EnergyHUB

Modern solutions to challenges for energy safety and security increase

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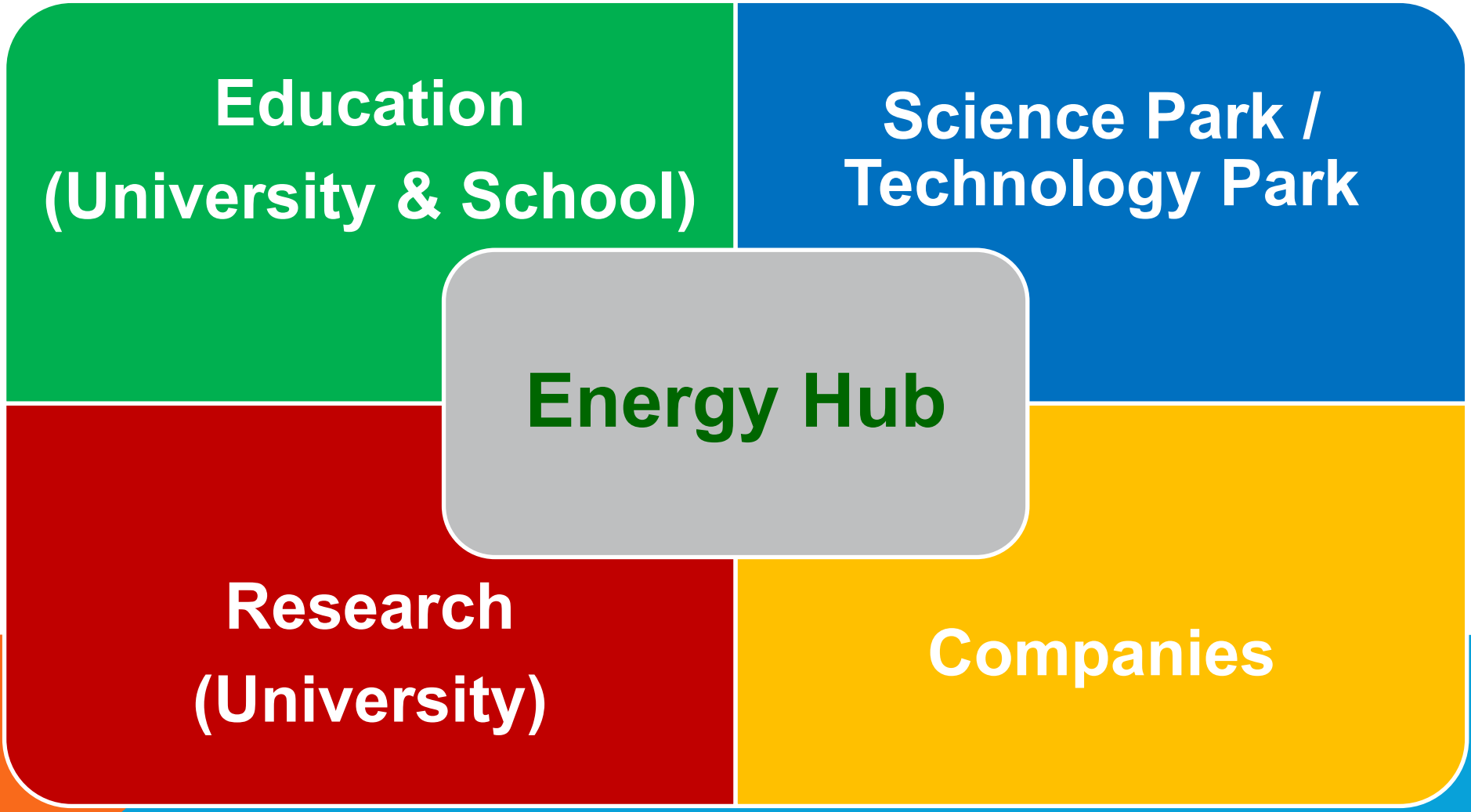
Kyiv, Ukraine, 2017

STRUCTURE OF ENERGY HUB



Education

Main task: creation and development of alternative / renewable energy laboratory

Laboratory (Basic / Mandatory components):

- The system of photovoltaic panels (2 kW);
- Wind station (2 kW);
- Solar heat station (pipes, collectors) (2 kW);
- Hybrid systems of alternative energy (for example, photovoltaic + thermoelectricity; solar collector + thermoelectric generator, etc.)
- Demonstrative solar photovoltaic elements (240 W);
- On-line alternative / renewable energy laboratory for analysis of data from each Energy Hub.

- Creation of Lab. Infrastructure **(ERASMUS K2)**
- **Bilateral programs** for pupils exchange and joint educational program creation

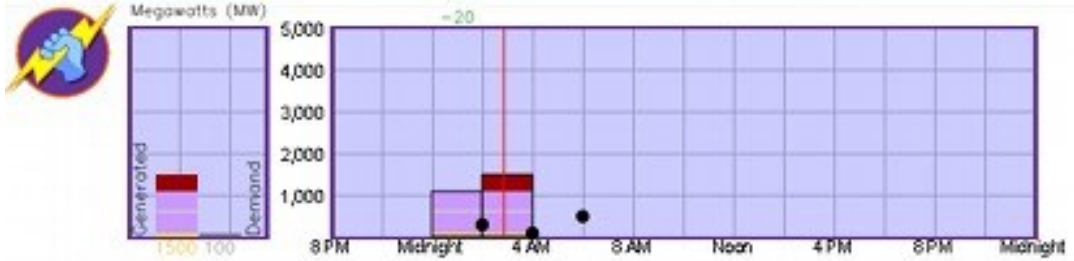
Educational laboratory for secondary

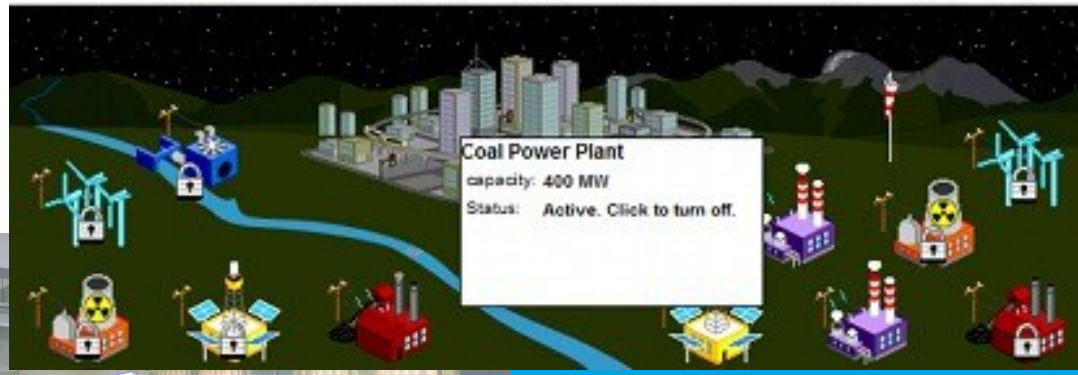
Tasks:

Preparing training labs for school subjects related to energy items:

- Physics;
- Ecology;
- Economy

Concept: Open educatio





Types of Labs:

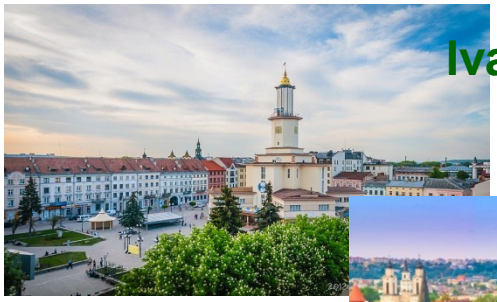
- **Virtual**
- **Class-lab, in specialized laboratory**

Educational laboratory for secondary

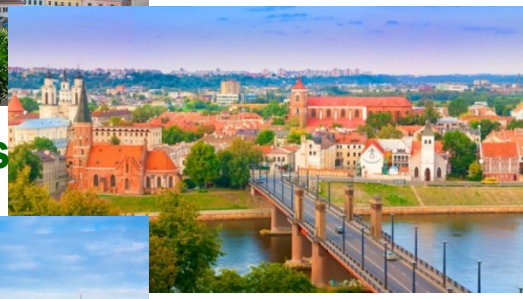
Results:

Pupils will be able to perform laboratory works on calculating the parameters of alternative and renewable energy sources (technical parameters and economic efficiency depending on any factors: wind, quantity of solar days, latitude, climatic zone, etc.):

- Photovoltaic solar panels;
- Wind stations;
- Concentrated solar heat plant;
- Thermoelectric energy transformation;
- Hybrid systems;
- Etc.



Ivano-Frankivsk



Kaunas

Drezden

Lublin

Educational laboratory for secondary

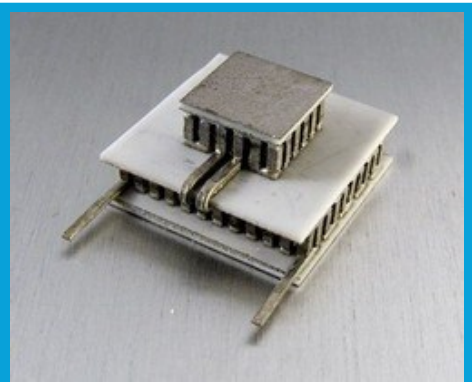
Concept: Increase interest for technical/nature education

Impact:

Students / school pupils will study natural sciences:

- Types of alternative energy;
- Principles of alternative and renewable energy sources;
- Technical features of such energy sources;
- Factors that influence on effectiveness of these energy sources;
- Possibility to perform an economic calculation of cost per unit energy and whole energy system;
- Possibility to determine the impact of different energy sources on environment; Increase the number of students in technical and natural science specialties; The market saturation by graduates will be a result of the “technological boom“. In particular, number of companies and startups in energy area will be growing with positive effect on the economy and






Educational laboratory for University

Tasks:

Laboratory works on special courses (for students of the physical and technical specialties, and demonstrational labs in direction of the economy efficiency determination and the feasibility of using the different energy sources at different conditions).

The particular attention will be paid to study the effects or phenomena, in which university of the each research groups is specialized. For example:

Vasyl Stefanyk Precarpathian National University –

- Thermoelectric energy systems;
- Devices for energy generation and accumulation (accumulators and supercapacitors).

University –partner 2 (**example**):

- Photovoltaic systems (for example, technical constructions);

University - partner 3 (**example**):

- Photovoltaic systems (for example, photovoltaic cells creation)
- new materials with nanoparticles and

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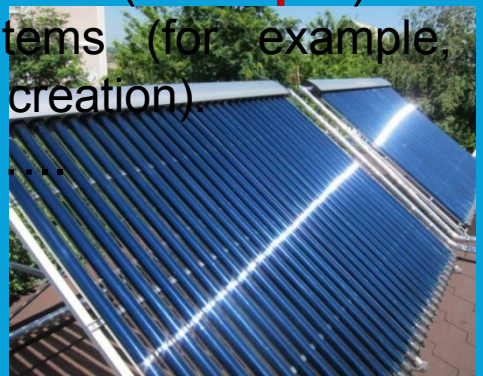
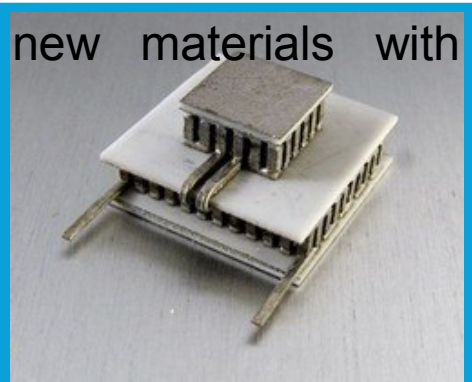



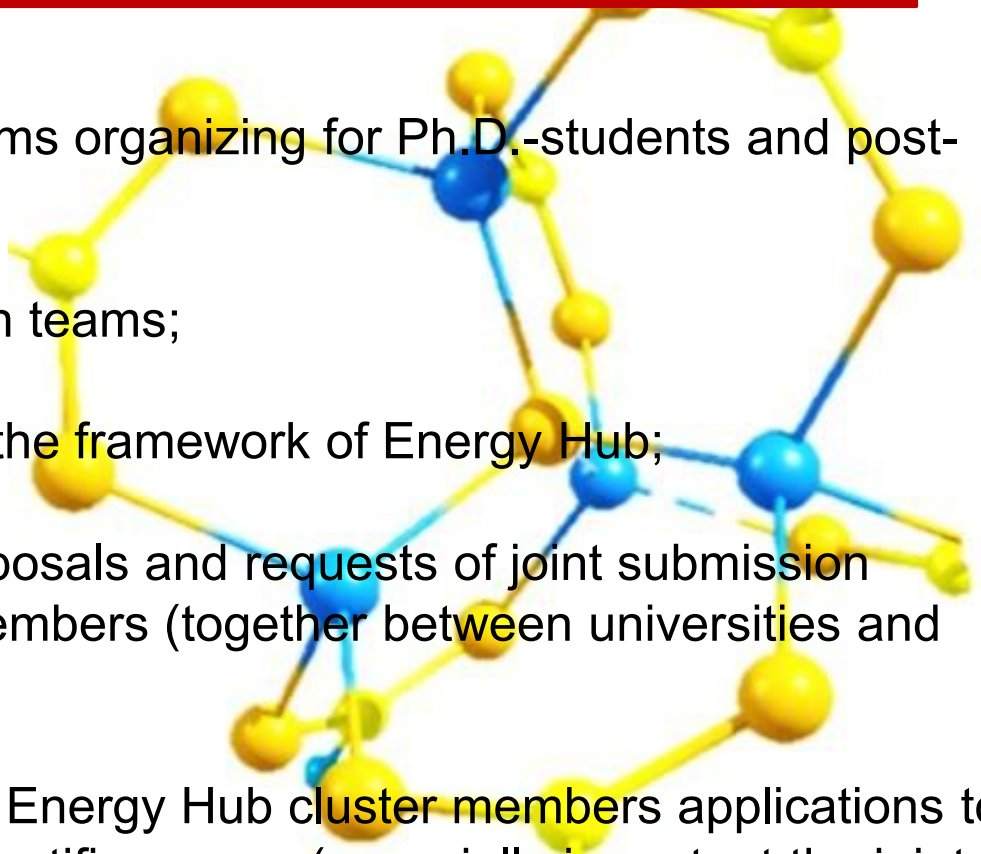

Educational laboratory for University

- Exchange programs for staff and students **(ERASMUS K1 – mobility);**
- Infrastructure creation **(ERASMUS K2 – lab infrastructure)**

Activity:

Laboratory on special courses;
Mobility programs:
- Joint exchange programs;
- Exchange of experience.

University Research



Tasks: Joint training programs organizing for Ph.D.-students and post-docs;

Creation of complementary research teams;

Expanding the bilateral research in the framework of Energy Hub;

The preparation of joint project proposals and requests of joint submission within of Energy Hub consortium members (together between universities and SMEs);

Stimulation for companies (SMEs) - Energy Hub cluster members applications to perform research by universities scientific groups (especially important the joint research between teams from the partners countries within Energy Hub members).

- Exchange programs for researchers and students **(ERASMUS K1);**
- The research laboratories creation **(ERASMUS K2)**

University Research

Activities:

Concept: Open research

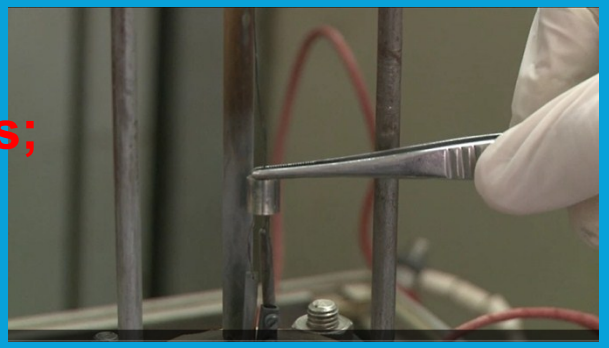
Cutting-edge scientific results;

The applied results will be immediately implemented at the companies - participants of the Energy Hub;

The mobility development between universities - participants of the Energy Hub;

Receiving the better scientific results through access to databases of the experiments of Energy Hub partner's organizations.

- **H-2020;**
- **SPS NATO projects;**



Science Park / Technology Park

Tasks:

Science parks / technology parks are the basic structures for:

- Organizing and ensuring effective technology transfer;
- Creation of new companies within the Energy Hub;
- The development of start-ups as the main mechanism for start of innovative high-tech business;
- The involvement of investments and grants;
- Training for Energy Hub participants : the basics of project management, creative development of innovative solutions, creation of reliable and competitive teams;
- Setting up joint educational and research laboratories for additional research by Energy Hub participants;
- **Joint technology transfer office (TTO)** for Energy Hub members creation.

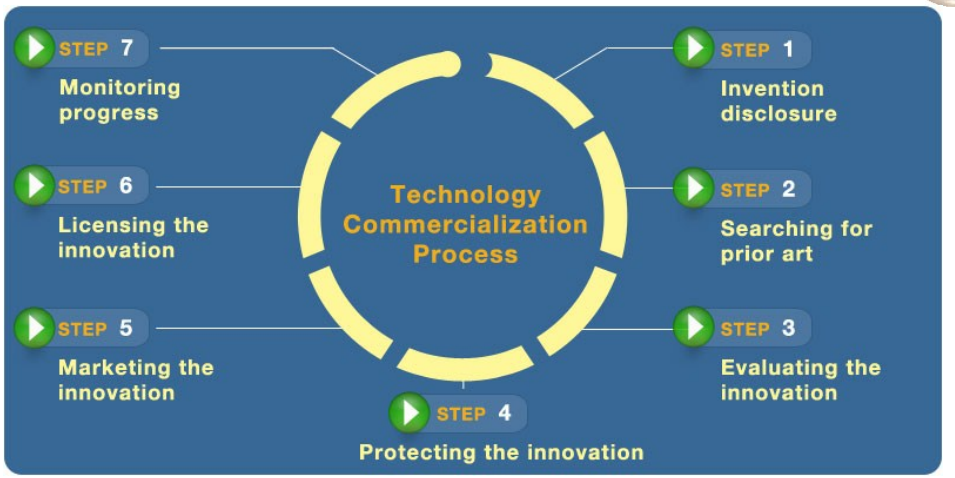
LUBELSKI PARK NAUKOWO TECHNOLOGICZNY

Science Park
Precarpathian University

Science Park / Technology Park

Activities:

Startup crash tests;



Technology commercialization;

IPr support;

Exhibitions organizing

Science Park / Technology Park

Joint Technology Transfer Office is the main priority of Energy Hub

(web source of scheme: https://www.cdc.gov/od/science/technology/techtransfer/technology-transfer-process.htm)

Companies

The energy cluster (or cluster of renewable energy sources) is the main component of Energy Hub's applied direction

What is cluster?

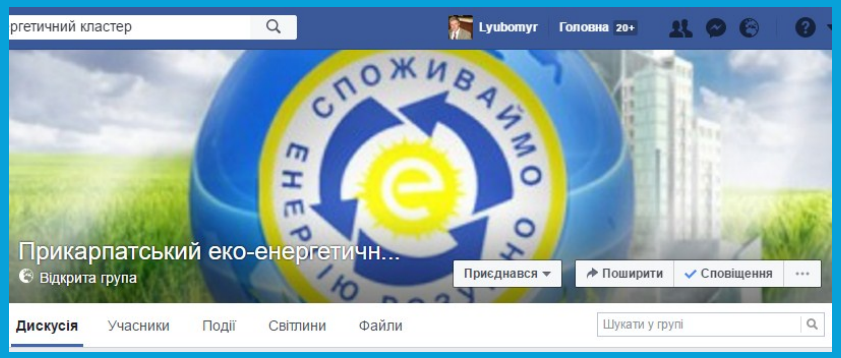
- it is a tool to attract resources from international donors and financial institutions in the area of energy conservation and alternative energy development

Participants of the energy cluster are the enterprises (SMEs), universities, service providers / conduct research / in the field of renewable energy

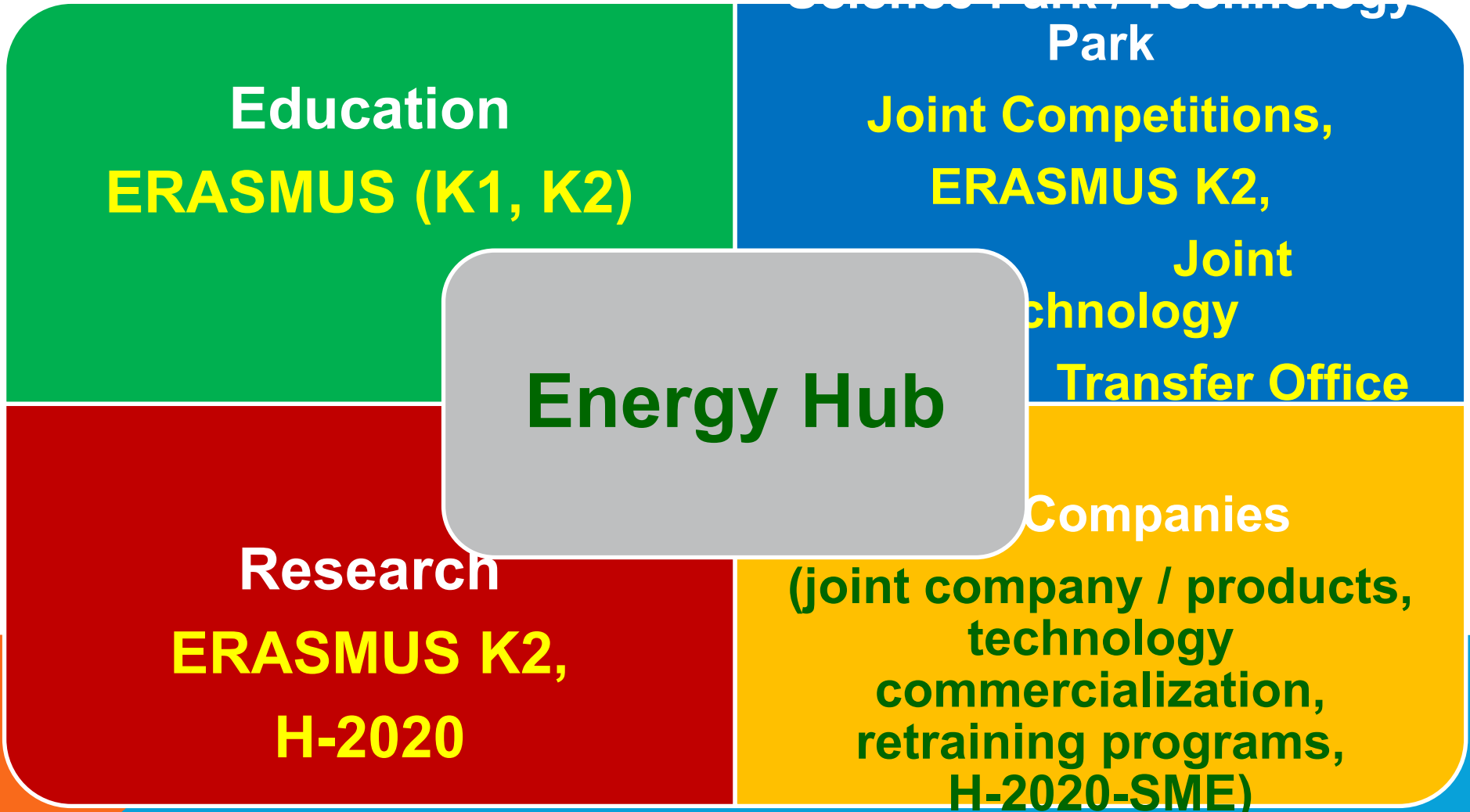
Companies

Benefits for Cluster:

- Retraining of specialists (training, new methods and technology);
- Looking for investments;
- Supporting participation in competitions H-2020 (SME);
- Creation of joint companies within Energy-Hub;
- Support for commercialization;
- Joint development of new products and access to markets of the Energy-Hub
- countries - participants;
- Promoting participation in international exhibitions;
- Making proposals for presence (or lack) of the specialists is the reason for the creation of new specializations at Energy-Hub's partner universities



MECHANISMS FOR SUPPORTING ENERGY HUB ACTIVITY



Energy Hub in Ivano-Frankivsk: communication

- Ivano-Frankivsk, Ukraine
- Kaunas, Lithuania
- Lublin–Chelm, Poland
- Rzeszow, Poland
- Dresden-Freiberg, Germany
- Ankara, Turkey

Possible participants

- Romania
- Austria
- Germany
- France
- Spain
- Portugal
- ……

Map for communications between different Energy Hubs

- Ivano-Frankivsk, Ukraine
- Kaunas, Lithuania
- Lublin – Chelm, Poland
- Rzeszow, Poland
- Dresden, Germany
- Ankara, Turkey

Potential partners

- Romania
- Austria
- Germany
- France
- Spain
- Portugal
- UK

MECHANISMS FOR ENERGY HUB ACTIVITY

Energy Hub

JOINT MANAGEMENT STRUCTURE:

Administrative group (2 persons for each Hub: Hub director and Ministry from relevant country representative person);
R&D Group (2 persons for each Hub: 1 person for representation research direction and 1 person for representation education)
Grant Writing group (2-4 persons for each Hub);
Technology Transfer Group (2-4 persons for each Hub from Science Parks or Technology Parks / Office);
Clusters Hub's Group (1 Leader and 1 Manager for each Hub)

CONDITIONS FOR MEMBERSHIP

Energy Hub

University (Research & Education Institution) PLUS

Technology Park (or Science Park) PLUS

Energy Cluster (or Group of Companies in Energy Industry

Energy Hub

Energy Hub is open for including the local laboratory or loc

The excellence partnership is the best key to success!

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