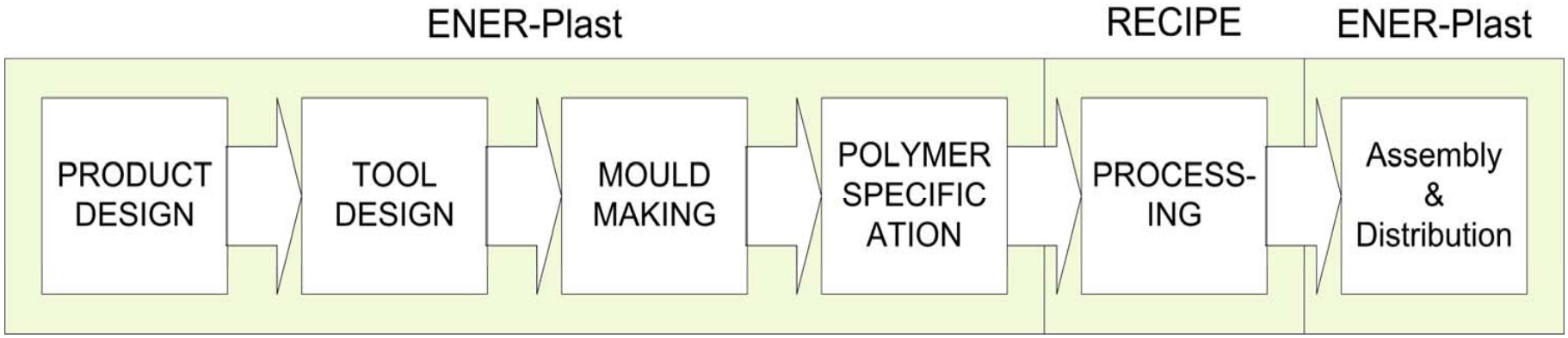
Future Sustainable Energy Supply in Europe - a Challenge for Research and Development

Karl-Friedrich Ziegahn
Karlsruhe Institute of Technology

KIT ENERGY CENTER

ENER-Plast
Reducing our carbon footprint

ENER-Plast – From Design to Manufacturing:
Instruments for reducing the energy consumption and carbon emissions of the polymer industry and supply chain



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Fraunhofer ICT

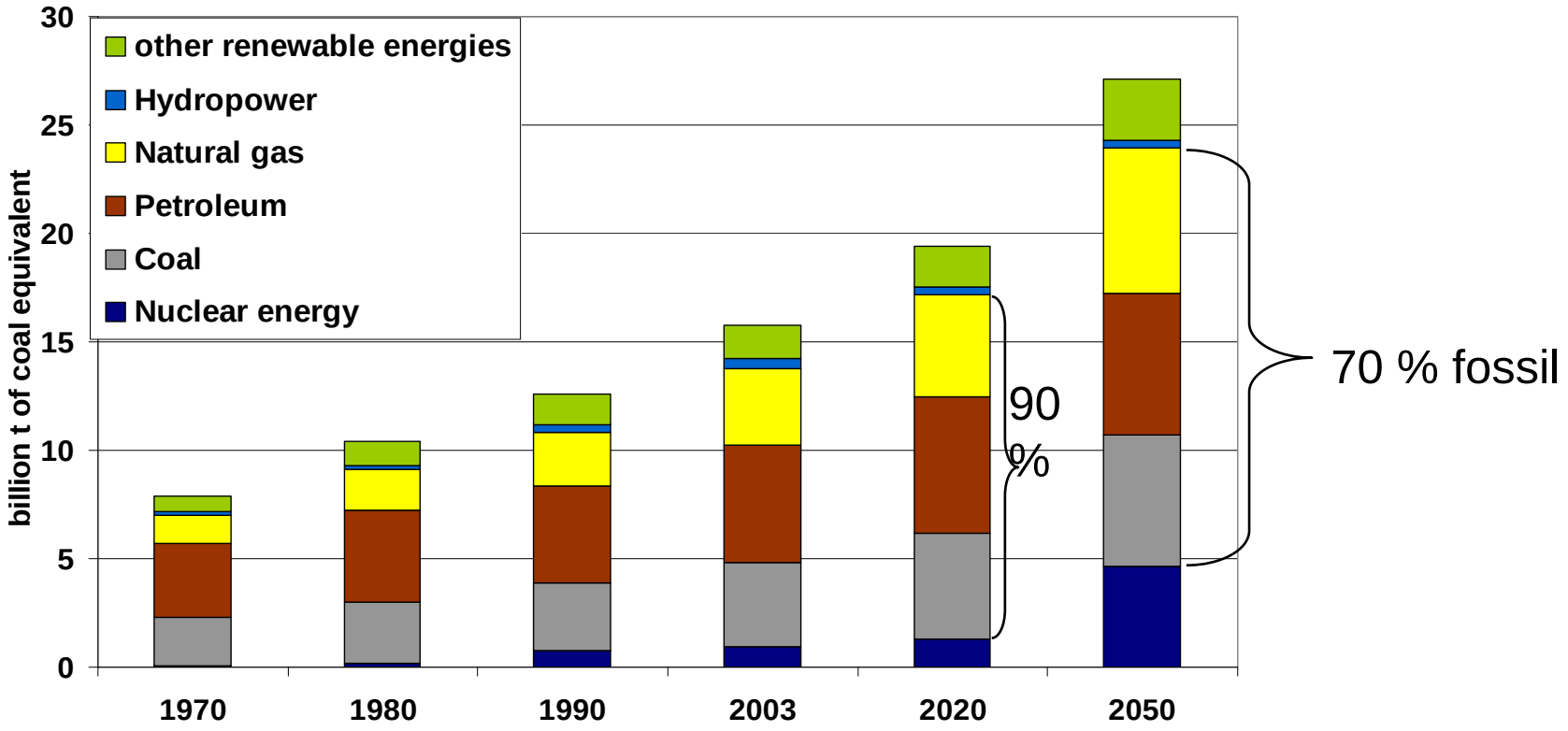
Thomas Reichert
Fraunhofer ICT
Joseph-von-Fraunhofer-Str. 7
76327 Pfinztal
www.ict.fraunhofer.de

Dreaming of Fuels…

…our fuel dreams are:

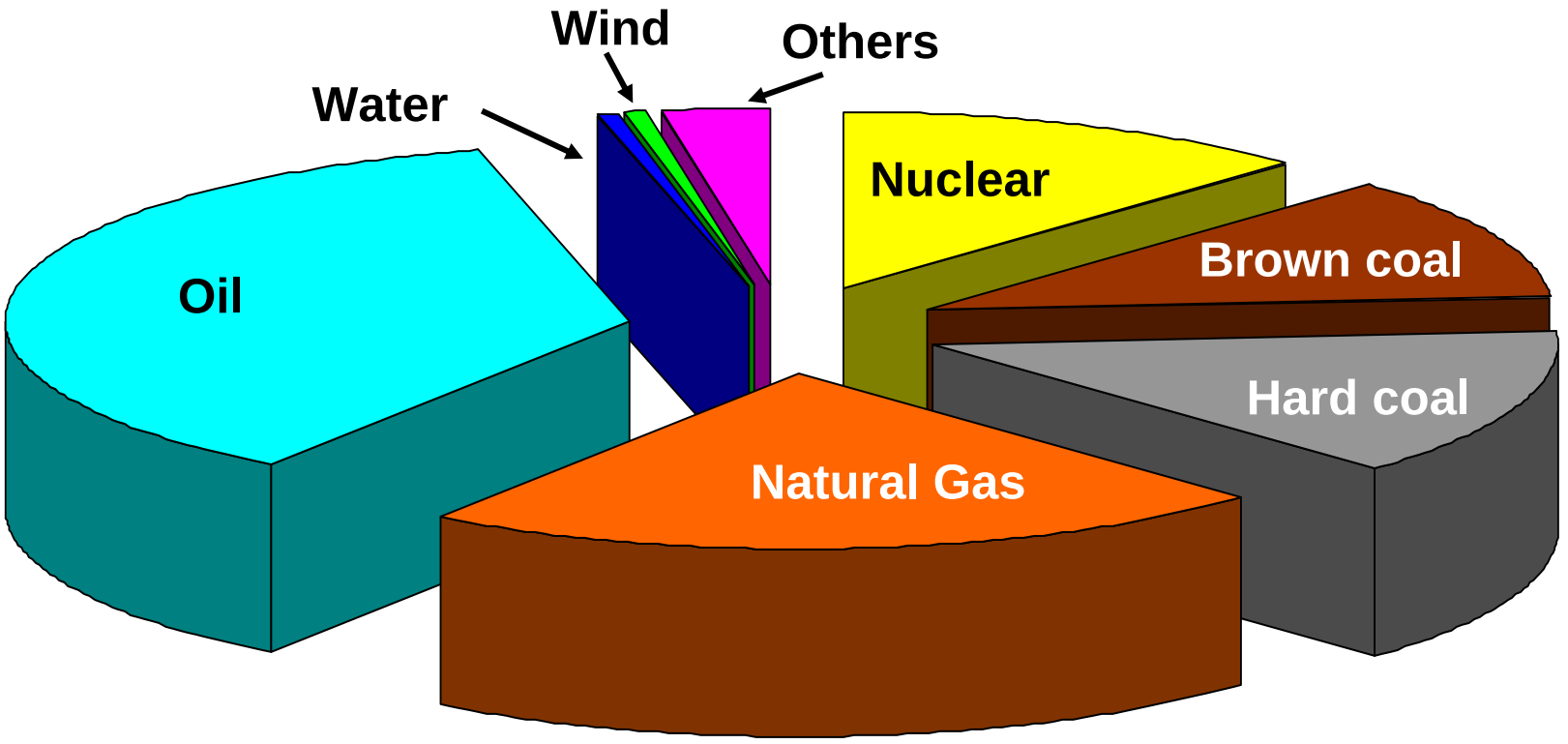
- Unlimited Resources
- Zero Emissions
- Available and cheap
- Enough for everybody

Global Energy Consumption



Quelle: BP (bis 2003), World Energy Council

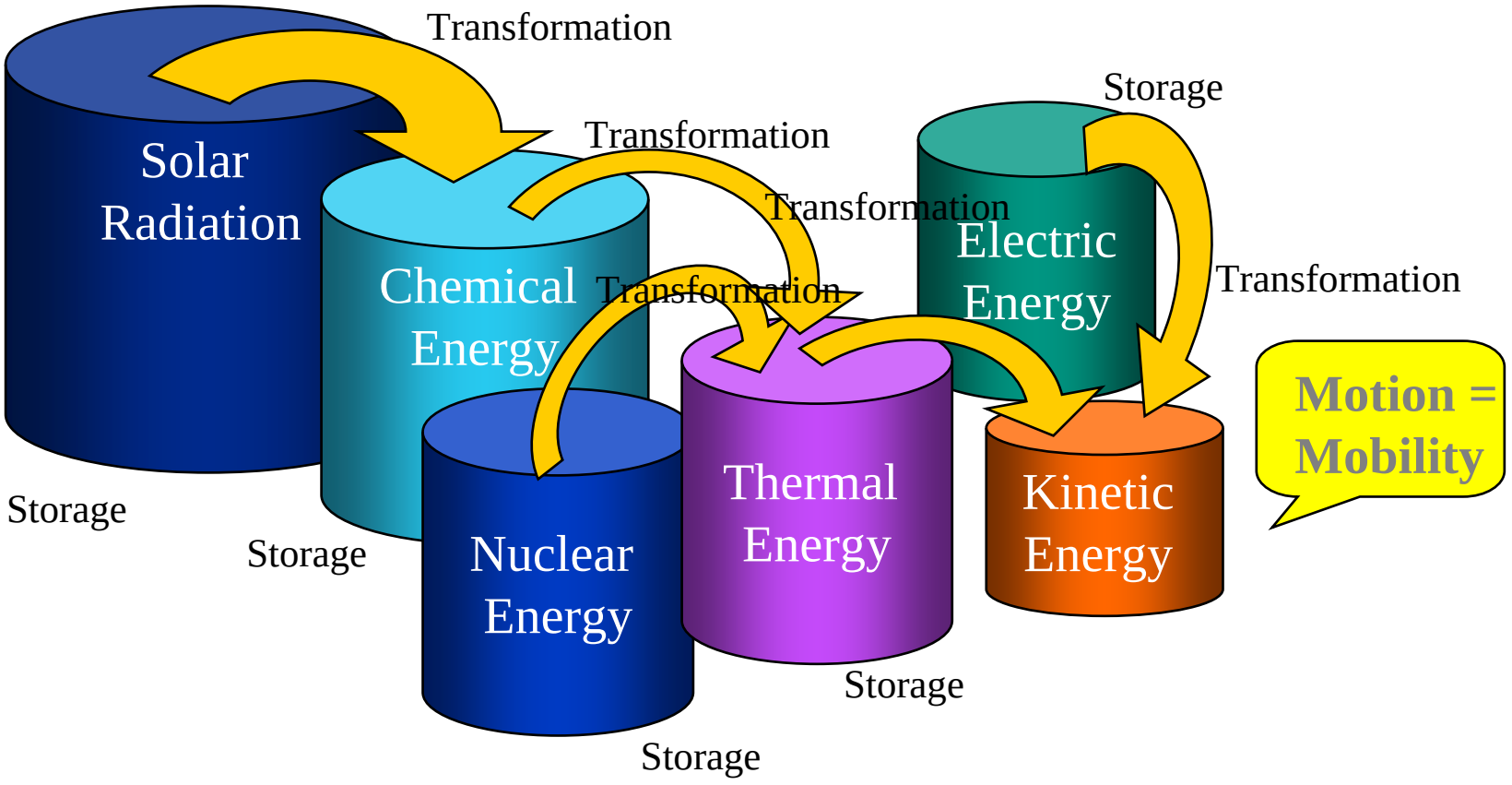
Primary Energy Consumption in Germany



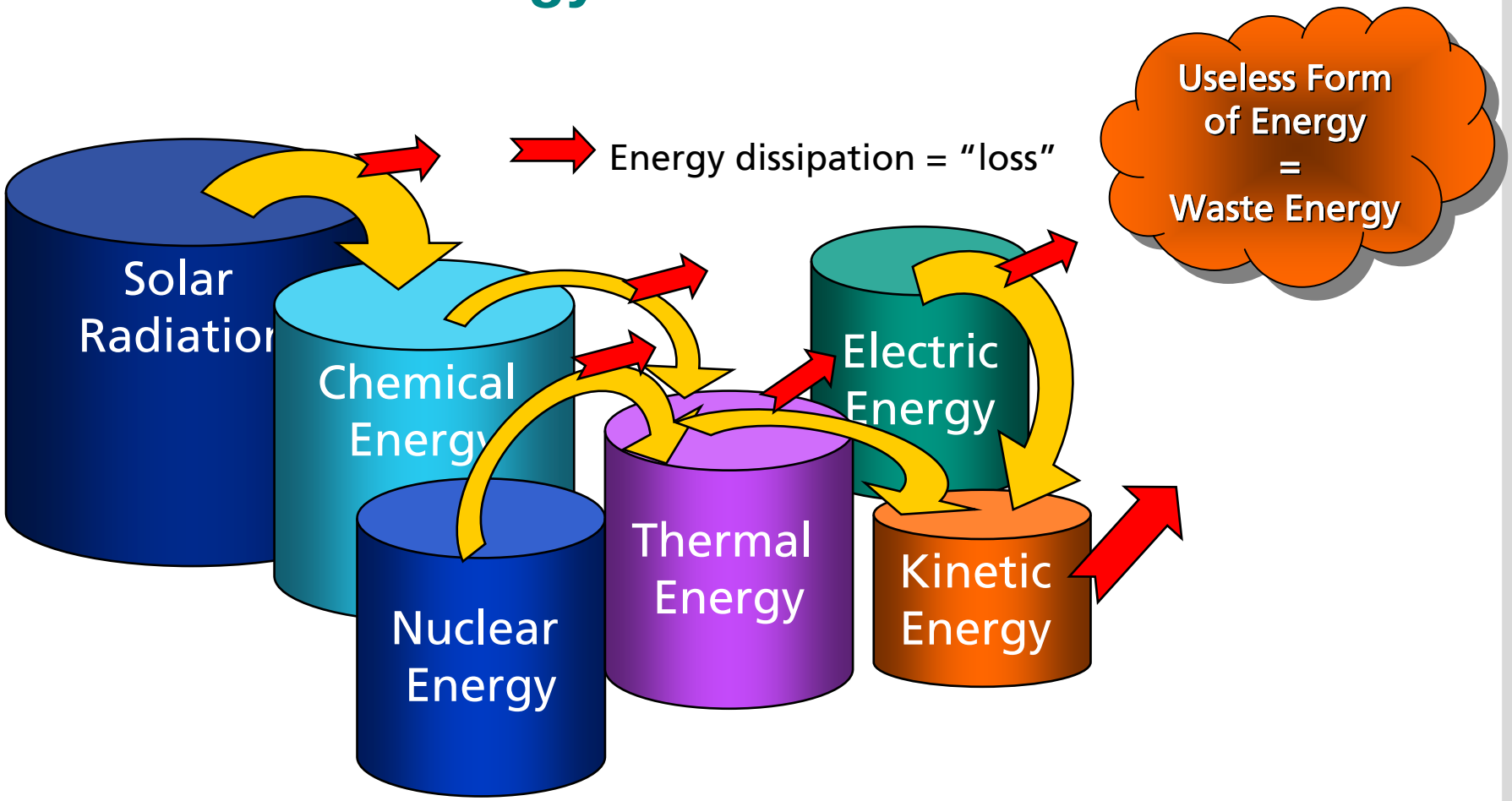
Total: 492,6 Mio. SKE

Source: AG Energiebilanzen 2004

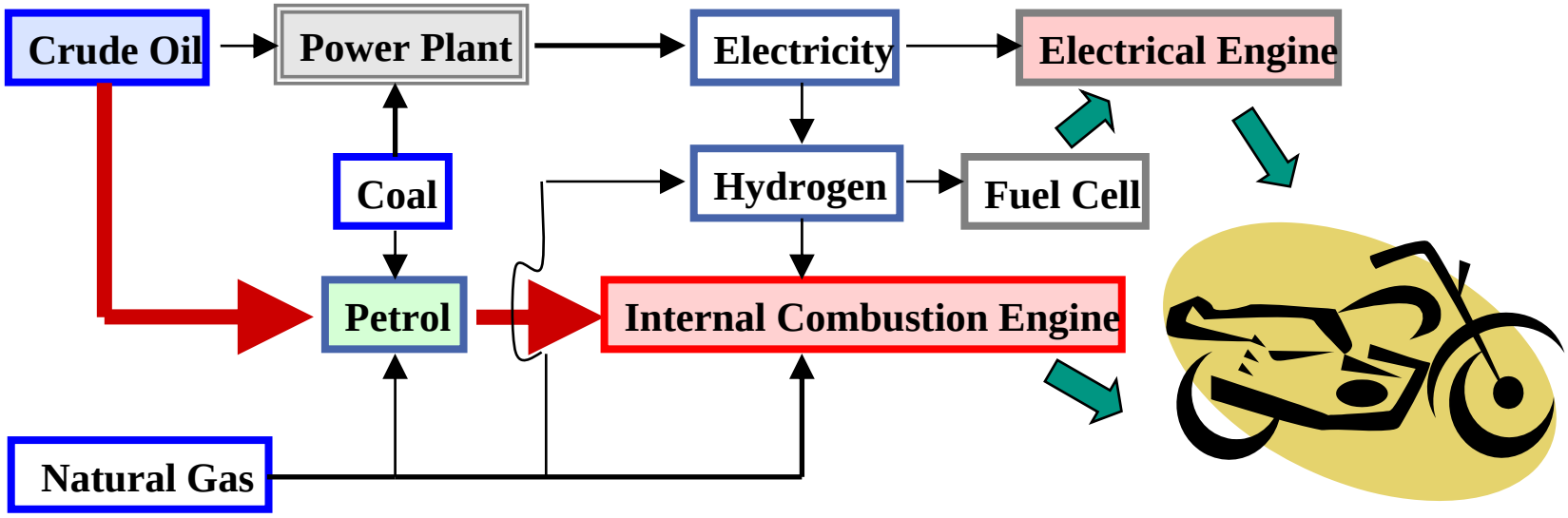
Physics says: “All Energy Use is only Energy Transformation from one Form into Another!”



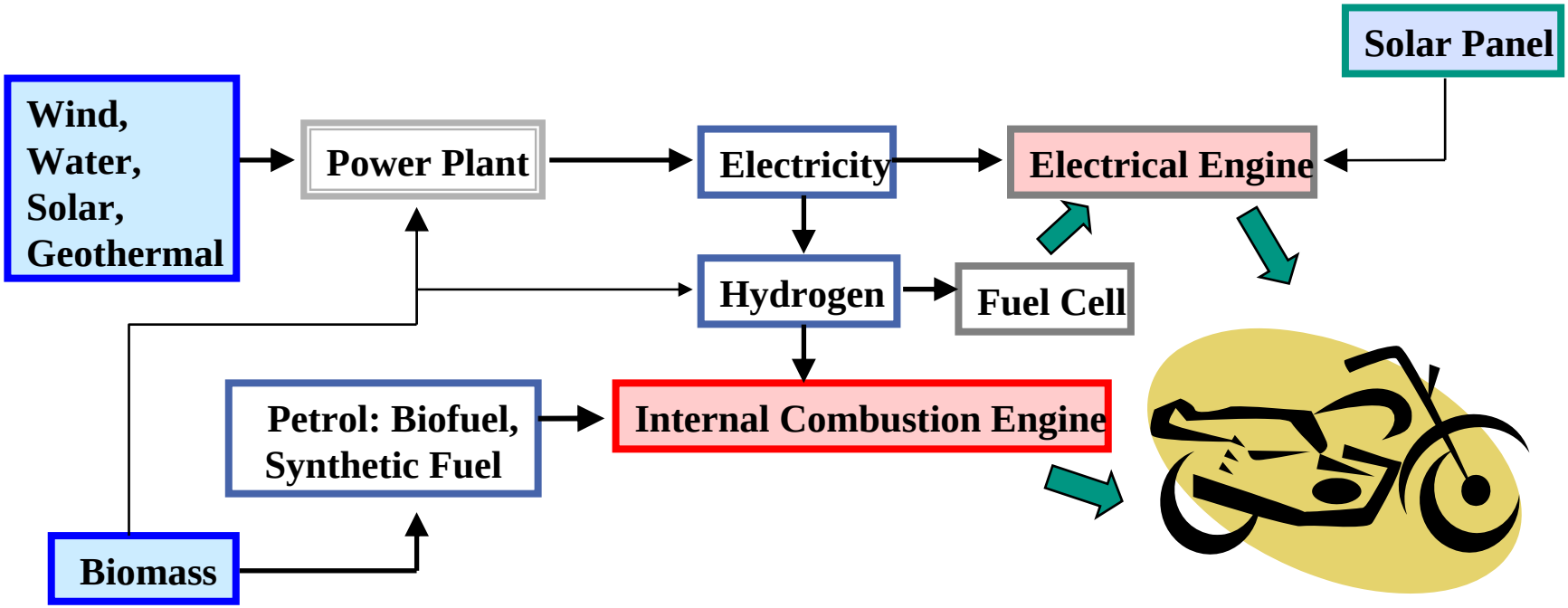
Engines Transform Energy …and 'Loose' Energy



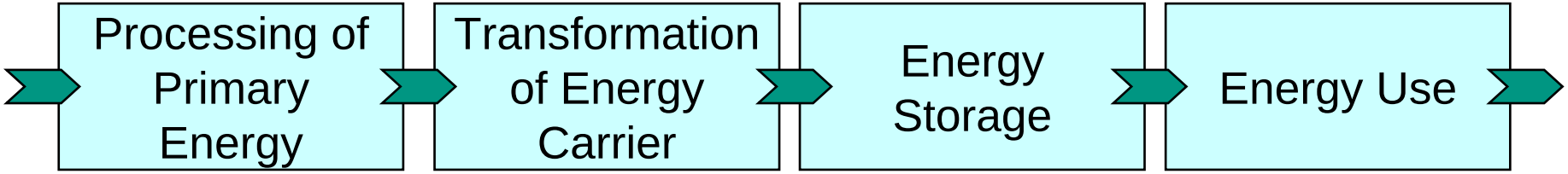
From Energy to Fuel to Propulsion (non-renewable)



From Energy to Fuel to Propulsion (renewable)

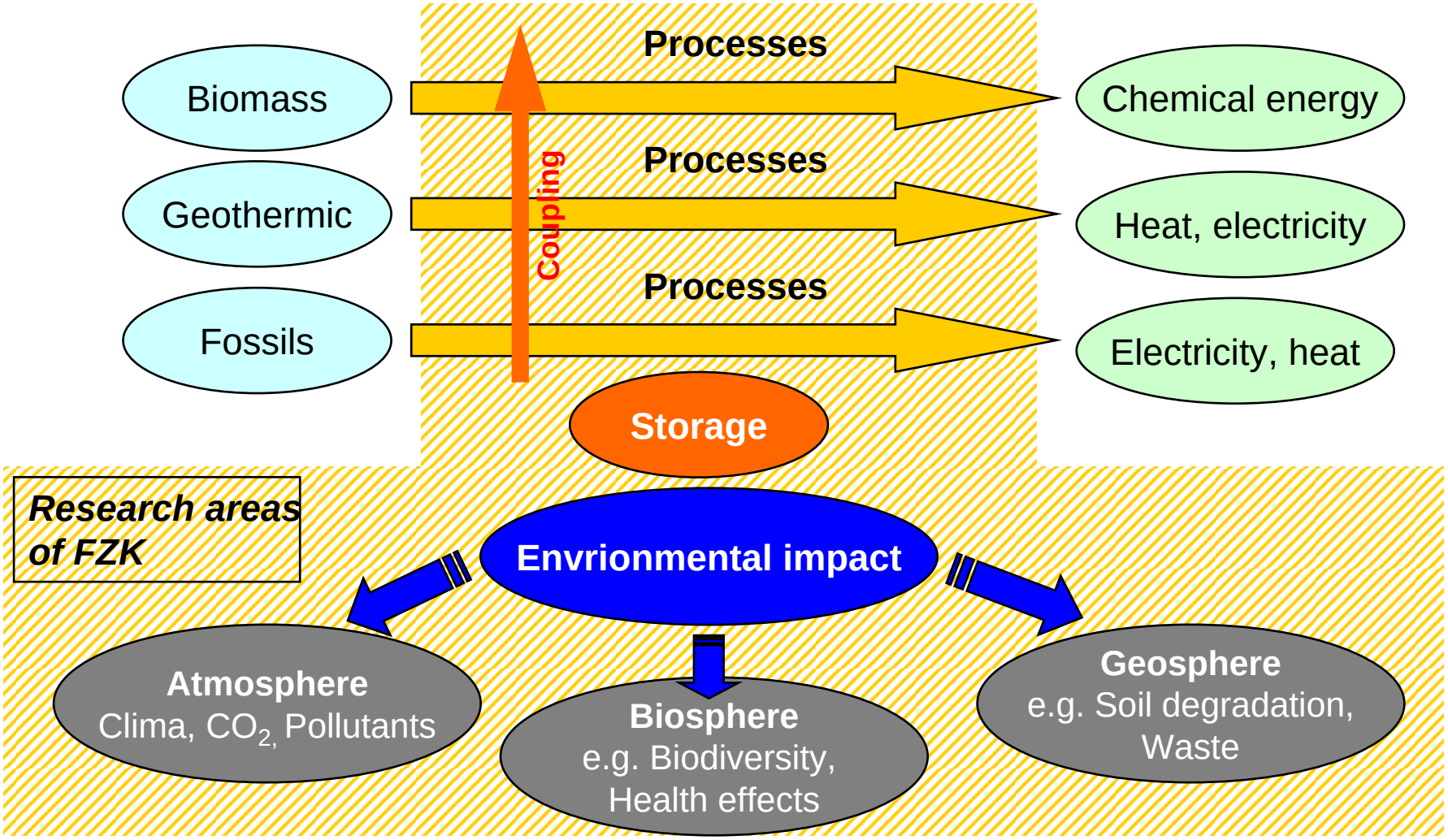


Research Needs for Energy Technology

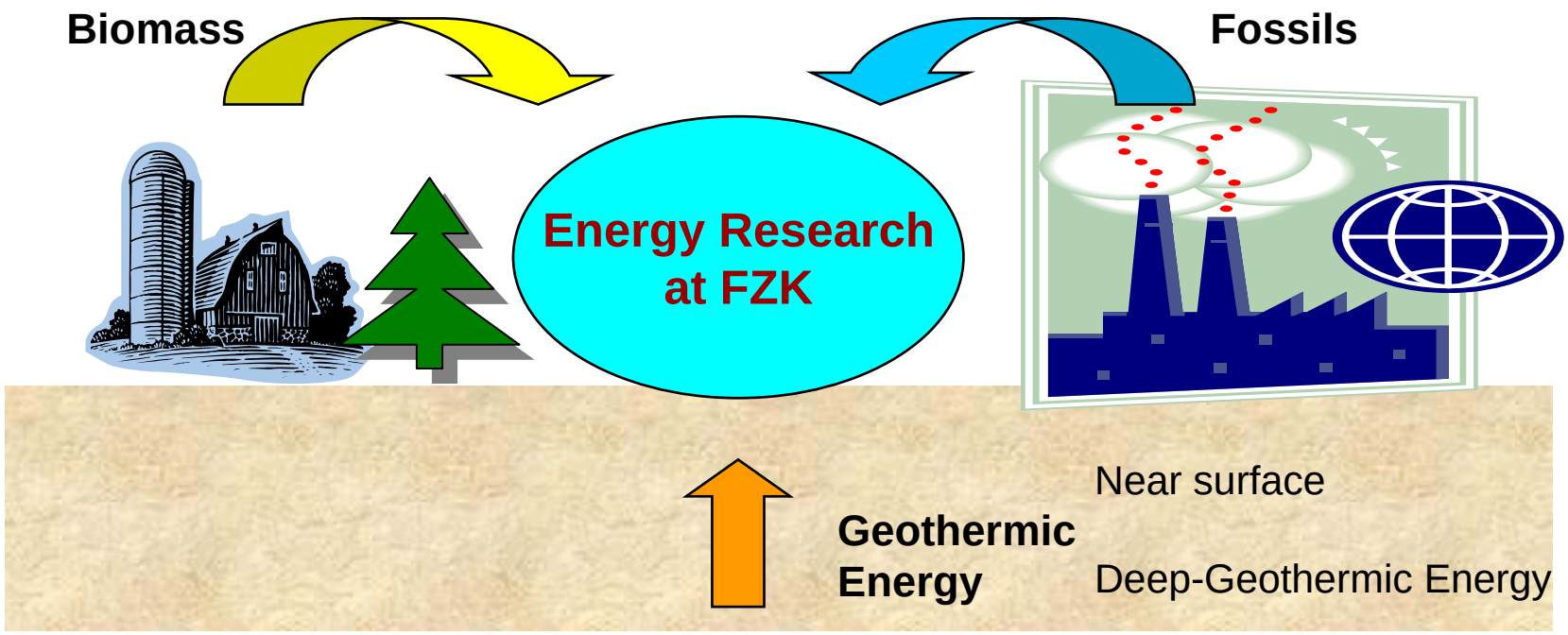


Increase of efficiency during transformation
Minimization of losses during use
Potential of renewable energy
Stretching of fossil energy
Climatic impact minimization
Protection of environment
Life cycle assessment

Energy Research at FZK



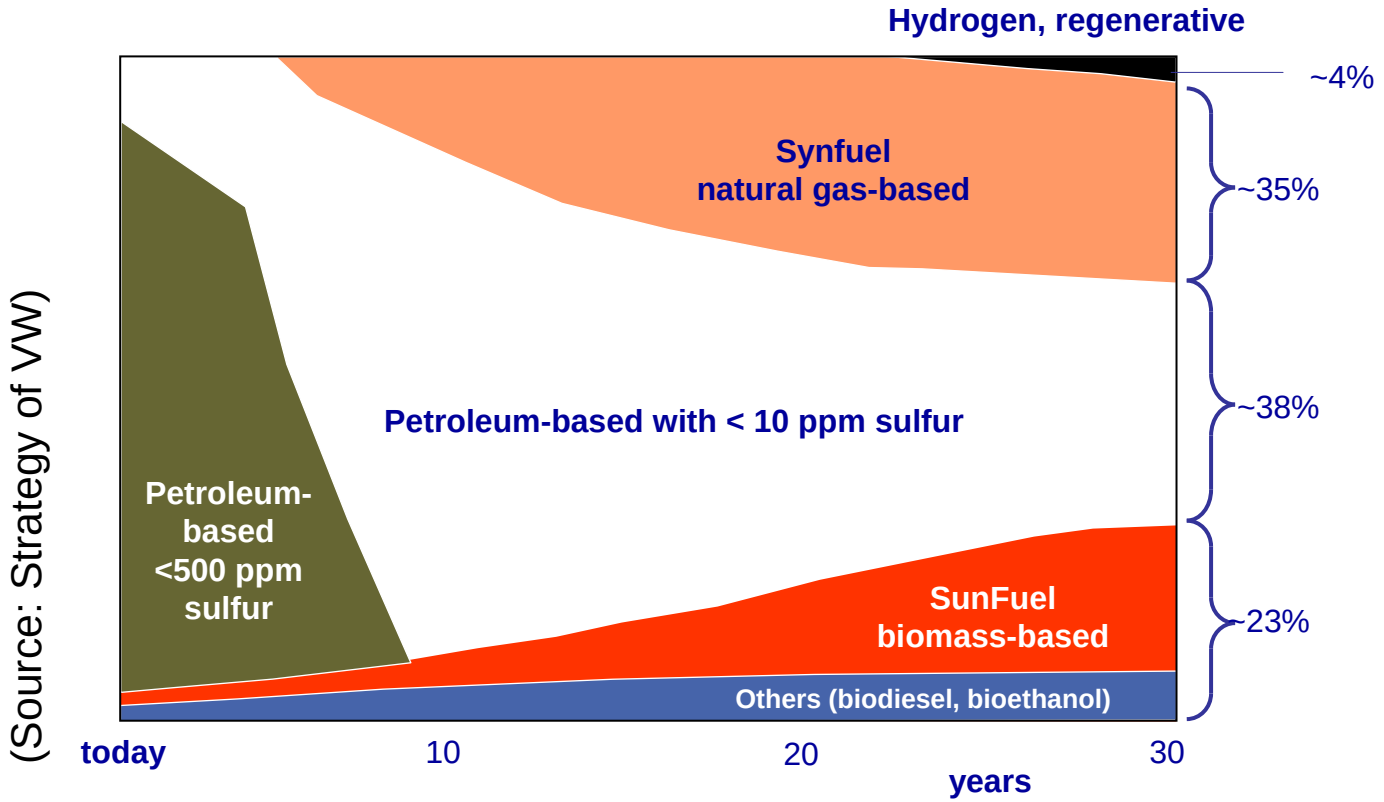
Focus of future energy research at KIT



Energy Research at FZK is focusing on processes, storage and use for

- Biomass after harvest
- Fossils after conveyance
- Geothermic energy above earths‘ crust

Future Scenario of Fuels in Europe



Vision 2030: only about 38% based on petroleum

Vision Bioenergy

- Agriculture, forestry and waste economy provide
- enough biomass for energy production
- without competing with food production, in accordance with a
- sustainable economy

- Increasing of
- today's harvest as well as utilization of so far mainly
- unused residual biomass from agriculture and forestry

Strategy Bioenergy

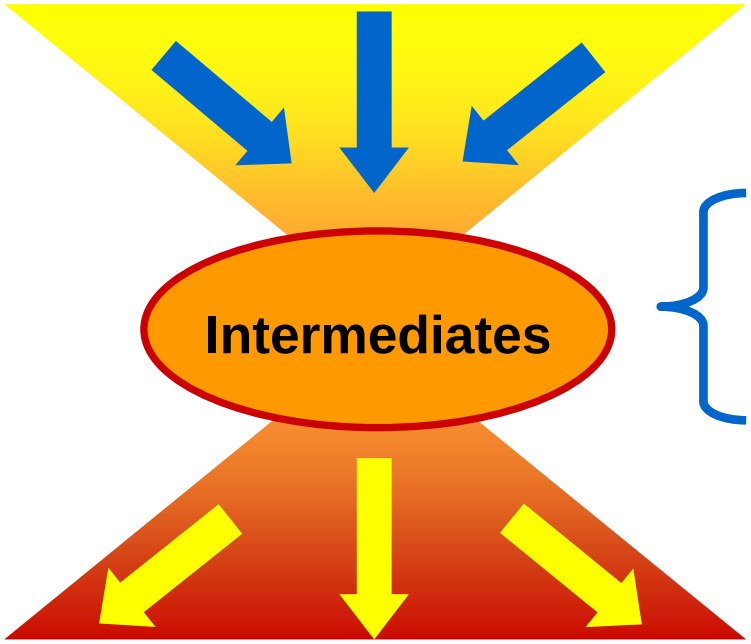
- Conversion of biomass into chemical energy carriers such as hydrocarbons requires carbon based feedstock
- ⇨ Biomass is the only renewable carbon source
- Electricity production and heat generation can also be achieved with other renewable energies
- <u>Consequence</u>
- Biomass preferably should be used to produce
  ⇨ High energy density synthetic fuels and other carbon based products

with a multitude of applications

Refining of Biomass – general concept

Feedstock Variety:

Dry Biomass - Wet green Biomass - Algae - Biogenic Waste

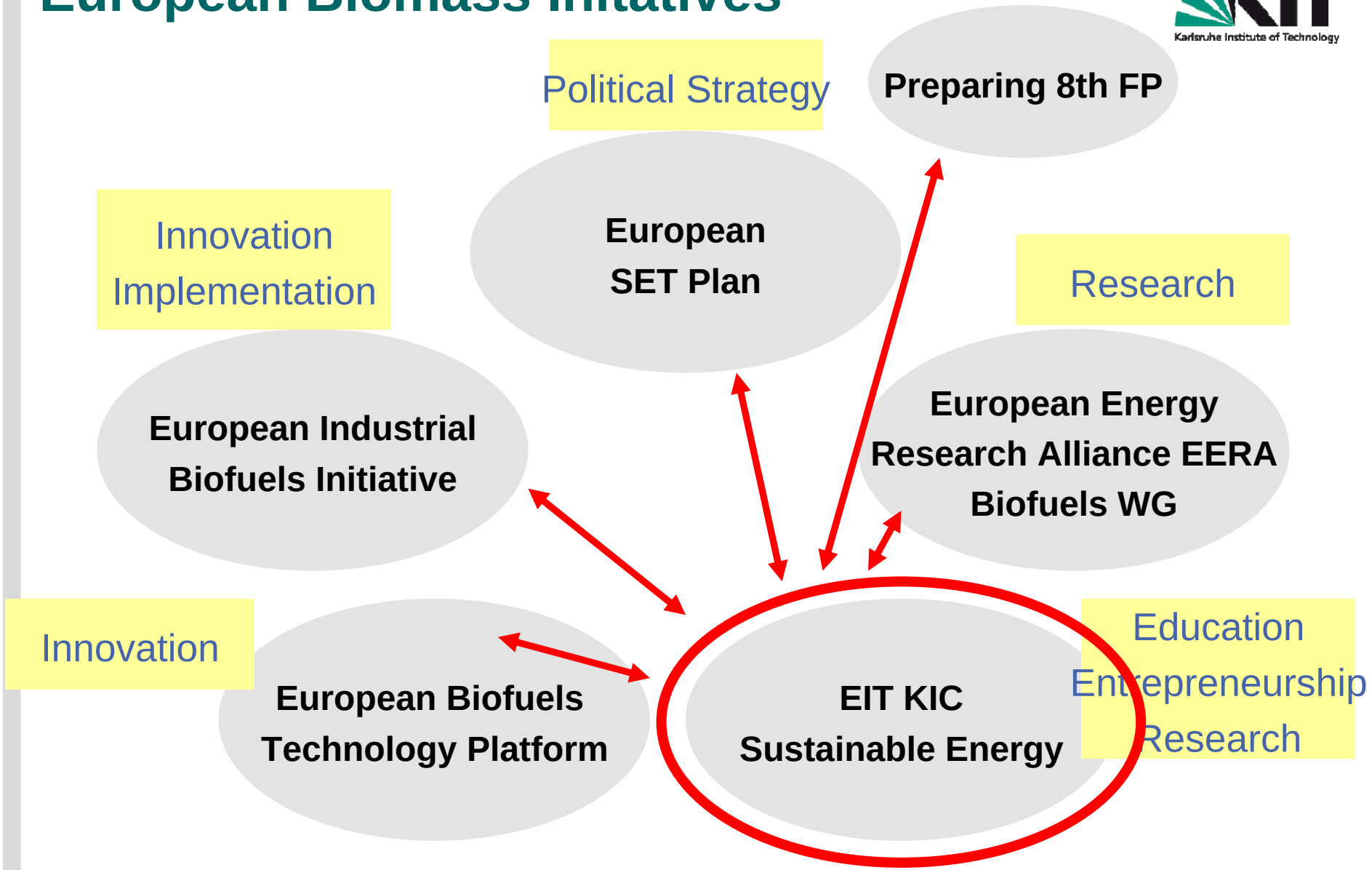


§ Energy rich
§ Storable
§ Transportable
§ Standardized

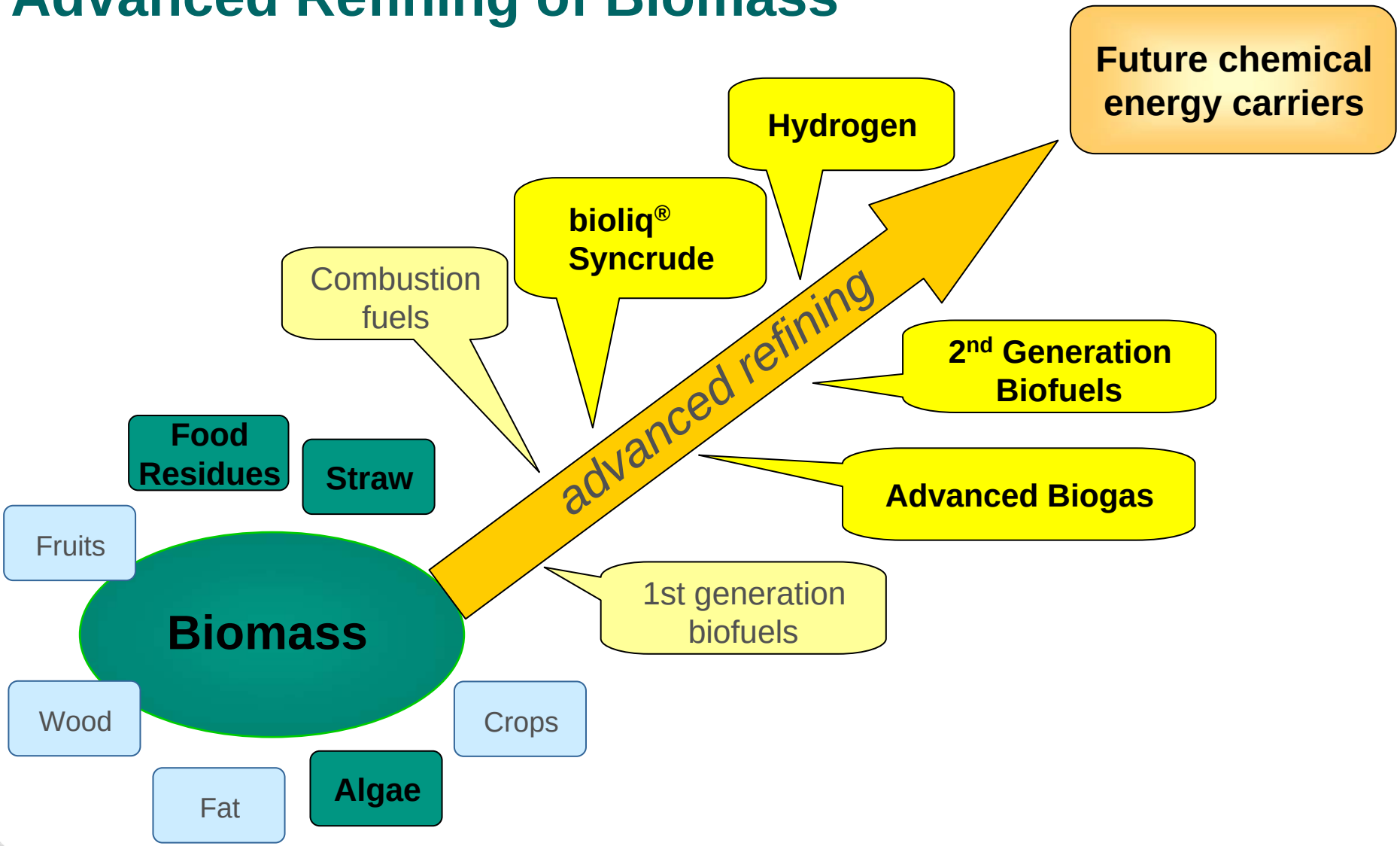
Product Variety:

Biofuels - Chemical Products

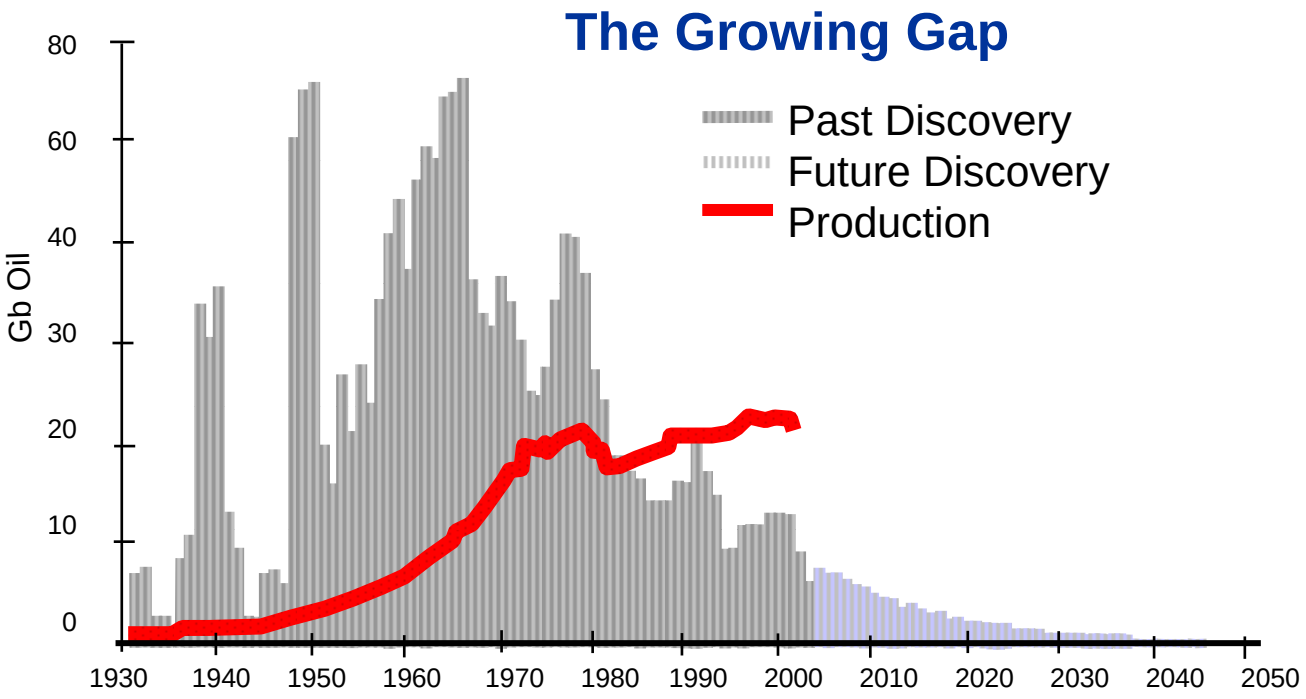
European Biomass Initatives



Conclusion:
Advanced Refining of Biomass

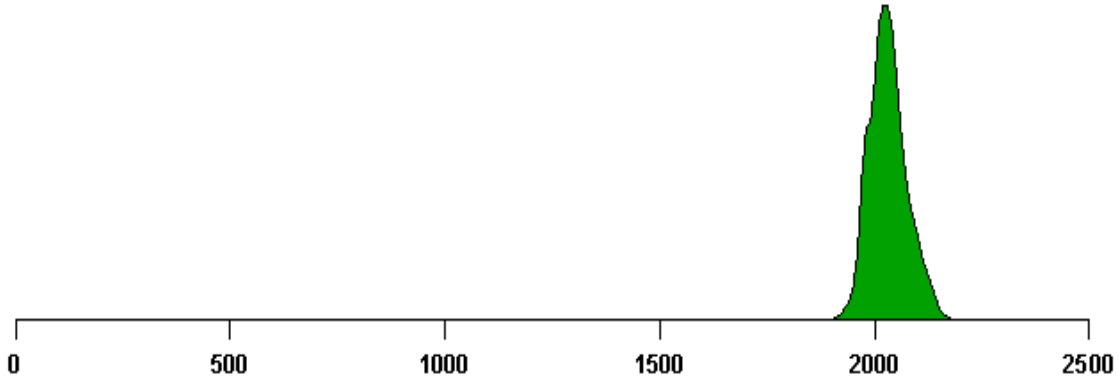


Decline of the “fossil” age



Source: Peakoil.net/Newsletter 39

Decline of the “fossil” age



The ‚fossil age‘ in a time window of 2500 years