



Bundesministerium
für Bildung
und Forschung

Energy Research Funding by the Federal Ministry of Education and Research BMBF

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FORSCHUNG

Ideen zünden!



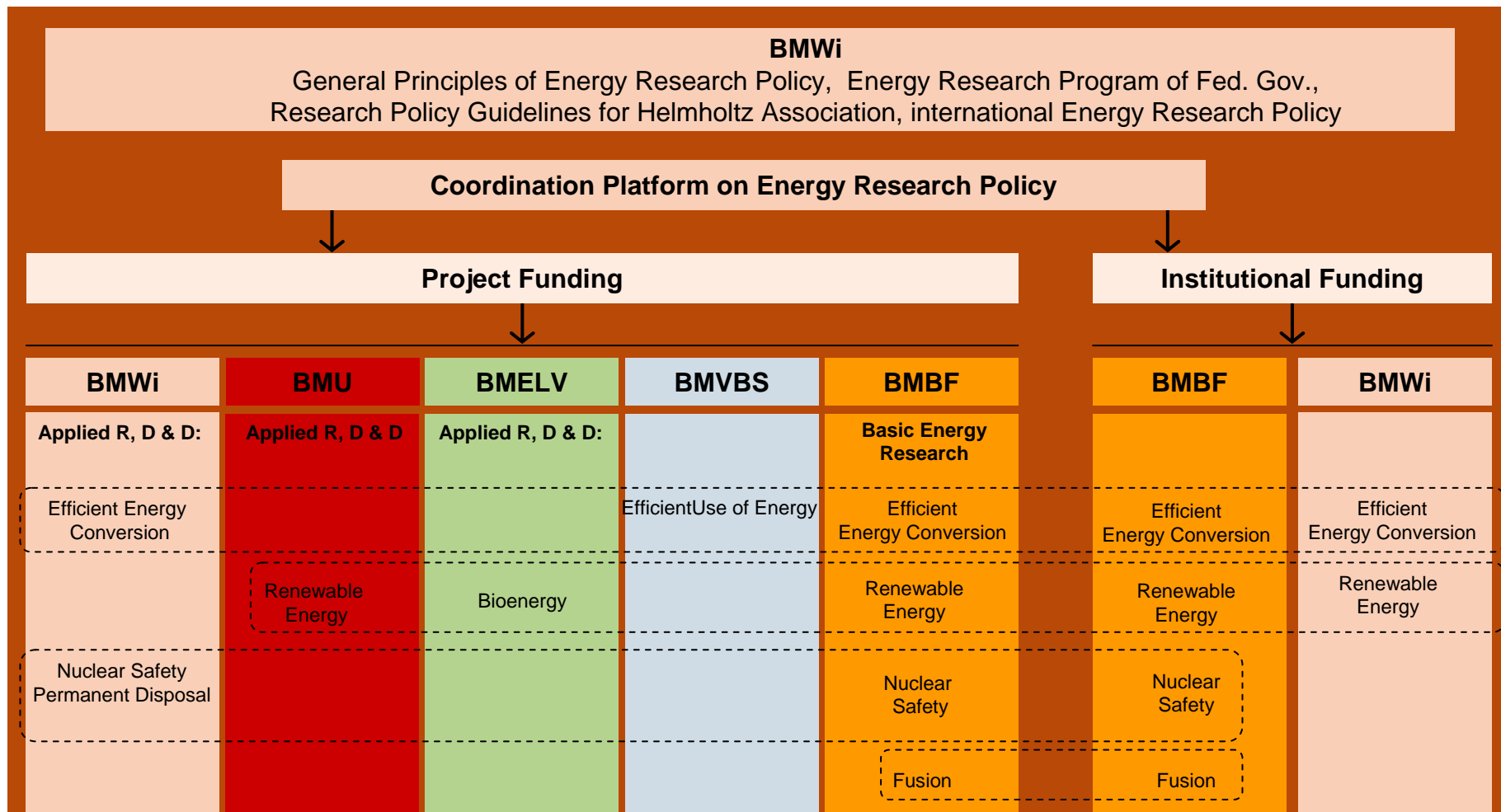
Energy research supports energy and climate policy

- **Sustainable energy supply as a strategic goal**
 - Energy security
 - Economy, affordable prices
 - Compatibility with climate and environmental protection requirements
- **Integrated Energy and Climate Program** of the Federal Government
 - Realization of European climate protection goals by 2020
 - Legislative initiatives and incentive programs
 - **Energy research and innovation** is an important program element
 - Energy research helps achieving energy and climate goals more efficiently, faster and less expensive
 - Energy research supports competitiveness and export





5 Federal Ministries fund energy research





BMBF funds energy research on various levels and with various instruments

- **Institutional funding:** Helmholtz, Fraunhofer, Max Planck, Leibniz
- **Project funding** with priority on research alliances of research centres and universities and on **strategic alliances** of science and industry
- **Funding of young scientists** e.g. creating working groups led by post docs
- **Transfer of research results** via seminars, workshops, conferences, summer schools



BMBF funds fundamental, long-term research work

The funding concept „Basic Energy Research 2020+“ focusses on

- Next generation solar technology (photovoltaics and solar hydrogen production by photocatalytic water splitting)
- Bioenergy (biomass production and conversion)
- Efficient generation, transport, storage and consumption of energy
- CO₂-storage and use
- Fusion research, especially contribution to ITER
- Nuclear safety and disposal research



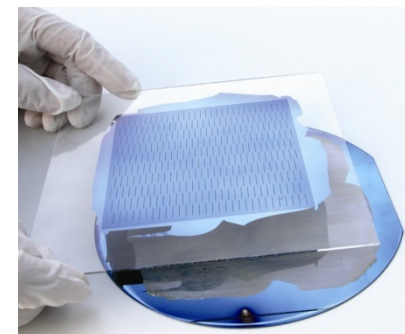
BMBF funding resources for energy research

- 200 Mio.€/a institutional funding (Helmholtz association)
- 55 Mio.€/a for projects in basic energy research
- 70 Mio. €/a for energy relevant projects in other programs



Next generation solar energy technology

- **Electricity generation by thin-film solar cells based on inorganic materials**
 - new materials, cell structures and hybrid structures
 - Improvement of the understanding of the physical processes in the solar cell
 - New methods for structural and functional analysis and simulation
- **Hydrogen production by photocatalytic water splitting**
 - Further development of natural photosynthesis
 - Improvement of semi-artificial systems
 - Creation and optimization of artificial systems





Next generation solar energy technology (2)

- **Innovation alliance „Organic Photovoltaics“**
 - Development of new or improved solar cells based on organic materials
 - Combination of basic research, application-oriented materials research and process technology
 - Solar energy converters in the small power range with 10% efficiency and a life-time of 2 -3 years shall be available at low production costs on a medium-term basis



Regional cluster „SolarValley Mitteldeutschland“

- Cooperation between regional solar industry, research and educational institutions
- Development of next generation solar cells based on very thin silicon wafers
- Maintain competitiveness of German photovoltaic technology by reduction of production costs
- Special regional initiatives for the education of young researchers and engineers



„BioEnergy 2021“ – a call for research on energetic use of biomass

- Use of specific energy plants as well as biological waste
- combined use of biomass for energetic and raw material purposes (bio-refinery)
- Improvement of efficiency of biomass conversion
- Goal: internationally competitive use of biomass in Germany





Innovation alliance „Lithium-Ion-Battery“

- Development of high-capacity and safe Lithium-based batteries
- Stationary and mobile fields of application e.g.
 - Combination of regenerative electricity generation with local energy storage
 - cars with electric or hybrid drive
- „National Development Plan for Mobility by Electric Cars“



Competition „Energy-efficient City“

- The city as a complex energy system
- Reduction of energy consumption and CO₂-emission by a certain percentage (The Federal Government's goal: 40% CO₂-emission reduction by 2020).
- Development of innovative strategies, technologies, instruments and new services
- Conversion of a „normal city“ into an „energy-efficient city“
- Networking in energy systems
- Development of new financing tools
- Overcoming barriers (financial, structural, legal etc.)
- Cost-benefit-consideration on municipal perspective





Various BMBF programs are relevant for energy efficiency

- **Materials Research Program**
 - Light weight materials
 - Components for fuel cell development
 - Heat insulation materials
 - High temperature-resistant materials (power generation)

- **Electronics and electronic systems programs**
 - Energy efficient drive systems
 - Energy saving chips and electronic systems (e.g. servers and personal computers)
 - Electronics for application in automobiles



Various BMBF programs are relevant for energy efficiency (2)

- **Optical technologies**
 - OLED R&D program
- **Microsystems**
 - R&D program on Micro FCs and energy independent microsystems
- **Production systems and technologies**
 - R&D program on energy and material efficient production technology
- **Social sciences**
 - Research program „New ways to sustainable consumption“



National Innovation Program on Hydrogen and FC Technology

- Coordinated by BMVBS, cooperation with BMWI and BMBF
- Research, Development and Demonstration
- 500 Mio €, 10 years-program
- R&D to increase durability and reduce costs
- FC application in transportation, industry, home, special markets,
- H₂ production



Low CO₂-power stations and carbon capture and storage

- **BMWI:** R&D on modern high efficiency power stations including carbon capture
- **BMBF:** R&D on CO₂ storage
- Exploration, selection and evaluation of storage sites
- Interaction of CO₂ with the reservoir medium and overlying rock
- Acceptance by the public is essential!
- CO₂ as a raw material for industry



Fundamental R&D on nuclear safety and waste

- **Reactor safety**, especially modelling and simulation
- Characterization and treatment of **radioactive waste**, partitioning and transmutation of long-lived radioactive waste
- **radiation research:** Radiation protection research, medical radiation biology, radiation and environment
- Participation in international committees and research platforms
- International integration of young scientists



International cooperation

- BMBF supports multilateral cooperation in projects of the International Energy Agency (IEA) and of the European Commission
- Basic energy research in the European Research Area in the framework of ERANET INNER (Innovative Energy Research)
- Cooperation in the International Fusion Experiment ITER within EURATOM agreement
- Individual cooperation contacts of the research institutions



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Thank you for your attention!

