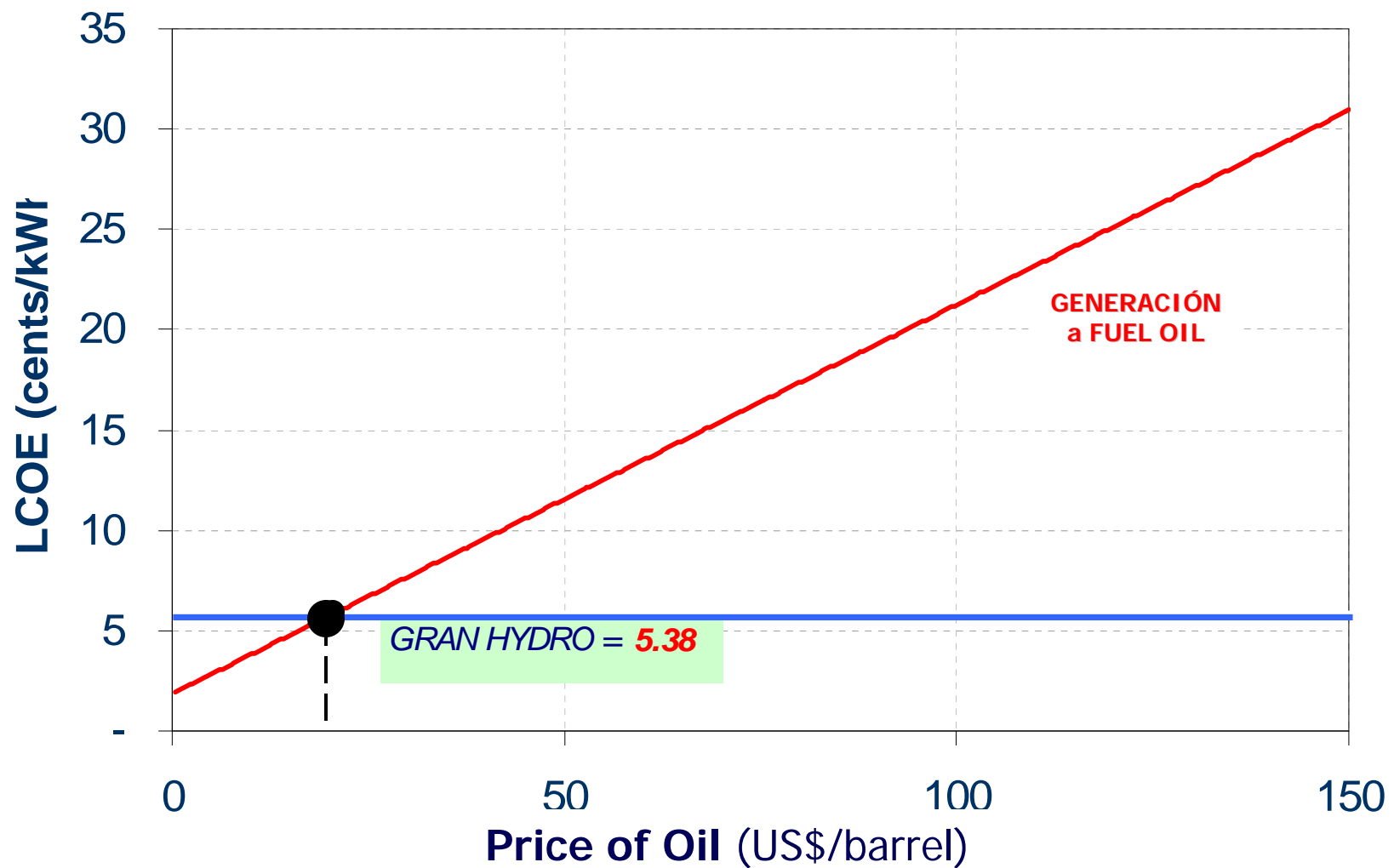
# LEVELIZED COSTS OF ENERGY

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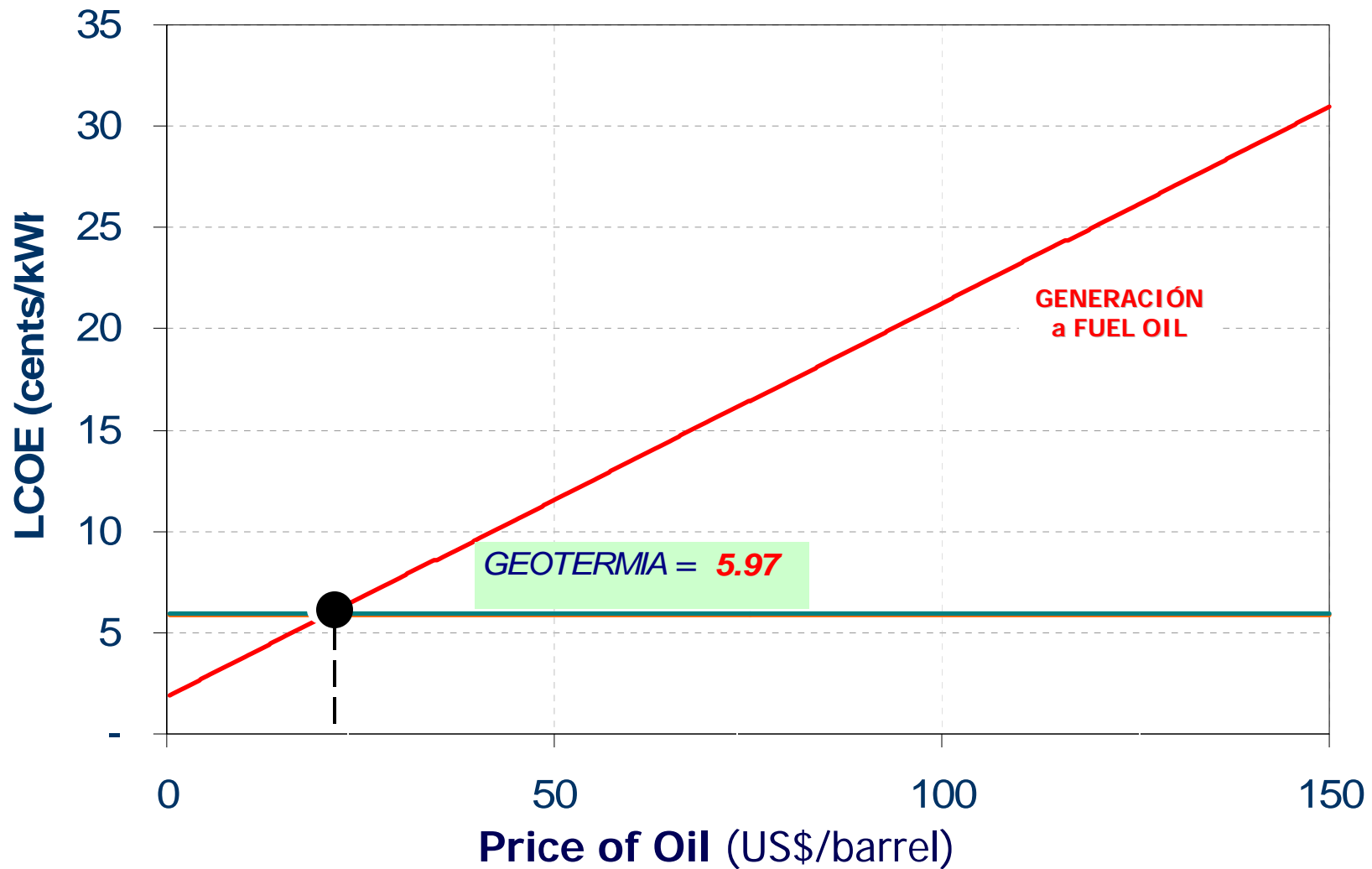
- Main problem of renewable energies is the difficulty calculating in a integrated way the effective **economic competitiveness** in comparison with conventionals.
- Concept of **Levelized Cost of Energy** (LCoE or LCE) : enables to compare – in a comprehensive manner – costs of different technologies, throughout their **lifetime**
- Represents cost of energy of a project for which **NPV = 0**
- In other words: LCoE = **minimum price** at which the energy has to be sold in order to reach the “**break-even**”

# Levelized Cost of Energy (LCoE):

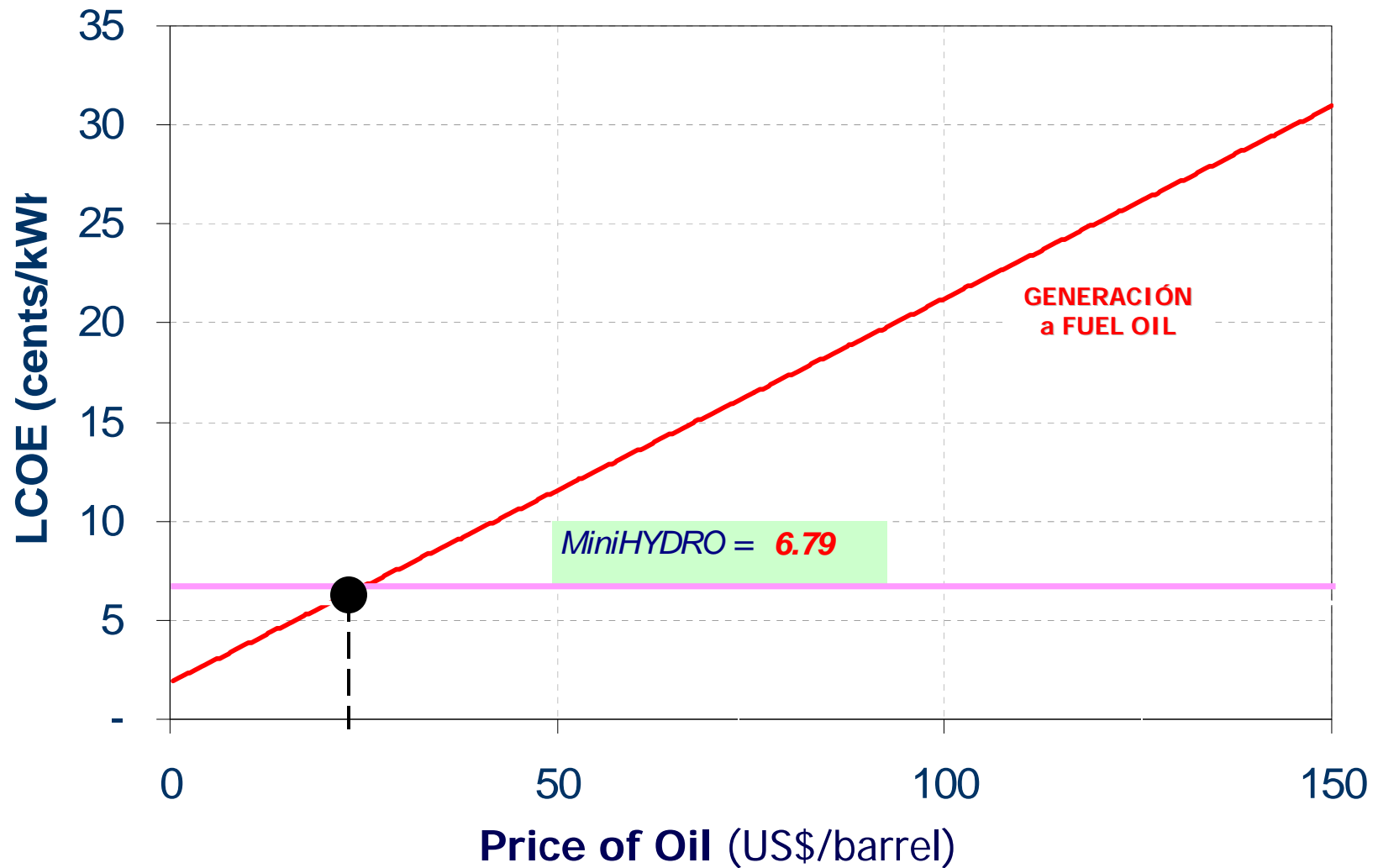
## Large HYDRO



# Levelized Cost of Energy (LCoE): **GEOTHERMAL**

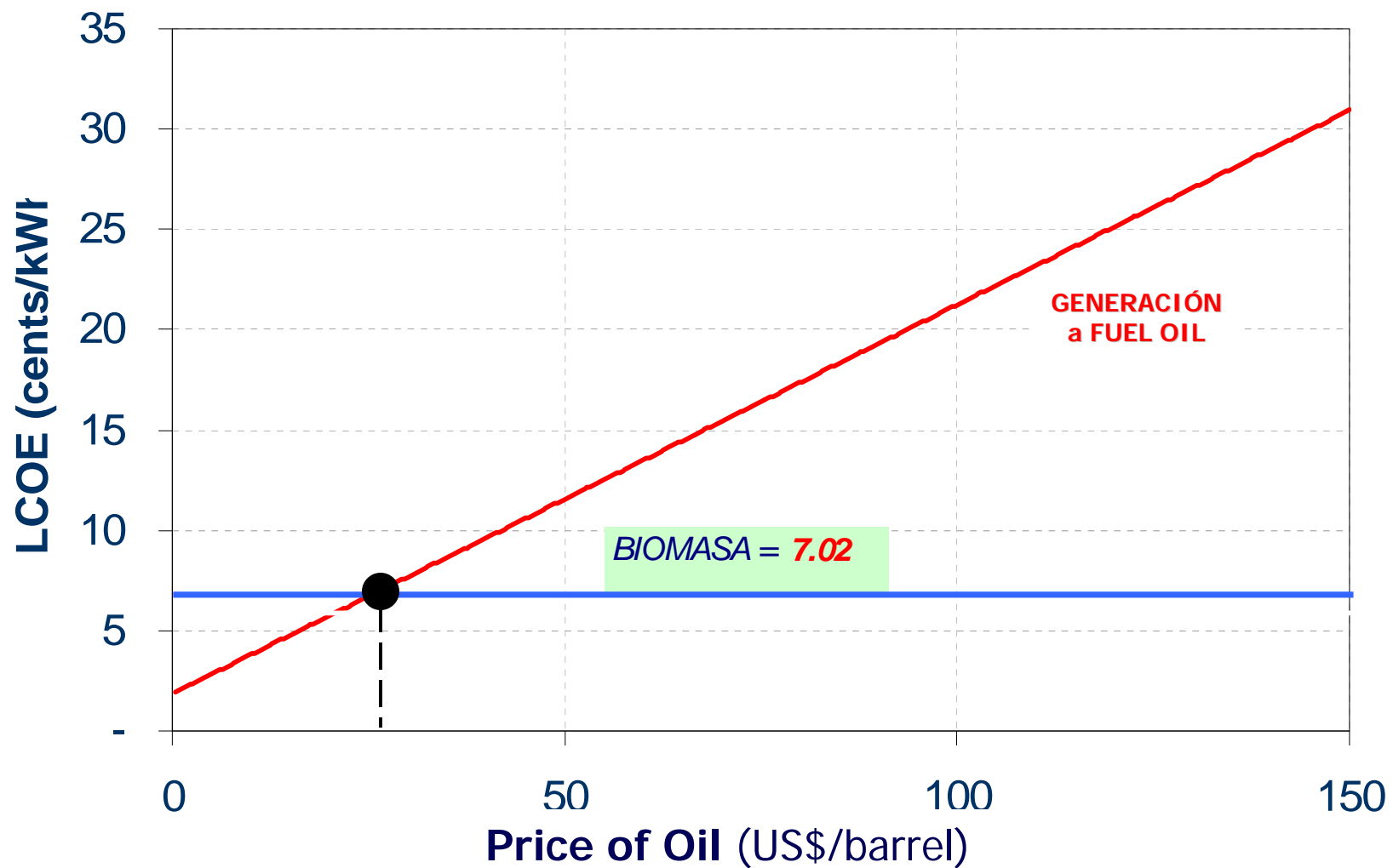


# Levelized Cost of Energy (LCoE): Mini HYDRO



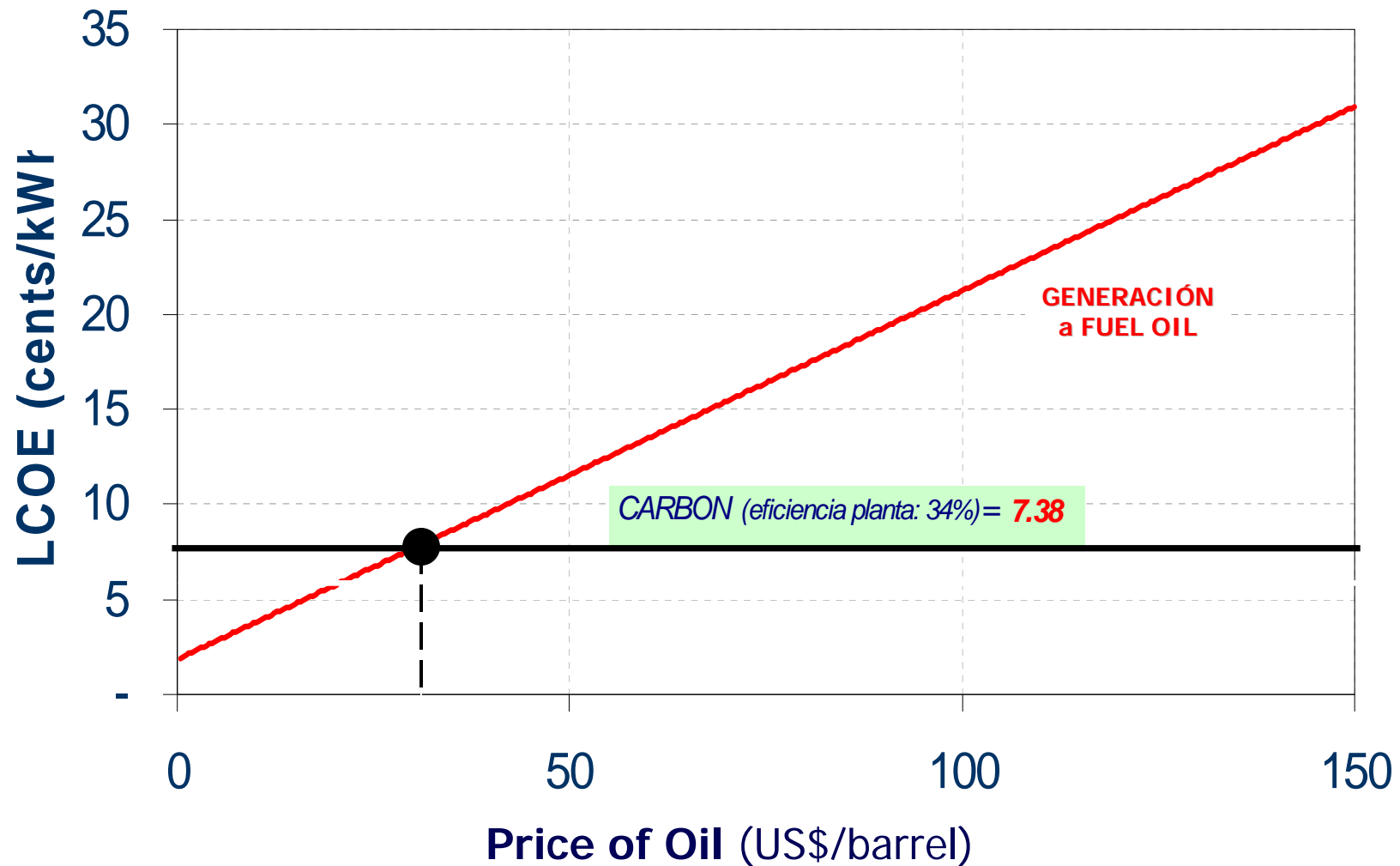
# Levelized Cost of Energy (LCoE):

## BIOMASS (gasification)



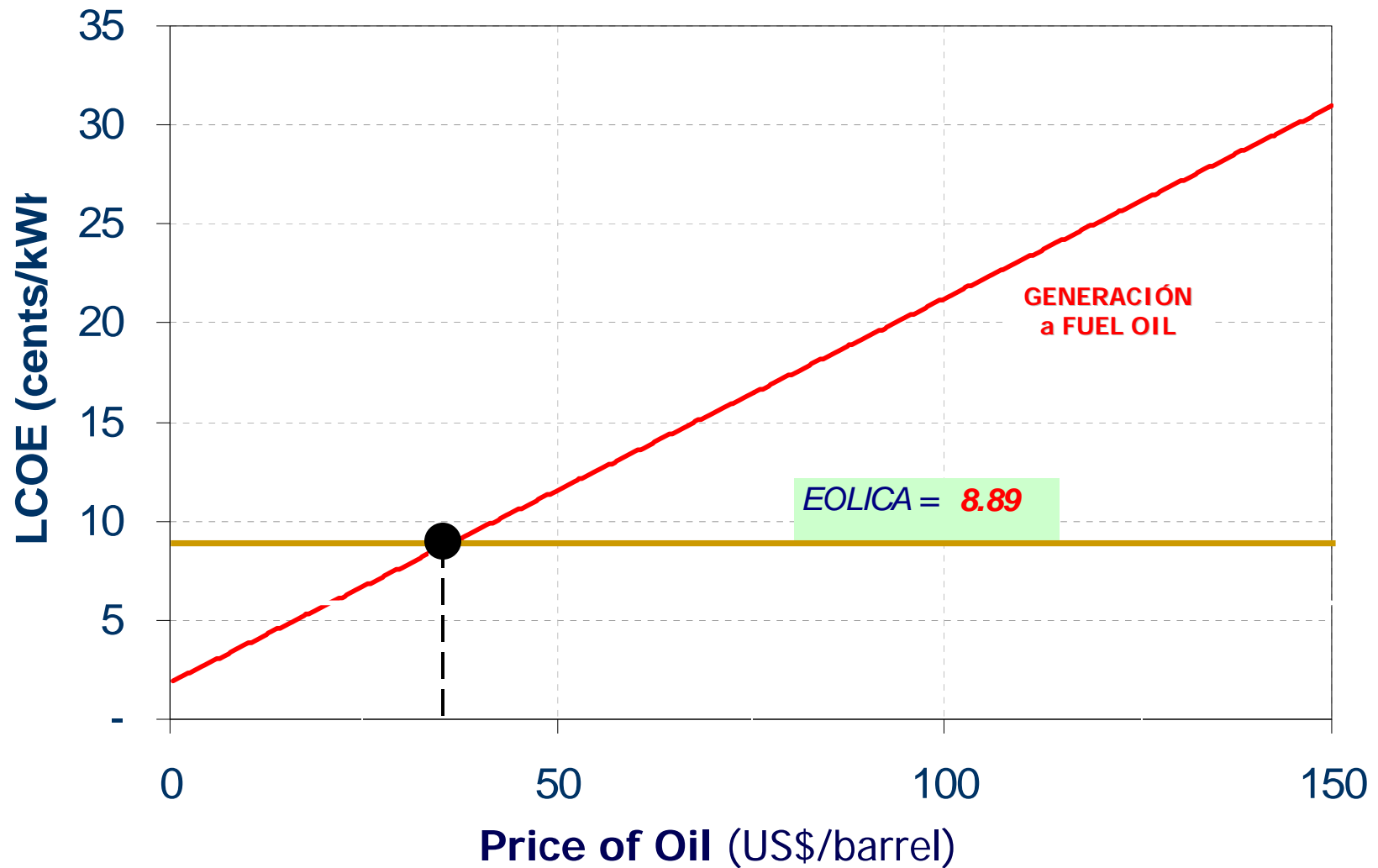
# Levelized Cost of Energy (LCoE):

**COAL** (price: 50 US\$/ton)



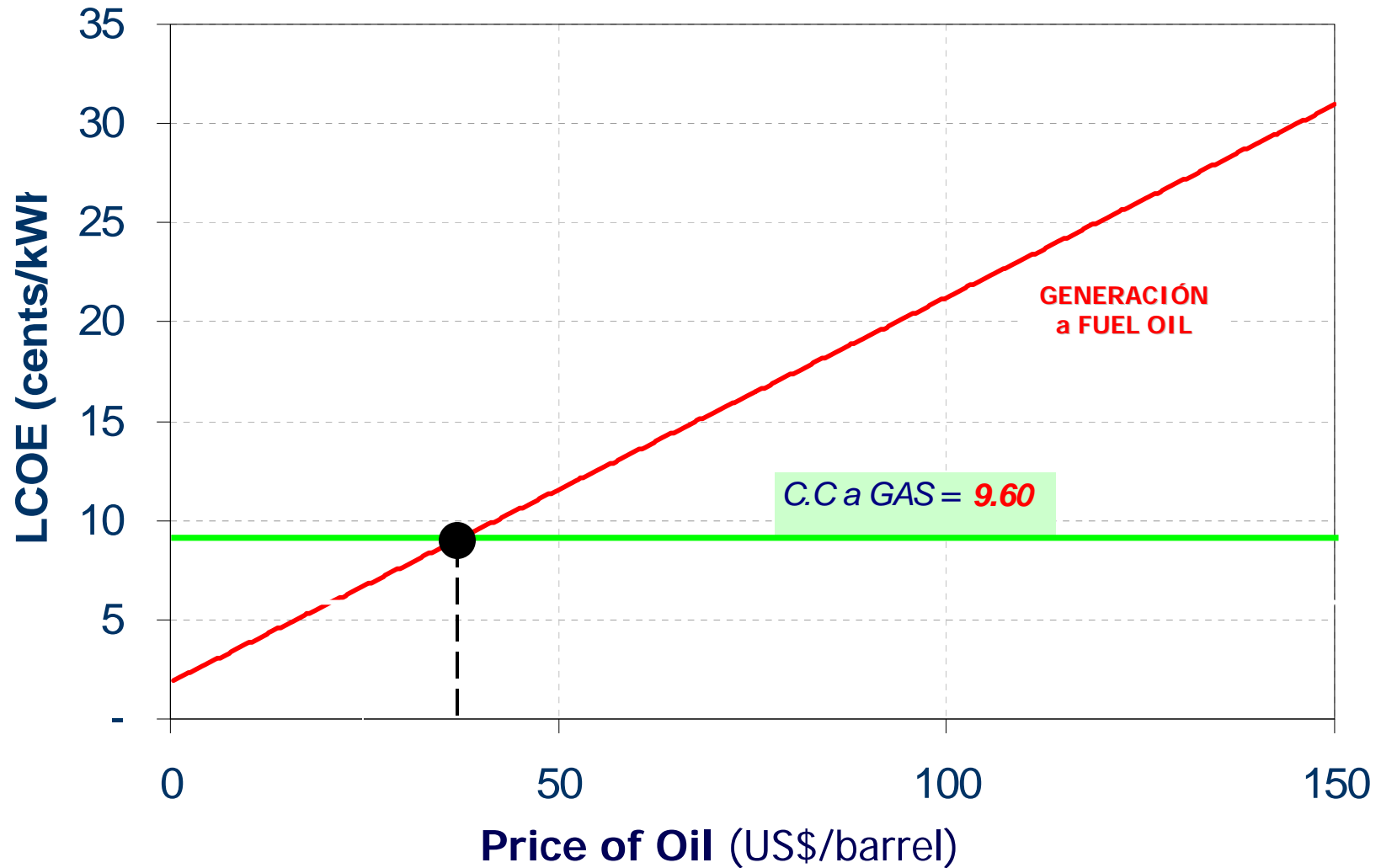
# Levelized Cost of Energy (LCoE):

## W I N D



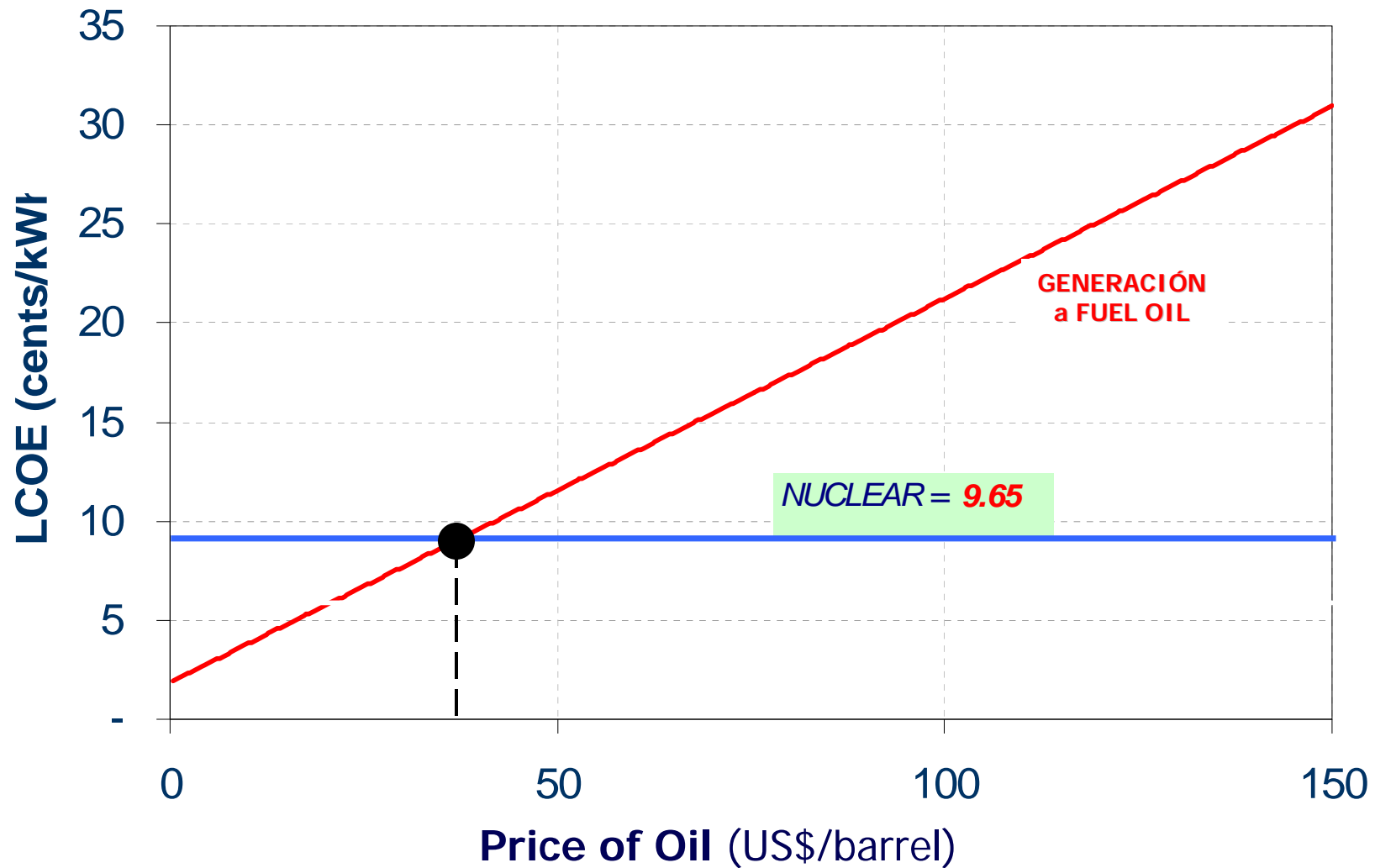
# Levelized Cost of Energy (LCoE):

**COMBINED CYCLE** (price of natural gas: 12 US\$/mmBTU)



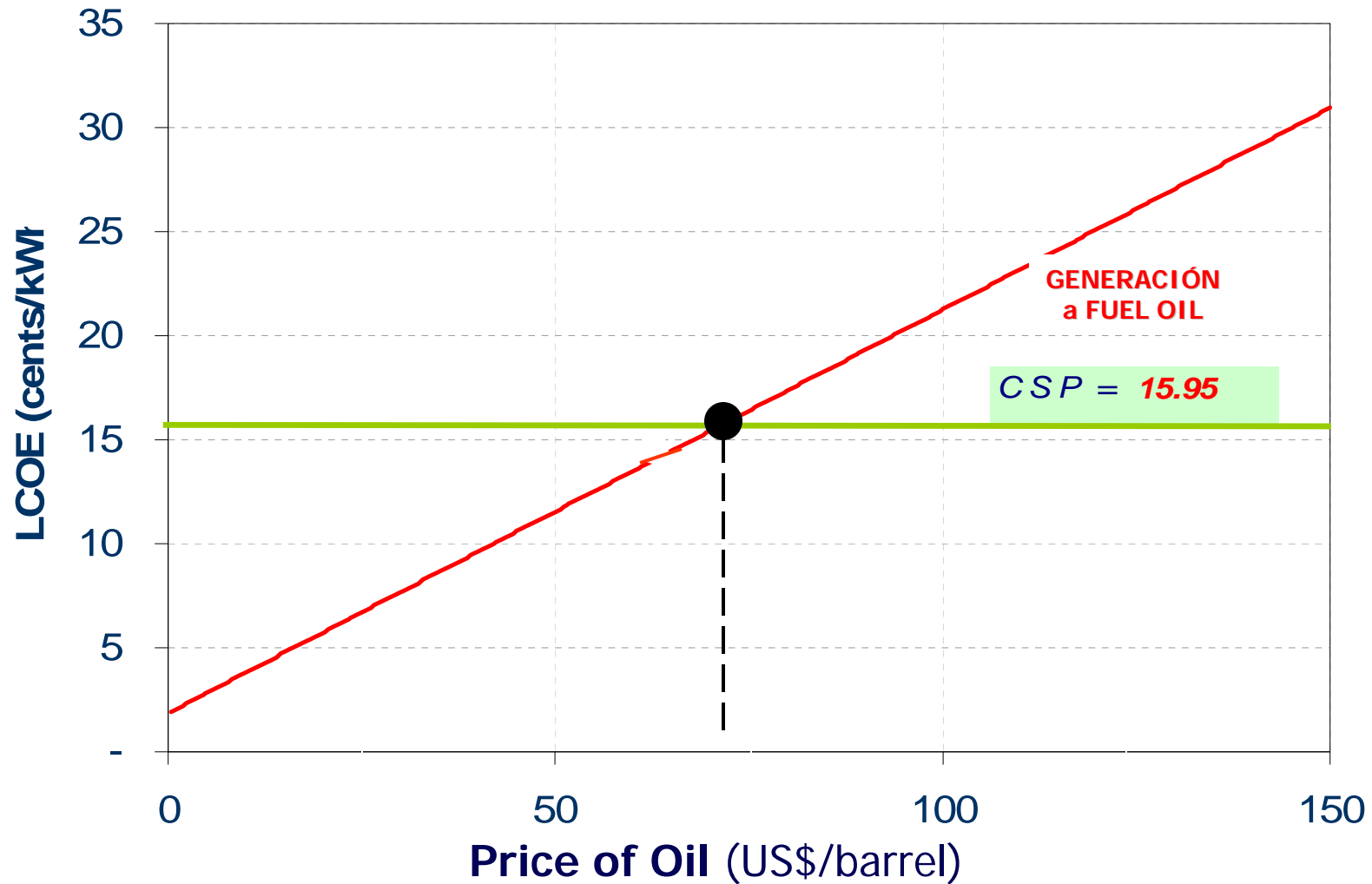
# Levelized Cost of Energy (LCoE):

## NUCLEAR



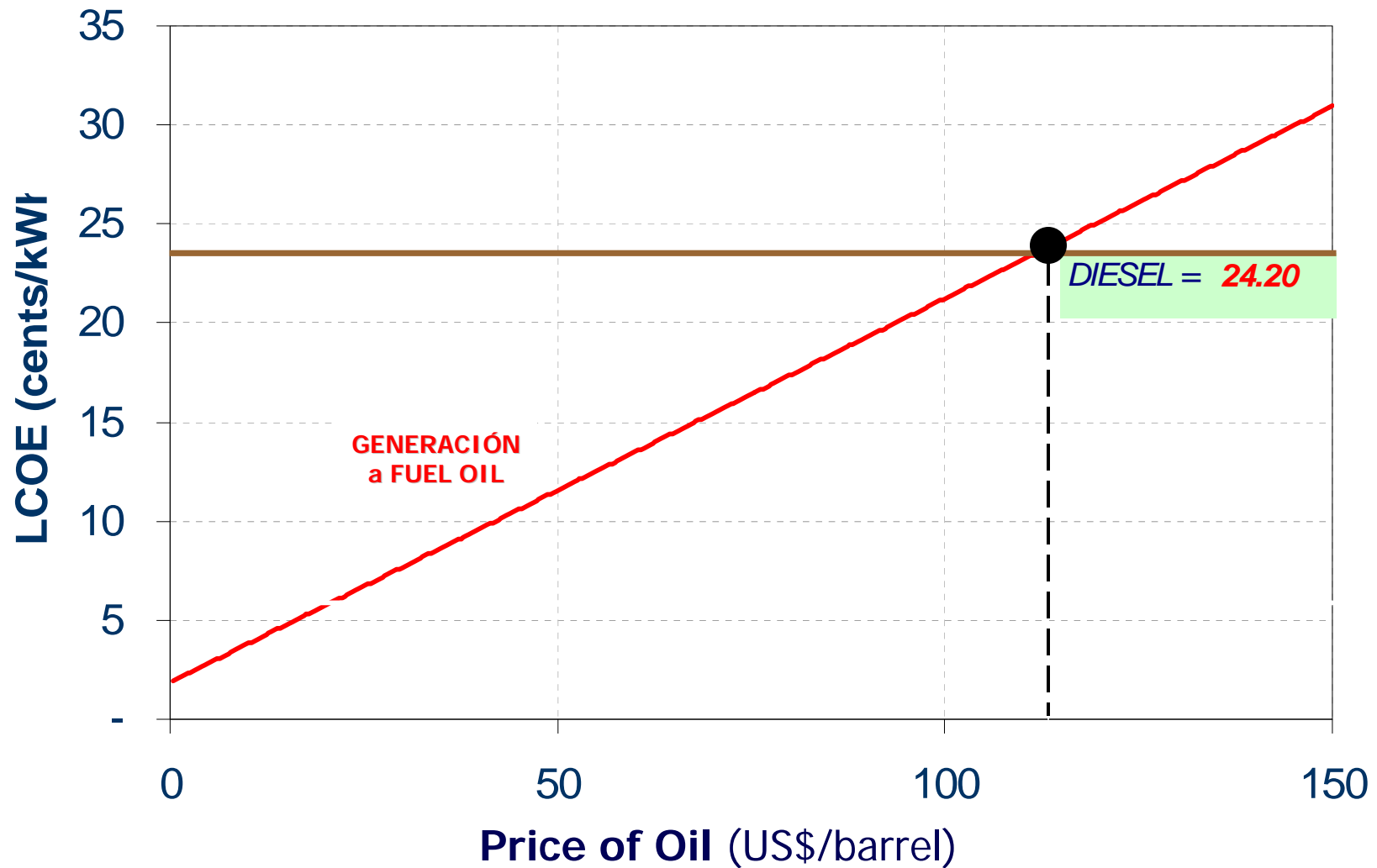
# Levelized Cost of Energy (LCoE):

## CONCENTRATED SOLAR POWER (CSP)



# Levelized Cost of Energy (LCoE):

**DIESEL** (price: 3.50 US\$/gallon)



# INSTITUTIONAL BARRIERS

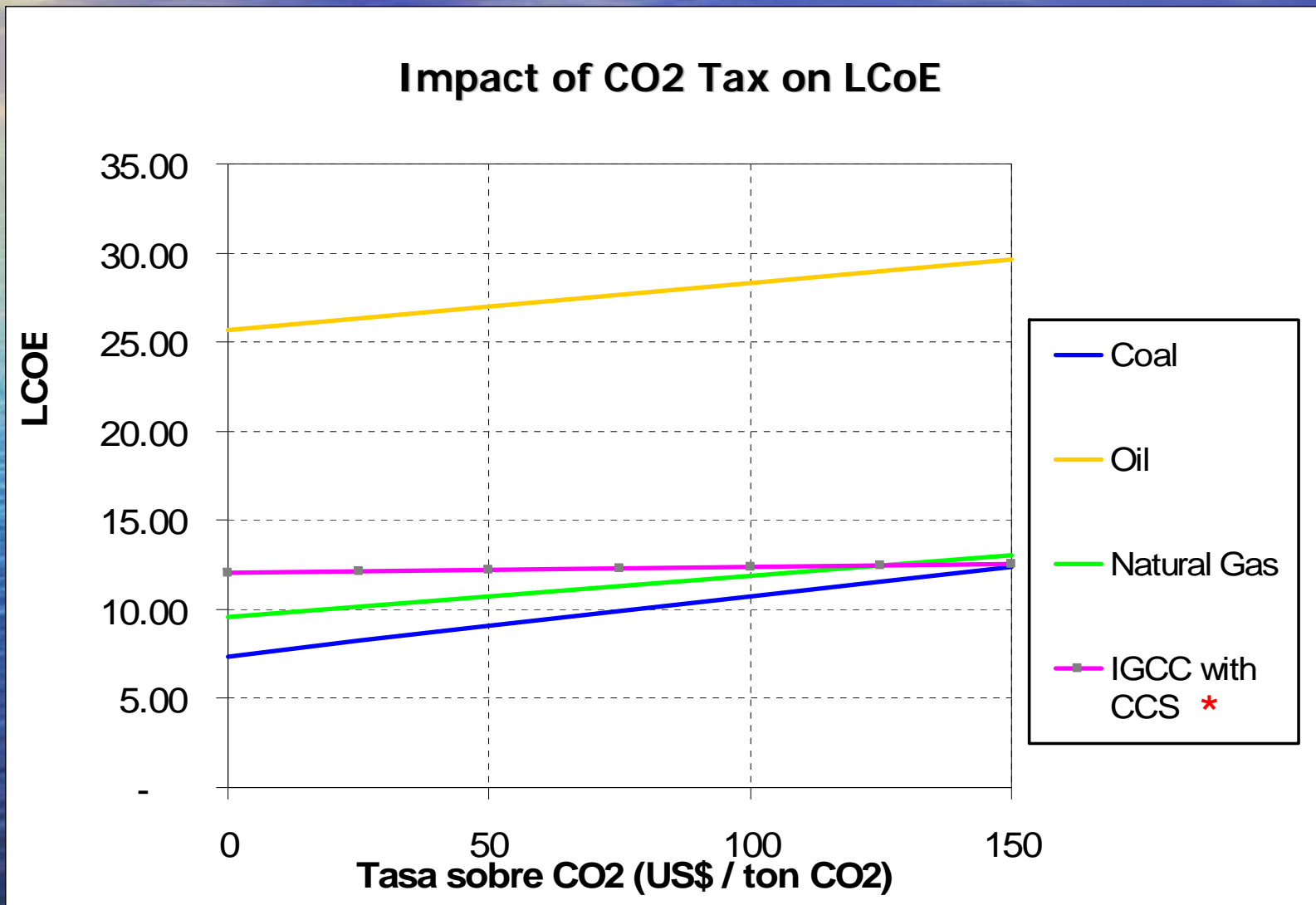
- Limited **institutionality** of the renewable energies
- Tendency to **prioritize red expansion** instead of renewable projects “in situ”
- **Global benefits not recognized** by the energy authorities (see next graphic)

# EXTERNALITIES AND GENERATION COST

SOURCE	GENERATION COST (US\$ cents/kWh)	EXTERNALITIES * (US\$ cents/kWh)
COAL	4 - 5.5	9.2
NATURAL GAS	3 - 4	0.8
LARGE HYDRO	1.8 - 3	0.01
FUEL OIL	3.9 - 5.3	9
NUCLEAR	2.4 - 7.2	0.4
GEOTHERMAL	4.5 - 8.5	0.6
MINI - HYDRO	5 - 10	0.01
BIOMASS	4 - 9	0.5
WIND	3 - 8	0.1
PHOTOVOLTAIC	30 - 80	0.7
	Range min - max , world average	"Uniform World Model" for Spain – calculated by UAH

\* Damages produced by polluting emissions coming from an energy source. Calculated throughout the whole "life cycle" of each kilowatt/hour

# ..and if the World imposes a CO<sub>2</sub> Tax to fossil fuels....



The  
Economist

America's new thinking on the Middle East  
Why hedge fund fees need capping  
Can the PlayStation 3 make Sony?  
The soaring price of luxury cars  
The kidney market

# Green dreams

The risky boom in the clean-energy business



Today, not only technical, ethical and environmental, but also **economical elements** exist that could open the way to a massive implementation of selected renewable energies.

So, let's go on promoting our **"Green Dreams" !**



***Thank you***

[manlio.coviello@cepal.org](mailto:manlio.coviello@cepal.org)