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Instrumente Structurale 2014-2020

The Interdisciplinary Approach for Ecoinnovation in Energy Systems Based on the Integration of Nanostructured Materials

UNIVERSITIES IN THE SET-PLAN

3rd UNI-SET Energy Clustering Event (ECE)
Universities in the Energy Transition: Focus on Smart Energy Systems and Communities

Bucharest, Romania | 21-23 November 2016

Prof. univ. dr. ing. Eden MAMUT

Sumary

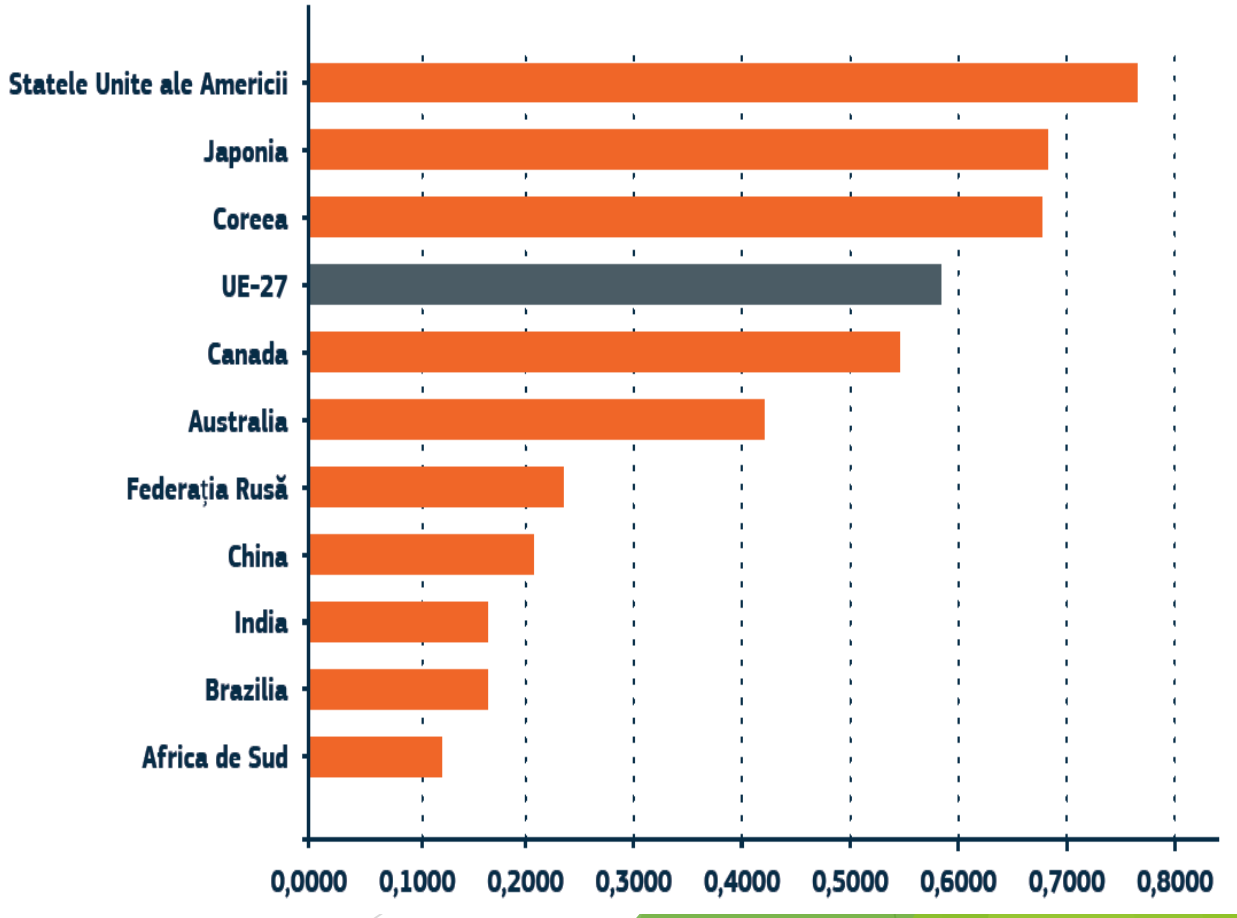
- Innovation Union
- Horizon 2020
- European Technological Platforms
- European Institute for Innovation and Technology - EIT
- Project objectives
- Activities
- Action plan

Innovation Union

The position of Europe in the global economy is rapidly changing. Till 2050, the European share of global GDP is estimated to be half of the current value of 29%.

Until now, Europe managed to hold its global export share (20%), the recorded performances being better than other advanced economies.

However, China, India and Brazil started to catch up EU, by improving their economic performances faster than EU in the last five years.



Innovation as a process

- **In the private sector**
- **In the public sector**
- **In the tertiary sector**

Innovation as a strategy

- To provide Europe a worldwide reputation in the scientific field;

- **To revolutionize the way the private and public sectors are collaborating,** especially through innovation partnerships;

- **To eliminate bottlenecks** – by creating an internal market for competences, patents, risk capital, acquisition of innovation and the establishment of standards, in order to accelerate the implementation of ideas on the market.

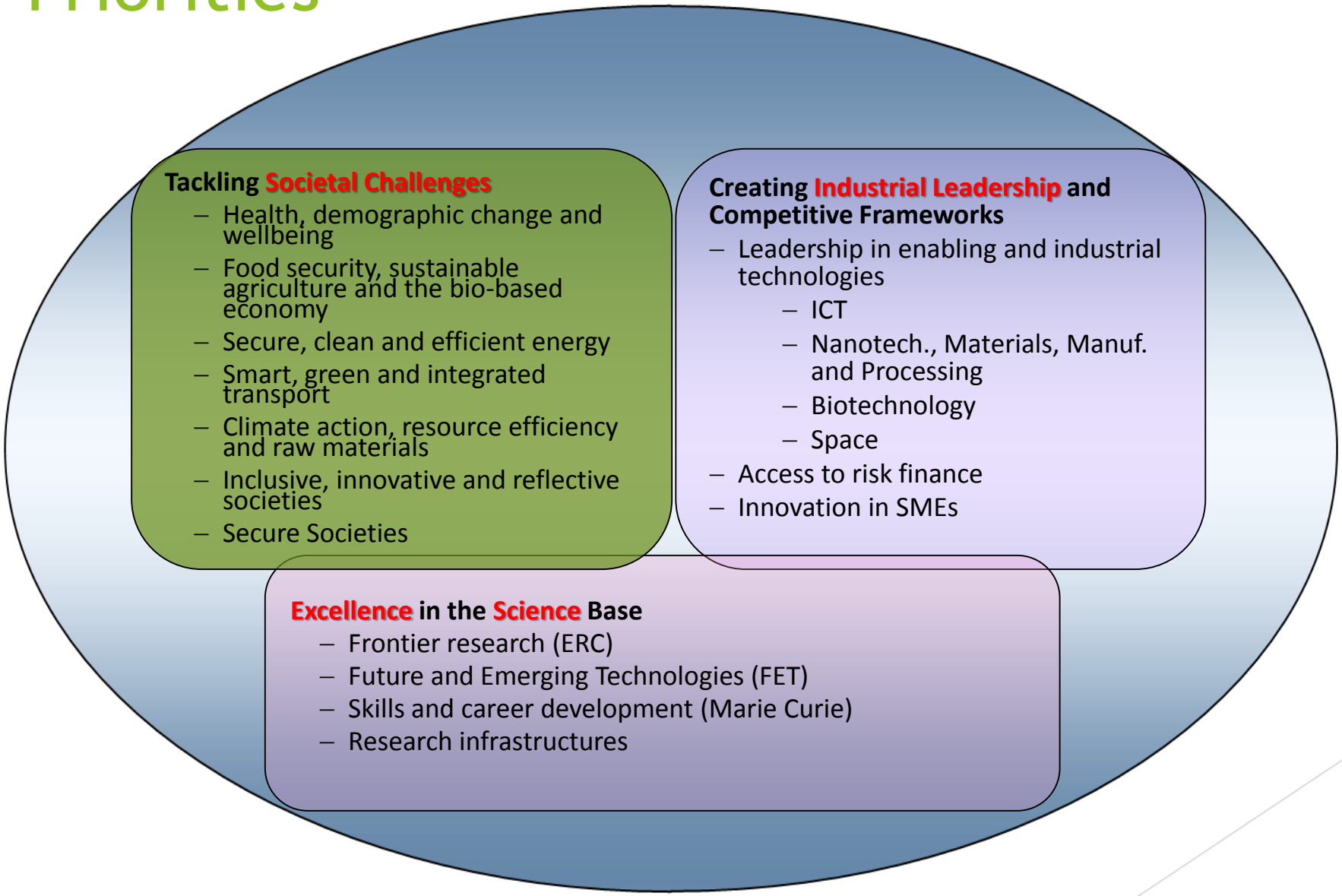
One of the revolutionary proposals is the partnership through innovation, which aims the approach on the main challenges our society is facing.

At the same time, it is considered that the partnerships shall help Europe to achieve its innovation potential faster, giving it an advance on future markets.

Horizon 2020

- Programme conceived on 3 fundamental components:
  - Addressing the societal challenges;
  - Industrial competitiveness;
  - Excellence in scientific research.
- Centered on innovation;
- Involvement of economic agents through the implementation of strategic technologies and PPP at institutional and contractual level;
- Simplified access for a large category of actors.

Priorities


Tackling Societal Challenges
– Health, demographic change and wellbeing
– Food security, sustainable agriculture and the bio-based economy
– Secure, clean and efficient energy
– Smart, green and integrated transport
– Climate action, resource efficiency and raw materials
– Inclusive, innovative and reflective societies
– Secure Societies
Creating Industrial Leadership and Competitive Frameworks
– Leadership in enabling and industrial technologies
– ICT
– Nanotech., Materials, Manuf. and Processing
– Biotechnology
– Space
– Access to risk finance
– Innovation in SMEs
Excellence in the Science Base
– Frontier research (ERC)
– Future and Emerging Technologies (FET)
– Skills and career development (Marie Curie)
– Research infrastructures

European Technological Platforms

- These are associative structures lead by the experienced companies from the industry, recognized by the European Commission as being the promoters of innovation, transfer of knowledge and European competitiveness.
- They are developing strategic action plans for scientific research and innovation, action plans at European and national level in order to be supported by public and private funds. The platforms are mobilizing interested parties in order to provide information for the defined priority domains and are disseminating the information within EU.
- Through actual cooperation, the platforms are supporting the promotion of solutions for the major challenges which concern the citizens, such as population aging, degradation of the environment, food or energetic security.
- They are independent and self-financed entities, which are conducting their activities in total transparence and are opened for new members.

European Technological Platforms

- Have strategic planning, mobilization and dissemination functions.
- In order to achieve their objectives, the main activities are:
  - The development of strategic plans in the scientific research and innovation, with an emphasis on the requirements of the envisaged economical sectors, including roadmaps for technological development and the implementation in the economic sector;
  - Encourage the participation of commercial actors in the EU Framework Programme for scientific research and innovation – Horizon 2020 and are cooperating with the networks from the EU member states;
  - Gather and capitalize the collaboration opportunities with other technological platforms and other partners along the value chain, specific to the addressed field, in order to tackle the trans-sectorial challenges and to promote new innovation models;
  - Identify the international collaboration opportunities;
  - Are acting as external counselling channels for the planning and implementation activities of Horizon 2020 programme;

The technological platforms were the main engines which contributed to the launch of high level Public-Private Partnerships, under the aegis of Horizon 2020 programme.

European Technological Platforms

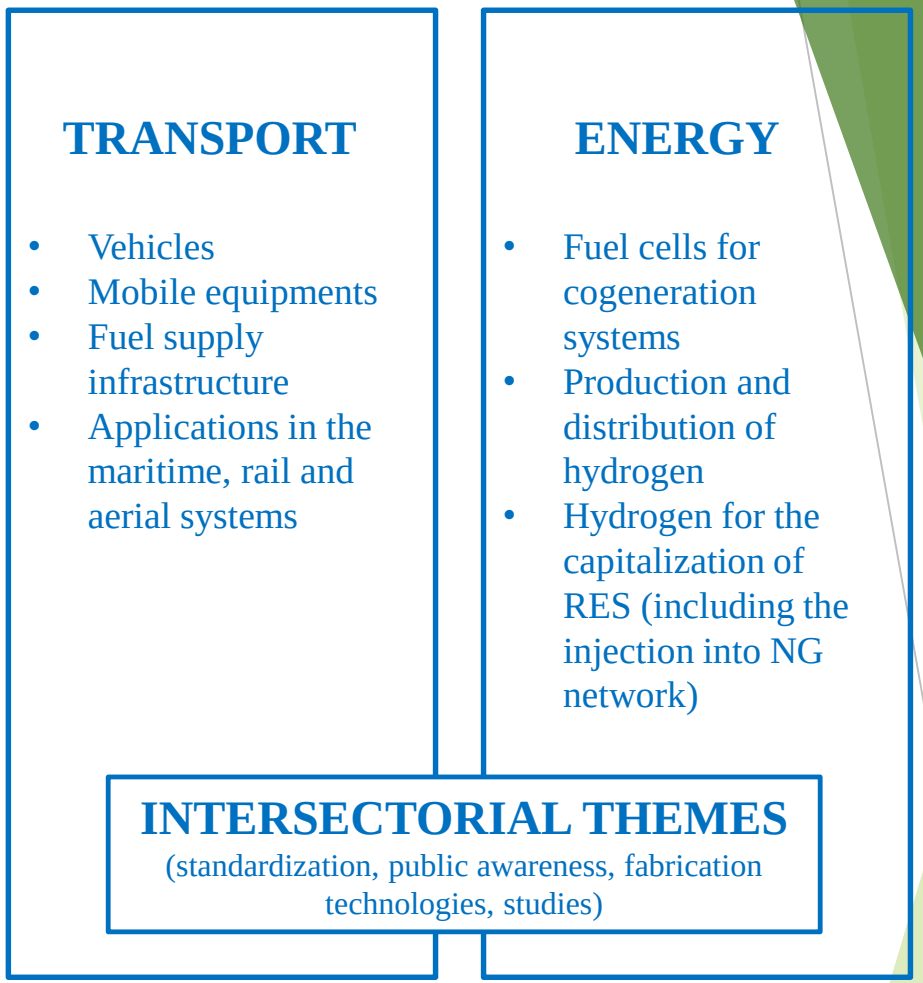
- Advanced Engineering Materials and Technologies (EuMat)
- Advisory Council for Aeronautics Research in Europe (ACARE)
- Embedded Computing Systems (ARTEMIS)
- European Biofuels Technology Platform - Biofuels
- European Construction Technology Platform (ECTP)
- European Nanoelectronics Initiative Advisory Council (ENIAC)
- European Rail Research Advisory Council (ERRAC)
- European Road Transport Research Advisory Council - ERTRAC
- European Space Technology Platform (ESTP)
- European Steel Technology Platform (ESTEP)
- European Technology Platform for the Electricity Networks of the Future - SmartGrids
- European Technology Platform for Wind Energy - TPWind
- European Technology Platform on Smart Systems Integration (EPoSS)
- European Technology Platform "Food for Life" (Food)
- Forest Based Sector Technology Platform (Forestry)
- Future Manufacturing Technologies (MANUFUTURE)
- European Technology Platform for the Future of Textiles and Clothing (ETP-FTC)
- European Technology Platform for Global Animal Health (GAH)
- European Hydrogen and Fuel Cell Technology Platform (HFP)
- European Technology Platform on Industrial Safety (Industrial Safety)
- Innovative Medicines for Europe (IME)
- Integral Satcom Initiative (ISI)
- Mobile and Wireless Communications Technology Platform (eMobility)
- Nanotechnologies for Medical Applications (NanoMedicine)
- European Initiative on NETWORKED and ELECTRONIC MEDIA (NEM)
- Networked European Software and Services Initiative (NESSI)
- Photonics21 - The Photonics Technology Platform (Photonics21)
- European Technology Platform on Photovoltaics (Photovoltaics)
- Plants for the Future (Plants)
- European Robotics Platform (EUROP)
- Technology Platform on Sustainable Chemistry (SusChem)

HFP – FCH2JU


New Energy World IG
Industry Grouping
NEW-IG
87members
European Union
represented by the
European Commission
N.ERGHY
research on fuel cells & hydrogen
Research Group
N.ERGHY
63 members

HFP – FCH2JU

Budget of 1.33 Biln. Euro for 2014 – 2020
With a robust implication of the industrial sector in the implementation of the programme and with additional investments to support common objectives



From the 20-20-20 objectives for 2020

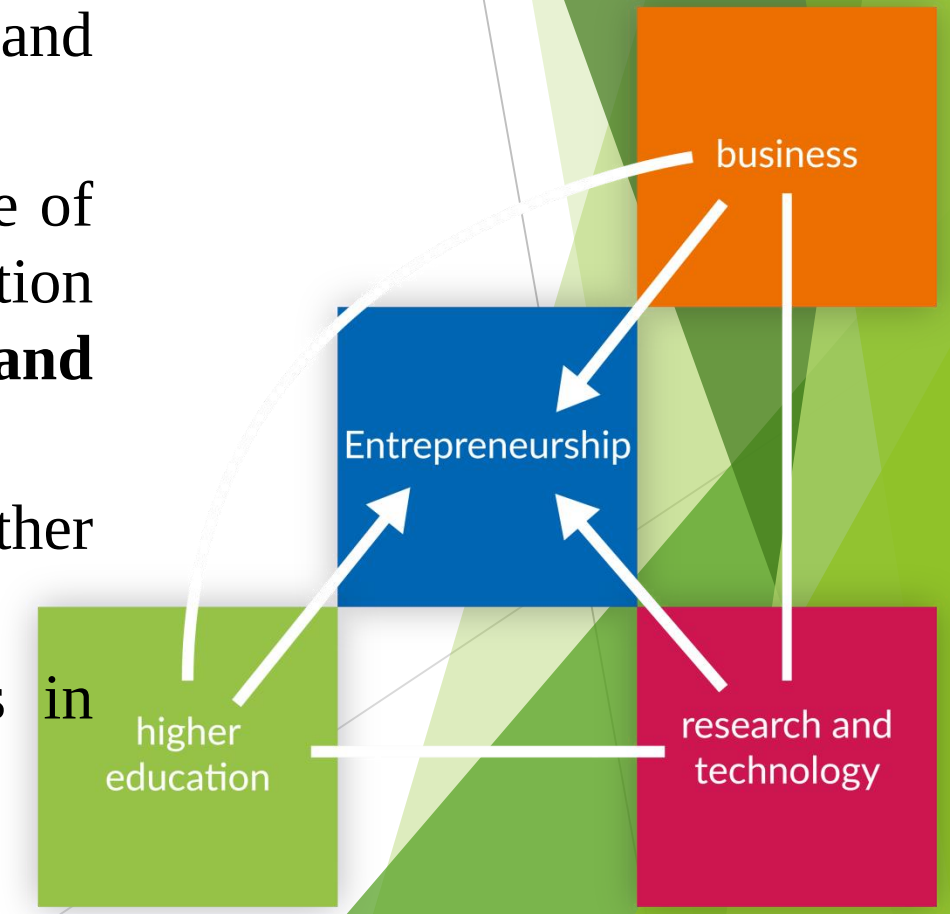
- 20% integration of RES
- 20% increase of EE
- 20% decrease of GHG

From EU targets for 2030

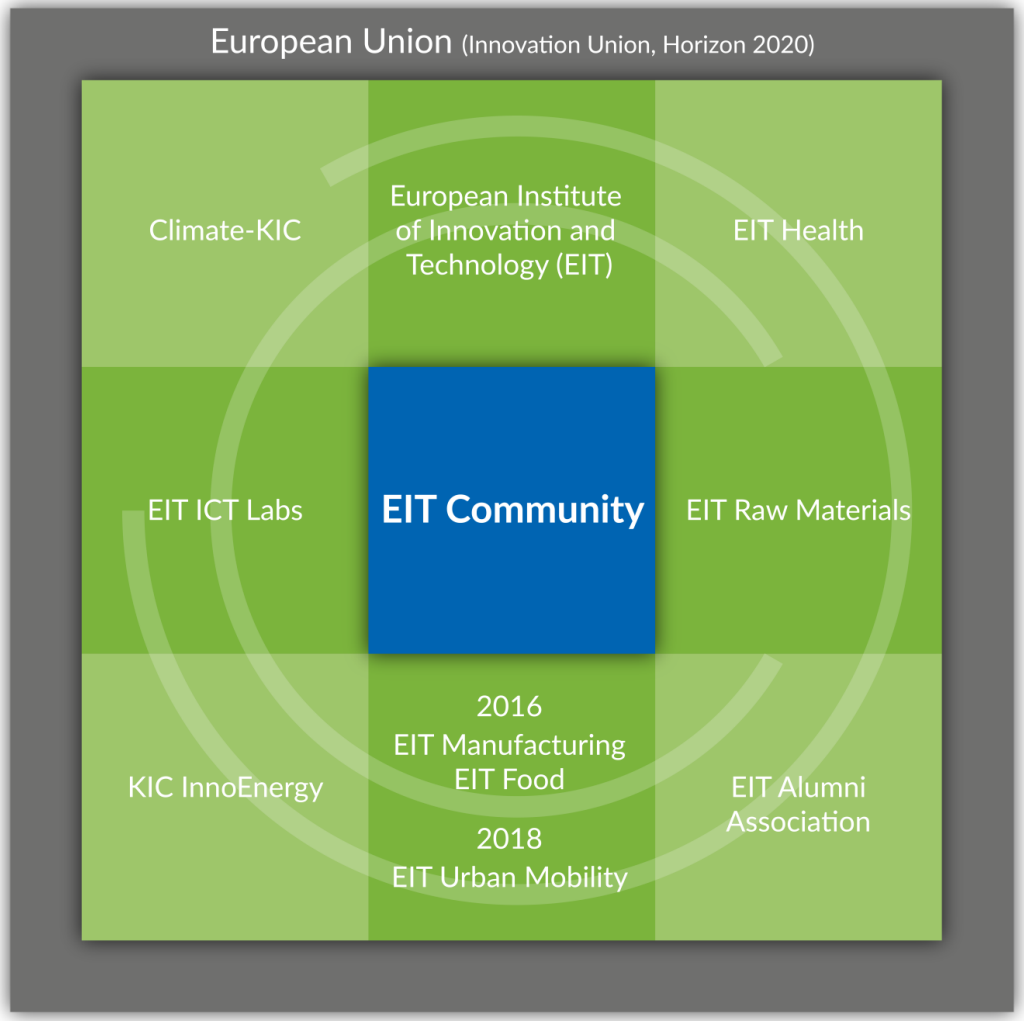
- 27% integration of RES
- 27% increase of EE
- 40% decrease of GHG

European Institute of Innovation & Technology - EIT

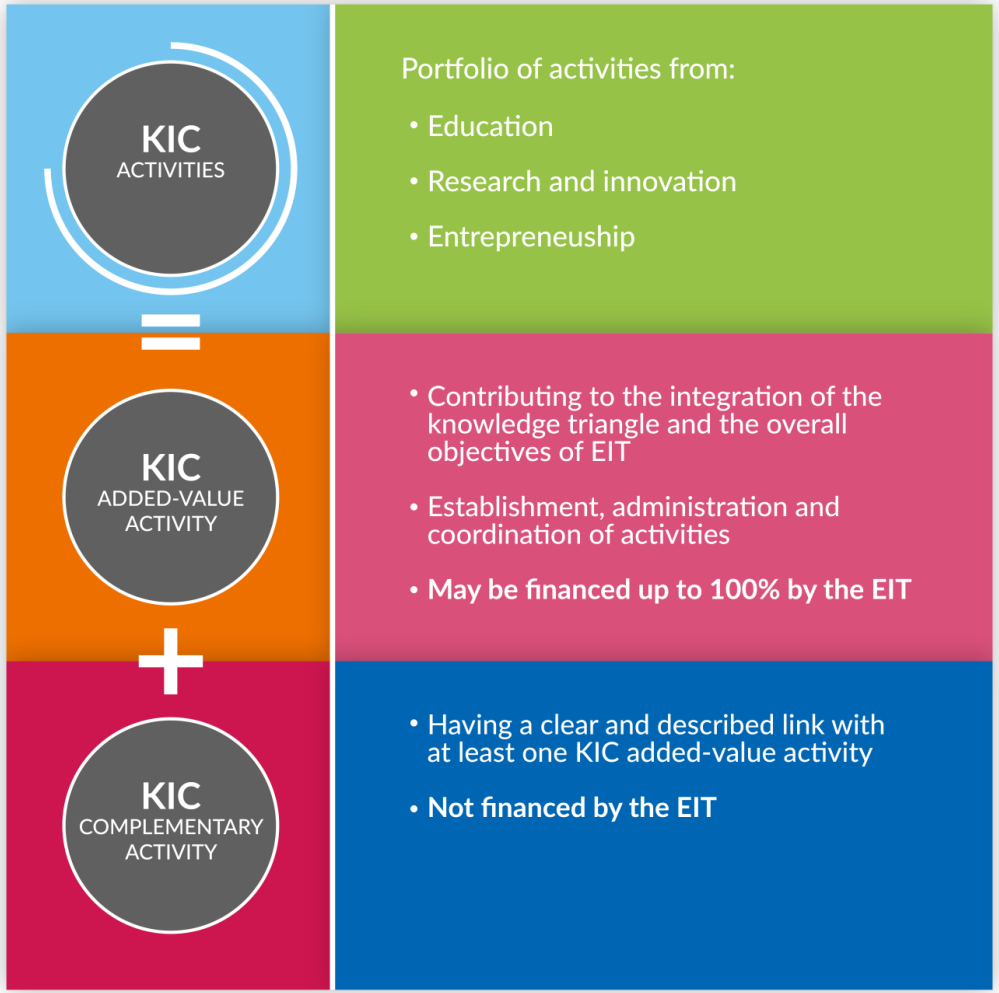
- EIT = European Institute of Innovation and Technology
- Is an independent EU organism having the purpose of strengthening the Europe ability for innovation through the development of **Knowledge and Innovation Communities** - KICs
- It is the first initiative within EU that brings together the three parts from the knowledge tringle
- Was established in 2008, with the headquarters in Budapest



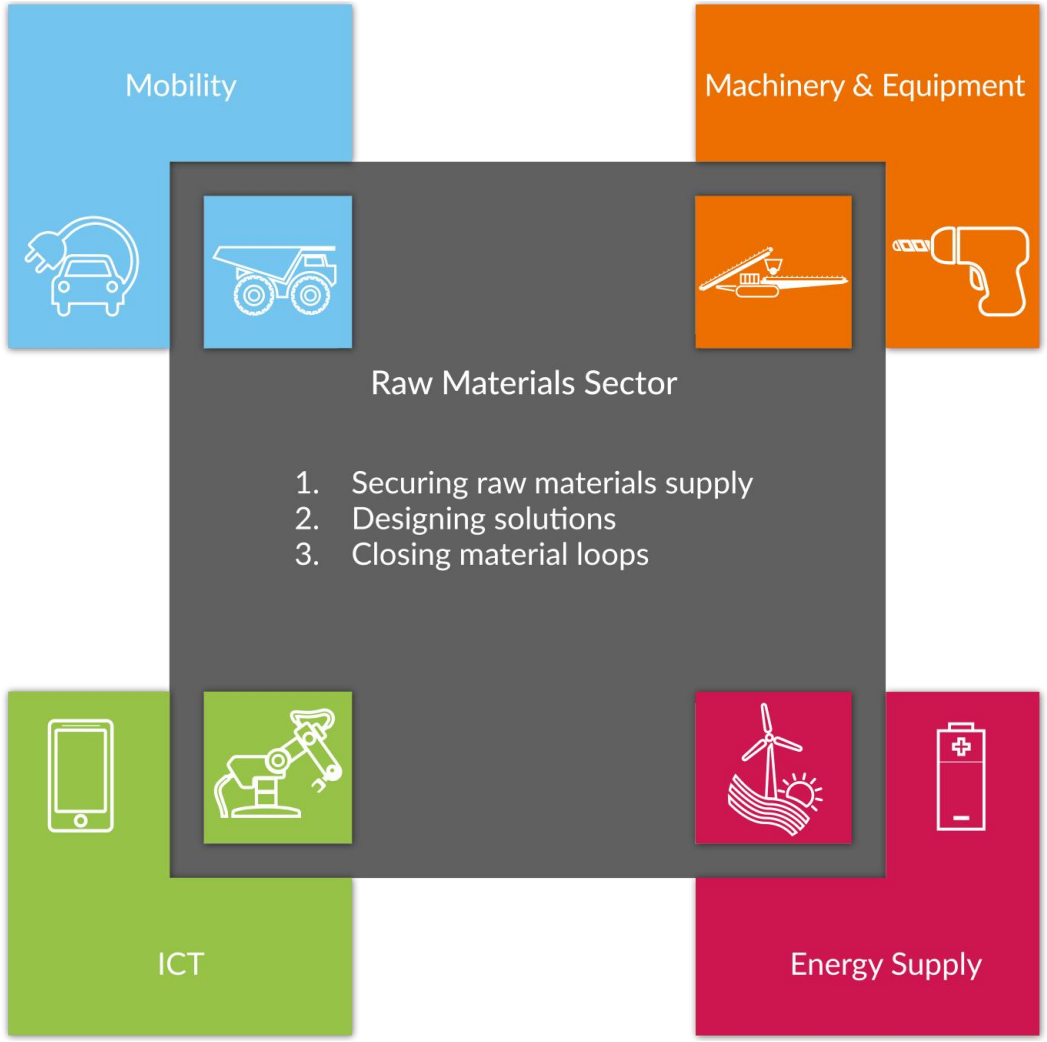
European Institute of Innovation & Technology - EIT



European Institute of Innovation & Technology - EIT



EIT Raw Materials



EIT Raw Materials

Eastern CLC


eit
RawMaterials

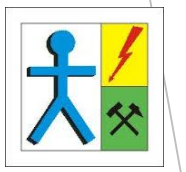

BASF
The Chemical Company


DMT


special melting
INTECO
technologies


iMN
Instytut
Metali Nieżelaznych
Gliwice


PŁ




KGHM
POLSKA MIEDŹ


KGHM
ZANAM


HZDR


Politechnika
Wrocławska


GeoZS


Wrocławskie
Centrum
Badań
EIT+


ALUINVENT


IGR


AGH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BERGAKADEMIE
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UNIVERSITÄT
FREIBERG


ZAG


POLITECHNIKA
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KGHM
Cuprum


F. J. ELSNER TRADING


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V KOŠICIACH


UNIVERSITATEA OVIDIUS DIN CONSTANȚA
ROMANIA


UNI
GRAZ


UNIVERSITAS STUDIORUM ZAGRABIENSIS
MDCLXIX


TU
WIEN

EIT - Romania

Indici de disparitate în anul 2015

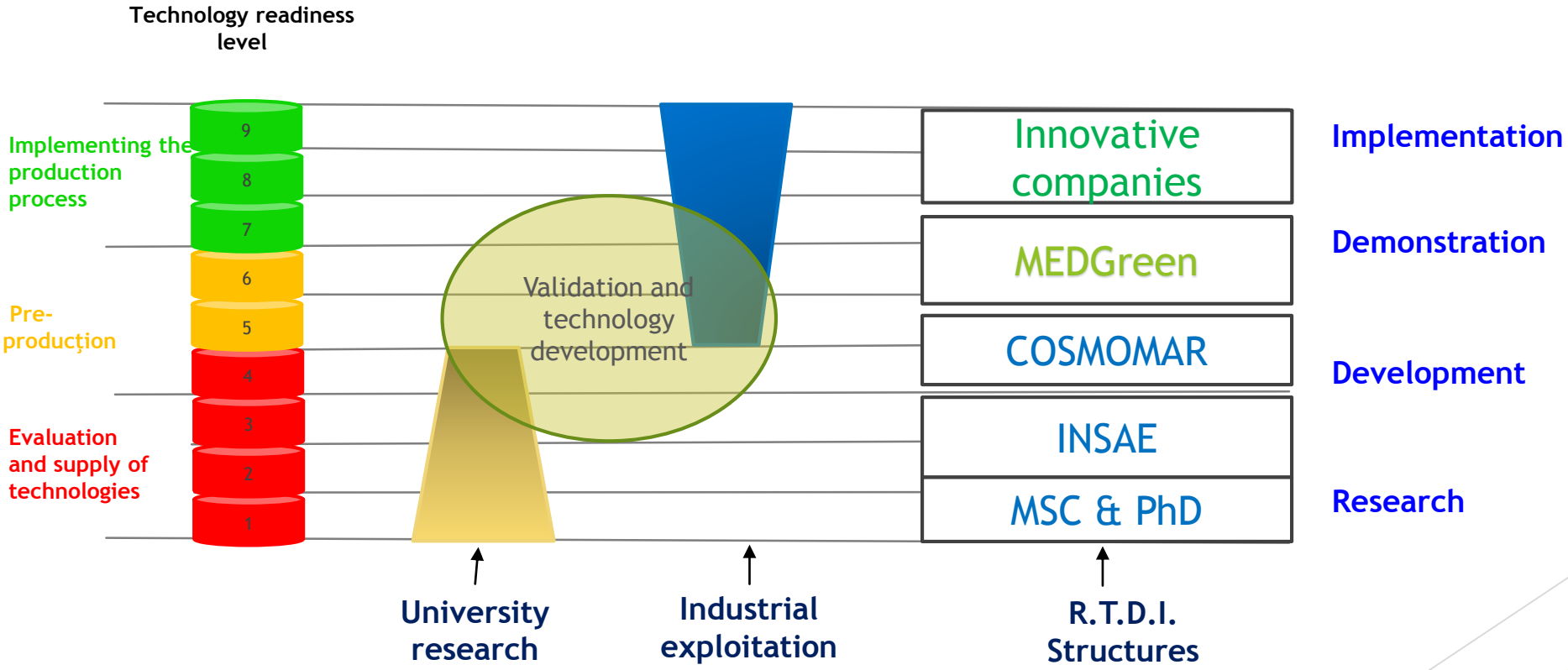
	PIB/loc. (% media națională)	Salariu net (% media națională)	Câștig/pierdere (%)
Nord-Est	62,0	84,7	+36,6
Sud-Est	89,1	86,8	-2,6
Sud Muntenia	77,2	93,2	+20,7
Sud-Vest Oltenia	74,2	90,0	+21,2
Vest	104,8	94,8	-9,5
Nord-Vest	87,4	87,7	+0,3
Centru	94,7	88,4	-6,7
București-Ilfov	234,5	141,4	-39,7

Sursa: INS, calcule proprii

Productivitatea resurselor în țările UE (2014)

Țara	PIB/loc. (PPS) (euro)	DMC (tone/loc.)	Prod. resurselor (euroPPS/kg)	PIB/DMC (EU28=100)
UE28	**27.486**	**13,1**	**2,1**	**100**
Luxemburg	73.265	20,6	3,6	169,3
Olanda	35.906	10,3	3,5	166,2
UK	29.926	8,7	3,4	163,4
Italia	26.356	8,3	3,2	151,5
Spania	25.021	8,3	3,0	143,1
Franța	29.245	12,0	2,4	116,4
Belgia	32.320	14,3	2,3	107,9
Germania	34.522	16,1	2,1	102,0
Malta	23.563	12,3	1,9	91,3
Cipru	22.398	12,3	1,8	86,4
Croația	16.108	9,3	1,7	82,3
Slovenia	22.623	13,1	1,7	82,2
Irlanda	36.742	21,5	1,7	81,2
Danemarca	34.226	20,1	1,7	81,1
Austria	35.499	21,0	1,7	80,3
Slovacia	21.078	12,6	1,7	79,8
Grecia	19.938	12,4	1,6	76,8
Ungaria	18.648	11,8	1,6	75,1
Cehia	23.206	15,2	1,5	72,7
Portugalia	21.401	14,3	1,5	71,2
Suedia	33.707	23,1	1,5	69,6
Lituania	20.602	14,8	1,4	66,1
Polonia	18.797	17,2	1,1	52,0
Finlanda	30.281	31,1	1,0	46,4
Letonia	17.522	20,5	0,9	40,7
Estonia	20.939	29,3	0,7	34,0
România	**15.159**	**21,3**	**0,7**	**33,8**
Bulgaria	12.804	19,4	0,7	31,3

University-Industry Interaction



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Scientific research on the development of advanced materials and multiscale optimization through the integration of nano-structured materials in advanced energy systems, Acronim: MultiScale”, contract no. 8/01.09.2016, ID P_40_279

Competitiveness Operational Programme Romania

Priority axis 1- Research, Technological Development and Innovation (RTDI) for Economical and Development Competitiveness

Investment priority: PI1b: promoting R&I investments, development of connections and synergies between companies, R&D centers and education

Action: 1.2.3 Project type: Partnership for Knowledge Transfer

Total value of the project: 8.254.937,50 Lei, of which non-refundable funds of 7.246.911,50 Lei.

The project is cofinanced by the Regional European Development Fund through the Competitiveness Operational Programme Romania.

Types of activities

Type A activity - Knowledge transfer

- A1 – Direct assistance for the partner companies, in order to identify the actual necessities for assistance from the Institute for Nanotechnologies and Alternative Energy Sources (INSAE) for the development of products and services;
- A2 – Thematic events for eco-innovative activities in the research areas from the present project;

Types of activities

Type B activities – Access of companies to INSAE facilities

- B1 – Access to HYRES platform and INSAE labs for research and testing activities;

Type C activities – Research and development competence transfer and innovation support

- C1– Industrial research activities and experimental development, executed for and in the name of partner companies;
- C3 – Market research executed by INSAE;

Types of activities

Type D activities - Industrial research and development in direct collaboration with partner companies:

- Sub-activity 4.1 (Type D1) – Industrial research on nano-structured materials with physical and chemical properties adapted to application requirements;
- Sub-activity 4.2 (Type D1) – Industrial research on new integration concepts on nano-structured materials through multiscale and Multiphysics modeling based on constructal theory, fractal methods, hybrid mathematical methods and bionic approaches
- Sub-activity 4.3 (Type D1) – Industrial research on the development of a holistic approach for the integration of advanced materials in order to promote eco-innovative solutions;

Types of activities

Type D activities – Industrial research and development in direct collaboration with partner companies:

- Sub-activity 4.4 (Type D1) – Industrial research for the integration of advanced materials in production, balance, accumulation and intelligent use of energy systems;
- Sub-activity 4.6 (Type D2) – Experimental development for the integration of the industrial research results in residual biomass processing systems and other types of bio-resources;
- Sub-activity 4.7 (Type D2) – Experimental development for the integration of the industrial research results, in order to develop biomass processing system for pelletizing the biomass, treatment of pelts by torrefaction and conditioning for obtaining superior properties for using in energetic systems, industrial processing systems or other eco-innovative applications and to develop eco-innovative concepts and methodologies for sewage treatment from municipal and industrial sewage water treatment plants with a positive energy balance.

Types of activities

Type D activities - Industrial research and development in direct collaboration with partner companies:

- Sub-activity 4.8 (Type D2) – Experimental development for the integration of industrial research results in order to develop bio-electrochemical reactor systems for the synthesis of high market valued substances, such as ammonia and urea, through the use of intermittent energy sources (wind and solar);
- Sub-activity 4.9 (Type D2) – Experimental development for the integration of industrial research results in order to develop biomass processing systems and other renewable energy sources (wind and solar) in order to produce hydrogen as an energy vector for high efficiency cogeneration systems and low environmental impact and to develop advanced engineering methods for the analysis and optimization of hybrid cogeneration installations integrating solar, wind, fuel cells, energy accumulation and classic cogeneration systems.

Types of activities

Type D activities - Industrial research and development in direct collaboration with partner companies:

- Sub-activity 4.10 (Type D2) – Experimental development for the integration of industrial research results for the development of catalytic biomass burners, biofuels and hydrogen, in order to increase efficiency and reduce pollutant emissions, provide eco-innovative auditing services, increase energy efficiency and reduction of the environmental impact and to provide modelling, simulation and optimization through the use of advanced engineering concepts for a multiscale and Multiphysics optimization of the energetic system processes;
- Sub-activity 4.11 (Type D2) – Experimental development for the integration of the industrial research results in order to obtain optimal structures tailored for wind and solar energy recovery with high corrosion resistance, destined for coastline and continental waters applications and for the development of construction materials with thermal isolation properties and anti corrosion properties for biogas installations, equipment isolation and industrial buildings isolation and for special applications in corrosive environments or for applications in continental waters.

Types of activities

Type D activities - Industrial research and development in direct collaboration with partner companies:

- Sub-activity 4.12 (Type D2) – Experimental development for the integration of industrial research results in design services and the development of turnkey solutions for industrial applications, developed on the concept of Internet of Services and Internet of Things and integrating specialized algorithms and databases.

Conclusions

- By the implementation of project MULTISCALE at “Ovidius” University of Constanta, it is envisaged the development of a functional system for education-industry collaborative partnership.
- In the pilot phase we are working with 9 companies as Ecohornet, Romniserv, Monsson, Coba Panels, INAS Craiova, RIG, Solarom, Apollo Ecoterm and Gremlin Computers.
- For the expansion of the partnership ecosystem, there were developed specialized cluster as MEDGREEN Cluster, specialized on eco-technologies and alternative sources of energy and 3DBS (Danube-Danube Delta-Black Sea Cluster) specialized on Blue Growth.
- The cooperative activities developed with the industrial companies is also facilitating the development of partnerships with other universities and research institutes, as it is the case of the partnership between “Ovidius” University of Constanta and University “Politehnica” of Bucharest and between our university and the National Institute for Research and Development in Microtechnologies.

Thank you!

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