

# Products and Energy Systems « Technology Roadmap » 2010-2020 on the French residential market

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Technology Roadmap  
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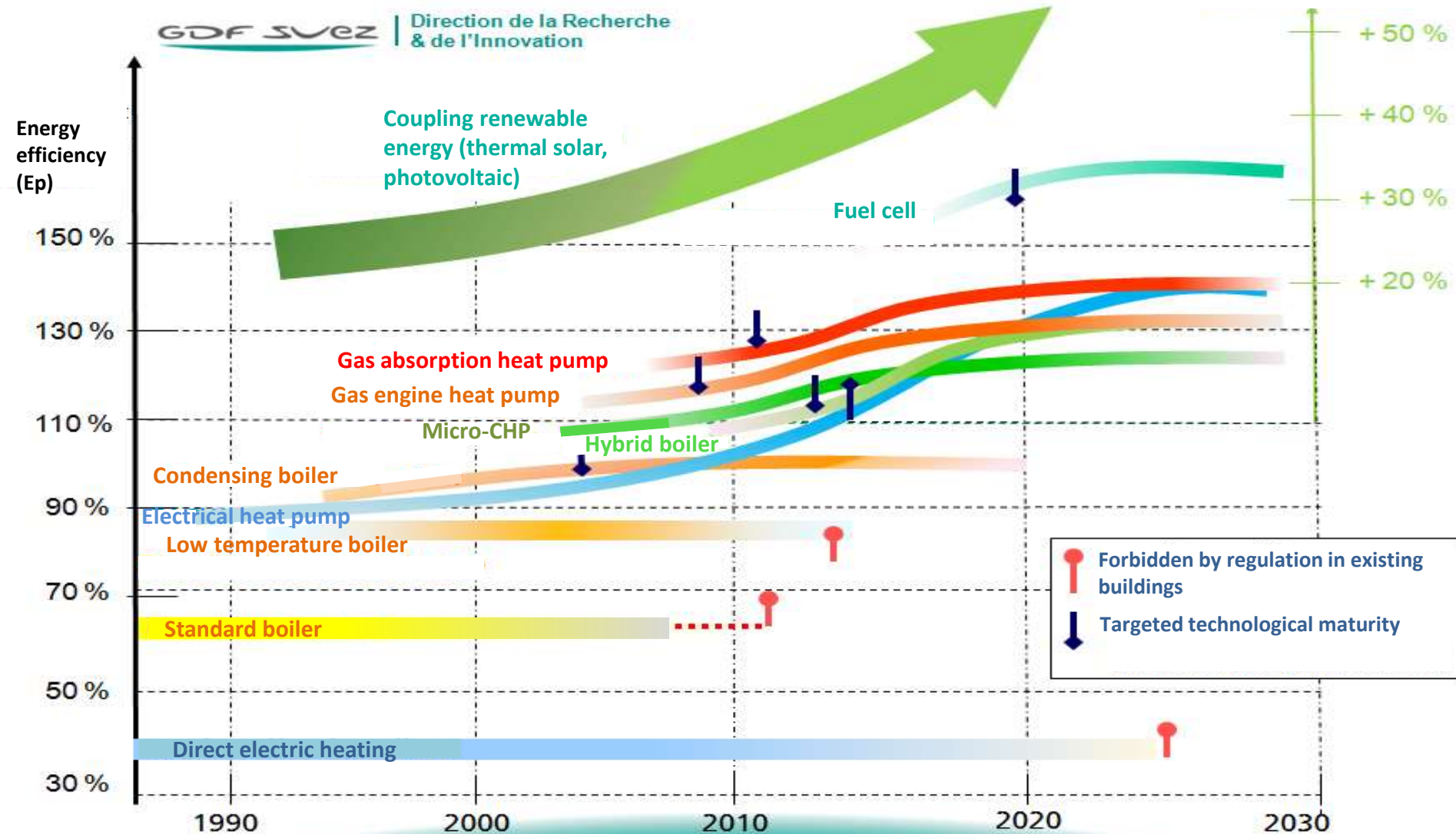
# Technology roadmap in new and existing buildings

- **A work done by GDF SUEZ and UNICLIMA experts in 2010 (new buildings) and 2011 (existing buildings)**
  
- **Analyze of the positioning of energy equipments according to :**
  - The current situation
  - Their energy efficiency
  - The investment costs
  - Their accessibility (replacement easiness in existing buildings)
  - The regulatory context
  
- **Tendency evolution from 2011 to 2020 with two different viewpoints :**
  - Efficiency / investment cost map
  - Efficiency / accessibility map

# Products and Energy Systems Technology Roadmap for new buildings

GDF SUEZ | Direction de la Recherche & de l'Innovation

Gain due to renewable energy



# Evolution of efficiency/investment ratio from 2011 to 2020 for existing buildings

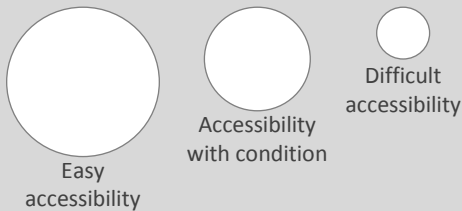
Energy efficiency (Primary energy)

## Energy systems 2020

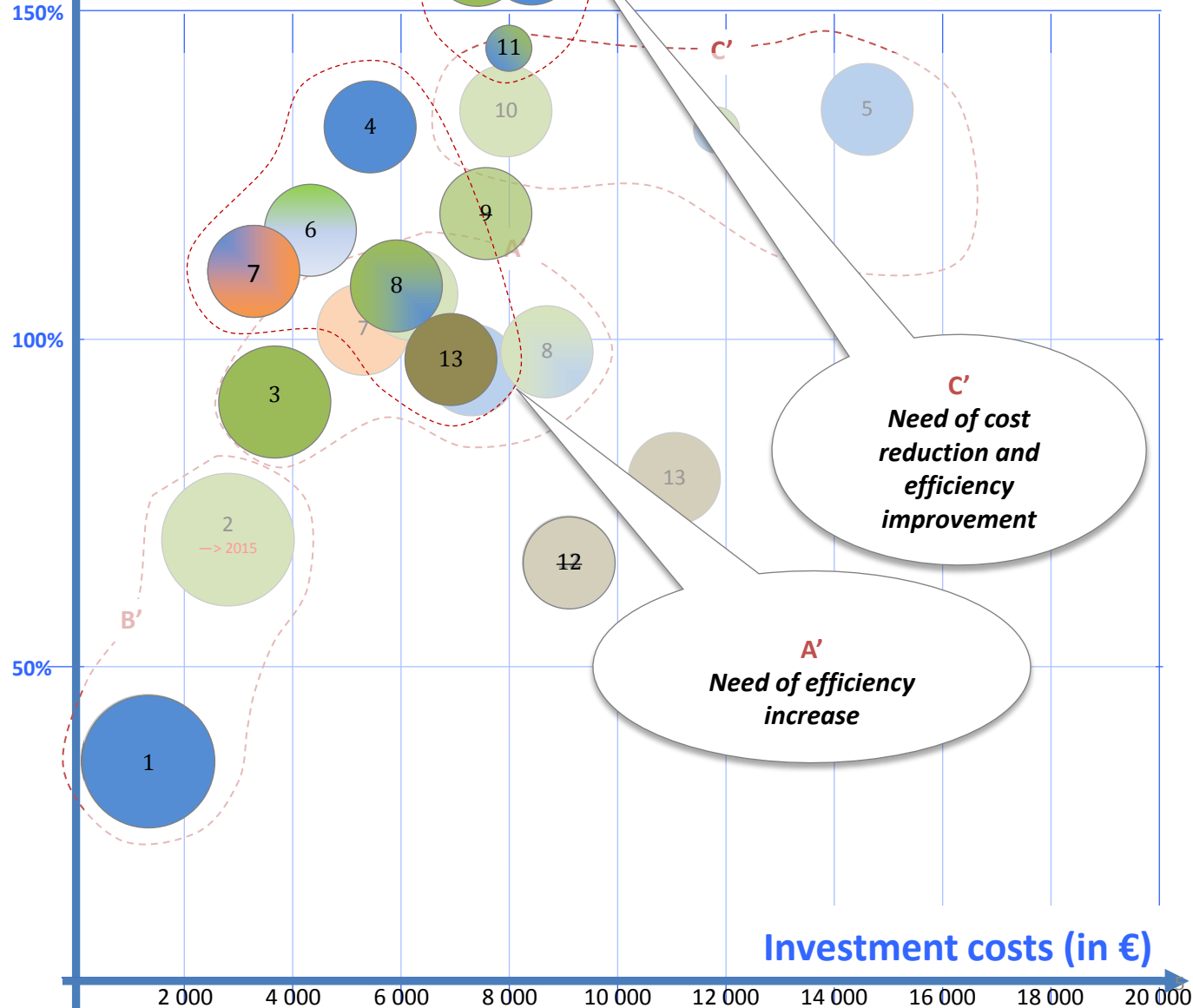
- 3. Condensing boiler
- 4. Electrical heat pump
- 6. Natural gas hybrid boiler
- 7. Heat pump plus oil-GPL boiler
- 8. Micro-CHP
- 1. Direct electrical heating
- 2. Low temperature boiler
- 5. Geothermal elec. heat pump
- 9. Gas engine heat pump (tertiary)
- 10. Gas absorption heat pump
- 11. Fuel cell
- 12. Wood log boiler
- 13. Wood pellet boiler

## Accessibility in existing building

(more or less severe technical condition)



## Energies



# The main identified impacts

## Impact on regulation

Take into account the **comfort of the end-users**  
Increase the use of all **renewable energy** sources  
Include **positive outside factors** (electric load curve, life cycle)

## Energy autonomy and storage

Renewable energy becomes necessary and has to be used in **auto-consumption way**  
Need of inter-seasons **energy storage**

## Optimization of electric network needs

Individual multi-energy equipment contribute to diffuse **effacement** (hybrid heat pump, micro-cogeneration)

## Impact on technology

Towards **control** of the full energy system (smart energy)  
**Sensitize** the end-user to virtuous behavior (monitoring)

## Impact of eco-design

Equipment and building choice according to multi-criteria **life-cycle assessment (LCA)**  
Systematize **LCA label**

## Impact on training

Organize the **increase of competence** of the sector  
**Synergy** between equipment manufacturers

**GDF SUEZ &  
UNICLIMA  
experts**

# Technology development – GDF SUEZ / some members of UNICLIMA partnership

## Low power gas modulating boiler



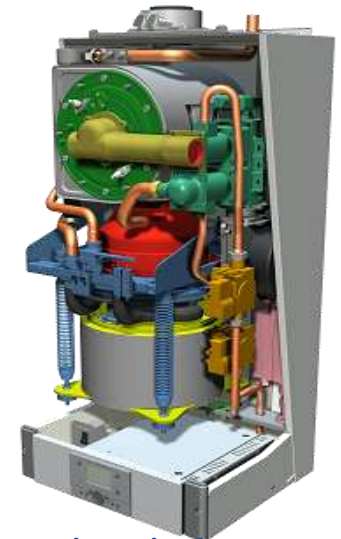
0,8kW – 12kW modulation  
Constant 109% efficiency

## Hybrid systems (heat pump+Condensing Boiler)



Condensation boiler + small  
heat pump  
Control on primary energy

## Micro-CHP



Decentralized electricity  
production



- **Engage in a communication plan and information** with professional (press conference), with the public authorities (Paris-Brussels) and with the “key players”.
  - **Continue cooperation on French and European issues** ErP Directive, labeling and "translation" into French law and directives ENR PEB
- **Continue the work of residential Roadmap and start the work on non residential buildings** (commercial offices schools, ...).



25th world gas conference  
"Gas: Sustaining Future Global Growth"

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**Thank you for your attention**

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