



# DOMESTIC APPLIANCES : EVER-GROWING EFFICIENCIES VS EVER-CHANGING BEHAVIORS

November 2012  
Sacramento

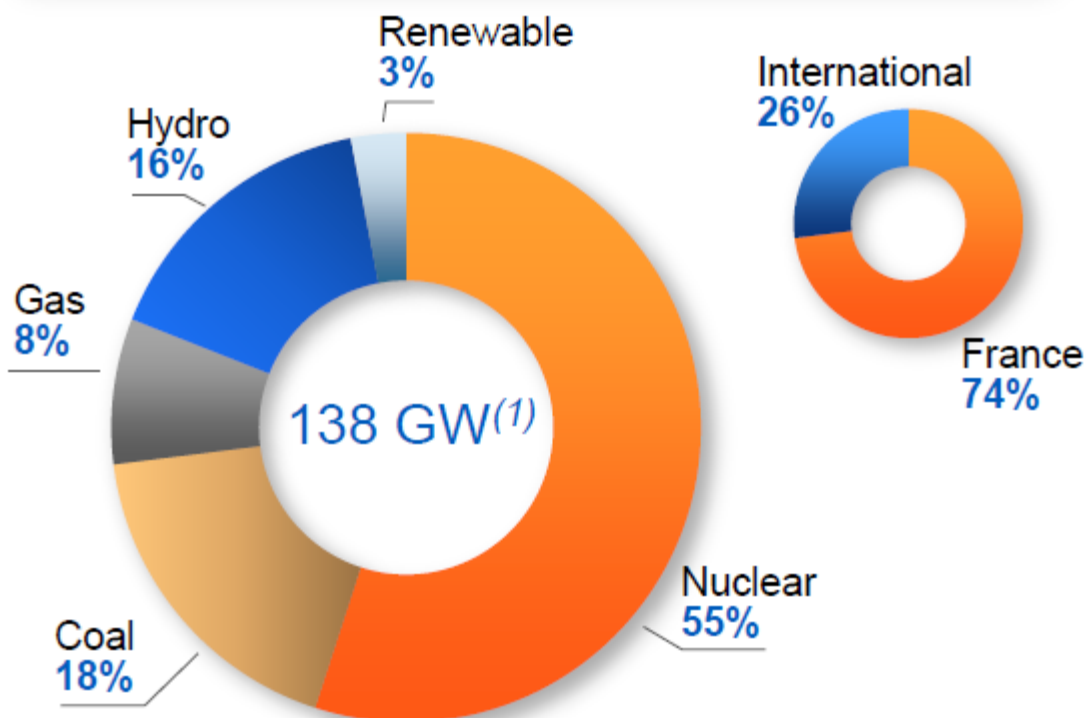
**Aurelia ESTEVE**  
aurelia.esteve@edf.fr

**Guillaume BINET**  
guillaume.binet@edf.fr



# EDF (ELECTRICITE DE FRANCE) PRESENTATION

Capacity installed (in GW)  
consolidated figure as at 31 December 2011



## Figures for France

Did you know?

**628.2 TWh**

Global generation

~80% nuclear

~8% fossil fired

~7% renewables<sup>(2)</sup>

~5% gas

**37.7 million**

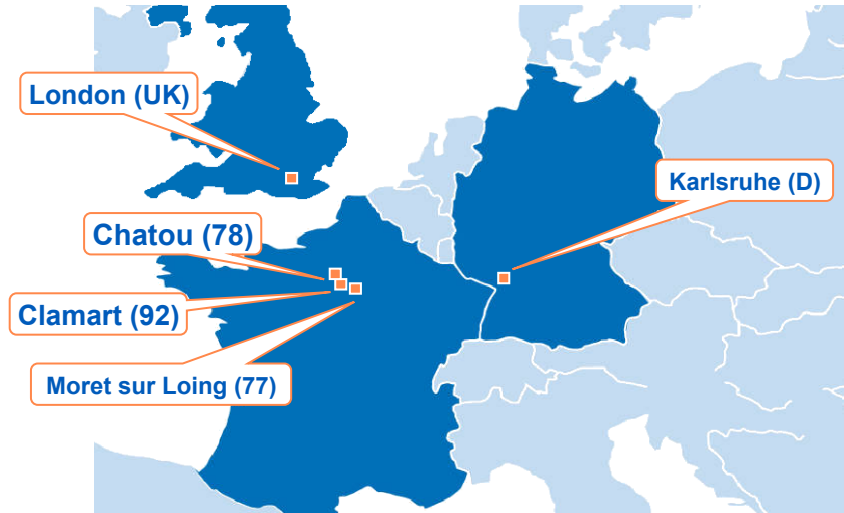
Customers

<sup>(2)</sup>Including hydropower

<sup>(1)</sup> Net capacities + non-controlling interests

# EDF R&D DEPARTMENT

**5** research centres close to our clients



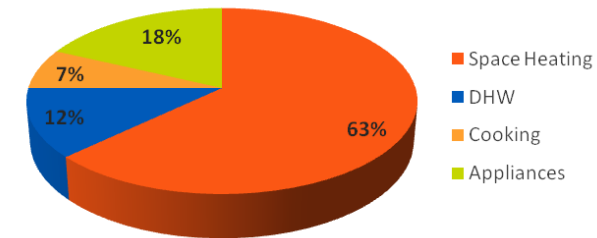
- **2,000** people
- **30%** women
- **78%** engineers and research staff
- **300** PhDs et **220** doctoral students
- **150** researchers who teach at universities and top graduate schools

# FRANCE POPULATION & FINAL ENERGY CONSUMPTION

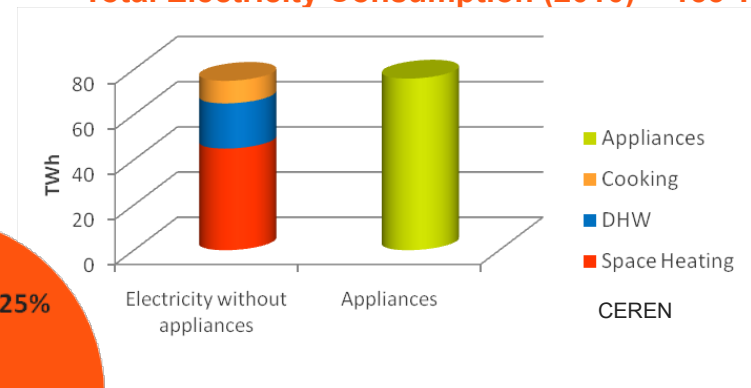


## FINAL ENERGY CONSUMPTION FOR RESIDENTIALS

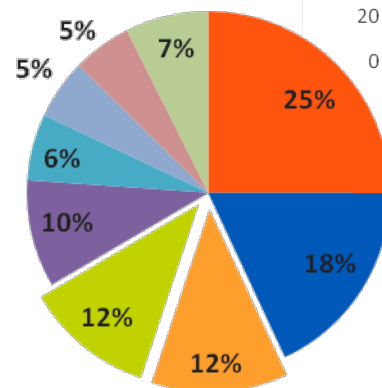
Total Energy Consumption (2010) = 411 TWh



Total Electricity Consumption (2010) = 153 TWh



Appliances = 76 TWh



2 hot topics TV and lighting widespread  
"Early adopters" regulation

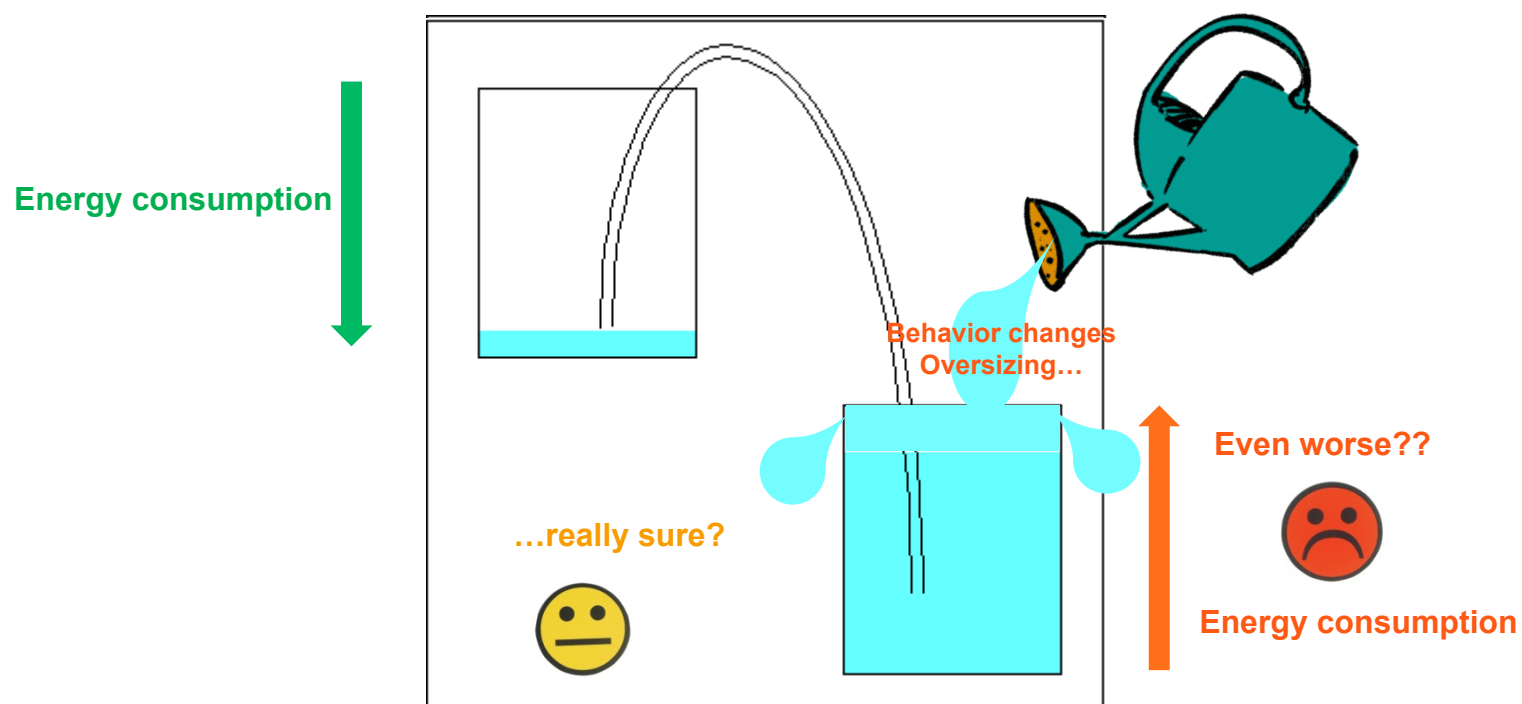
CEREN

EDF R&D



- fridges & freezers
- Small appliances
- TV
- Lighting
- IT
- Clothes-washers
- Dish-washers
- Dumble dryers
- Other

# THINK ABOUT ENERGY EFFICIENCY ...



# LONG TERM ENERGY FORECASTING AND PROSPECTIVE

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→ *Grid development*  
→ *Power plants needs*

## ❖ **Assessment of:**

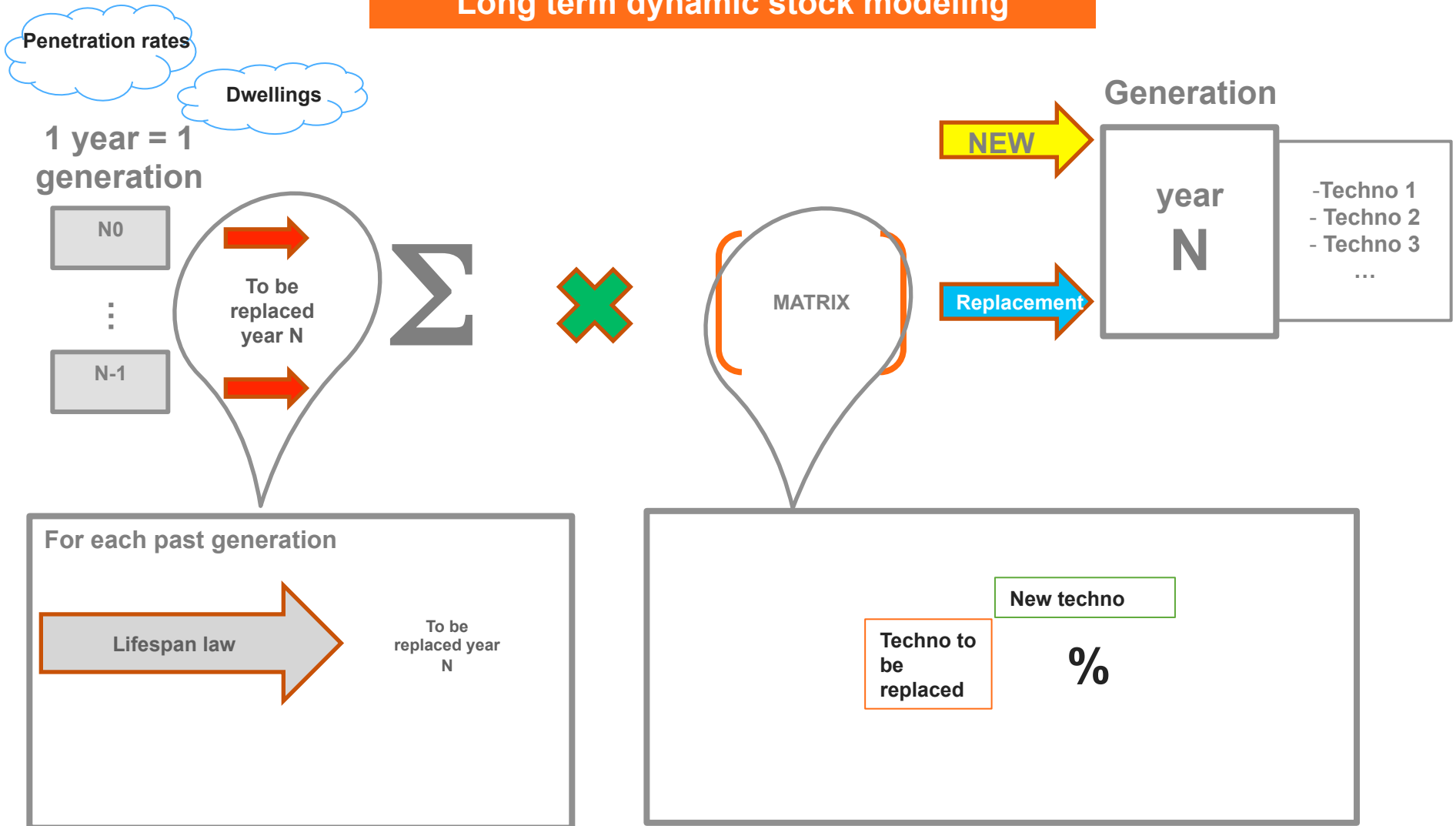
- The impact of technological breakthrough
- The impact of policies and regulation

## ❖ **Models:**

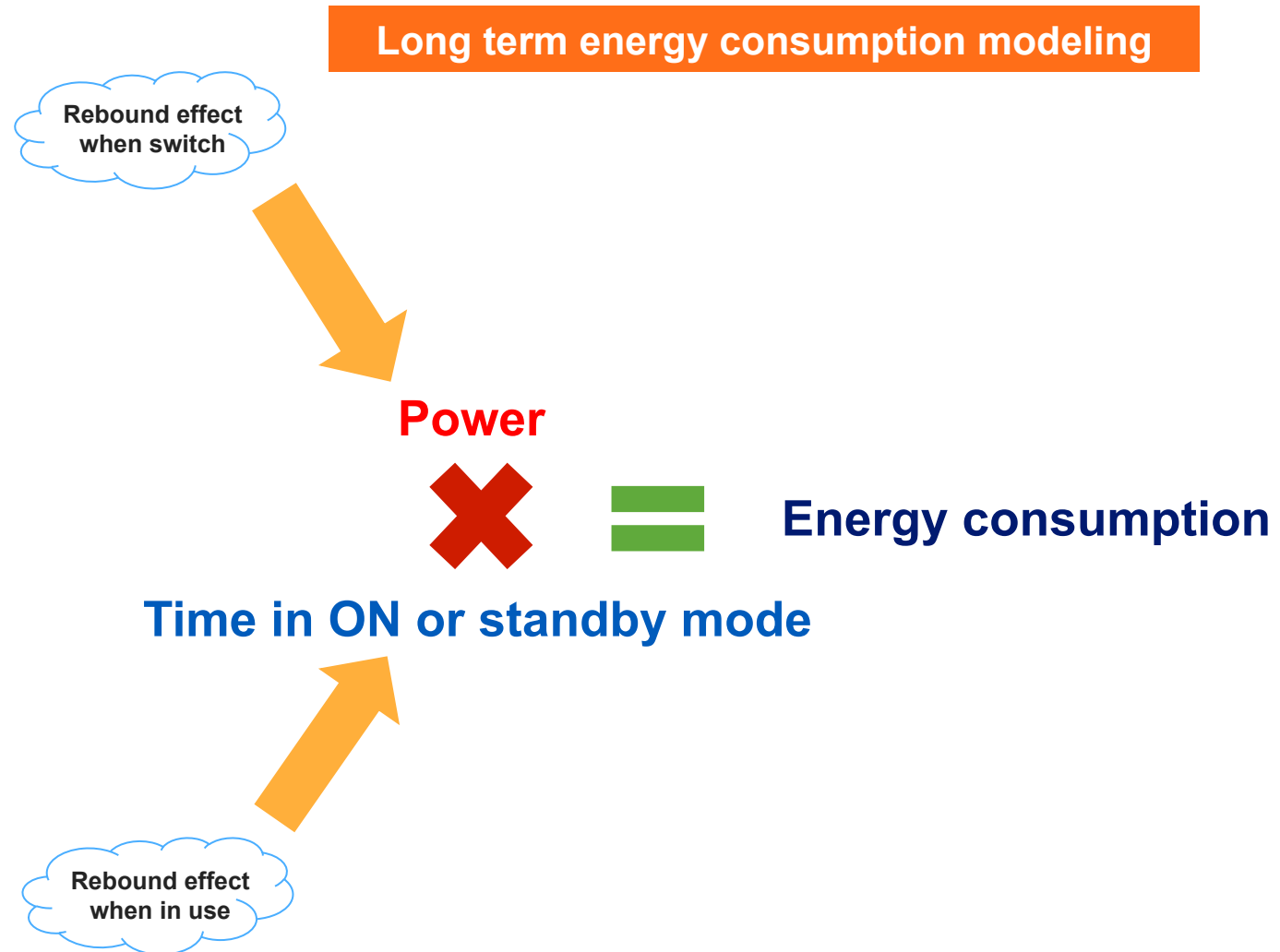
- Bottom-up
- Techno-explicit
- Not only technology-driven models
- Take into account behaviors

# DYNAMIC BOTTOM-UP & TECHNO-EXPLICIT MODEL 1

## Long term dynamic stock modeling



# DYNAMIC BOTTOM-UP & TECHNO-EXPLICIT MODEL 2



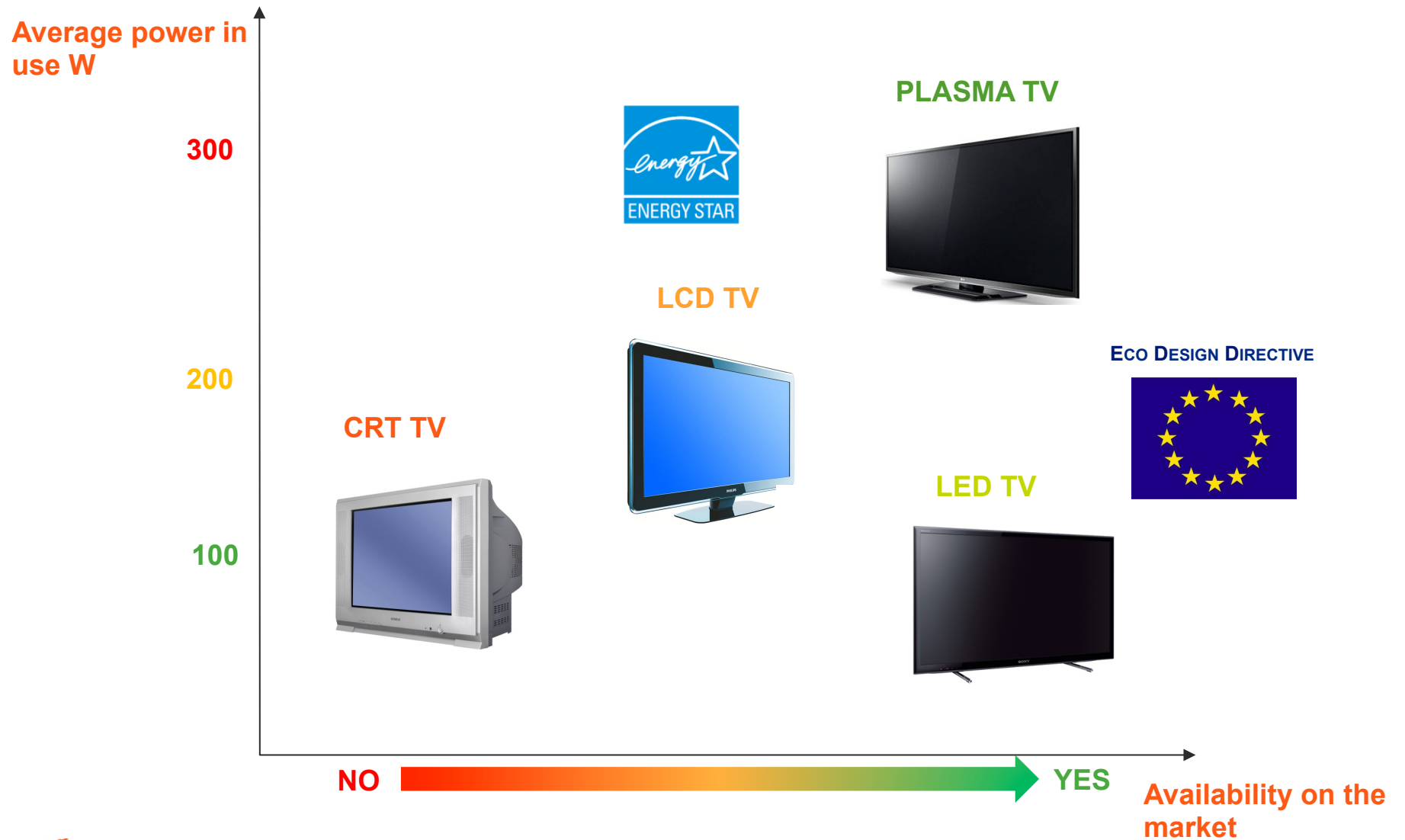


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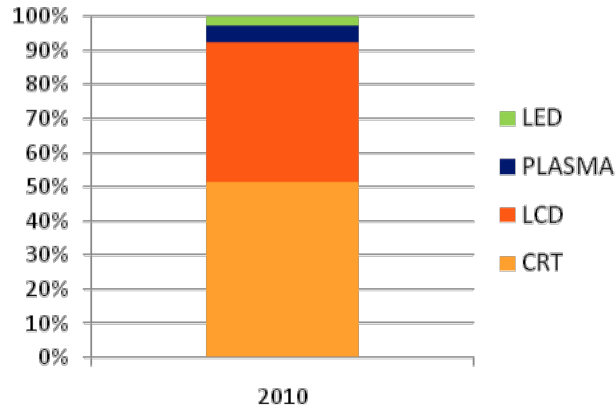
# FIRST CASE STUDY

## TV

# TV : TECHNOLOGIES & REGULATION



# TV : HYPOTHESIS OF THE MODEL



**TARGET 2020 : TV STOCK = 100% LED TV**

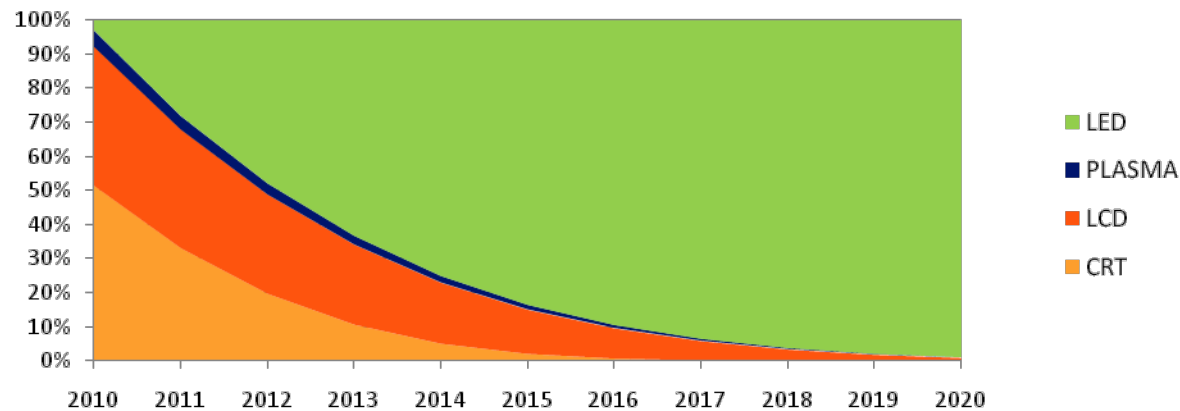
WHAT DOES IT MEAN?

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ANY TV RENEWAL = SWITCH TO LED TV FROM 2010

ANY NEW TV IS A LED TV FROM 2010

TV stock segmentation



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# TV : MAIN RESULTS

## ❖ REFERENCE

Technical saving potential

## ❖ SCENARIO 1

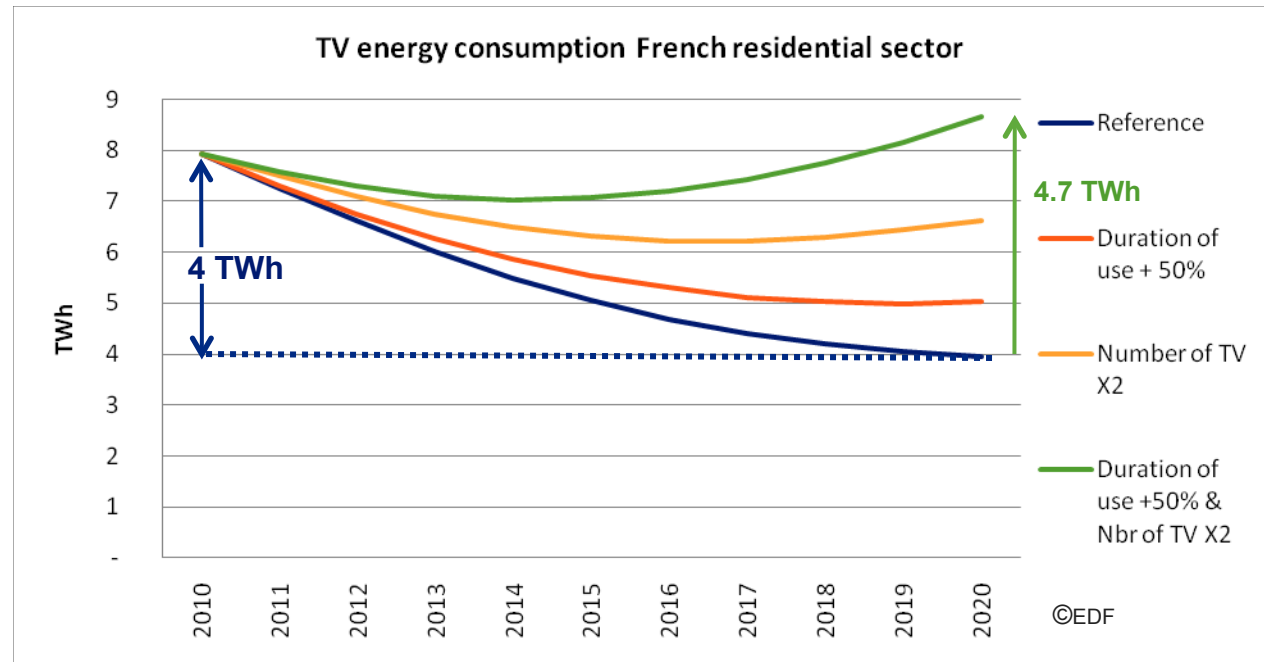
Rebound effect on the duration of use = +50%

## ❖ SCENARIO 2

Rebound effect on the number of TV sets owned by dwellings with already more than one TV = +100%

## ❖ SCENARIO 3

Scenario 1 + scenario 2



➡ Saving Potential **wrecked** in SCENARIO 3

➡ Over consumption due to behavior = **0.7 TWh**

Loss of savings due to Behavior







Electricity consumption for Residentials

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# SECOND CASE STUDY

# LIGHTING

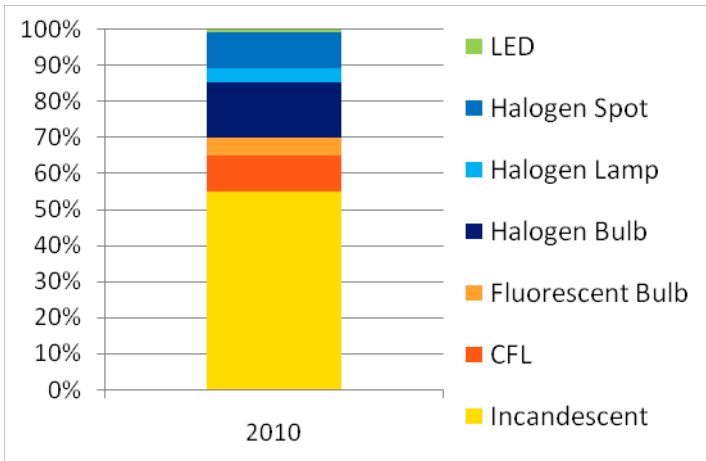
# LIGHTING : TECHNOLOGIES & REGULATION

Energy Class	Type of Light Bulb	
A	 Compact Fluorescent	 LED
B		
C	 Halogen	 <b>BANNED</b>
D		
E		
F		
G		

ECO DESIGN DIRECTIVE



# LIGHTING : HYPOTHESIS OF THE MODEL

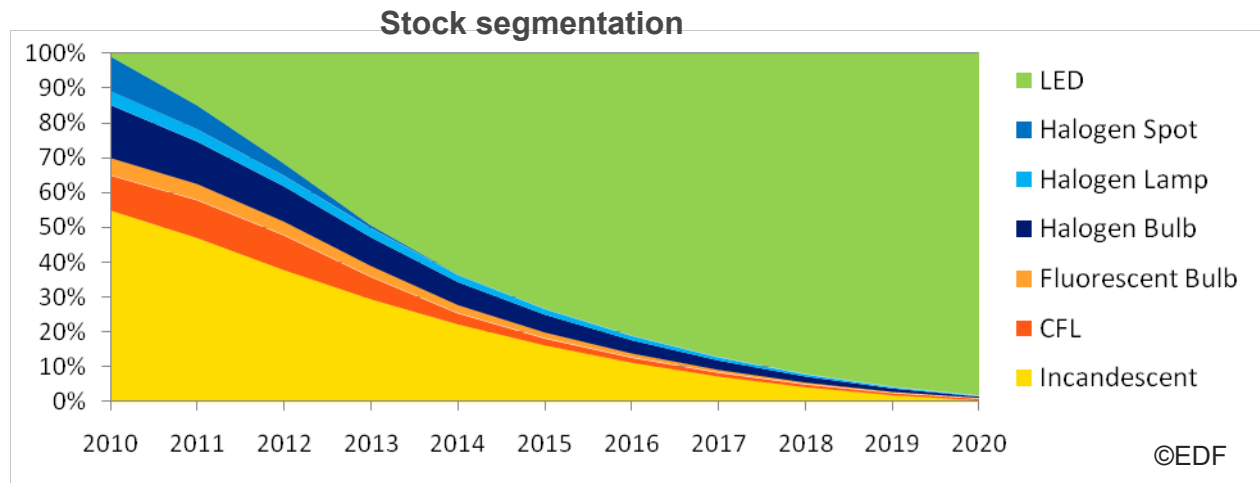


**TARGET 2020 : LIGHTING STOCK = 100% LED**

WHAT DOES IT MEAN?

ANY LIGHT BULB RENEWAL = SWITCH TO LED FROM 2015

ANY NEW BULB IS A LED FROM 2015



# LIGHTING : MAIN RESULTS

## ❖ REFERENCE

Technical saving potential

## ❖ SCENARIO 1

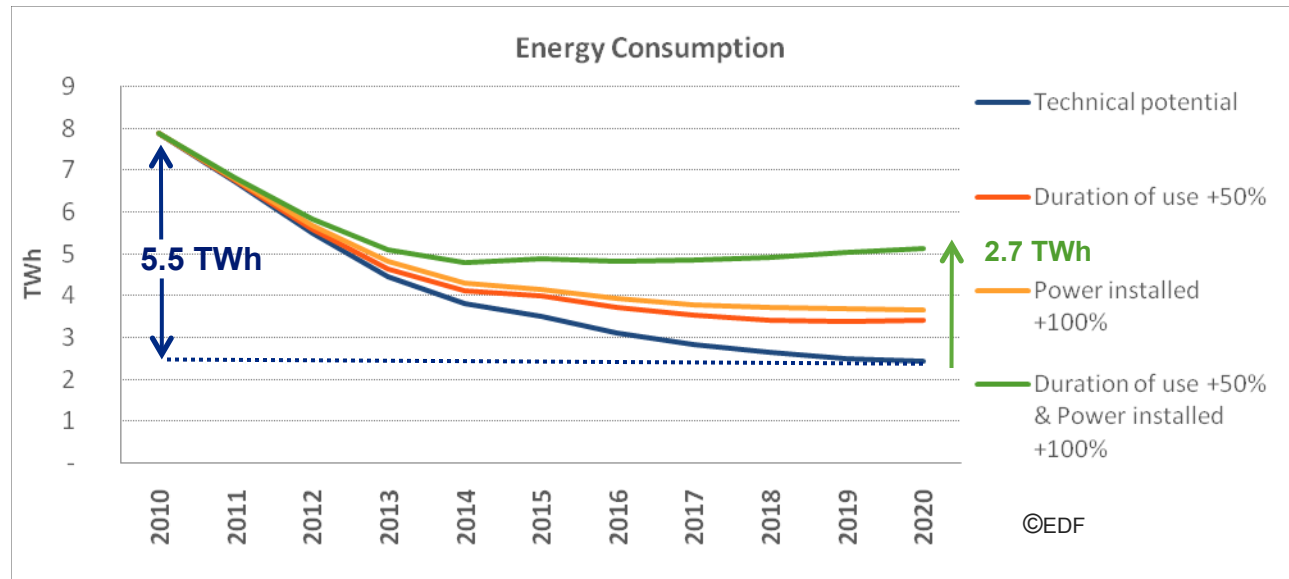
Rebound effect on the duration of use = +50%

## ❖ SCENARIO 2

Rebound effect on the power installed = +100%

## ❖ SCENARIO 3

Rebound effect on the power installed (+100%) & duration of use (+50%)



➡ Saving Potential  $\div 2$  in SCENARIO 3

➡ Loss of savings due to behavior  $= 2.7$  TWh

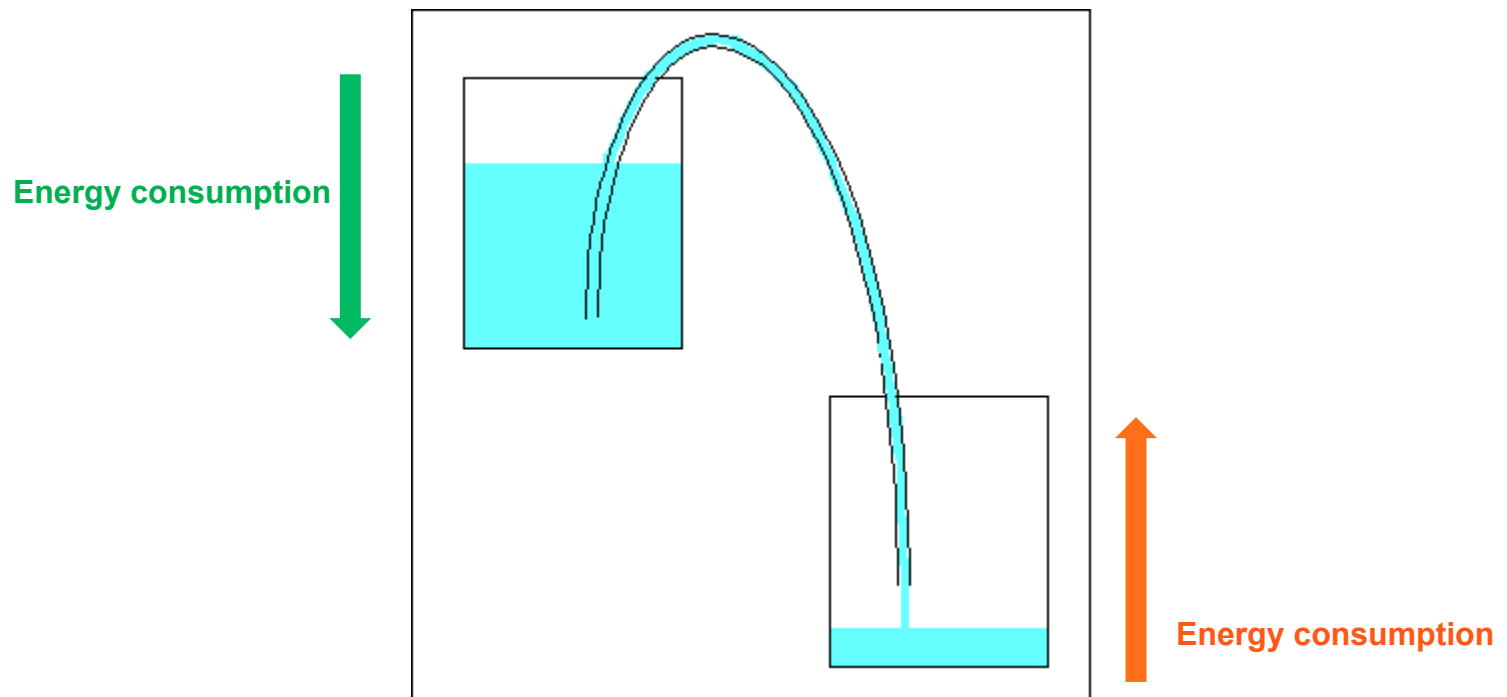
$=$   Electricity consumption for Residentials



So...

## Both for TV and lighting

- ❖ Best technology available by 2020
- ❖ **Realistic behavior changes** lead to **great losses of energy savings**

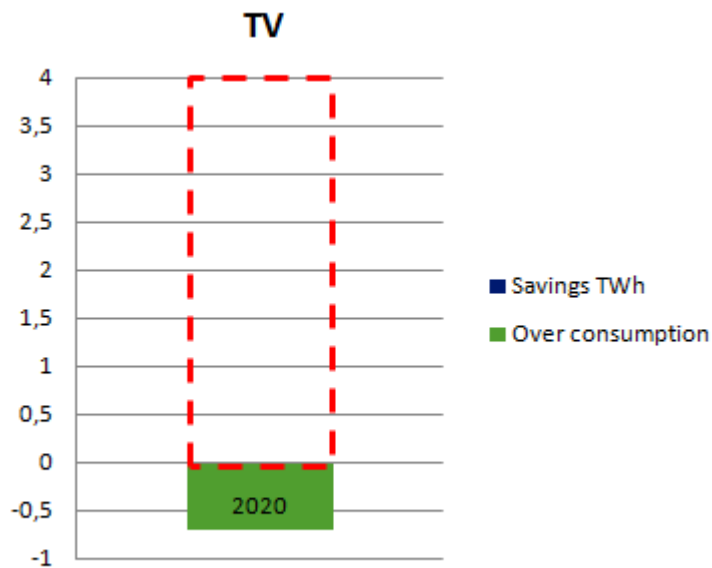


So...

## Both for TV and lighting

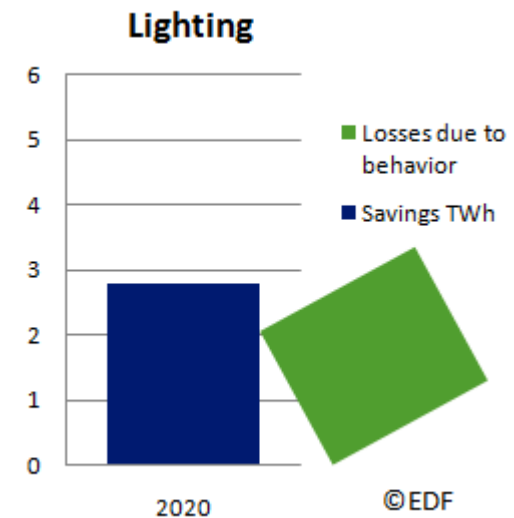
- ❖ Best technology available by 2020
- ❖ **Realistic behavior changes** lead to **great losses of energy savings**

### Over consumption for TV

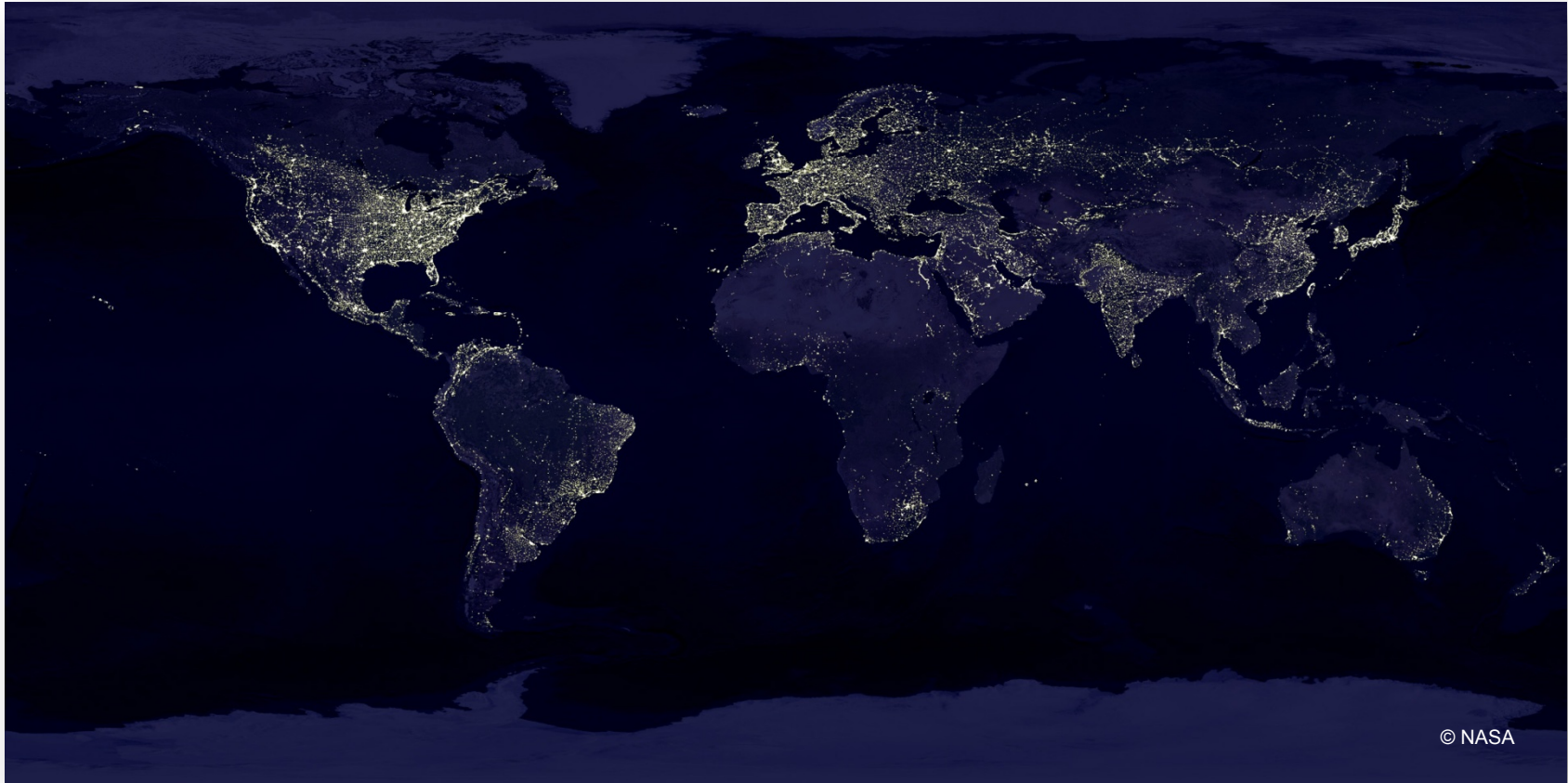


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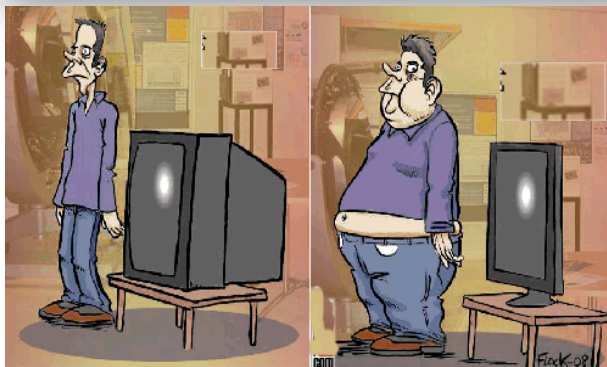
### Cut by half the energy efficiency for lighting



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# Thank you

**Aurelia ESTEVE**  
aurelia.esteve@edf.fr

**Guillaume BINET**  
guillaume.binet@edf.fr



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