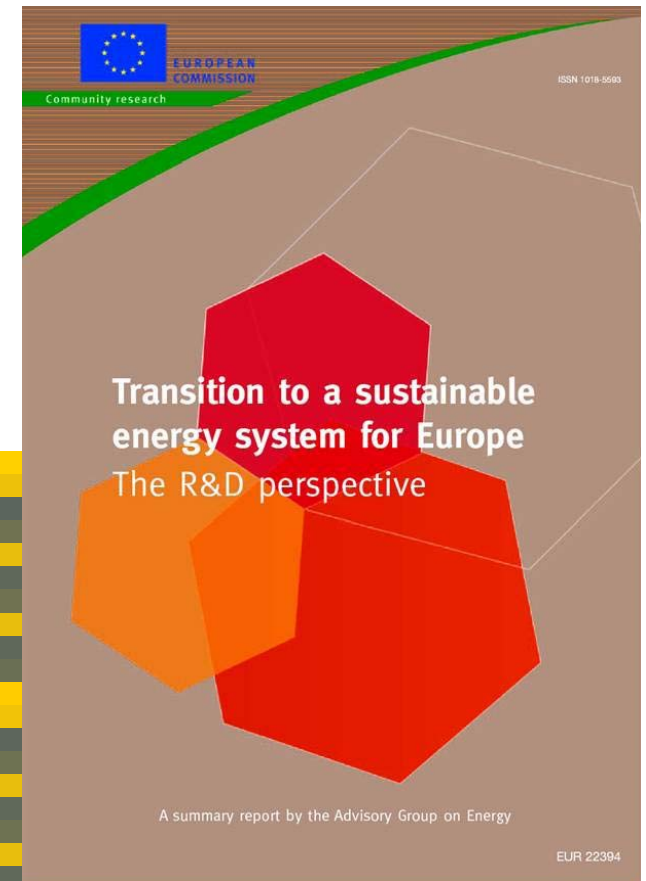
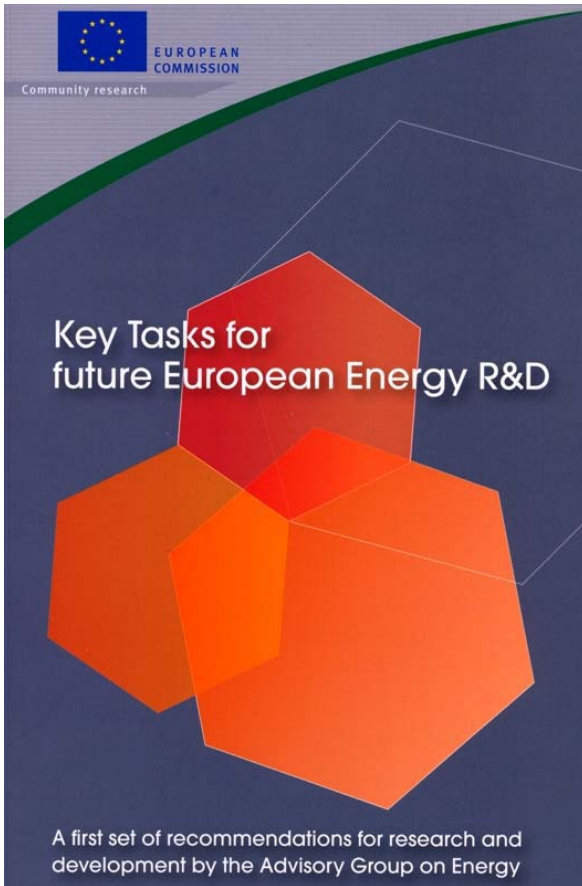


# Summary of Advisory Group on Energy Reports

## **EUROPEAN COMMISSION**

Directorate-General for Research,  
Directorate J – Energy, Unit I - Policy and Strategy

Albrecht Reuter und Oliver Fricko  
auf Basis der Unterlagen von Prof. Faninger





EUROPEAN  
COMMISSION

ISSN 1018-5593

Community research

# Transition to a sustainable energy system for Europe

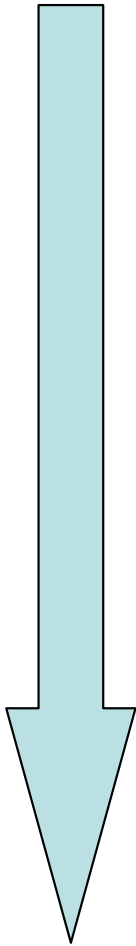
## The R&D perspective

A summary report by the Advisory Group on Energy

EUR 22394

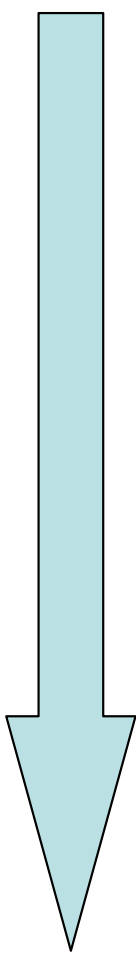
# Summary of electricity/heat conversion technology options (1)

short term

- 
- Low/medium temperature solar thermal applications for hot water, heating, cooling, industrial processes, etc
  - Combined Cycle Gas Turbine (CCGT)
  - Nuclear fission (Gen III/III+)
  - Wind energy (including offshore/deep offshore)
  - System integration [not a conversion technology but grid issues represent a major barrier to development of the European electricity system]
  - Solid biomass
  - Fuel cells (SOFC, MCFC)

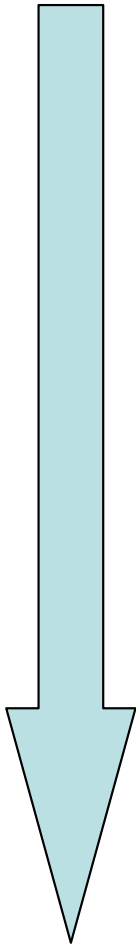
# Summary of electricity/heat conversion technology options (2)

mid term

- 
- Geothermal energy (including deep geothermal – HDR/HFR)
  - Carbon capture and storage (CCS)
  - Cleaner use of coal (steam/ gas turbine, combined cycle) with CCS
  - Advanced fossil fuel plants (super/ultra-supercritical steam Integrated Gasification Combined Cycle (IGCC), with CCS)
  - Solar photovoltaic (PV)
  - Solar thermal power plants
  - Ocean energy (wave, sea current)
  - Nuclear fission – Generation IV
  - Nuclear fusion

# Summary of transport options

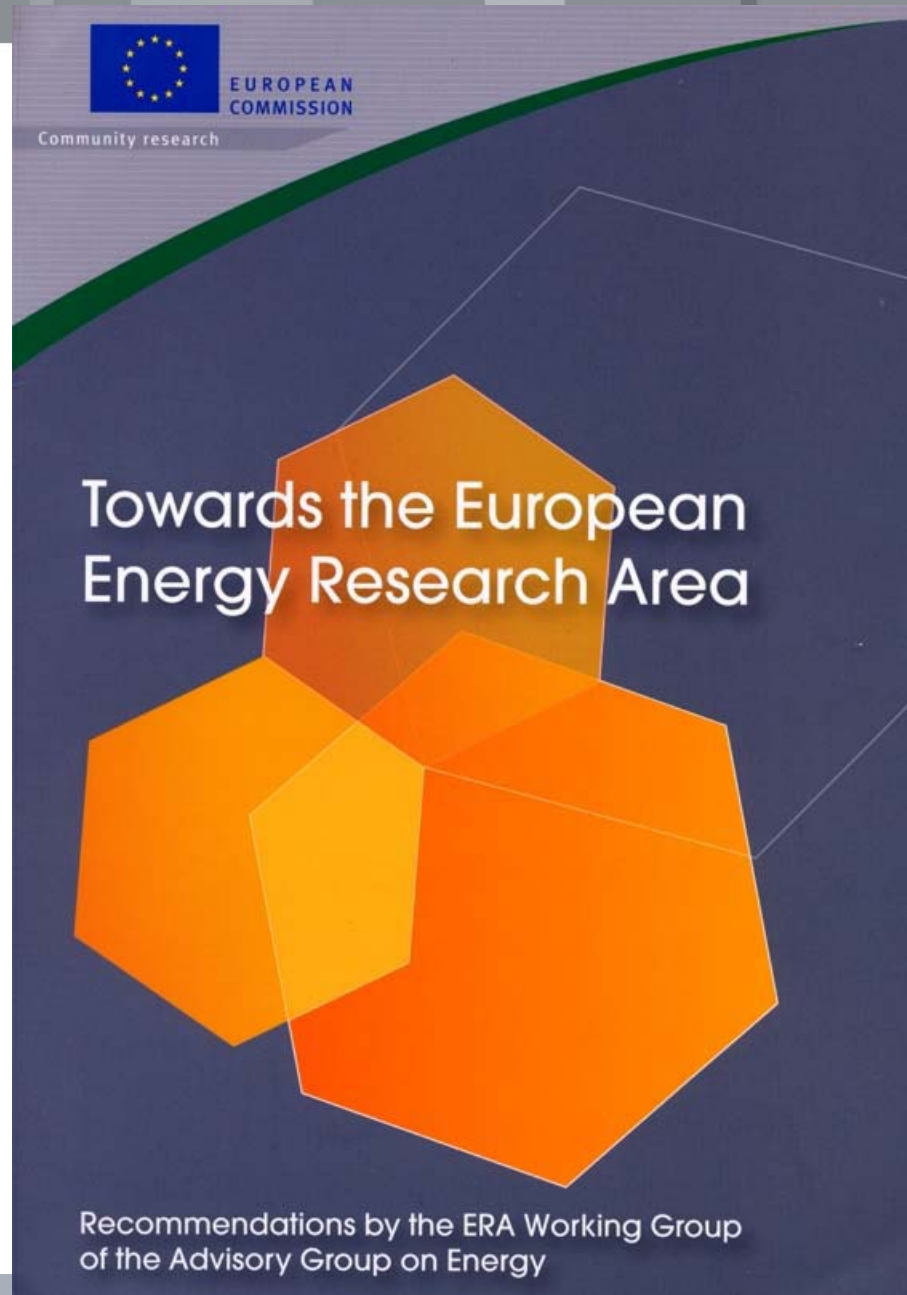
## short term



- Reduction in demand (smaller engine size; speed limits; transport mode switching)
- Advanced high-efficiency ICEs
- Improved hybrid electric designs with petrol, diesel, biodiesel
- Biodiesel; bio-ethanol as carriers
- Co-processing of biomass with fossil fuels
- Synthetic fuels from gas / coal Fischer-Tropsch
- Biofuels from ligno-cellulosic feedstocks
- Electric vehicles (EVs) with advanced battery electricity storage
- Hydrogen with fuel cells
- Air transport: hydrogen/ gas turbine

## Key conclusions and recommendations

*„Opportunities for energy demand reduction through changed consumer behaviour and improved efficiencies should be strongly supported by a shared European policy approach, as a matter of urgency.“*



# Vision of an EERA

## The European Energy Research Area,

pooling and retaining resources, to enable EU Energy R&D securing part of the €16 trillion plus world market for energy technology between 2001-2030

*“Above all, it is of a vibrant, world-leading single energy research market across Europe, with well-trained researchers able to pursue rewarding careers within that market.”*

# KEY Tasks of the EERA

- Setting a **Research Agenda**
- Providing „World-Class“ (better) **research facilities** and pool **intellectual resources**
- **Political commitment** to solving environmental, economic and societal problems that energy research aims to address
- Seek additional (public & private) **funding**

# EERA tasks for designing FP7

- **Accelerate** coordination process and research of strategically important R&D fields
- Develop **research** and **communication** facilities
- Ensure adequate **international participation**
- Build **societal backing**
- Coordinate **parallel fields** of research
- Develop **human resources**

# KEY Tasks of the Commission

- Top-Down Approach for **Coordination** Purposes
- **Instrument implementation** for coordination and implementation
- Horizontal approach to tackle **cross-cutting issues**
- Allow for **flexibility** to adapt to changing requirements

# Needs of specific Technologies

## Biomass

- Use in **Transport** sector (30% of fuels by 2030)
- Use of current FP instruments and some new depending on research field

## Fuel Cells

- Use in **mobile & local applications**
- Use of current High Level Group, then Technology Platform (TP)

# Needs of specific Technologies

## Solar Photovoltaics

- Expand **Grid-Connected PV** systems by 2030
- **Non-Grid** market penetration by 2020
- Expand current PV trac system

## Solar Thermal (High Temperature)

- Develop solar combined cycle technologies → **Hydrogen production**
- SolLabNetworks an existing collaboration to extend
- Member state access to Platforma Solar

# Needs of specific Technologies

## Hydrogen Related Tech.

- Use in **Storage & Transport**
- High Level Group, then Technology Platform

## DG & Renewable Net Integration

- Development of a **EU Grid** integrating alternative energy production
- Based on FP5/6 instruments and extending these

# Needs of specific Technologies

## Near-Zero CO<sub>2</sub>, fossil fuel based power generation

- Aiming at **CO<sub>2</sub> free** electricity generation
- Current FP instrument are adequate, but for Demo plants and strategic deployment high Level Groups and TP are required

## Nuclear Fission

- Research 4th Generation reactors and go **beyond electricity production**
- Using existing Instruments and extending these to TPs

# Needs of specific Technologies

## Ocean Energy

- By 2020 cover significant part of energy demand
- Utilise IEA Implementing Agreement for Int. R&D. Expand on Wavenet (FP5) and Wavetrain Network (FP6) communication. Integrated Infrastructure Initiatives for test facilities.

## Socio Economic and Policy related R&D

- **Combine individual Member State efforts**
- Socioeconomics build on current FP instruments
- ERA-NET establishment to combine national efforts & identify common points

# Needs of specific Technologies

## Wind Energy

- By **2020 significant contribution** to energy production
- Europe to maintain leading position
- Pursue a Technology Platform