

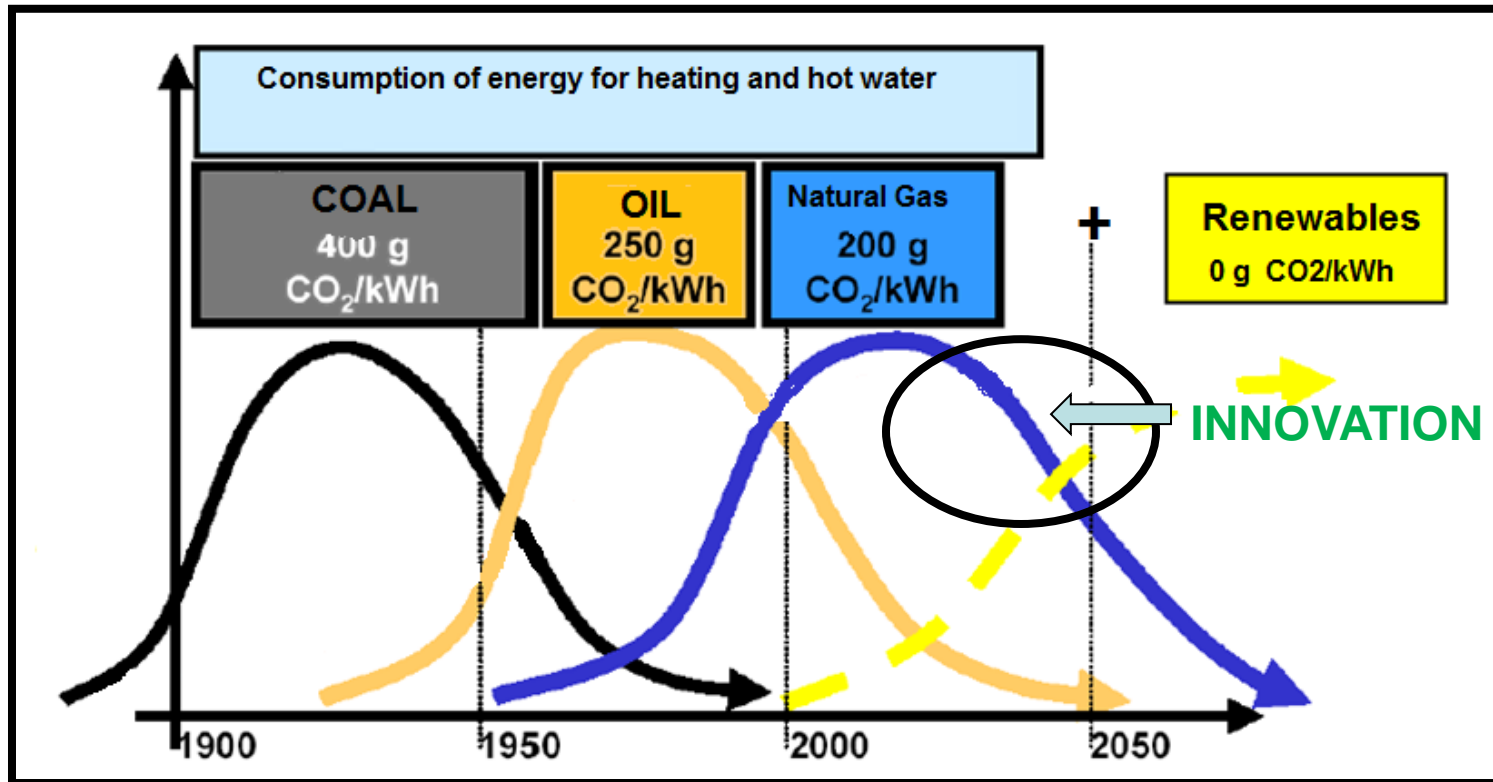
# **ENERGY MANAGEMENT SYSTEMS AND INTEGRATED USE OF GAS AND RENEWABLES**

SEOUL – 19 th October 2011  
GDF SUEZ – CRIGEN - F.PASTIER

# SUMMARY

- **Context and targets : Low carbon emissions**
- **Solutions with natural gas : Roadmaps**
- **Energy management systems : Think Global**
- **Key points for a brilliant future for gas industry**

# Context : Low carbon emissions



# TARGETS : REGULATION (=RT 2012) IS THE KEY DRIVER

PRIMARY ENERGY REPARTITION IN FRANCE		OBJECTIVES OF PRIMARY ENERGY		
		HOUSES BEFORE 2008 * (EP)	RT 2012 EXISTING HOUSE LOW CONSUMPTION (EP)	RT 2012 NEW HOUSE LOW CONSUMPTION (EP)
1. HEATING	142 KWHEP/M <sup>2</sup> .YEAR	±40 KWHEP/M <sup>2</sup> .YEAR	±15 KWHEP/M <sup>2</sup> .YEAR	< 10 KWHEP/M <sup>2</sup> .YEAR
1. HOT WATER	21 KWHEP/M <sup>2</sup> .YEAR	±25 KWHEP/M <sup>2</sup> .YEAR	±25 KWHEP/M <sup>2</sup> .YEAR	±15 KWHEP/M <sup>2</sup> .YEAR
1. COLD	12 KWHEP/M <sup>2</sup> .YEAR	±15 KWHEP/M <sup>2</sup> .YEAR	±10 KWHEP/M <sup>2</sup> .YEAR	<10 KWHEP/M <sup>2</sup> .YEAR
1. LIGHTING				
5 . ELECTRICAL AUXILIARY	30 KWHEP/M <sup>2</sup> .YEAR			
INTERNET & COMPUTERS	75 KWHEP/M <sup>2</sup> .YEAR	75 KWHEP/M <sup>2</sup> .YEAR	60 KWHEP/M <sup>2</sup> .YEAR	60 KWHEP/M <sup>2</sup> .YEAR ↘
WASHING - MACHINES				
<b>Consumptions (1+2+3+4+5)</b>	<b>±205 KWHEP/M<sup>2</sup>.YEAR</b>	<b>80 KWHEP/M<sup>2</sup>.YEAR</b>	<b>50 KWHEP/M<sup>2</sup>.YEAR</b>	<b>0</b>

# TARGETS : ENERGY EFFICIENCY IN BUILDINGS



Labels that classify the efficiency from A to G



Isolation

Renewable Energies 



# Solutions with natural gas : Roadmaps

In all markets, the unit energy consumption is decreasing and their distribution regarding heating, hot water, lighting, ventilation and other uses electric is deeply changed.

**Energy systems have to meet the new costumers' needs**

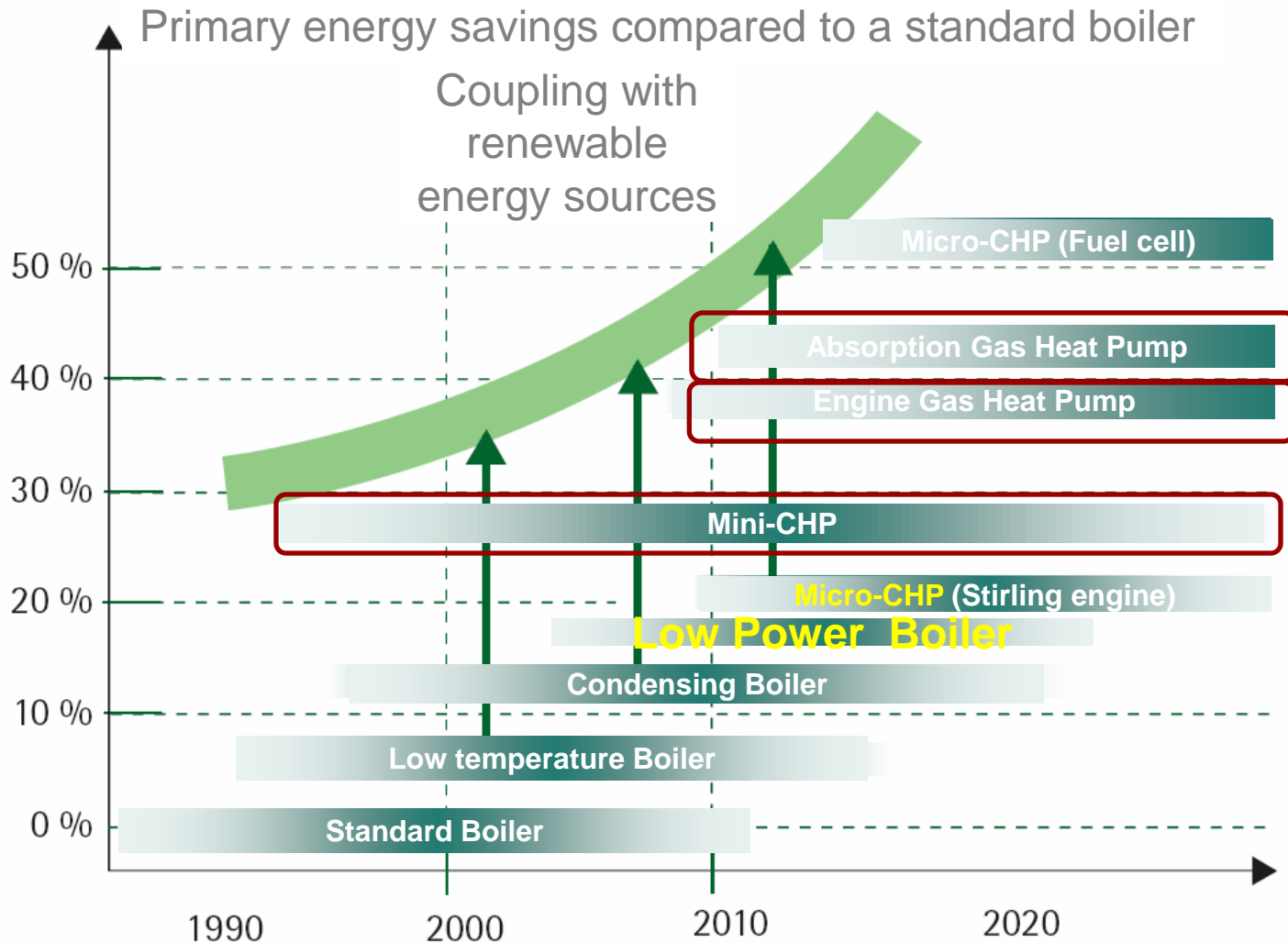
**No major technological breakthroughs, but an important conceptual jump.**

**Dissociation and association between heat demand electric power production-**

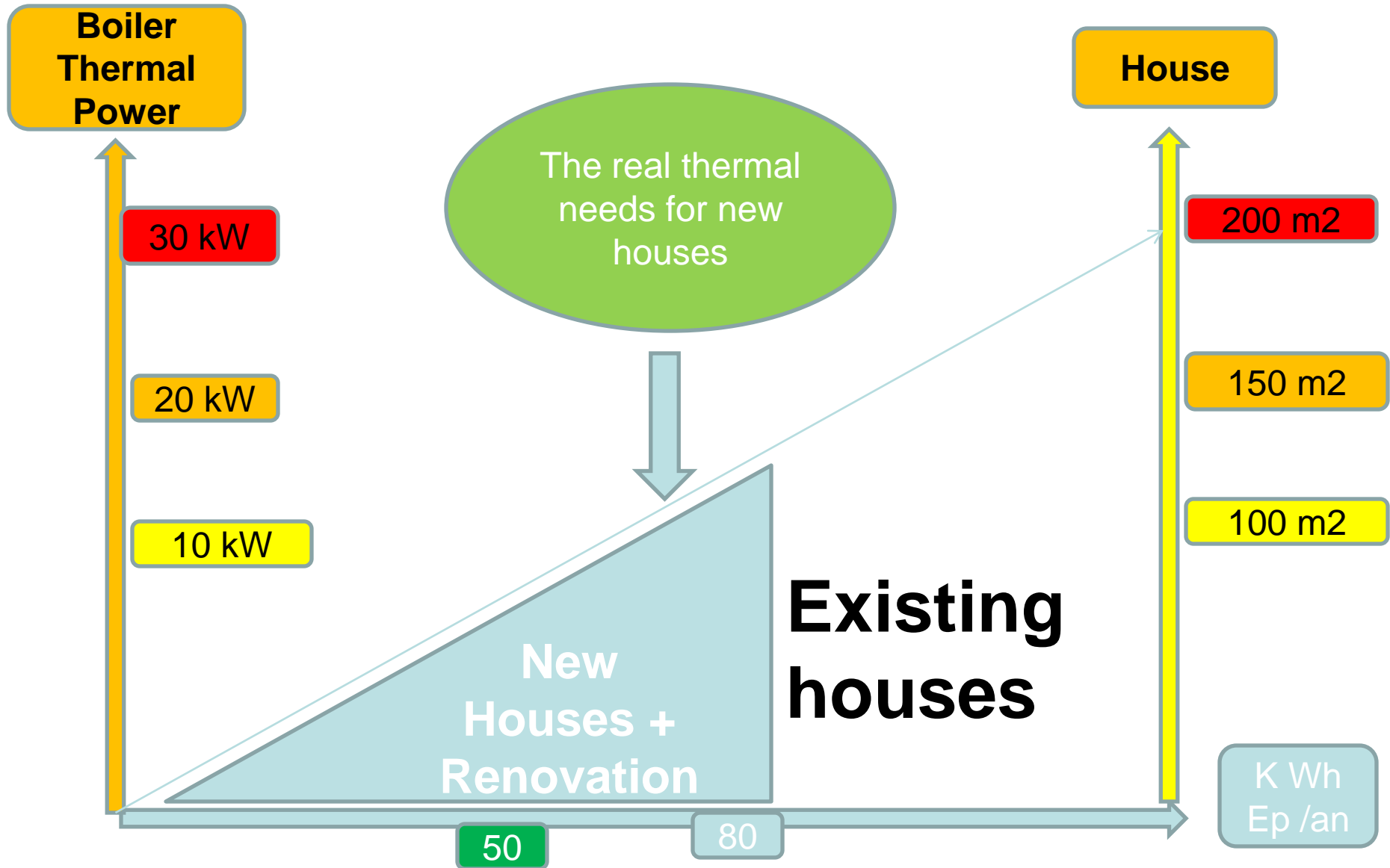
**High energy mix :**

Complementarities between fossil energy, electricity and renewable energy in a single energy system to meet the needs of cold, heat and electricity

# Solutions with natural gas : Roadmaps for France

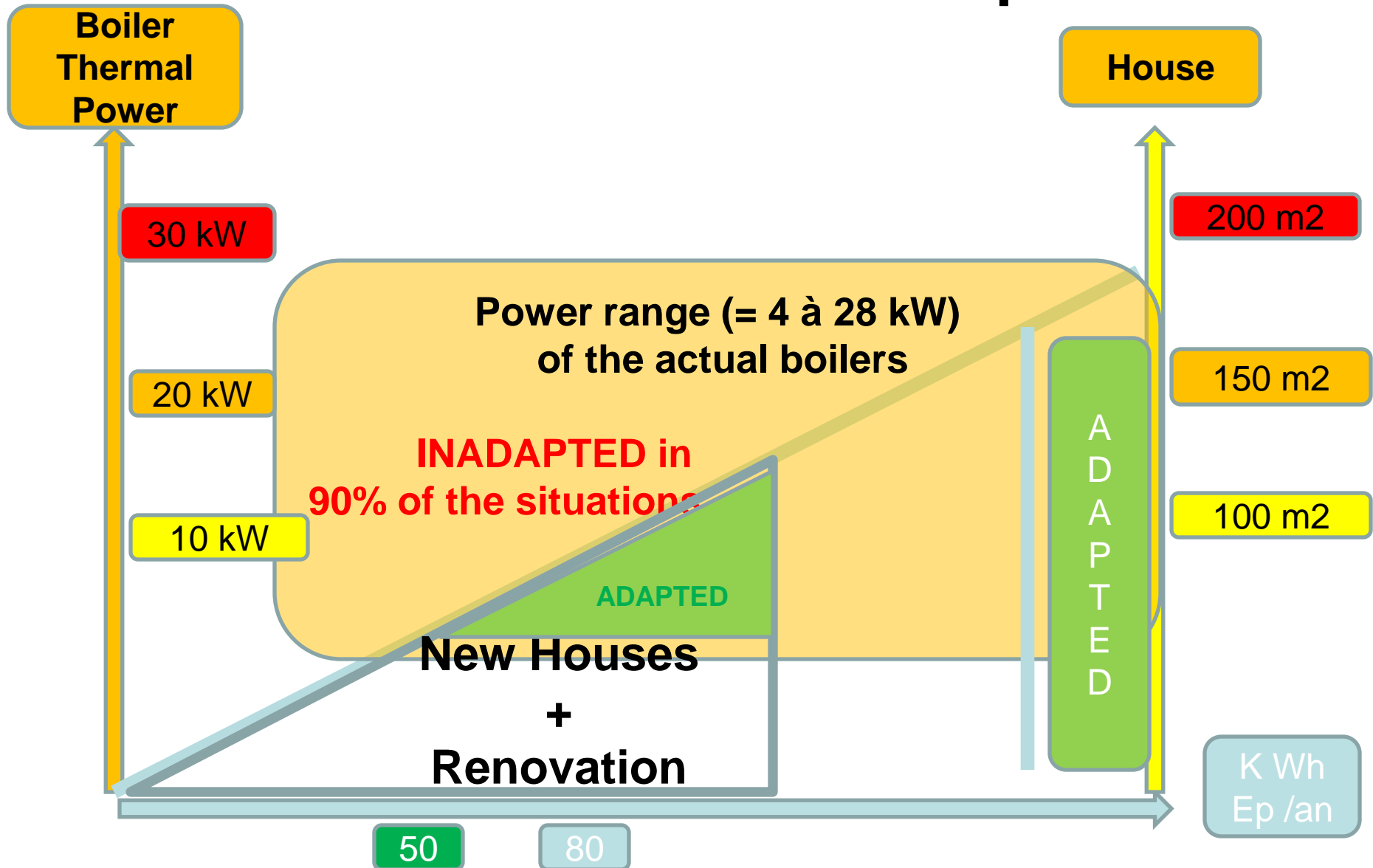


# Solutions with natural gas : Boilers' Roadmaps

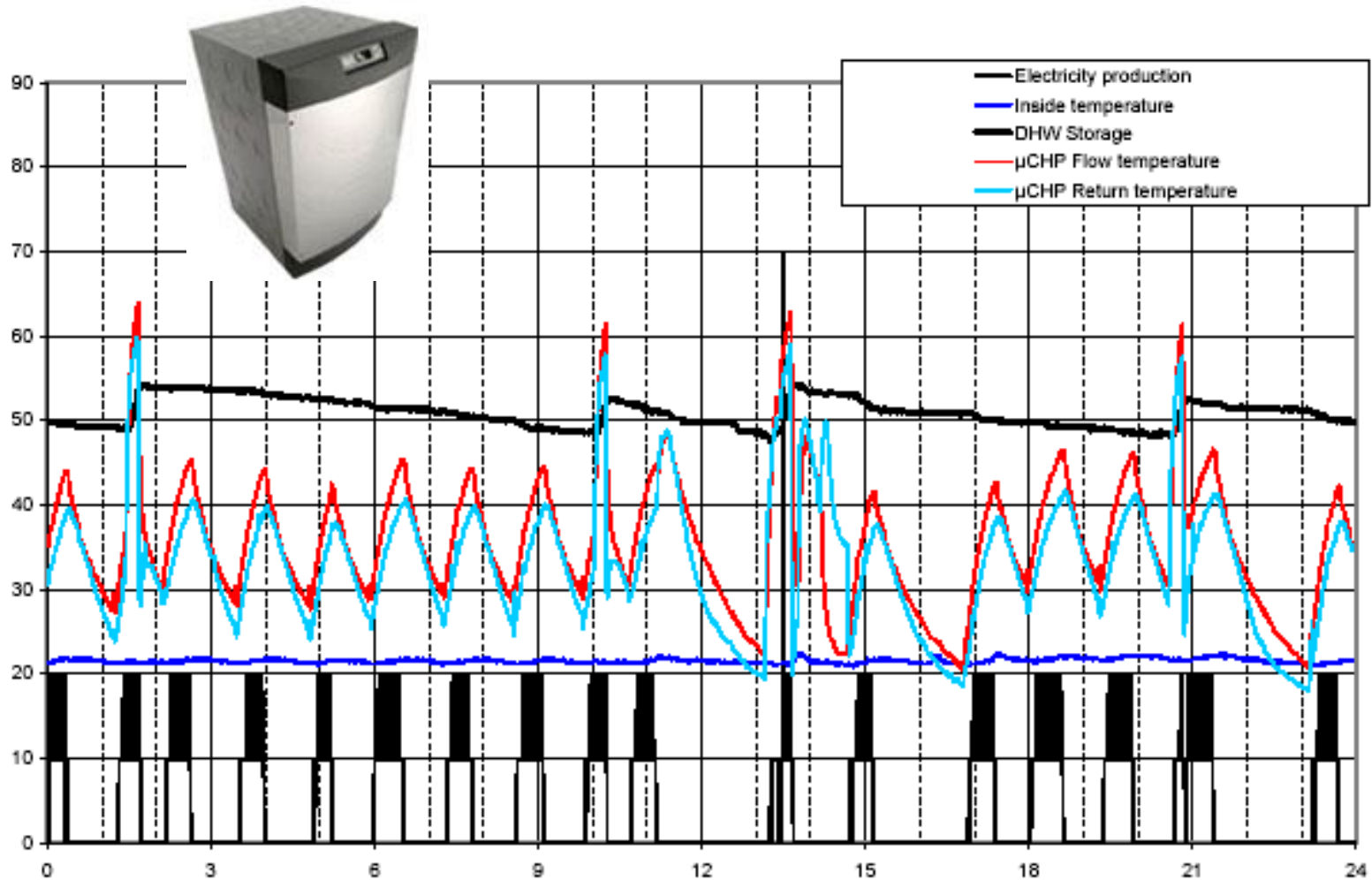




# Solutions with natural gas : Boilers's Roadmaps

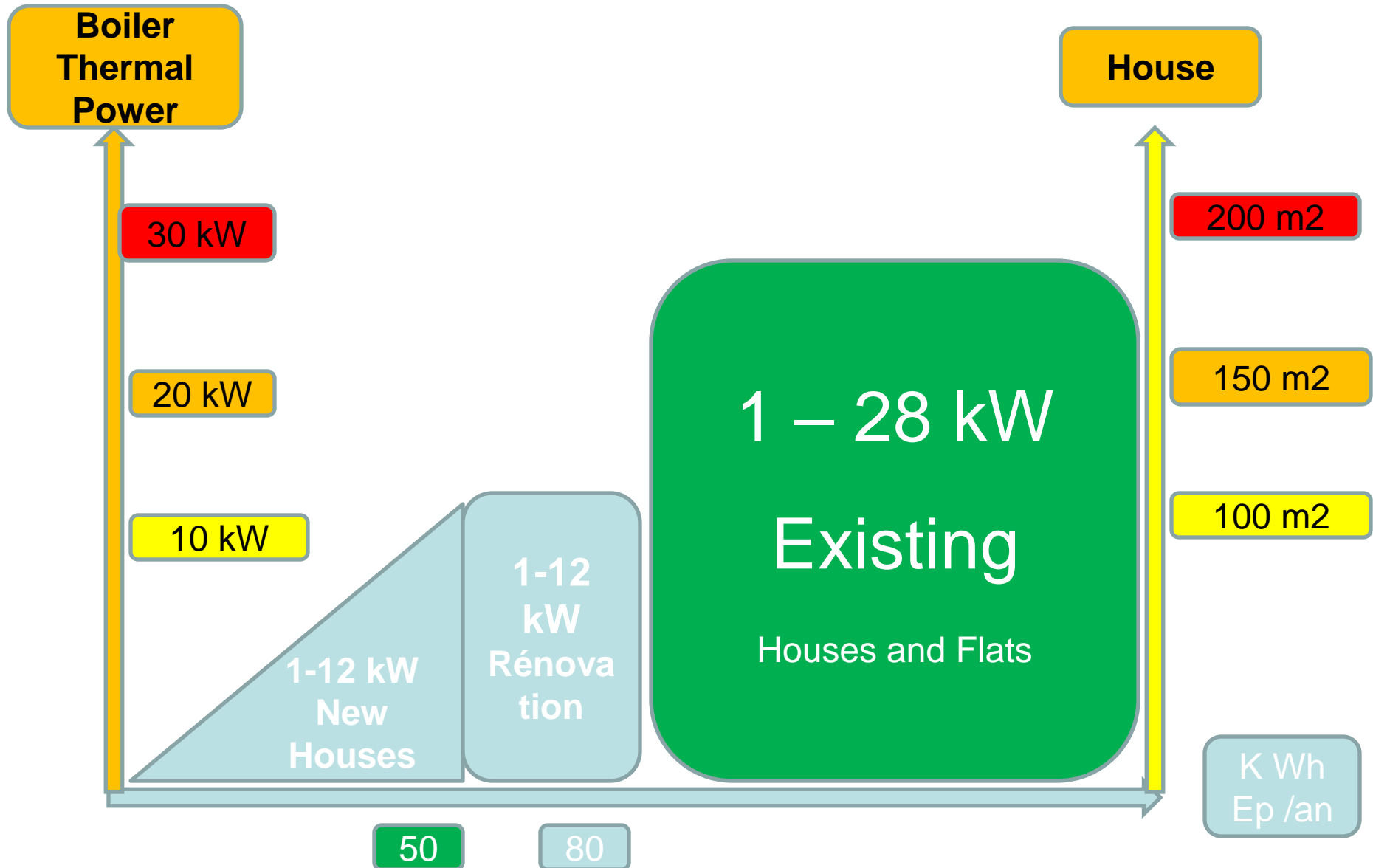


# What really happens



# New Solutions for natural gas :

## 2 Low Power Modulating Boilers of GDF SUEZ



# Low Power Modulating Boilers



Low NOx  
Burner



Water tank  
150 liters



Floor Boiler version



Wall Hung  
version



Insert Vidéo with modulation to 1 kW  
Rotameter : instant power viewing

# Low Power Modulating Boilers : First results

- Constant efficiency (108% PCI) for every power demand 1kW to 12 or 28 kW
- Gas consumption reduced by 20%
- CO<sub>2</sub> emissions reduced by 30%

# Energy management systems : Think global

**Energy systems have to meet the new costumers' needs**

**Dissociation and association between heat demand  
electric power production**

**High energy mix :**

Complementarities between fossil energy, electricity and renewable energy in a single energy system to meet the needs of cold, heat and electricity

# Energy management systems : Think global

**Field test = metering + test of new concepts**

Between October 2007 and June 2008 : 40 units installed & metered

**Hot Water + Electricity  
produced by the Stirling**

35 clients



Washing  
Machine



Dish  
Washer



# Energy management systems : Think global

Energetical efficiency  
from 76 to 57

Fuel Car



For 100 km (6L)

Losses



Fuel car  
Rdt = 25 %

Electrical vehicle  
only



For 100 km

Losses



Electrical  
vehicle  
Rdt = 80 %

Losses



Transport &  
Distribution  
Rdt = 92%

Losses



Mix of  
production  
Rdt = 42%



Electrical  
vehicle  
+  
M-CHP

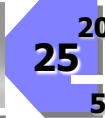


For 100 km

Losses



Electrical  
vehicle  
Rdt = 80 %



Transport &  
Distribution  
Rdt = 92%

M-CHP : Stirling  
Rdt = 105%

Losses



Mix of  
production  
Rdt = 42%

Losses

Combustible 52

57

Combustible 5



# Energy management systems : Think global

Gaz consumption = 19 000 kWh / year

Electricity production = 1 200 kWh / year

Electricity auto-consumption = 56%

Many « stop and go » = electrical output is decreasing by 20%

High gas consumers make more savings

The annual CO<sub>2</sub> emission decreases by one tonne

# Key points for a brilliant future for gas industry



## Innovation

is transforming an idea into reality  
to acquire a competitive advantage

### 1. Find efficient technologies :

- a. Burners : modulation and CO2 emissions
- b. Electricity production : increase the electrical output up to 60%
- c. Controlers : able to manage different technologies
- d. Every technology is now connected to Internet

### 2. Think Global : Connect : dish wahaer, washing machine and electrical or hybrid vehicule + **RENEWABLES**

**Thank You  
for your  
attention**

