

éNERGIE @ UL

Energies for the future Challenge, Lorraine Université d'Excellence Program

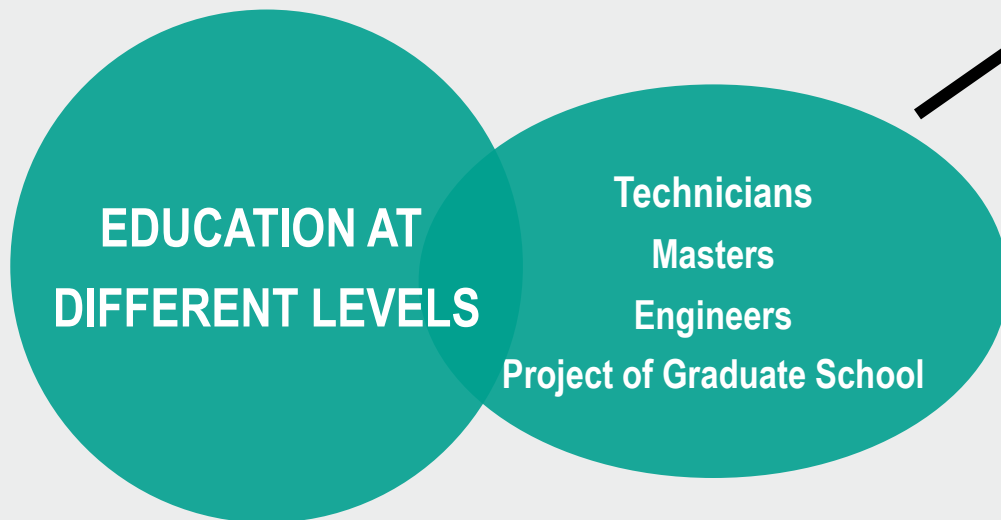
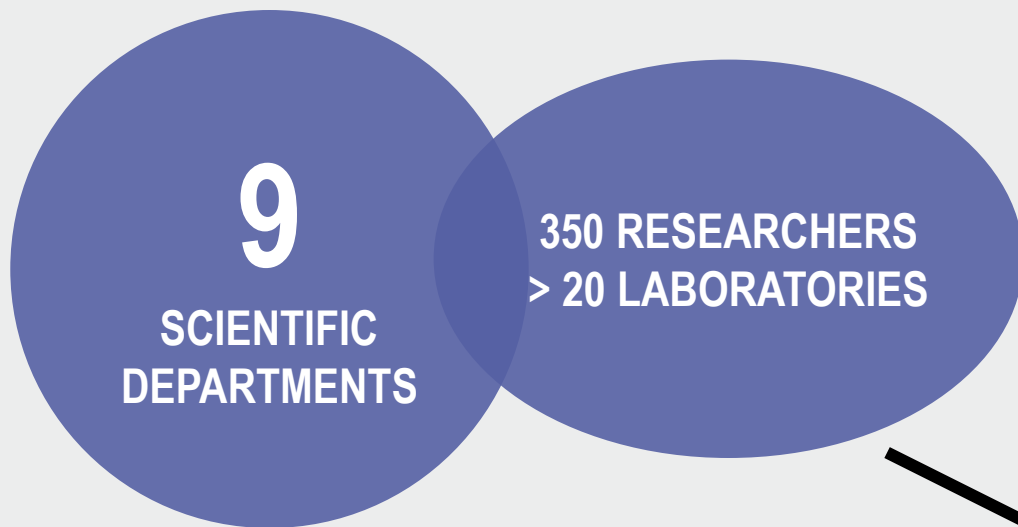
A MULTIDISCIPLINARY INITIATIVE ON ENERGY TRANSITION

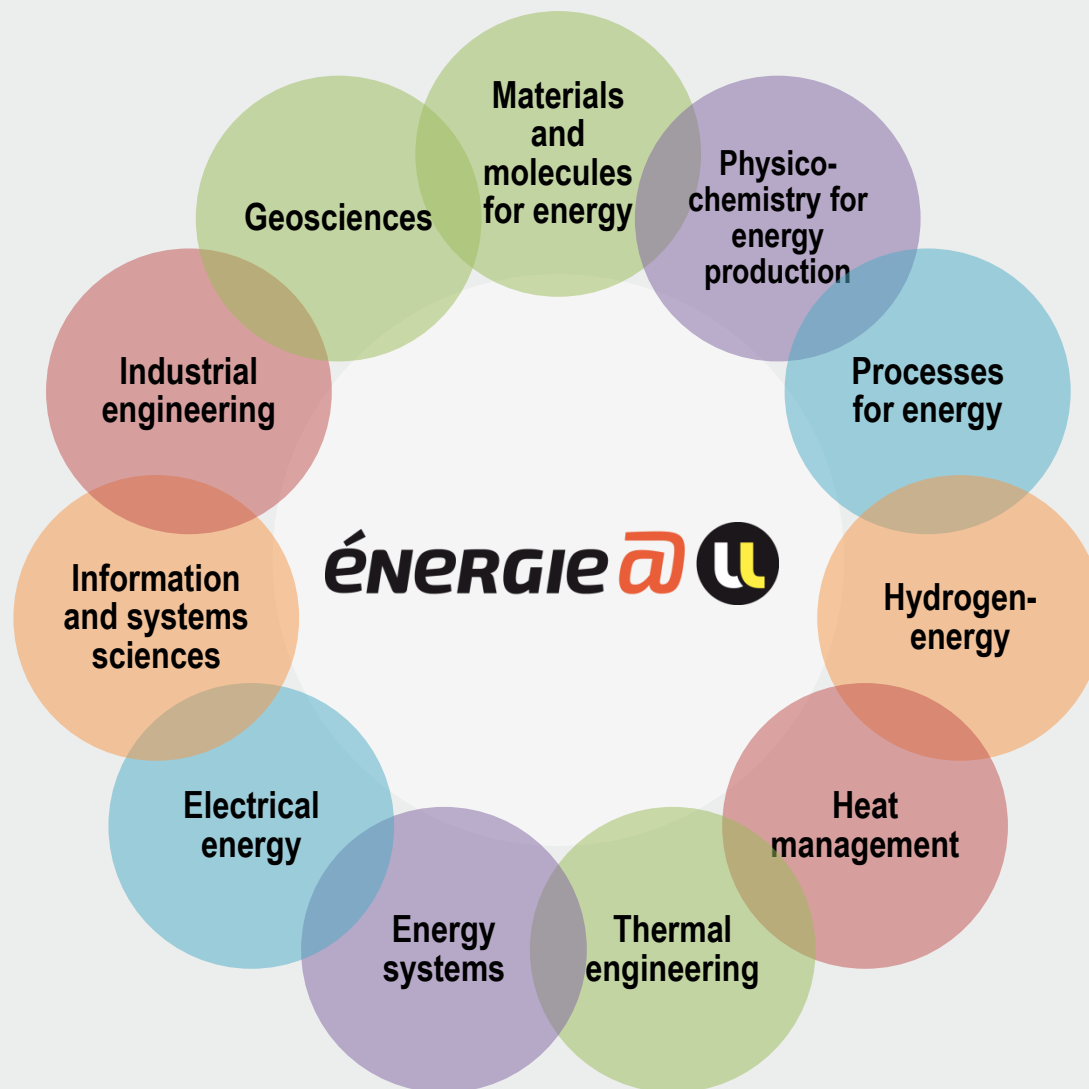
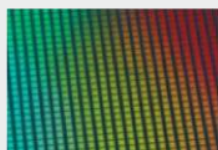
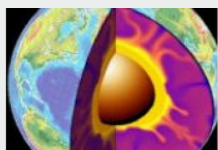


- Whole value chain of materials
- Sustainable management of the natural resources
- **Energies for the future**



- Digital trust
- Innovative solutions for aging
- Knowledge engineering







Psychology

Ergonomy
Prospective
ergonomy

Geography

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Social
sciences

History

Law and
regulation

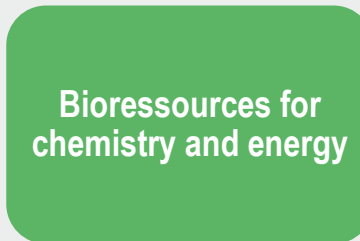
Material and molecules

Human

Society

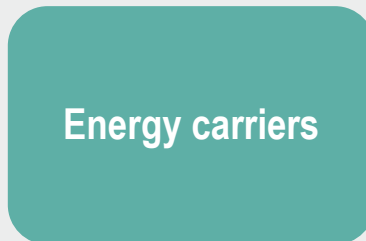
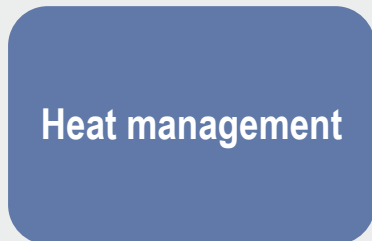
Modelling

Simulation



Processes

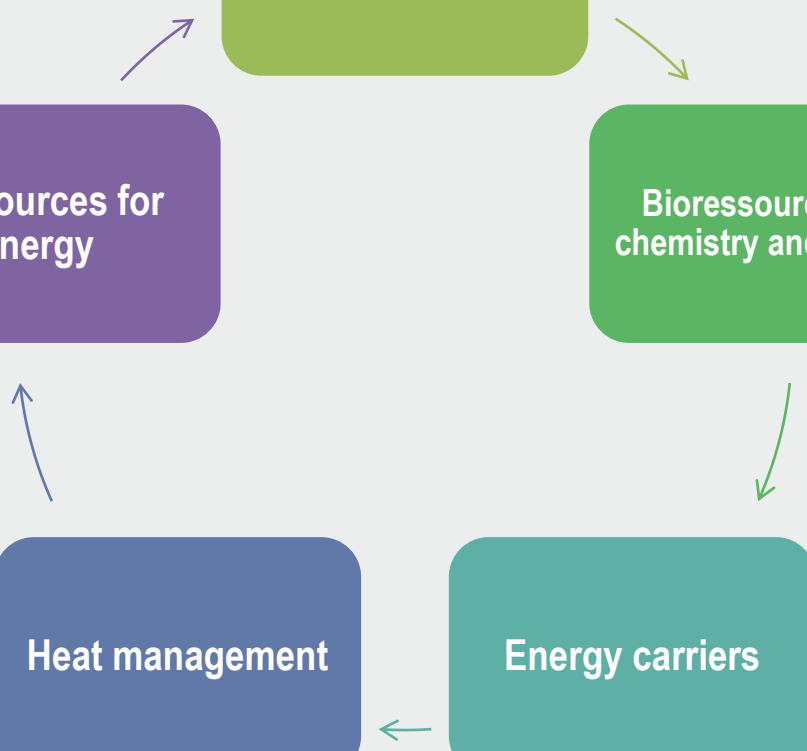
Digitalization



Temporal perspective

Economy

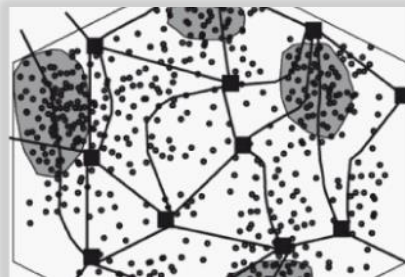
Spatial perspective



Insertion of the energy production facilities (renewable, distributed) in the territories

Space requirement of the energy networks

Environmental, regulatory and geographic constraints



Past energy transitions, impact on territories and communities

Human-Technology interfaces

Objective and subjective risks, individual/collective risks



Acceptance, mistrust, mediation

Technology philosophy

Energy law, usage conflicts

Education science



- **Hydrogen-energy (ULHyS) - LUE** 
- Sustainable use of the sub-soil for energy - DeepSurf - LUE 
- **Insertion of distributed energy sources in territories (biomass, wind)**
- Working group on numeric for energy

ULHyS : Université de Lorraine Hydrogen Science and technologies



Interdisciplinary by nature

5 ambitions for ULHyS

1 – International outreach

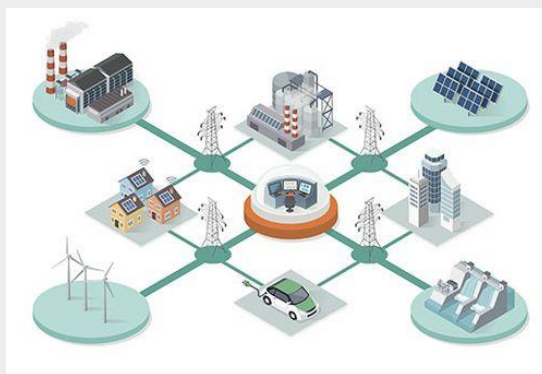
2 – Multi-disciplinary approach

3 – Socio-economic partnerships

4 – Education programme

5- Research and Training Institute

From H₂ production to the end users



Ergonomics

Economics

Industrial eng.

Chemical eng.

Mechanical eng.

Electrical Eng.

Control

Transfers

Electrochemistry

Materials

Sustainable use of the sub-soil for energy - DeepSurf



Track the exchanges of mass and heat between the underground and the surface, consequences on the environment

New approaches for energy transition

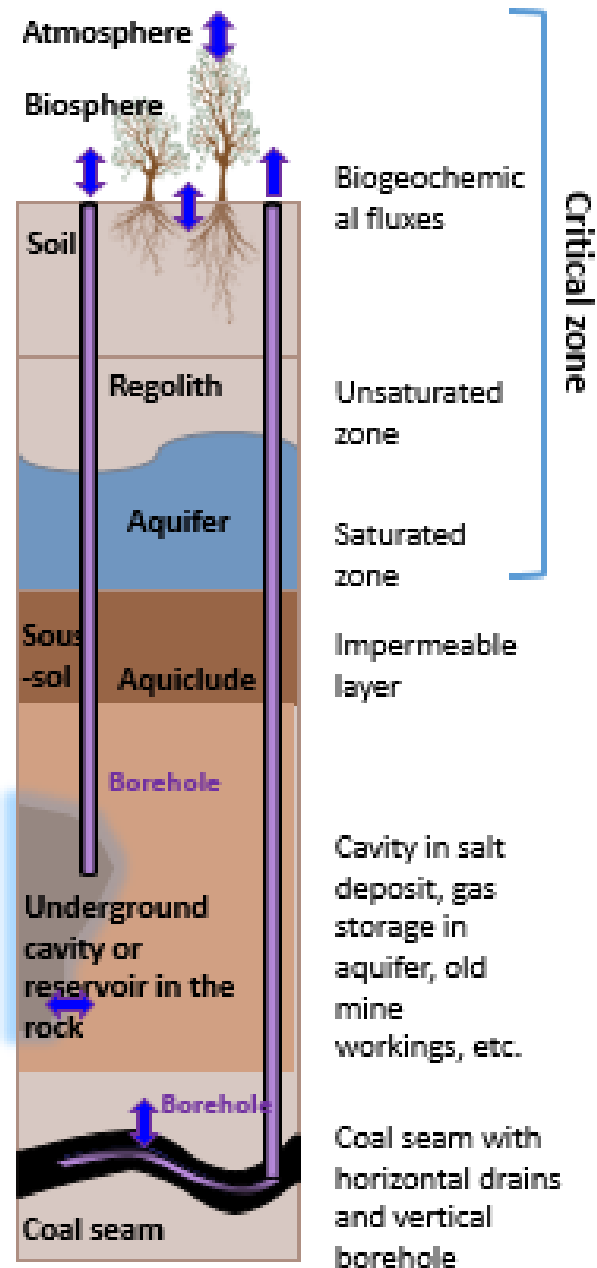
Life cycles, carbon budget and economics approaches applied to energy transition (biomass, fossil resources, nuclear energy, renewable solutions)

Deep-surface interactions

Study of interactions between the surface and the underground (development of new tools, database acquisition, modelling)

Risk assessment and territorial integration

Analysis of history (past) and scenario (future),
Adapting the legal framework to new uses,
Assessment of the territorial integration of projects)





Nuclear production

4 nuclear power plants (12500 MW)



Mobility

North-South and East-west (TEN-T corridors), cross-border mobility



Renewables

- 1st producer of wind energy in FR
- 4rd producer of PV energy in FR
- Hydroelectricity
- Biomass (from wood)
- Hydrogen energy (1 refueling station+ several projects)



Sub-soil

- Coalbed gas
- Unexploited mines and subterranean cavities to store energy resources (heat, CH₄, H₂)



Industry

- Strong carbon footprint
- Strong energy intensity
- High emission of waste heat



