Bioverda

SUSTAINABLE ENERGY

Fully integrated BioPower (Fuel/Energy) approach of Bioverda

Balanced Risk & Opportunity

Dubrovnik November 2007

Overview of the NTR Group

- Founded in 1978, headquarter in Dublin, Ireland
- Market capitalisation of 1,800,000,000 Euro
- 1,700 Employees across 7 countries EU & U.S.A./Canada
- Recognised pedigree in financing renewable energy projects
- Strategic Investment Plan based on our own equity investments of 3,000,000,000 Euro into **BioPower factories**

Bioverda - Biofuels

- Fully integrated **Biodiesel** plants (crushing, transesterification, glycerol distillation)
  - Mecklenburg-Vorpommern, Germany:
    - 120,000 tpa rape seed crush
    - 45,000 tpa biodiesel facility
  - Thuringia, Germany:
    - 160,000 tpa rape seed crush
    - 95,000 tpa biodiesel facility

- **Bioethanol** plants under construction in the U.S. – joint venture with VIRGIN Biofuels, Richard Branson
  - Tennessee: 300,000 tpa bioethanol facility and
  - Indiana: 300,000 tpa bioethanol facility

Bioverda – Bioenergy

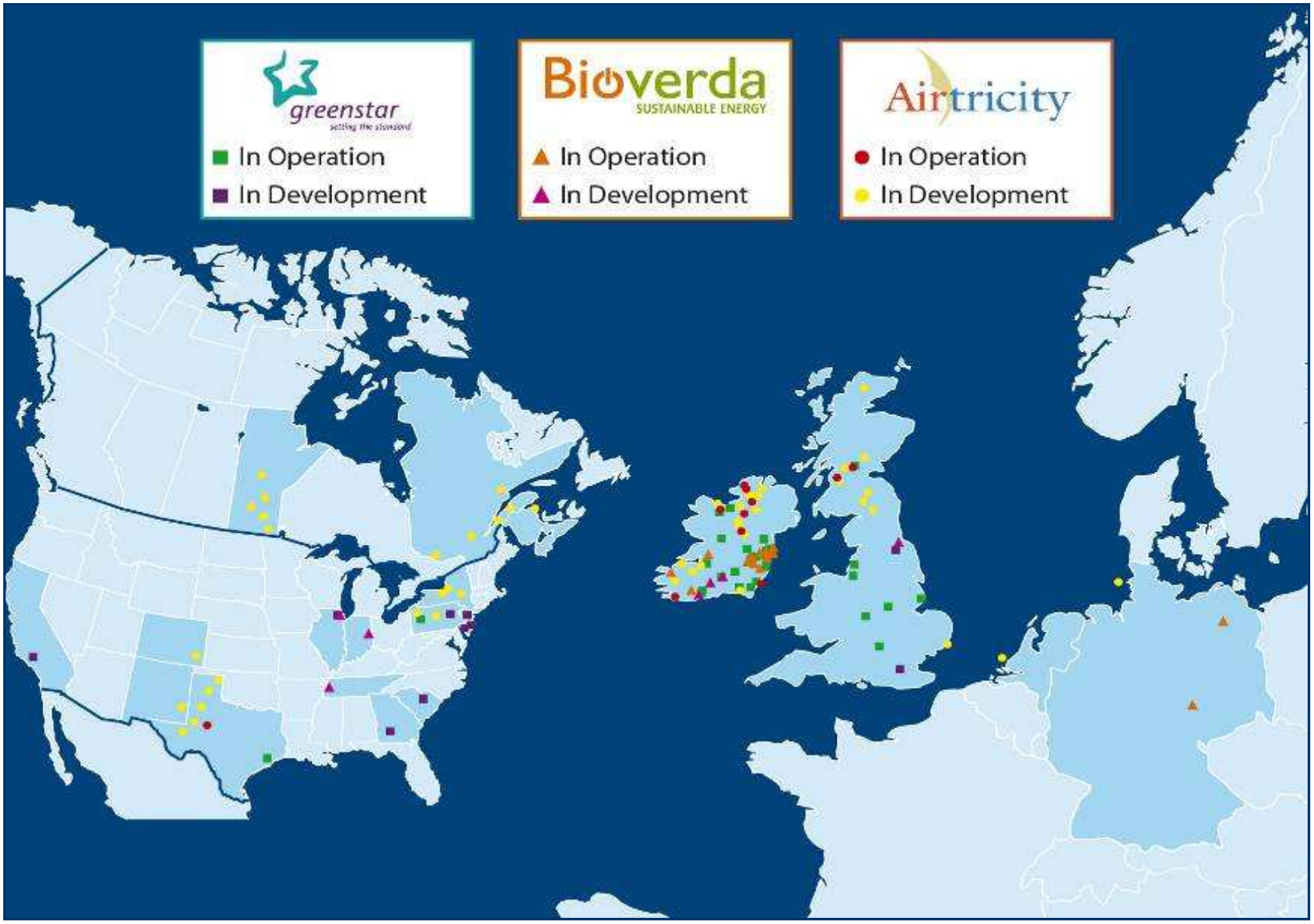
- 25 MW **Biomethane** plant based on landfill waste in Ireland
- 32 MW electricity Biomethane factory in Ireland
- **100 MW Biomethan factories in development** (Germany, NL)

Airtricity & Greenstar

- Airtricity – joint venture between NTR plc and Future Wind Partners
  - developing and operating **wind farms** (10.000 MW) in Ireland, the UK, Canada and the U.S.

- Greenstar – joint venture between NTR plc and Celtic Utilities
  - leading integrated **waste management** company in Ireland, the UK and US
  - including recycling, residual disposal and biological treatment

NTR PLC Group Locations



Demand Triangle

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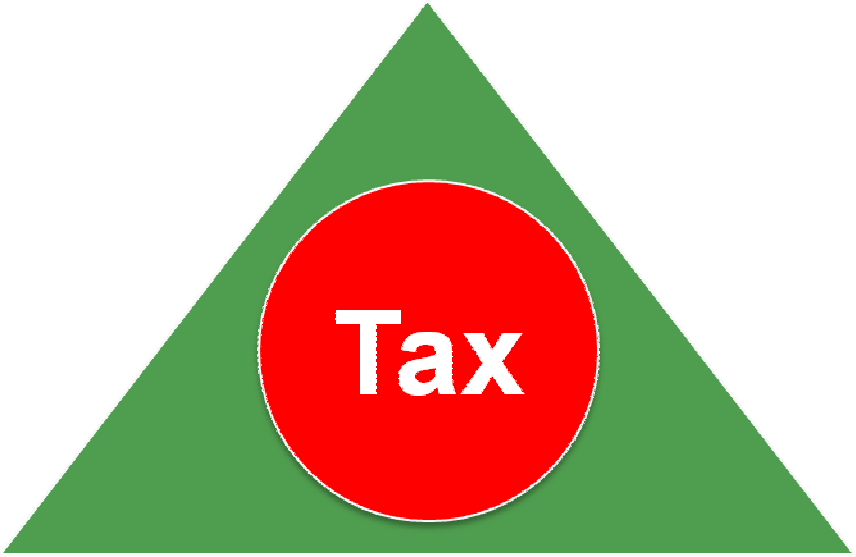
Food (hunger)



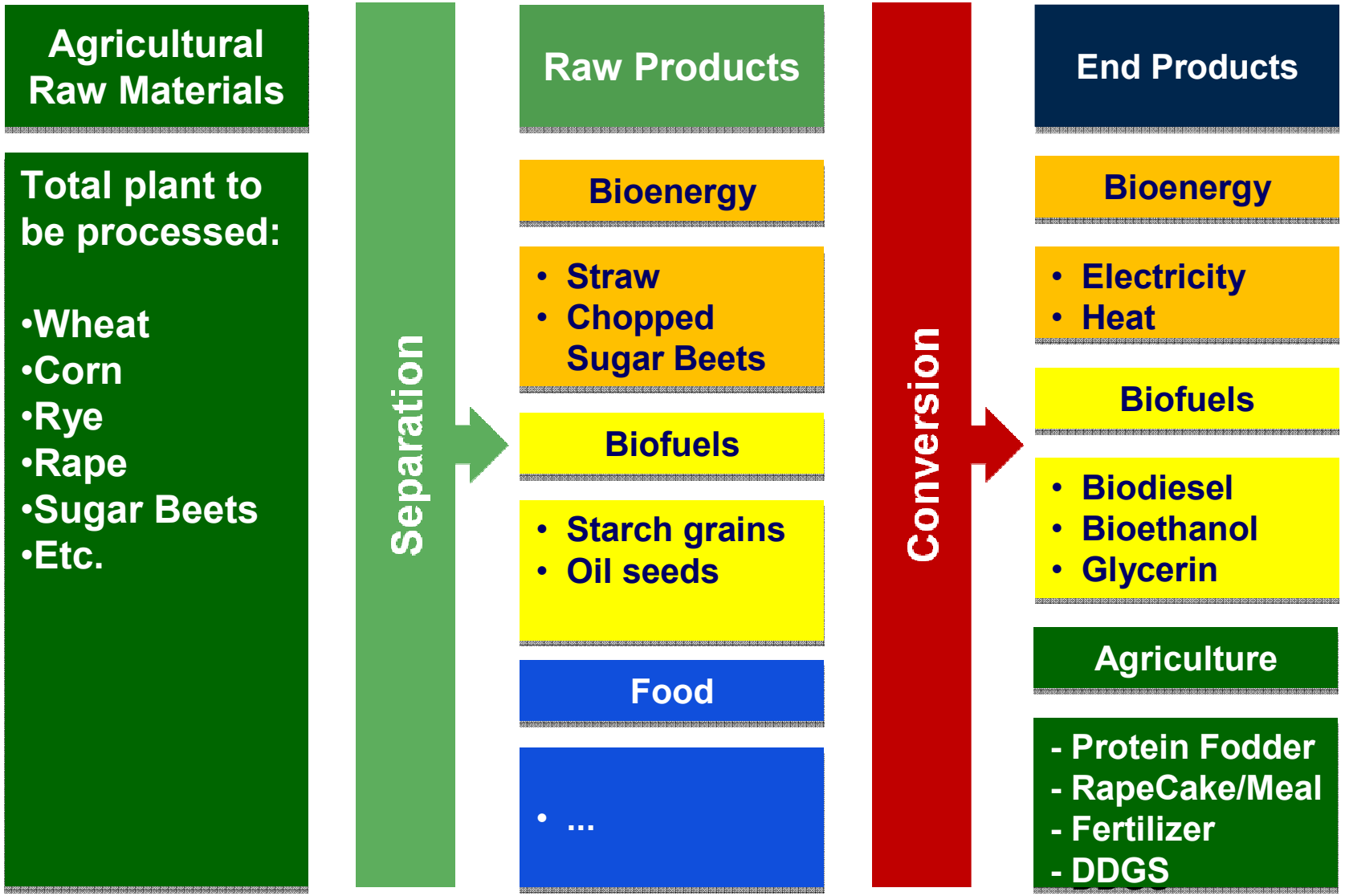
Energy (freeze, non mobility)

- Fuel
- Electricity
- Heat

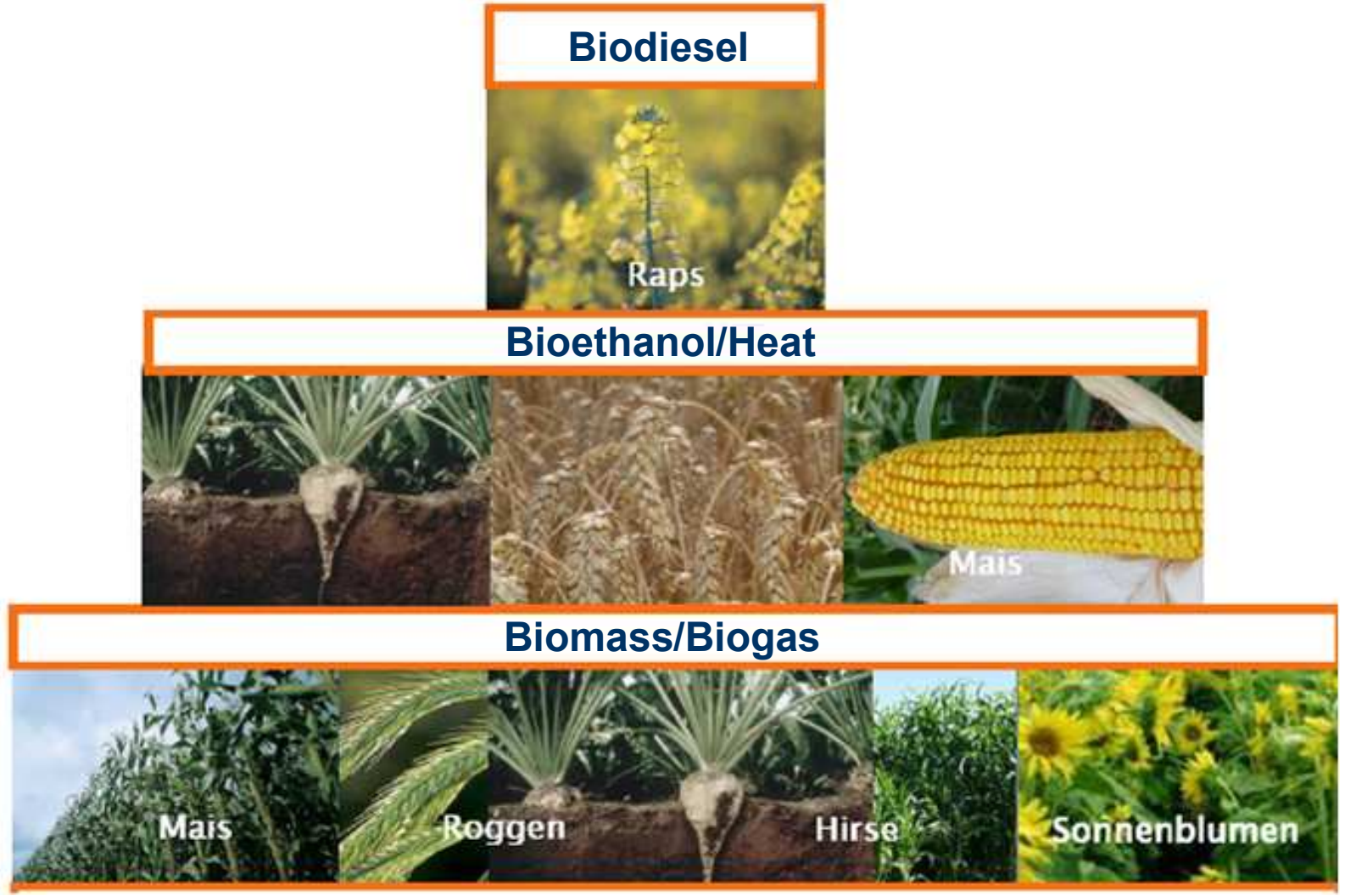
Industrial Raw Materials (No clothes, no tools)

- Chemical Industry
- Building & Construction Industry

BioPower Products Chain - 1st generation state of the art proven technology



Agricultural Raw Materials for BioPower



Source: KWS

Issues Governments Are Facing

- **Priority one:**
  - strong focus on **budget consolidation** (lack of balance)
  - **additional tax income** via developed infrastructure not considered
  - multiplication due to **higher employment**, income & spending with windfall tax-profits for governments not considered
- **Priority two**:
  - solve the **urgent problems** (burning platforms)
  - Bioenergy not considered as priority & opportunity
- **Hurdles:**
  - “cowboy-effect” results in **blocked resources** by “gold-seekers”
  - %-ratio of successfully realized projects vs. planned is very low
- **Consequences:**
  - prepare infrastructure to cope with **negative effects of climate change** to the agricultural sector

Issues Industry Is Facing

- **Local implementation of EU directives:**
  - regional impression of different preconditions
  - **overemphasizing regional cultures** & mentalities with the hurdle of a non-harmonized approach across the states
  - each state individual interpretations causing dysfunctionalities
- **No clearly formulated and easy understandable subsidy systems**
  - Uncertainty of planning processes
- **Changing subsidies during first years of operating plants**
  - E.g. Germany: changes from tax subsidies to mandatory blending
- **Excessive subsidies of fossil fuel:**
  - World Bank report (1992) subsidies to the energy industry $230 bn globally, over 55% to worldwide petroleum products
- **Responsibility for high food prices allocated ONLY to Biofuels/Bioenergy industry**

Food versus Bioenergy

- **Competition** for agricultural area:
  - E.g. Germany: currently only 13% of agricultural area used for energy crops, increase to 20% possible without negative effects to agricultural and food production

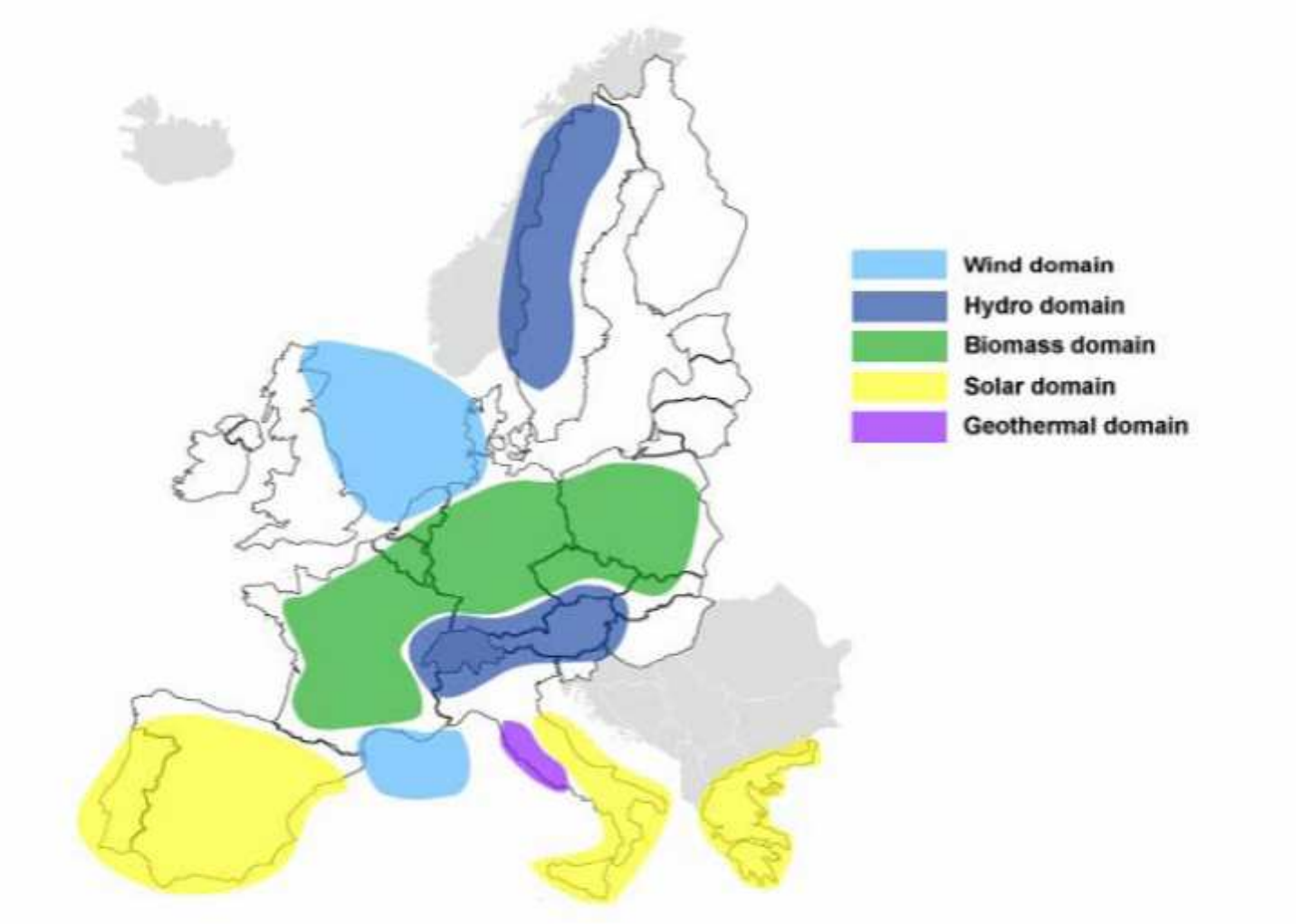
- **Price increase**:
  - Crop failure major contributor
  - Increasing demand from China and India
  - Reduction of EU agricultural subsidies

- **Deletion of rain forest** in Asian and South American Regions:
  - Implementing sustainability criteria valid for food and bioenergy industry

Perspectives 1st generation technology

- Sustainable 1st generation technology to **produce food, fodder, biofuels, and bioenergy**
- 1st generation technology providing an essential **bridge until 2nd generation technology** can be installed widely
- 1st generation technology allowing the production of sustainable, **low carbon footprint biofuels**
- **DEVELOPMENT of the AGRICULTURAL SECTOR to use set aside land, idle land, not arable land with the target of acceptable prices for food and energy**
- Proper **crop rotation** guarantees food, fodder, fuel, fibre etc.

Potential Renewable Energy Domains in Europe (2030)



Source: Edenhofer 2007, Potsdam Institute for Climate Impact Research (PIK)

Thank you very much for your attention !

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