



ENTE PER LE  
NUOVE TECNOLOGIE,  
L'ENERGIA E L'AMBIENTE

**Department of Energy technologies,  
efficiency and renewable sources**

# Overview of activities

**Agostino Iacobazzi**

**ENEA, Department of Energy technologies, efficiency and renewable sources  
C.R. Casaccia, Via Anguillarese 301, 00123 S. Maria di Galeria (ROMA)**

**[agostino.iacobazzi@enea.it](mailto:agostino.iacobazzi@enea.it)**

## Low carbon energy production

## Efficient end-use technologies

### ➤ Renewable Energy Sources

- Photovoltaic
- Bioenergy
- Concentrated Solar Power

### ➤ Advanced technologies

- Clean coal
- Carbon Capture and Sequestration
- Nuclear (Fission and Fusion)
- Fuel cells
- Hydrogen

### ➤ Stationary

- Ecobuilding
- Smart grids
- Energy storage

### ➤ Transportation

- Mobility
- Advanced vehicles
- Energy storage



Short term



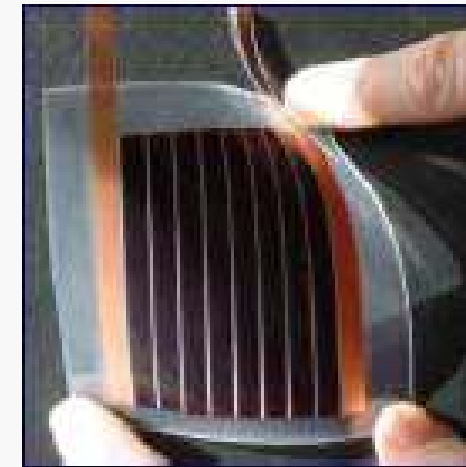
Medium term



Long term

### ◆ Photovoltaic

- ✓ Concentrated c-Si
- ✓ Advanced c-Si
- ✓ Thin-film and organic



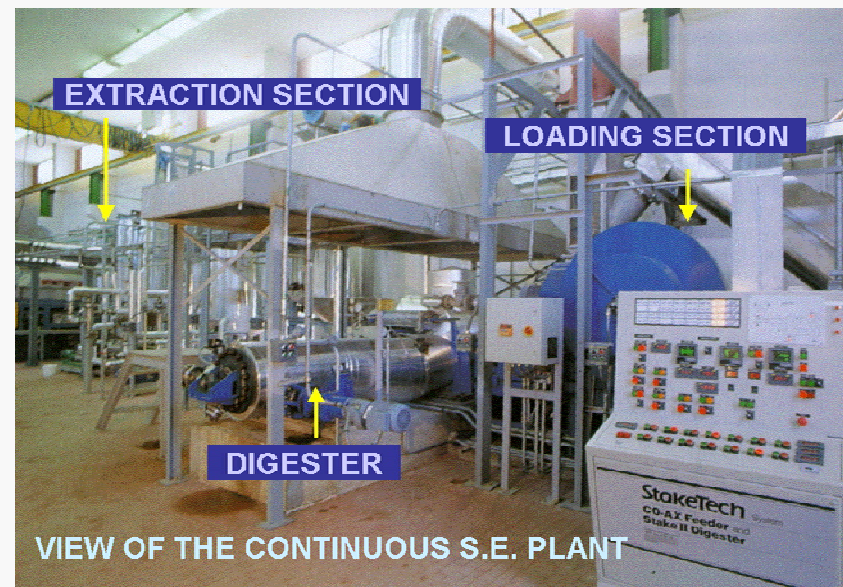
### ◆ Concentrated Solar Power

- ✓ Electric energy production
- ✓ Hybrid plants (Biomass+solar)
- ✓ Dissalation
- ✓ Solar cooling



### ◆ Bioenergy

- ✓ 2nd generation biofuels (biodiesel and bioethanol)
- ✓ Biomass and waste gasification
- ✓ Algae and bacteria



### ◆ Clean Coal

- ✓ advanced coal gasification systems
- ✓ H<sub>2</sub> – O<sub>2</sub> combustion
- ✓ Carbon capture systems

### ◆ Carbon Capture and Sequestration

- ✓ Deep saline aquifers
- ✓ ECBM

### ◆ Nuclear

- ✓ GEN IV fission
- ✓ Fusion (ITER, DEMO)



### ◆ Fuel cells

- ✓ Proton Exchange Membrane (PEM)
- ✓ Molten Carbonate (MCFC)
- ✓ Solide Oxide (SOFC)
- ✓ Material, component and systems

### ◆ Hydrogen

- ✓ Production (fossil fuels, RES)
- ✓ Storage (hydrides, nanostructures)
- ✓ Utilization (Fuel cells, ICEs, thermal cycles)



## ◆ Energy efficiency

- ✓ Ecobuilding
- ✓ Components and systems

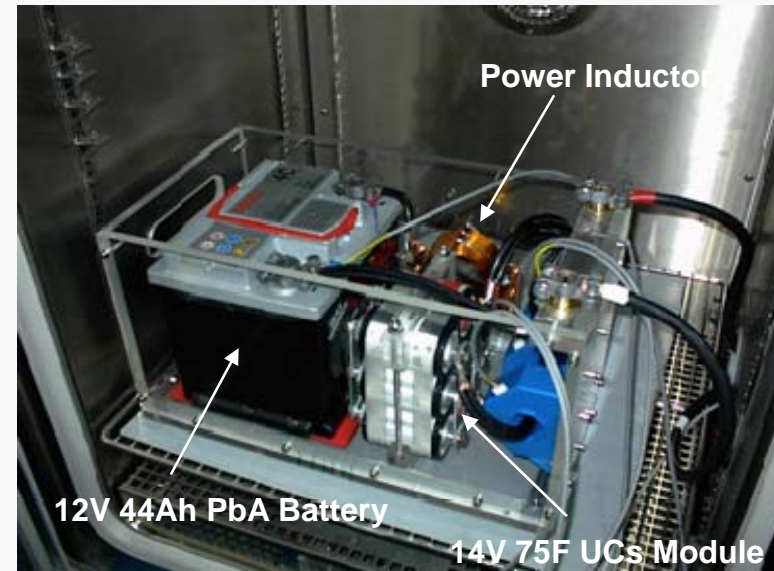
## ◆ Smart grids

- ✓ Distributed Generation
- ✓ Power Parks and districts
- ✓ Optimization - “ODESSE” ENEA Platform (Optimal *DES*ign for *Smart Energy*)



## ◆ Mobility

- ✓ Transport modelling and optimisation
- ✓ DSS for Transport Planning
- ✓ Optimisation models for freight logistic and operation



## ◆ Advanced Vehicles

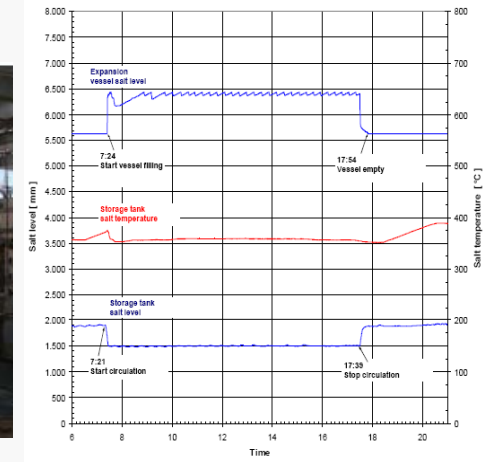
- Components development
- Power train development
- Testing facilities





### ◆ Thermal

- ✓ Motlen salt heat storage for CSP plants



### ◆ Electric

- Advanced batteries (Li-ion, ionic liquids)
- Supercapacitors
- Power management
- Testing facilities

