FIRECE CENTRAL EUROPE Project CE1131

WPT1 Increasing competence to manage Regional Energy Plans and elaboration of the FIRECE plan

State of the art analysis

Report on the contribute of industry to regional energy targets

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Introduction

Report with the State of the art analysis and SWOT analysis from all 9 areas to highlight the contribute of the industrial sectors to the implementation of the Regional Energy plans.
Gaps, limits and bottlenecks will be identified thanks to a SWOT analysis.

1. Project Area State of the art

FIRECE project's area involves 9 regions (NUTS 2 level) in 7 countries of the Central Europe Area. As it is shown in Table 1 the total population is approximately 20.5 million with an average GDP per capita slightly below the EU level. FIRECE project's area is a well balance picture of the Central Europe area representing all the five different DG REGIO classes based on GDP per capita. The level of industrialization, productive dynamics and energy intensity are different among the regions. Therefore local/regional policies for energy savings and renewable has different focus depending on the characteristics of the production systems.

Table 1: Population and GDP per capita in the FIRECE Area

NUTS NAME	Country code	Country name	NUTS CODE	Population*	Stage of development**	GDP per capita***
Burgenland	AT	Austria	AT11	287.000	3	89
Praha	CZ	Czech Republic	CZ01	2.544.000	5	124
Leipzig	DE	Germany	DED5	983.667	4	102
Jadranska Hrvatska	HR	Croatia	HR03	1.406.667	2	57
Dél-Dunántúl	HU	Hungary	HU23	920.667	1	44
Veneto	IT	Italy	ITH3	4.918.000	5	111
Emilia-Romagna	IT	Italy	ITH5	4.431.333	5	120
Lubelskie	PL	Poland	PL31	2.160.333	1	47
Dolnoslaskie	PL	Poland	PL51	2.911.667	3	75
			TOTAL FIRECE AREA	**20.563.333**	**AVERAGE GDP per capita FIRECE AREA**	**95**

*Source: Eurostat - average 2012-2014
**Source: DG REGIO -5 Classes based on GDP per capita average 2012-2014
***Source: Eurostat - in PPS, expressed as index (EU28=100) average 2012-2014

Some Regions (Burgenland, Praha, Croatia, Lubelskie) addressed energy objectives in their smart specialization strategy as one of the priority strategy for innovation.

Table 2: Regions with Energy Policy Objectives in their Smart Specialization[1]

Name [NUTS ID]	Description	Economic Domains	Scientific Domains	Policy Objectives	Source	Date of Source
Burgenland [AT11]	**Sustainable energy** Renewable energy, new construction materia...	D - Electricity, gas, steam and air conditioning supply D.35 - Electricity, gas, steam and air conditioning supply F - Construction ...	05 - Energy 05.32 - Energy efficiency - consumption 05.37 - Renewable energy sources	J - Sustainable innovation J.65 - Resource efficiency J.68 - Sustainable energy & renewables	Final RIS3 Document	Jul - 2016
Prague [CZ01]	**Smart energy**	J - Information and communication technologies J.58 - Publishing activities J.59 - Motion picture, video and television programme production, sound recording and music publishing activities ...	05 - Energy 05.33 - Energy production and distribution efficiency 05.36 - Other power and storage technologies	D - Digital transformation D.22 - Cleaner environment & efficient energy networks and low energy computing	Peer Review	Nov - 2013
Croatia [HR]	**Energy and Sustainable Environment** Energy technologies, systems and equipment...	D - Electricity, gas, steam and air conditioning supply D.35 - Electricity, gas, steam and air conditioning supply E - Water supply; sewerage; waste managment and remediation activities ...	02 - Environment 02.08 - Monitoring facilities for measurement of pollution 02.14 - Protection of soil and groundwater ...	J - Sustainable innovation J.68 - Sustainable energy & renewables J.69 - Sustainable land & water use J.70 - Sustainable production & consumption	Final RIS3 Document	Mar - 2016
Lubelskie [PL31]	**Low-carbon emission energy** acquisition of energy resources, energy pr...	B - Mining and quarrying B.05 - Mining of coal and lignite B.06 - Extraction of crude petroleum and natural gas ...	01 - Exploration and exploitation of the earth 01.06 - Mineral, oil and natural gas prospecting 05 - Energy 05.37 - Renewable energy sources	A - Aeronautics & space A.03 - Bio fuels & energy efficiency D - Digital transformation ...	Final RIS3 Document	Oct - 2014

[1] http://s3platform.jrc.ec.europa.eu/map

2. The contribution of industry to Regional Energy targets in the 9 areas

2.1 Energy targets in the project area: energy efficiency as a common challenge

FIRECE aims to contribute to the implementation of the Regional Energy Plans to achieve the targets (in terms of RES and Energy savings) planned at EU and National level with particular attention to industry.
The promotion of renewables is mainly operated at national level with incentive schemes to all the operators and sectors with no distinction among private, public or industry sector.
If we look to the share of renewables in energy final consumption in the FIRECE partner countries we can notice that Italy, Austria, Hungary, Croatia and Czech Republic have already reached the level required to meet their national 2020 target during 2015 and Germany, Poland are on track.

	2015 (%)	RES target (%)
EU	16.7	20
Czech Republic	15.1	13
Germany	14.6	18
Croatia	29	20
Italy	17.5	17
Hungary	14.5	13
Austria	33	34
Poland	11.8	15

Table 3: Share of energy from renewable sources[2] (in % of gross final energy consumption)

regarding the target for energy efficiency, the 2017 assessment of the progress made by Member States towards the national energy efficiency targets for 2020 and towards the implementation of the Energy Efficiency Directive as required by Article 24(3) of the Energy Efficiency Directive 2012/27/EU highlighted the following findings[3]:

- *"After energy consumption gradually decreased between 2007-2014, it increased in 2015 in part due to a less warm winter and lower fuel prices. Although primary energy consumption rose by 1.5% compared to 2014, it was still on track to meet the 2020 target. While final energy consumption also increased in 2015, it was still below the 2020 target thanks to savings achieved in previous years. Energy consumption appears to have increased further in 2016 following another less warm winter*
- *Primary energy consumption largely decreased in the post-recession years (2009-2015) in nearly all Member States, showing that economic recovery and growth could be achieved without increasing national demand for energy.*
- *Weather variations are one of the main reasons for the fluctuations observed in energy consumption in recent years. Weather corrected figures suggest that energy consumption, after falling from 2005, has been broadly flat since 2012*
- *Increases in economic activity have tended to push up energy consumption. Energy savings have helped offset this. However, their level was not high enough in 2015 and 2016 to offset the impact of the growth in economic activity.*

[2]Source: Firece elaboration on Eurostat figures
[3]REPORT FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT AND THE COUNCIL 2017, Brussels 23/11/2017 COM (2017) 687 final, pag. 1

- *Final energy intensity in industry decreased in almost all Member States in 2015.*
- *Member States are making good progress in achieving energy savings under Article 7 of the EED. Their collective efforts in 2015 were above the linear trajectory for achieving the required savings by 2020.*
- *In their 2017 NEEAPs, several Member States revised their indicative national targets for 2020. While the national targets announced are still consistent with the EU level of ambition for final energy consumption in 2020 when taken together, the gap is now greater for primary energy consumption".*

In FIRECE partner country the industry sector increased its energy consumption during the period 2005-2015 in Austria (+4%), Germany (+3%), Hungary (+25%). However the improvement in the total energy intensity more than compensate that increase and the following countries already achieved/or are close to the savings than the annual amount needed: Austria, Germany, Hungary Italy, Poland. Croatia and Czech Republic are behind the amount needed to reach the targets[4].

	Estimated level of cumulative savings in 2015 on the basis of linear delivery (ktoe)	Reported savings for 2015 compared the estimated level (%)
Czech Republic	523	17%
Germany	4499	131%
Croatia	139	19%
Italy	2732	99%
Hungary	394	89%
Austria	557	240%
Poland	1588	98%

Table 4: Overview of reported energy savings for 2015[5]

Energy Regional policies for the industry sector are not specifically focused on renewables but more in general on energy efficiency and competitiveness.
Energy is in fact one important competitiveness factor for industry: for the average manufacturing company energy represents around 10-15% of its total costs[6].
Energy efficiency involves delivering more services for the same energy input or the same service for less energy input[7].
Industry is one of the main energy consumer sector, at EU level represent the 25.3% of the final energy consumption while in FIRECE countries it goes from the 16.5% of Croatia to the 33.3% of Austria (see table below).

	% Energy consumption in Industry on Final energy consumption (2015)
EU	25.3%
Czech Republic	31.2%
Germany	28.7%

[4] EUROPEAN COMMISSION op.cit., pag. 10
[5] EUROPEAN COMMISSION op.cit., Table 3 pag 15
[6] Greenovate! Europe, Resource efficiency potential in manufacturing industries: A comparison of resource saving potentials of single companies vs. manufacturing value chains (2013)
[7] IEA (2017), Energy Efficiency 2017, https://www.iea.org/efficiency/

Croatia	16.5%
Italy	22.3%
Hungary	24.5%
Austria	33.3%
Poland	24.2%

Table 5: % Energy consumption in Industry on Final energy consumption (2015)
Source: Eurostat

Nevertheless, the value that energy efficiency can generate in industry goes beyond reduced energy bills and in encompasses broader long-term benefits, such as overall flexibility and productivity, worker comfort, product quality, production time and waste, reduction in maintenance cost and pollution[8].

Even though energy efficiency in EU manufacturing industry has improved on average by 1.3% per year over the last 15 years, studies show that EU industrial energy efficiency can continue to improve at rates that are similar to those seen in the past[9].
Large companies and energy-intensive industrial companies, where energy bills are relevant, in general have already improved their energy efficiency.
On the other hand there are an impressive number of SMEs which may have not implemented even basic measures as they may not have sufficient management time, capability or dedicated expertise to do so and therefore the market share of low cost potential for energy savings in SMEs is particularly high[10]. In addition to it, in the case of SMEs the supply of long-term finance and the availability of project development resources is a greater barrier[11].

The final report of the Energy Efficiency Financial Institution Group (EEFIG) "How to drive new finance for energy efficiency investments" identifies a need to raise the priority of energy efficiency at company's executive board level, incorporate energy efficiency investments within the standard corporate finance dialogue and process.

Considering these positive impacts on the productive system of the territory and the community, local and regional authorities during the recent years started on elaborating and implementing public policies to support the energy transition of the industry to a low carbon economy.
In general the direct scope of these type of public policies is the promotion of the competitiveness of the industry with undifferentiated mix of energy interventions which improve energy performances and reduce energy intensity.

Energy intervention could spam from metering equipment, renovation of heating and cooling generation system (HVAC/HVACR technologies depending the sector), shifting of energy fuel (electricity, gas, biofuel), shifting of the production hours (depending of the cost of energy), renewable energy, building requalification, etc.

[8] IEA (2017), op.cit
[9] Fraunhofer-Institute for System and Innovation Research. (2009). Study on the Energy Savings Potentials in EU Member States, Candidate Countries and EEA Countries
http://ec.europa.eu/energy/efficiency/studies/doc/2009_03_15_esd_efficiency_potentials_final_report.pdf
[10] IEA. (2014). Energy end-use policies and programs towards industrial SMEs – the case of Japan, Belgium, Spain and Sweden" IEA IETS Annex XVI Energy Efficiency in SMEs Task I.
http://www.iea.org/media/workshops/2014/eeu/smenovworkshop/Patrik_Thollander_Session1.pdf
[11] Energy Efficiency Financial Institution Group (EEFIG), Final Report "How to drive new finance for energy efficiency investments", pag.39

Energy audits are normally the first step to better understand the consumption and the feasibility of any further interventions.
These type of intervention requires initial investments that are repaid in the medium-long term period.
Sometimes Regional policies supports companies for acquiring the knowledge (energy audits) and for facilitating the credit access using innovative financing instruments[12] (IFI).

The recommendations regarding regional incentive systems of project CEP-REC[13] (Central Europe 2012-2014) when dealing IFI underlines the following aspects:

- Rely on local forces, regional planning capacities and establish a department in the regions for designing the programs/priorities for distributing EU funds for energy purposes and for making decisions on actual disbursement
- Establish a revolving fund – Development and Investment Organization (DIO[14]) for sustainable energy.

2.2 Regional Energy targets in the project area

Within FIRECE countries there is a different level of knowledge concerning planning and use of IFIs (Germany, Italy, and Austria are used to manage them; Slovenia, Poland, Croatia, Hungary, Czech Republic are moving their first steps).

The survey conducted among FIRECE regions highlighted that all the regions involved has a regional energy plan or similar (in Hungary for Dél-Dunántúl and for the country there are strategies) but only 4 (Emilia-Romagna Region, Burgenland, Lubelskie, Lower Silesia) have a specific objectives for energy efficiency of SMEs.

[12]COM(2011) 662 final; A framework for the next generation of innovative financial instruments - the EU equity and debt platforms: "The innovative financial instruments dealt with in this Communication include instruments which provide equity/risk capital, or debt instruments (such as loans or guarantees to intermediaries that provide financing to a large number of final recipients who have difficulties in accessing finance, or risk sharing with financial institutions in order to increase the volume of finance and hence the impact resulting from the EU budget intervention)".

[13] http://www.cep-rec.eu Report 4.5.2 Recommendations for improving national and regional renewable energy incentive systems and applying innovative instruments, June 2014

[14] The EU Interreg IVC project "Regions for Green Growth" outlines a model of a regional revolving fund – a Development and Investment Organization (DIO) - which is especially useful when access to capital is limited. This fund can provide part of the equity or loan needed for a sustainable energy investment to fill the gap between the initiator investors own equity, commercial bank loan and the required investment costs. The fund is managed within the region by a public authority (e.g. under the regional council) and is based on close cooperation with sustainable energy investors and commercial financing institutions. Actually, it is a specific method for creating a public-private cooperation structure for investments in sustainable energy. The fund operates on a non for profit or low return basis, therefore it can provide the gap filling loans at lower than market rates. If it provides equity, exit rules are laid down: after a few years the fund sells its shares in the given project to retain capital and maintain the revolving fund – and to be able to finance newer projects. Such a fund only makes sense if there is a large enough potential pool of sustainable energy projects therefore such a project possibilities assessment has to precede the setting up of the fund. A DIO is the combination of a project development organization and an investment fund in which the necessary know-how and skills to develop projects will be concentrated in the DIO organization in order to develop many projects in an effective and efficient way. The objective and incentive of a DIO is to develop a portfolio of sustainable energy projects whereby risks can be mitigated because of the number of projects (portfolio effect).

These objectives are however included in the Regional Operative Programs of all the regions, following the EU policy mainstreaming on the focus on Low carbon Economy.

FIRECE AREAS	Regional Energy Plan	SME objectives		BEST PRACTISE DATABASE	FUNDING SOURCE	Types SMEs incentives	Authority		Connection Link
		in REP/similar	in ROP				REP	ROP	
Burgenland	YES	YES	YES	Burgenland DataBase Kommunal Public Consulting (KPC)	ROP	Grants	Non Partner	Non Parnter	Direct Link
Praha	YES	NO	YES	ROP database	ROP Czech Moravian Guarnatee and Development Bank Commercial Bank European Investment Bank	Subsidies, financial instruments (soft loans EE/RES)	Non partner (but Cluster member)	Non partner	To be established
Leipzig	YES	NO	YES	Technology Start-up fund (fi-compass)	ROP	Start-up Fund Saxony	Non partner but Direct link and close cooperation with Authority	Non partner but Direct link and close cooperation with Authority	Established
Jadranska Hrvatska	YES	NO	YES	NO	Istrian County Budget Energy Efficiency Fund Croatian Bank for Reconstruction and Development Commercial Banks	General credit line	Non partner	Non parnter	To be established
Dél-Dunántúl	STRATEGY	NO	YES (EDIOP)	YES EDIOP Database	EDIOP	Soft Loans	Tolna County Development Agency (AP11)	ASP15 METTERE NOME	Established
Veneto	YES	NO	YES	Veneto Sviluppo	ROP	Loans with a maturity of over one year and combined credit products	Non Partner	Non partner	To be established
Emilia-Romagna	YES	YES	YES	Emilia-Romagna Region (work in progress)	ROP	Energy audits, soft loans, energy revolving fund	Partner	Partner	Same organisation
Lubelskie	YES	YES	YES	NO	ROP	RES infrastructure, EE heat systems (grants)	Partner	Partner	Same organisation
Lower Silesia	STRATEGY	YES	YES	Energy Technology Center	ROP	application of EE technologies in industry (grants); Loans Planned for SMEs	Non Partner	Non parnter	Direct Link

Table 6: Survey Matrix Results

Legend of colors:

While in some regions it seems that energy efficiency in industry has been identified as a regional strategic priority and there is a coherent alignment between the regional policy and the regional operative program (main funding source) in other regions the supporting schemes for SMEs have not a direct link to regional energy objectives.

Within the former regions, thanks to a clear definition of the objectives it is more likely that in those territory there is positive framework for supporting the development of energy efficiency investments. In fact there is a direct commitment of the Regions on monitoring and evaluation of the impacts, built the dialogue with stakeholders, spread and share information for supporting decision makers and financial institutions.
With access to greater information that targets making smart, long-term energy efficiency investments, companies will dedicate greater resources and focus into energy management and energy efficiency[15].
However the lack of a regional strategic priority doesn't reflect an absence of financial support scheme for energy efficiency of SMEs.
All the FIRECE Regions are in fact supporting SMEs for low-carbon investments within their Regional operative program.

REGION (Nuts 2)	Regional Energy Plan	SME objectives		Implemented measures and intervention axis	Regional Target in the Industry Sector
		in REP/similar	in ROP		
Burgenland	YES	YES	YES	Ambitious target on renewables. Energy efficiency also included. Energy dedicated measures for SMEs.	50% of energy consuption covered by renewables
Praha	YES	NO	YES	Energy efficiency is supported under Priority axis no. 3 "Effective energy management, development of the energy infrastructure and renewable energy sources, support for introduction of new technologies in the area of using energy and secondary raw materials". Financial mechanisms are focussed on SMEs (subsidies, financial instruments)	CO2 reduction target of 20% until 2020 (based on 1990 level or later baseline year)
Leipzig	YES	NO	YES	SME Support programme more on business start-ups and expansions, innovation and technologies	Not declared
Jadranska Hrvatska	YES	NO	YES	General credit lines for general purposes in the improvement of businesses but also priority 1.10 Energy Efficiency and Renewable energy sources	Not declared
Dél-Dunántúl	STRATEGY	NO	YES	Priority axis 4: Transition to low-emission economy in all economic areas. Targets set are to be reached with combined credit products (non-reimbursable grant, credit, own resource). Priority axis 8: Financial instruments. Targets set are to be reached with loans with a maturity of over one year.	Under priority axis 4. the relevant indicator is: Estimated annual decrease in greenhouse gas emissions, its target figure set for 2023 is 342,543.11 tons of CO2 equivalent Under priority axis 8. the relevant indicator is: Number of enterprises receiving grants, its target figure set for 2023 is 23,250 enterprises.
Veneto	YES	NO	YES	No specific objectives but incentive for SMEs for energy audits, adopt management system and energy efficiency interventions	Not declared
Emilia-Romagna	YES	YES	YES	Axis 4 - Promotion of the low carbon economy in regions and in the production system with the main objective to encourage businesses to lower their energy consumption and to produce energy from renewable resources to support self-consumption, including by setting up ecologically equipped production areas.	Increase energy efficiency 4% per year
Lubelskie	YES	YES	YES	Priority Axis 4 "Environmentally-friendly energy"" and Priority Axis 5 "energy efficiency and low-emissivity"" - construction and reconstruction of the infrastructure used for the production of RES energy; investments in the construction and modernization of heat production units; - support for deep thermal modernization of enterprises; Business projects that reduce the amount of energy, heat and water loss; construction and reconstruction of RES installations	Not declared
Lower Silesia	STRATEGY	YES	YES	Priority Axis 3 "Low carbon economy" 3.2. Energy efficiency in SME's Supporting of energy-efficient technologies in entreprises (modernisation and extension of production lines to more energy efficien production line and introduction of energy management systems	Not declared

Table 7: Regional energy targets in FIRECE area

Three Regions clearly declared measurable targets for Low Carbon Economy (see table above).

[15] Op. cit., pag. 65

FIRECE AREAS	Examples of Financial Instrument	Financial Agencies/Banks
Burgenland		KPC
Praha		Czech Moravian Guarantee and Development Bank Commercial Bank Czech Savings Bank Raiffeisen Bank
Leipzig	YES (fi-compass: Start-up Fund)	SAB - Development Bank of Saxony KfW - Bank Group
Jadranska Hrvatska		Croatian Bank for Reconstruction and Development European Bank for Reconstruction and Development
Dél-Dunántúl		Hungarian Commercial Bank Budapest Bank FHB Land Credit Mortgage Bank
Veneto	YES	Veneto Sviluppo Unicredit Officinae Verdi
Emilia-Romagna	YES	Energy Fund (Revolving Fund)
Lubelskie	YES	Lublin Business Support Agency
Lower Silesia		Regional Development Agency AGROREG SA and Sudeckie Economic Initiatives Association, Consortium: ECDF S.A. and Mega Sonic S.A., Consortium: Fund of the Wałbrzych Region Wałbrzyskiego and Wrocław Regional Development Agency WARR SA Polish Enterprise Foundation

Table 8: Financial Instruments and Financial Agencies/Banks

3. The SWOT ANALYSIS

The information gathered in the report have been combined with the results of the survey and an analysis of main statistical available dataset for the 9 regions.

Strengths	Weaknesses
Experiences on Energy planning at regional level **Regional Operative Programs funds for SMEs** **Past and On-going financial instruments for SMEs** **R&D /Innovation policy (Startups and SMEs)** **Innovation related to technologies** **Research and development funds (SMEs)**	**Lack of measurable target for Industry contribution to Low Carbon Economy (3 Regions)** **Lack of SMEs objectives in Energy Plans for all the Regions (4 Regions)** **Lack ROP and REP authorities within the partnership**

Opportunities	Threads
Direct links with Managing Authorities (REP and ROP) **Synergies on know-how and experiences in the project area** **Although there is an high focus on R&D policies 4 Regions have S3 on Energy field** **Different level of Experiences on implementation of IFIs at regional level**	**Heterogeneity of the project area in terms of population, GDP, energy intensity and industry sectors** **Heterogeneity of the RES and EE targets within programming instruments and related funds** **Scarcity of private funds** **Market uncertainty** **Lack of permanent public funds** in the regions

Conclusions

The survey of the state art analysis and SWOT analysis clearly highlighted that among FIRECE partnership there is a different level of knowledge concerning planning and use of IFIs, energy plan and energy efficiency in industries. This is due to not only to the heterogeneity of the partners but also to the differences within the FIRECE territorial context (population, GDP, industry specialization, energy intensity, etc.).
The SWOT analysis identified gaps limits and bottlenecks.
As a conclusion of the state-of-the-art analysis and to better focus next FIRECE actions it should be recommended to take into consideration these elements and take advantage of them.
On this respect partner countries could be divided in different groups depending on their different level of experience. In this way it will be possible to better focus the next activities and tailor specific intervention action on the basis of the different needs and requirements.

For this report, it could be considered the following comparison respectively grouping of the partner countries:
Group 1
Partners that can manage energy plan/strategy
Group 2
Partners that have experience in developing financial instrument for energy efficiency in SME
Group 3
Partners that have experience in developing and monitoring IFIs for energy efficiency in SME

The information for the grouping have been taken from table 2, 6, 7 and 8 also from the detailed information about the partner country from Appendix I.

Group	Description	Partner Area	Focus Issues
Group 1	Partners that can manage energy plan/strategy	ALL	Monitoring and evaluation of energy plan
Group 2	Partners that have experience in developing financial instrument for energy efficiency in SME	ALL	Alignment of Energy Plan with Financial Instruments – Monitoring impact Development of IFI in relation of Energy Plan
Group 3	Partners that have experience in developing and monitoring IFIs for energy efficiency in SME	Veneto, Emilia-Romagna, Praha (with examples reported in "Benchmarking Report),Lower Silesia, Del-Dunatul, Jadranska Hrvatska	Improve the monitoring and evaluation of IFIs

Appendix 1. The Survey

Veneto Region (IT)

1. **Do you have in your area a "Regional Energy Plan" or any similar tool?**

Veneto Region deals with the regional energy system programming and promotes the reduction of energy consumption. With this respect, in February 2017 it approved the Regional Energy Plan-Renewable sources, energy saving, energy efficiency (PERFER) which defines the coordination lines on the promotion of renewable energy sources and energy saving. The main objective on the Plan is the regional objective of the so called Burden Sharing concerning the gross final consumption covered by renewable energy sources[16].

The PERFER has the following contents:

- Introduction
- Objectives and burden sharing
- Legal framework
- Incentives schemes
- Regional Energy Asset
- Regional Energy Infrastructure (for production, stocking and energy distribution)
- Burden sharing and development framework – State of the art
- Regional energy potential towards 2020
- Implementing measures of the Plan
- Plan monitoring
- Planning instruments
- Follow-up annexes

2. **Do you have any specific objectives in the above, dedicated to SMEs/ Enterprises? And /or any similar instruments? And any funds supporting it?**

The Regional Energy Plan does not have any specific objectives dedicated to SMEs or enterprises.

For SMEs there are incentive funds managed by Regions to develop energy audits or to adopt management system and energy efficiency interventions

3. **Is there any database or just data reporting already existing cases of Best Practices in the field concerned?**

Veneto Sviluppo developed an Energy Fund financed by the ROP-ERDF 2007-2013 in the axis 2 (Energy), action 2.1.3 that provides an incentive by granting of soft loans through a revolving fund and capital grants for improvement of production techniques in order to increase the energy efficiency of the plant, adopting measures that allow to exploit the energy potential by using renewable sources and non-conventional power generation systems.

4. **Do you have any specific measures in your ROP (Regional Operational Plan) – ERDF about Energy efficiency/saving addressed and supporting SMEs/Enterprises?**

ROP/ERDF 2014-2020 Axis 4 Action 4.1.1 – Promoting eco efficiency and the reduction of primary energy consumption in public, residential and commercial buildings and institutions integrating renewable sources[17].

- ROP/ERDF 2014-2020 Axis 4 Action 4.1.2 – Incentives addressed to the reduction of energy consumption and greenhouse gas emission of enterprises and productive areas included the installation of renewable energy production structures, giving priority to the use of high efficiency technologies[18].

[16] IT link: http://www.regione.veneto.it/web/energia/piano-energetico-regionale

[17] https://bandi.regione.veneto.it/Public/Dettaglio?idAtto=650&fromPage=Elenco&high=por%20fesr%202014-2020

[18] https://bandi.regione.veneto.it/Public/Dettaglio?idAtto=1908

5. **Authorities in charge for the Energy Plan (s) / Strategy**

Veneto Region/Economic development area/Research, innovation and energy management

6. **Authorities in charge to manage ERDF Funds (2014-2020) addressed to Energy**

-Veneto Region/Public works sector and Industry and Craft organizational unit
-AVEPA – Public agency established by Veneto Region in charge for payments, contributions and aids in the agricultural sector.
-Veneto Region – Joint programming Unit (Direzione programmazione unitaria) Director: Pietro Cecchinato
-Veneto Region – Joint programming Unit – ERDF Programming and management section Director: Caterina De Pietro"

7. **Is there any direct link between the Partner and the Authorities mentioned? Which one? How it will be established?**

There are no direct links between the Chamber of Commercio of Venice Rovigo and the Authorities mentioned above. There will be established through meetings and events.

8. **Financial Instruments planned to support Industry low-carbon transition**

ROP ERDF 2014-2020

9. **Other Authorities to be involved (ministries, regional department dealing with FIRECE topics)**

Veneto Region – Economic development area – Research and Innovation Unit (Director: Franco Bonaldo)
Veneto Region is also the local coordinator of the so called “Patto dei sindaci” and it offers technical and financial assistance to its municipalities that participate in the Agreement. It is the first and most ambitious initiative of the European Commission addressed to local entities

10. **Public Financial Agencies and Private Financial Intermediaries involved for Energy investments**

Veneto Sviluppo is a public financial intermediary that defines the economic programming of Veneto Region, by managing specific financial instruments in favour of venetian SMEs.
Unicredit bank offers financial opportunities and solutions developed in order to permit the benefits maximization coming from the energy self-production (Energy Leasing). Unicredit helps to reduce energy costs and spending and to produce clean energy respecting the environment. With this respect, Unicredit, in JV with WWF has developed a new economy business model, Officine Verdi, an energy efficiency group that operates in the energy efficiency sector as “system integrator”, offering services, technologies and financial solutions to reduce energy costs and carbon emissions.

Leipzig (DE)

1. Do you have in your area a "Regional Energy Plan" or any similar tool?

On the city level of Leipzig we have several plans dealing with energy related topics. The main plan is the Climate Protection Program of the city of Leipzig.

Energy and Climate Protection Program 2014-2020 - Leipzig Makes Plans for Sustainability[19].As the foundation for updating the 2005 Climate Protection Program (approved in February 2005), in 2011 the city of Leipzig generated an Energy and Climate Protection Plan. The plan includes the following core concepts:

- As-Is analysis of energy availability and use in the areas of economics, communal requirements, household consumption and transportation;
- Emission balance;
- Potential analyses for energy conservation, energy efficiency, fossil fuels and renewable energy; trend and action scenarios for 2020, 2030 and 2050;
- Instruments and Measures Catalogue;
- Vision scenario for 100% renewable energy use.

The new Leipzig Energy and Climate Protection Program for 2014-2020 (ESKP; Energie - und Klimaschutzprogramm) was approved by the City Council in May 2014.

The EKSP consists of an analysis section, Part A, which sets forth the targets of the energy and climate protection processes, and a measure section, Part B, which lists over 100 different measures to be implemented in the areas of urban development and land-use planning, communal buildings and facilities, supply and disposal, mobility, internal organization and communication/cooperation. The measure section of the EKSP is, as an energy-related work program, also an important component of the eea process[20].

Beside the Climate Protection Program the Economic Development Office has developed a Measures and Implementation Concept **"Leipzig - City for Intelligent Mobility"**. The policy was developed to transform Leipzig towards a leading city of intelligent mobility (post fossil) in Germany. It includes a wide range of concrete measures which should be implemented to reach this target. Each defined measure includes the description, objectives, initiator, responsibilities, partners, scheduling, financing and costs. The measures defined in the policy (e.g. enlargement of charging infrastructure and integration in special planning, mobility sharing options, urban logistic concepts, multi modal transport…) are separated in different groups. Some of them are already implemented some are under implementation and other ones are in conception phase. The policy as a measurement package was developed for the whole city of Leipzig. This process includes a public participation process with several workshops to include the opinion of a wide range of stakeholders and actors relevant for the latter implementation. The territorial coverage of the respective measures is very different. While the sustainable urban city logistic concept incl. urban hubs mainly influences the city center, the demand-oriented expansion of charging infrastructure, sharing options, multi-modal transport solutions need to be separately planned for each district and their development scenario.

There are several policy instruments dealing with mobility, transport and spatial planning were several departments of the city administration are responsible for instance: Urban Transport Plan of the City of Leipzig, Concept of Car Reduced City Centre, Integrated urban development plan, Air Pollution Plan, Energy and Climate Protection Plan, Cycling Traffic Development Plan.

The measures defined in our policy "Leipzig - City for Intelligent Mobility" influence of affect the above mentions policies. Therefore it is necessary to have a joint working and cooperation process to ensure the successful implementation of the sustainable mobility measure in the whole area of Leipzig.

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[19] Source: http://english.leipzig.de/environment-and-transport/leipzigs-climate-protection-programme/

[20] The current version of the Climate Protection Programme can be found here: http://www.leipzig.de/umwelt-und-verkehr/energie-und-klima/energie-und-klimaschutzprozess-eea/energie-und-klimaschutzprogramm-2014-2020/

The policy is linked to the innovation strategy of the Free State of Saxony as they tackle several future fields (part of the smart specialization strategy) defined based on global challenges and mega-trends e.g. in environment and resources, energy and mobility.
In the future field mobility measures like intermodality, new transport networks, energy efficiency, intelligent and sustainable logistics are included similar to our policy.
The current version of the Measures and Implementation Concept "Leipzig – City for Intelligent Mobility" can be found here: https://ratsinfo.leipzig.de/bi/vo020.asp?VOLFDNR=1005057

2. **Do you have any specific objectives in the above, dedicated to SMEs/ Enterprises? And /or any similar instruments? And any funds supporting it?**

The Economic Development Office of Leipzig has developed an SME Support Program.
Partly aimed at existing companies, the City of Leipzig's SME Support Program is also intended to provide stimulus for business start-ups and expansions. Funding is provided for promising projects in those enterprises lacking sufficient financial resources for their implementation. The SME Support Program was launched in 2013 to enable SMEs to make better use of their own potential, above all by means of innovation and technology based project funding – and hence boost their competitiveness.[21]
Beside the SME Support Program there are several initiatives available for the support of Startups such as the SpinLab as an incubator center which is co-founded by HHL Graduate School of Management. Further there is the SMILE initiative as university Startup network.[22]

3. **Is there any database or just data reporting already existing cases of Best Practices in the field concerned?**

Case study from the fi-compass database were the 'Technology Start-Up Fund in Saxony' (TGFS) is mentioned as best-practice for the Germany, Saxony Region.
Further there are several initiatives awarding innovative SMEs such as the futureSAX project initiated by the Saxon State Ministry for Economic Affairs, Labour and Transport. There best-practice examples of SMEs are awarded even concerning energy issues.[23] Also there is the "IQ-Innovationspreis Mitteldeutschland" (IQ-Innovation award central Germany) or the "Der große Preis des Mittelstandes" (SMW award) honoring innovative businesses.

4. **Do you have any specific measures in your ROP (Regional Operational Plan) – ERDF about Energy efficiency/saving addressed and supporting SMEs/Enterprises?**

The responsible body for our ERDF Operational Program of Saxony is the State Ministry of Economic Affairs, Labour and Transport.[24]
EE and RES measure are included e.g. in the thematic objectives TO4 - Low-carbon economy and TO6 - Environment and resource efficiency. Further many fields in the innovation strategy from Saxony address energy issues e.g. axis C of the smart specialization strategy (http://www.innovationsstrategie.sachsen.de/en/smart-specialisation.html)

Operational Program Saxony 2014 - 2020
In Saxony, we address the OP and the Innovation Strategy of the Free State of Saxony 2014 - 2020. The OP of Saxony directly address the Europe 2020 objectives, particularly emphasizing the goals related to research, development & innovation and climate change & energy sustainability. Most funds (81%) are foreseen for strengthening research and development in the Saxon economy and for improving applied research in Saxony, in line with the regional innovation strategy.1 The total budget for the OP of Saxony is 2.611.275.081,00€ with an EU contribution of 2.089.020.063,00€.

[21] Source: Leipzig Means Business 2016
[22] Source: http://english.leipzig.de/science-and-economy/startup-support/leipzig-startup-initiatives/
[23] Source: https://www.futuresax.org/about/project
[24] Source: http://ec.europa.eu/regional_policy/en/atlas/programmes/2014-2020/europe/2014de16rfop012

Funding priorities are:

- Strengthening research, technological development and innovation
- Enhancing the competitiveness of SMEs
- Supporting the reduction of CO2 emissions
- Risk prevention
- Sustainable urban development

As impact of the OP it is expected that the yet insufficient R&D expenditures of the SME dominated economy will increase and lead to an advanced competitiveness of Saxony's economy. 4.200 cooperation projects with R&D institutions are to be realized and around 330 Mio. Euro of private funds shall be mobilized for research and innovation projects. Further 1.400 new jobs in 250 supported enterprises through productive investments shall be established and 26.900 SMEs are to be provided with high speed internet access.

Innovation strategy Saxony 2014 - 2020 [25]

The innovation strategy was elaborated as a "dynamic" document, so that Saxony can react on new developments and marked trends. There are ongoing evaluations and dialogues with economic, scientific and social partners to adjust the strategy. The innovation strategy contributes to increasing the effectiveness of Saxony`s innovation policy and within these it will lead to economic growth and the base for self-sustained innovative structures will be enabled.

Smart specialization of the Free State of Saxony[26]

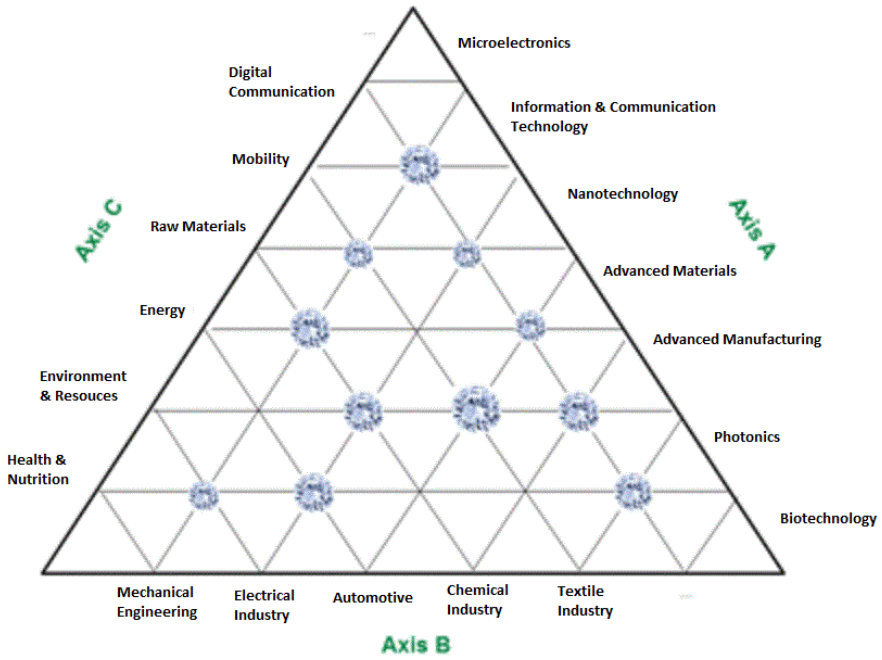
Based on a comprehensive analysis and a participation process with various stakeholders following points about Saxons economy were pointed out:

- Broad industry base with a long industrial tradition
- Diverse R&D landscape
- Focusing too strongly on the present is not expedient for a specialization regarding the dynamics that characterize innovation think and act future oriented
- Innovations are increasingly the result of cooperation across sectors or technologies

Axis A reflects the Key Enabling Technologies with the technologies where Saxony is particular strong developed in. Axis B reflects the traditional developed sectors of the Free State of Saxony and Axis C reflects the fields with the main potential for growth in the future. In the intersections (diamonds) between the 3 Axes there are fields with high innovation potentials were research should be fostered.

[25] Source: http://www.innovationsstrategie.sachsen.de/en/index.html

[26] Source: http://www.innovationsstrategie.sachsen.de/en/smart-specialisation.html



5. Authorities in charge for the Energy Plan (s) / Strategy

City of Leipzig- Economic Development Office / - Department for Environmental Protection / / - Transport and civil engineering office / - City Planning Department or the Office for urban renewal and housing promotion

6. Authorities in charge to manage ERDF Funds (2014-2020) addressed to Energy

Saxony State Ministry of Economic Affairs, Labour and Transport

7. Is there any direct link between the Partner and the Authorities mentioned? Which one? How it will be established?

YES; the energy and environmental cluster of Leipzig founded the NEU e.V. in 2011 as management association, the city of Leipzig is member of the association and they work closely together on energy and environmental issues / also Leipzig is one of the leading cities for E-mobility in Germany and the Economic Development Department of the City has developed an measurement plan for Leipzig as city for intelligent mobility http://english.leipzig.de/detailansicht-news/news/electro-mobility-leipzig-as-a-pioneer-and-german-model-city/

8. Financial Instruments planned to support Industry low-carbon transition

TO4 - Low-carbon economy / TO6 - Environment and resource efficiency / many fields in the innovation strategy from Saxony address energy issues e.g. axis C of the smart specialization strategy (http://www.innovationsstrategie.sachsen.de/en/smart-specialisation.html)

9. Other Authorities to be involved (ministries, regional department dealing with FIRECE topics)

SAENA - Saxony Energy Agency / DENA - German Energy Agency / Chamber of Commerce

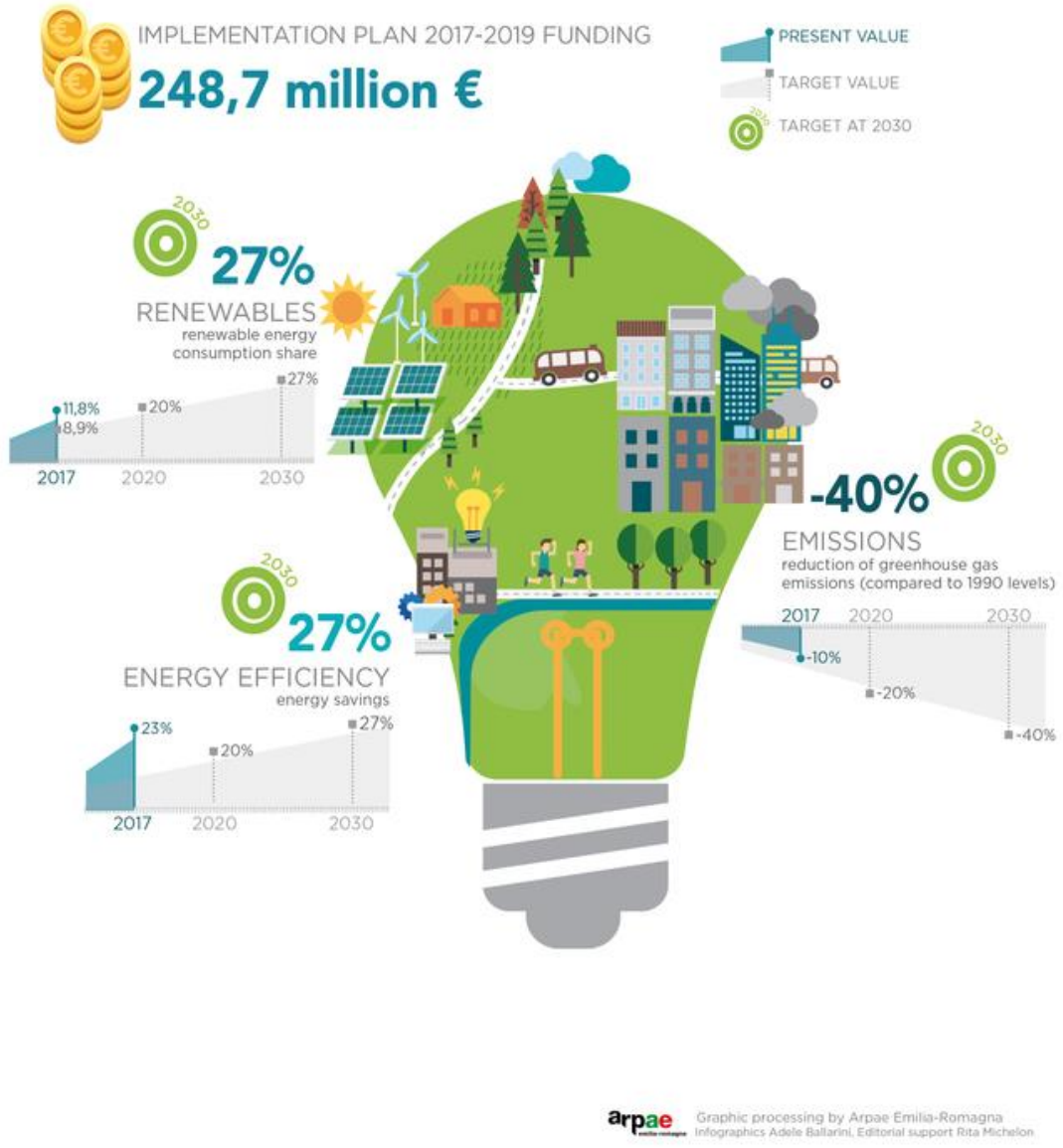
10. Public Financial Agencies and Private Financial Intermediaries involved for Energy investments

SAB - Development Bank of Saxony / KfW - Bank Group / Local and National Banks / regional LEADER initiatives

Emilia-Romagna Region (IT)

1. Do you have in your area a "Regional Energy Plan" or any similar tool?

Since 2007 ERR is adopting a Regional Energy Plan (REP). The last REP was officially approved and adopted the 1st March 2017.



The Regional Energy Plan sets the strategy and targets of Emilia-Romagna Region for energy and climate up to 2030, dealing with the enhancing of green economy, energy saving and efficiency, renewable energy development, transport, research, innovation and training.
Implementation plan 2017-2019 funding: 248,7 million €

Renewables
27% target value at 2030
20% target value at 2020

8,9% target value at 2017
11,8% present value at 2017

Emissions
-40% target value at 2030
-20% target value at 2020
-10% present value at 2017

Energy efficiency
27% target value at 2030
20% target value at 2020
23% present value at 2017

2. **Do you have any specific objectives in the above, dedicated to SMEs/ Enterprises? And /or any similar instruments? And any funds supporting it?**

REP has a specific section dedicated to the Industry sector with a target of increasing the energy efficiency of Industries of about 4% per year, through:
A) supporting the shift from fossil sources of energy to Electricity, especially in self-production from renewable sources;
B) supporting to recover and to re-use the thermal losses of industrial production and to co-generation;
C) supporting the spreading of energy control and management systems (energy audits, ISO management system etc);
D) set-up of Financial instrument to optimize the resources rather than the profit of the investments;
E) boosting best- practices development concerning the energy saving together with the development of RES also through the adoption of strategies of industrial symbiosis. All the measures/actions reported in the REP are financially supported.

3. **Is there any database or just data reporting already existing cases of Best Practices in the field concerned?**

We are presently working to set-up a database colleting all the energy consumption of different industrial sectors while we are already financing and covering the 100% of costs necessary to carry out the energy audits of more than 200 SMEs, necessary to make a benchmark on the energy efficiency of the main industrial production sectors at regional level. In addition, we have already implemented the "Observatory of the Green Economy" that groups all the green enterprises of the region.

4. **Do you have any specific measures in your ROP (Regional Operational Plan) – ERDF about Energy efficiency/saving addressed and supporting SMEs/Enterprises?**

In the ROP ERDF 2014- 2020 there is the ***Axis 4 - Promotion of the low carbon economy in regions and in the production system***, that intends to create incentives for energy efficiency and savings as well as for the development of renewable resources both by public bodies and companies with a view to regional sustainable development both in terms of protecting the environment and saving energy costs.
The intended results include: reducing the energy consumption of production processes for industrial businesses and public buildings by 20% and increasing businesses' energy production from renewable resources by 20% and self-consumption by 25%.
It is based on three objectives:

1- to encourage businesses to lower their energy consumption and to produce energy from renewable resources to support self-consumption, including by setting up ecologically equipped production areas;
2- to promote lower energy consumption in buildings and public facilities, as well as the introduction of renewable energy production systems;
3- to promote sustainable mobility in urban areas.

In addition to it, the ***Axis 3 - Production system competitiveness and attractiveness***, intends to stimulate an innovative, attractive process for investments, new entrepreneurial initiatives and talents. To increase competitiveness and attractiveness, this priority axis focuses on supporting the growth of investments in production, business internationalization and new business start-ups, while promoting, among other things, direct incentives and support measures for access to credit.
It is based on five objectives:
1- to set up and consolidate micro, small and medium-sized enterprises;
2- to support the introduction and effective use of ICT tools in SMEs;
3- to support business certification and innovation in the biggest tourist areas and growth opportunities for cultural and creative sectors;
4- to revive the willingness to invest in the production system;
5- to support internationalization pathways;
6- to improve access to credit by serving as a guarantor for growth, diversification and internationalization projects.

Finally, worth to mention also the ***Axis 1 - Research and innovation***, that intends to strengthen the regional network for research and technology transfer to businesses. The measures supported by this axis are aimed at increasing businesses' capacity to introduce new solutions and products, including through collaborations with research partners, promoting innovation pathways in strategic areas of the regional production system, strengthening the research of the High-Tech Network, facilitating the use of innovation laboratories and centers through international openness and participation in European programs such as Horizon 2020 and COSME, as well as supporting high-tech start-ups.
It is based on four objectives:
1-to strengthen the technological capabilities of laboratories in the High-Tech Network by acquiring new instruments;
2- to increase businesses' innovation activities by supporting their research projects, the acquisition of technological innovation services, the adoption of innovative process and product solutions, as well as research and development projects in collaboration with research partners (centers, universities, etc);
3- to strengthen the regional and national innovation system by supporting participation among regional actors in specialist technological networks and in complex projects;
4- to support the creation and consolidation of high-tech start-ups.

5. Authorities in charge for the Energy Plan (s) / Strategy

PP3 Emilia-Romagna Region – Attilio Raimondi

6. Authorities in charge to manage ERDF Funds (2014-2020) addressed to Energy

PP3 Emilia-Romagna Region – It is both ROP ERDF and ROP ESF Managing Authority.

7. Is there any direct link between the Partner and the Authorities mentioned? Which one? How it will be established?

Partner and Regional Managing Authorities are within the same general directorate

8. Financial Instruments planned to support Industry low-carbon transition

The Multiscope Regional Fund of public financing, set up with the Regional Act. n.791/2016 and 1537/2016, it is a Financial Instrument, according to the previous art. 37 of the EU Reg. n.1303/2013, set up with public resources on the ROP ERDF of ERR 2014 – 2020 and in particular:
a) Axis 3 - Competitiveness and attractiveness of the production system - 3.5.1 Starter Fund
b) Axis 4 - Promotion of low carbon economy in the territories and the production system - 4.2.1 Energy Fund
The Fund is a revolving fund of soft loan financing, privately-funded for the purpose of providing loans at a reduced rate.
The Fund consists of a total initial public budget of about € 47,000,000.00 on the ROP ERDF of ERR for 2014 -2020 programming period divided into two sub-funds:
• Starter Fund of about € 11,000,000
• Energy Fund of about € 36,000,000 of which 2.4€ are to carry out Energy audits (cost free for the Enterprises).

9. Other Authorities to be involved (ministries, regional department dealing with FIRECE topics)

The Italian Ministry of the Economic Development

10. Public Financial Agencies and Private Financial Intermediaries involved for Energy investments

The revolving fund is managed by a private Entity selected via public procurement and presently it is a Consortium. See below for details.

Dél-Dunántúl (HU)

1. Do you have in your area a "Regional Energy Plan" or any similar tool?

In 2012, within the framework of the MANERGY Central Europe project[27] (led by one of STRIA's main owners), the so called South Transdanubian Regional Energy Strategy was elaborated. The document makes inventory of the RES potential of the region, main internal and external factors, the energy needs and dependences of several branches of the economy, optional grants and financing possibilities . It also summarizes potential public and private funding to be accessed/requested, also the relevant actors of the issue tackled. The strategy, though, does not set up priorities and measures for implementation as it does not have financial envelopes for such purpose[28].

Regarding national level, the Ministry of National Development is responsible for improving the energy efficiency in Hungary. In 2012, the Ministry adopted the National Energy Strategy 2030[29], whose aim is to ensure the long-term sustainability, security and economic competitiveness of domestic energy supply. One of the main elements of the Strategy is the National Energy Efficiency Action Plan, which focuses mainly on the reduction of primer energy consumption.

Extract from the EN executive summary of the regional strategy:
"The strategy considers the special characteristics of the region (geography, legal conditions, average size of municipalities, etc.). It contains middle- and long term observations by also describing the available financial resources that can be used to improve the regions' energy management in order to have only the minimum negative impact on the environment and to enhance the independency from external energy suppliers outside the EU. The demand is taken into consideration on the basis of the actual measures of consumption as well as target measures that could be ensured by eco-conscious, cost-effective energy management. The target measures are defined on the basis of the conclusions of a demand analyses. The regional energy strategy creates a basis for local authorities to prepare their own local concepts and implement them."

Table of contents describing the summary in more detail:
1. Situation analysis
1.1. The region's geographical location and natural endowments
1.2. Population, public administration and settlement structure
1.3. Economic characteristics of the region
1.4. The regional transport infrastructure
1.5. Regulatory framework
1.5.1. Strategical level
1.5.1.1. European Union
1.5.1.2. Documents of national scope
1.5.1.3. Regional concepts
1.5.2. Legislation
1.6. Competent national authorities and organizations supervising the enforcement of law and Orders
1.7. Administrative levels with decision making competences in energetic regulation questions

[27] Project information: http://www.central2013.eu/nc/projects-2007-2013/approved-projects/funded-projects/?tx_fundedprojects_pi1[project]=97

[28] Weblinks to the strategy:
http://www.deldunantul.com/sites/default/files/del-dunantuli_regionalis_energia_strategia_v06.pdf
http://www.deldunantul.com/sites/default/files/south_transdanubian_regional_energy_strategy_en_summary.pdf (EN summary)

[29] Weblinks to the strategy:
http://2010-2014.kormany.hu/download/4/f8/70000/Nemzeti%20Energiastrat%C3%A9gia%202030%20teljes%20v%C3%A1ltozat.pdf
http://2010-2014.kormany.hu/download/7/d7/70000/Hungarian%20Energy%20Strategy%202030.pdf

1.8. Institutions and organizations participating in the region's energy production and Distribution
1.8.1. Energy suppliers and waste management facilities
1.8.2. Clusters
1.8.3. Educational institutions
1.8.4. Non-governmental organizations
1.9. Energy production and distribution of South Transdanubia
1.9.1. Presentation of the power plants and factories in the region
1.9.2. The region's electricity and gas networks
1.9.3. Amount of supplied electricity
1.9.4. Characteristics of district heating and domestic hot water (DHW) supply.
1.9.5. The regional greenhouse gas emissions
1.9.6. The South-Transdanubian region's energy consumption by sectors and energy resources
2. SWOT analysis of the energetic development in South Transdanubia
3. determination of the region's energetic purposes
4. Strategic steps
4.1. Grants, financing possibilities
4.1.1. Direct sources from the European Union
4.1.2. Own sources
4.2. Policy actions – development of interregional energetic co-operations

Extract from foreword of the national strategy:
"The National Energy Strategy, based on new foundations, will ensure the long-term sustainability, security and economic competitiveness of energy supply in Hungary. Serving primary national interests, guaranteeing the security of supply, taking into account the least cost principle and asserting environmental considerations, it enables Hungary to contribute to resolving global issues to an extent proportionate to its international weight and as far as its resources allow.
In order to achieve our goals, the document lays downs five crucial efforts: increasing energy savings and energy efficiency, increasing the share of renewable energies, integrating the Central European grid network and constructing the required cross-border capacities, maintaining the existing nuclear capacities and using the domestic coal and lignite resources in an eco-friendly manner for power generation.
Thinking responsibly, the Government considers it to be of critical importance in terms of energy policy to rebuild those Government positions that were given up in previous years due to short-term fiscal considerations or even less transparent or meaningful reasons. The only way to achieve the objectives of the strategy, including in particular the ensuring of affordable energy supply to consumers, is by increasing the involvement of the government."
Table of contents describing the quoted foreword in more detail:
3 STATE OF AFFAIRS
3.1 Global trends
3.2 European Union
3.3 Regional outlook
3.4 The Hungarian situation
4 PILLARS
5 BASIC CONDITIONS
5.1 Climate policy
5.2 Fossil fuel reserves
5.3 European commitments
5.4 Technological development
5.5 Demographic indicators
5.6 Economic growth
5.7 Conclusion
6 VISION

6.1 Primary energy
6.2 Electric power
6.3 Heat energy
6.4 Transport
7 HORIZONTAL ISSUES
7.1 Rural development
7.2 Training and employment
7.3 Environmental protection and nature conservation
7.4 Social and welfare considerations
8 THE ROLE OF THE STATE
8.1 Ownership
8.2 Regulation
8.3 System of Institutions
8.4 Financing
8.5 International relations
8.6 Decision-making points
9 OUTLOOK 2050
10 ABBREVIATIONS
11 Economic Feasibility Study
11.1 Electricity sector
11.2 Heat market
11.3 Gas market

2. **Do you have any specific objectives in the above, dedicated to SMEs/ Enterprises? And /or any similar instruments? And any funds supporting it?**

As for the regional strategy, the answer is no. SMEs and the industry is mentioned as main consumers of the energy. Besides that, different main actors such as clusters support the more extended use of renewable energy and the use of energy efficiency solutions. Financial envelopes are linked to mainstream Operational Programs of the European Union in the 2014-2020 programming period in Hungary.
At national level, the Economic Development and Innovation Operational Program's (EDIOP) exclusive beneficiaries are the small and medium-sized enterprises. Within the framework of EDIOP, the 4th priority deals with the field of Energy to encourage the SMEs for the cost-effective production and energy use. By means of the 4th priority, the SMEs have the possibility to apply for two calls for proposals, which are aimed at building energy developments by using renewable energy.

3. **Is there any database or just data reporting already existing cases of Best Practices in the field concerned?**

The internal IT system (EUPR) that manages the EDIOP applications can be served as a database, but it contains only data about those applications, which have applied for support from the financial framework of EDIOP.

4. **Do you have any specific measures in your ROP (Regional Operational Plan) – ERDF about Energy efficiency/saving addressed and supporting SMEs/Enterprises?**

Within the period of 2014-2020, there are no specific Regional Operational Programs. The development of energy efficiency is managed mainly at national level (EDIOP, EEEOP).
Economy Development and Innovation Operational Program - EDIOP[30]:
Priority 4: Transition to low-emission economy in all economic areas (targeting SMEs)

[30] http://ec.europa.eu/regional_policy/en/atlas/programmes/2014-2020/hungary/2014hu16m0op001

Priority 8 measures in support of: Energetic refurbishment of existing building stock, improvement of district heating solutions, increasing the share of renewable energy in the consumption of households

Environment and Energy Efficiency and Operational Program - EEEOP[31]:
Priority 5: Increase of energy efficiency, use of renewable energy

To complete the above two operational programs, a further one also worth mentioning (though it is not targeting SMEs) as deals with energy efficiency:

Territorial and Settlement Development Operational Program - STDOP[32]:
Priority 3: Transition to low-emission economy, especially in rural areas
Measure 2: Increasing the energy efficiency of local municipalities, increasing the share of renewable energy in the consumption

5. Authorities in charge for the Energy Plan (s) / Strategy

In terms of the regional strategy, it is the Tolna County Development Agency (TCDA). TCDA is AP 14 of FIRECE and has the majority ownership (67,04%) of PP4 STRIA.
Regarding national level, the Energy Strategy belongs to the Ministry of National Development's responsibilities. The EDIOP MA as AP15 is involved into the implementation of FIRECE project. The Environment and Energy Efficiency and Operational Program (EEEOP) is also under the competence of the Ministry of National Development.

6. Authorities in charge to manage ERDF Funds (2014-2020) addressed to Energy

Ministry for National Economy as the Managing Authority and Intermediary Body of the Economy Development and Innovation Operational Program (EDIOP). (Beneficiaries are SMEs.)
Ministry for National Economy as the Managing Authority and Intermediary Body of the Territorial and Settlement Development Operational Program (STDOP). (Beneficiaries are municipalities.)
Ministry of National Development as the Managing Authority and Intermediary Body of the Environment and Energy Efficiency and Operational Program (EEEOP). (Beneficiaries are state owned public organizations and large companies/enterprises.)

7. Is there any direct link between the Partner and the Authorities mentioned? Which one? How it will be established?

In official or regulatory terms PP4 STRIA is independent from the above mentioned Managing Authorities.
Given the fact that EDIOP MA is AP 15 of the FIRECE project, their direct contribution to the transnational learning process is provided.

8. Financial Instruments planned to support Industry low-carbon transition

As it is mentioned above, there are two calls for proposals related to the field of Energy within the framework of EDIOP. One of them is the so-called combined call, which means that it contains non-refundable support and financial instrument (loan) at the same time.
There is a plan about a credit construction that would be realized within the scheme of EDIOP. This credit construction would also affect the 4th priority of the OP.
From the three above mentioned Hungarian Operational Programs:

- EDIOP targets the SMEs in terms of energy efficiency and low carbon developments,

[31] http://ec.europa.eu/regional_policy/en/atlas/programmes/2014-2020/hungary/2014hu16m1op001
[32] http://ec.europa.eu/regional_policy/en/atlas/programmes/2014-2020/hungary/2014hu16m2op001

- EEEOP targets large (250 and plus employees) enterprises in identical terms,
- whilst STDOP addresses the local municipalities so as to create a business friendly public environment (industrial parks, incubation facilities, etc.) favouring companies intending to go (among others) low-carbon."

9. Other Authorities to be involved (ministries, regional department dealing with FIRECE topics)

With the involvement of TCDA (regional [county] level) and the EDIOP MA (national level) further stakeholders could easily be reached by the project dissemination events. Therefore beyond these two organizations named direct involvement of further actors into the implementation of FIRECE is not needed.

10. Public Financial Agencies and Private Financial Intermediaries involved for Energy investments

Due to recent nationalization and simultaneous centralization processes in the ownership structures of Hungarian commercial banks and saving cooperatives in the country, the ownership share of the Hungarian State is 55% of the credit institutions. Good examples for this is the Hungarian Commercial Bank and the Budapest Bank, FHB Land Credit and Mortgage Bank. The circle of saving cooperatives are even more spread from this aspect, given that those are especially micro-regional business entities in all regions of the country. The Hungarian State quite often entrusts these newly nationalized bank sector companies to act as intermediaries of allocating European Union financing towards SMEs in favour of low-carbon transition via the EDIOP MA and also via the state owned Hungarian Development Bank. What is more, the Hungarian Central Bank also offers favourable enterprise credits and loans directly to enterprises, among others for low-carbon transition. Therefore the Hungarian portfolio is rather wide.

Burgenland (AT)

1. **Do you have in your area a "Regional Energy Plan" or any similar tool?**

In Burgenland Region there are Energiestrategie Burgenland 2020+ and Strategy: With Nature to new success.

The energy strategy Burgenland 2020+ presumes the following milestones:

1. 2013 Burgenland will reach autonomy in electricity on the balance sheet. This means that starting from 2013 Burgenland will produce more electric power than needed.
2. 2020 more than 50% (=4,7 Billion KWh) of the overall all the energy consumption in Burgenland will be renewables and most of them will be produced directly in Burgenland
3. In a „visionary" outlook for 2050 Burgenland will produce 100% of its needed energy in Burgenland.

Within the first 2 chapters „Road map towards the energy strategy" as well as „accompanying tools and studies" are explained. Especially the "Energy team Burgenland" and experts from Fachhochschule Burgenland, who elaborated different energy scenarios, contributed to important parts of the energy strategy Burgenland 2020+ by confining the contents and by defining middle and long term goals.

In this respect the regional plan for erecting of wind power plants, the results for regional agricultural resources elaborated in the project EKKO as well as the implemented cadastre for solar resources were good basics for the preparation of the resource potential for renewable energy in Burgenland.

Connections and influences of European energy goals and overall factors like demography, labor market, economy, nature or environment were taken into consideration concerning the specific situation of Burgenland and finalized by marking the general goals and forecasts for 2013, 2020 and 2050.

In chapter 5 an analysis of the production and consumption of energy in Burgenland concluding the period from 2001 until 2011 was elaborated.

By collecting of many suggestions and feedbacks of regional experts and stake holders a catalog of 60 groups of measures was established. The measures are grouped in the sectors: Energy efficiency, Energy production and resources as well as storing, transformation and logistics of energy.

In chapter seven a roadmap for reaching the 50% goal for Burgenland is described. In this case the measures are separated in "Energy consumption divided in energy types and in consumer groups" and "energy production divided in different types of energy (power, gas, fuels, etc.)

A „visionary" outlook to the year 2050 is described in chapter 8 – separated for different energy carriers – and a proposed road map for reaching complete energy autonomy for Burgenland. By reaching this goal some technology leaps are postulated, especially in enhancing the use of solar and wind power as well as sufficient solutions for storing and transforming of renewable energy.

2. **Do you have any specific objectives in the above, dedicated to SMEs/ Enterprises? And /or any similar instruments? And any funds supporting it?**

EUB (Energie- und Umweltberatung Burgenland) is a programme which is dedicated to SME, too. Funding programme of KPC (from the state of Austria) will a lot of energy dedicated measures for SME. EFRE Programme for Burgenland 2014 - 2020

3. **Is there any database or just data reporting already existing cases of Best Practices in the field concerned?**

Energy related funds from European programs are documented in a Database in Burgenland. KPC (Komunal Public Consulting -Austria) is regularly publishing best practice examples of energy related projects for SME. The same is the case in the klima.aktiv programme where special energy related projects of SME are marked.

4. **Do you have any specific measures in your ROP (Regional Operational Plan) – ERDF about Energy efficiency/saving addressed and supporting SMEs/Enterprises?**

Operational Programme Burgenland 2014 - 2020; Regional Strategy: With Nature to new success;

5. Authorities in charge for the Energy Plan (s) / Strategy

Government of Burgenland; Energy Agency of Burgenland; Department of spatial Planning ind Burgenland; Research Burgenland GmbH

6. Authorities in charge to manage ERDF Funds (2014-2020) addressed to Energy

WIBU (Wirtschaftsförderung Burgenland), Regionalmanagement Burgenland, Forschung Burgenland (EUB-Programme), KPC (Komunal Public Consulting) which is responsible for all Austria.

7. Is there any direct link between the Partner and the Authorities mentioned? Which one? How it will be established?

YES - all organizations in Burgenland are interlinked and belong to the same organization (Landesholding Burgenland). There is also a cooperation between Burgenland and the KPC (Austria). Sometimes the province of Burgenland and the KPC (Austria) are funding projects in cooperation.

8. Financial Instruments planned to support Industry low-carbon transition

The existing ERDF program as well as the ESF program will be continued.

9. Other Authorities to be involved (ministries, regional department dealing with FIRECE topics)

Ministry for economics, ministry for agriculture, AEA (Austrian Energy Agency), klima.aktiv program (Austria)

10. Public Financial Agencies and Private Financial Intermediaries involved for Energy investments

KPC (is running a national bank), regional bank institutes

Lower Silesia[33] (PL)

1. Do you have in your area a "Regional Energy Plan" or any similar tool?

Lower Silesian Voivodship does not have a current "regional energy plan" or any similar tool/document. The last document approved by the resolution of the Lower Silesian Voivodship Board was the Lower Silesian Energy Strategy from 2001. Since then, no document taking into account the issues of energy efficiency has been adopted as a mandatory document for the region.
Nevertheless there are several documents of strategic importance for the Lower Silesian Voivodship which take into account the issues of energy efficiency.

Among them are:
1. Development Strategy of the Lower Silesian Voivodeship 2020[34].
2. Regional Innovation Strategy for Lower Silesian Voivodeship for years 2011-2020[35]
3. Energy Development Strategy on the Lower Silesia on the basis of the foresight the foresight methods (2011)[36].

1. The Development strategy of the Lower Silesian Voivodeship 2020 is a tool dedicated to stimulate and design development that targets activities of administration and indicates areas requiring regulation and funding. The Strategy is the most important document of the Voivodeship setting out mid-term policy directions. The document defines objectives of development and provides framework for future projects however does not indicate precisely what and from what resources will be implemented. There are eight objectives identified in the Strategy, out of which two are related to SMEs and energy efficiency, including Objective 3. Increase of competitiveness of companies particularly SME and Objective 4. Environment protection, efficient use of resource and adaptation to climate changes and improvement of the safety level.

2. Regional Innovation Strategy for Lower Silesian Voivodeship for years 2011-2020 is a tool for implementing the innovation policy of Self-government of the Lower Silesian Voivodship, focusing on the objectives of promoting and supporting the development, diffusion and efficient use of new products, services and processes, both within the organisation (whether public or private) and from a market perspective. The strategic and operating objectives define what the regional authorities want to achieve in order to ensure the innovative development of the region and the method of executing these assumptions. Among four objectives there is a Strategic objective 2. "Increased chance for the success of innovative business projects", which is focused on the increase of availability of financing of the innovations though the development and dissemination of financial instruments and products.

3. Energy Development Strategy on the Lower Silesia on the basis of the foresight methods (2011) – a document that presents challenges for the Lower Silesia power system and their selected properties and includes the diagnosis of the power system in the region as well as selected regions of the European Union, foresight methodology by using the Delphi methods, expert's reports and panels. The results of foresight studies, discussions of panel discussions in the form of expert

[33] Dolnoslaskie
[34] The EN version of the Development Strategy can be found here: http://www.umwd.dolnyslask.pl/fileadmin/user_upload/Rozwoj_regionalny/SRWD/SRWD_2020_wersja_ang..pdf
[35] The EN version of the Regional Innovation Strategy can be found here: http://www.innowacje.dolnyslask.pl/images/attachments/aktualizacja_rsi/rsi_wd_ang.pdf
[36] Unfortunately the EN version of the Energy Development Strategy is not available. The abstract in EN can be found here: https://www.researchgate.net/publication/292393837_Regional_energy_strategy_on_the_basis_of_the_foresight_study?ev=prf_high

opinions, diagnosis of the state, analysis of good practices (e. g. in Germany, Austria), SWOT analyses, analysis of challenges and forecasts made it possible to define the problems and desired state at the regional energy level, which were indicated in the mission and objectives of the main and partial strategies. The strategy was realized in the period 2009-2011 by the team from Wroclaw University of Technology (Poland) with the participation of industry experts. The aim of the document was to indicate the directions of power engineering development (divided into sectors: electricity, heat, gas, renewable energy sources) and the development of R&D works for power engineering and the possibilities of their implementation in the region.

The following mission has been formulated:
Ensuring energy security in conditions of innovative, ecological and competitive regional energy sources using local energy resources.

The mission directly stems from three basic strategic objectives focusing on energy security, innovation and environmental and economic aspects. Implementation and development of consensus among the individual objectives is a major challenge for the region:
Basic objective No 1: Ensuring energy security.
Basic objective No 2: Intensifying innovative processes in regional power generation.
Basic objective No 3: Minimising environmental impact and actions aimed at more economical use and production of energy.

The strategy sets out objectives that should be implemented by smaller entities, which in the future will probably perform the function of prosecutions, as well as for municipalities, their associations and poviats, which know best the specificity of the local market and can set directions for the development of energy economy in their area and provide conditions within their legal, organizational and financial possibilities to implement them. When designing the strategy, social needs (energy consumers) were taken into account, in the framework of the so-called social and economic scenario, as well as requirements related to environmental protection (environmental scenario).

The main conclusions of the strategy are that there is a need:

- to participate in its implementation by various entities and to cooperate among different entities,
- monitoring of energy potential at the voivodship level,
- energy planning at municipal level for energy management,
- implementation of less capital-intensive technologies and structural and organizational solutions in a short period of time, which do not require high financial outlays, and in the opinion of experts will mainly implement the economic, environmental and social scenario. Addressing waste management and agriculture for energy solutions. Experts pointed to the necessity of wider use of public-private partnership in the field of energy management of waste, pro-efficient and pro-ecological behaviour (e. g. recovery of waste heat in production processes, waste segregation), wide use of smart meters of solar technology and generation of electricity from hydroelectric power. The proposed solutions are conducive to the future development of Smart Grids technologies,
- taking decisions and actions on the directions of energy development in 2030-2050 and after 2050, because theses implementing the security and innovation scenario are mainly related to long-term planning. The experts in the framework of these two scenarios indicated, among others, the following. Theses connected with the development of lignite deposits near Legnica, the development of low power nuclear energy, the use of small scale poly - generation devices, technologies based on fuel cells, the use of superconductive materials in transformers and generators, the development of distributed power generation, the first installations using advanced energy storage technologies in the process of distribution of renewable energy, the use of amorphous solar cells with a large area of more than 20%

conversion efficiency. These technologies require both programming and programming financial resources, implementation of new legal solutions, as well as undertaking or becoming involved in research and development work carried out in global scientific centres, training of engineers in the following areas in this respect and in the labour market.

An important result of SWOT analysis is the indication of the necessity to undertake necessary modernization and development investments in order to ensure energy security and improve energy efficiency. On the other hand, the analysis of historical data on consumption of different energy carriers indicates a decrease in the demand for network heat, which is an important problem for the entities of the heat sub-sector.

2. **Do you have any specific objectives in the above, dedicated to SMEs/ Enterprises? And /or any similar instruments? And any funds supporting it?**

1. Development Strategy of the Lower Silesian Voivodeship 2020 - a policy document that defines objectives of development and provides framework for future projects. There are eight objectives identified in the Strategy, including Objective 3. Increase of competitiveness of companies particularly SME and Objective 4. Environment protection, efficient use of resource and adaptation to climate changes and improvement of the safety level.

2. Regional Innovation Strategy for Lower Silesian Voivodeship for years 2011-2020 a strategic document of the development program nature.
Among four strategic objectives included in the Strategy there are: Strategic objective 2. Increased chance for the success of innovative business projects:
- Operational objective 2.1. Provision of effective support for the enterprises in the form of capital, knowledge and infrastructure within the scope of Lower Silesian Innovation System.
- Operational objective 2.2. Support of research-development activity within the enterprises.

3. Energy Development Strategy on the Lower Silesia on the basis of the foresight the foresight methods (2011) – a document that presents challenges for the Lower Silesia power system and their selected properties and includes the diagnosis of the power system in the region as well as selected regions of the European Union, foresight methodology by using the Delphi methods, expert's reports and panels.
There are strategic objectives and concrete action programs addressed to specific target groups, including enterprises. Among them are: Activities for the Business Investor Group - the group of entities which are interested in the investments related to the energy sector.

3. **Is there any database or just data reporting already existing cases of Best Practices in the field concerned?**

There is information available on best practices in RES and energy efficiency in Lower Silesia region. One of them is Energy Technology Center in Świdnica founded in 2012. It was created by Independent Industry Association. The Center is one of the most modern investments in Poland. This is the seat of the Clean Energy Houses' Project Team which elaborates projects of the energy - efficient houses. The aim of the Center is technology testing, verifying and correction. The Center disseminates the results of technology research what helps investors to make aware choices of the holistic energy solution. The Center has a great impact on the most important areas of energy efficiency including industry, means of transport and architecture. Within the Świdnica Center operates the "Energy Technology Centre" Cluster which brings together companies and institutions whose main field of activity is the use of renewable energy sources as well as the implementation of technologies related to energy efficiency.

4. **Do you have any specific measures in your ROP (Regional Operational Plan) – ERDF about Energy efficiency/saving addressed and supporting SMEs/Enterprises?**

Regional Operational Program of Lower Silesia 2014-2020: Priority Axis 3 – Low carbon economy; Activity 3.2. Energy efficiency in SME's. The Activity 3.2 provides co-financing for projects involving the application of energy-efficient technologies in an enterprise (including modernization and extension of production lines to more energy-efficient production lines and introduction of energy management systems).

5. **Authorities in charge for the Energy Plan (s) / Strategy**

The Institute for Territorial Development - a research and development entity whose activity is focused on the implementation of tasks related to spatial planning and territorial development, with particular emphasis on regional and cross-border issues. The Institute is a self-governing organizational unit of the Lower Silesian Voivodeship, established in 1999 thanks to the conjoining of four smaller regional planning offices from Lower Silesia.

6. **Authorities in charge to manage ERDF Funds (2014-2020) addressed to Energy**

1. Marshal Office of the Lower Silesian Voivodship - a regional authority responsible for managing ERDF funds under the Regional Operational Program 2014-2020 of the Lower Silesian Voivodship / Department of European Funds of the Office of the Marshal of the Lower Silesian Voivodship.
2. The Lower Silesian Intermediate Body (DIP) as the budget unit of the Lower Silesian Voivodship within the Regional Operational Program of the Lower Silesian Voivodship 2014-2020 covered the implementation of the following areas in the field of low-carbon economy:
Priority 3 – Low carbon economy.

7. **Is there any direct link between the Partner and the Authorities mentioned? Which one? How it will be established?**

YES. Marshal Office of the Lower Silesian Voivodship is the main shareholder of Regional Development Agency ARLEG S.A. in Legnica.

8. **Financial Instruments planned to support Industry low-carbon transition**

GRANTS: Calls for applications for co-financing (grants) of projects concerning low-carbon economy were announced in 2016 under the Regional Operational Program of the Lower Silesian Voivodship 2014-2020 Priority 3 Low-carbon economy including Activity 3.2. Energy efficiency in SME's. No information on planned calls. LOANS - planned: National Economy Bank, Priority Axis 3 – Low carbon economy - Loans under activity 3.2
The loan for energy efficiency measures in the SME sector is an instrument which will be granted on preferential terms: micro, small and medium-sized enterprises, groups of agricultural producers, enterprises whose majority shares belong to the territorial self-government units.

9. **Other Authorities to be involved (ministries, regional department dealing with FIRECE topics)**

The Institute for Territorial Development in Wrocław.

10. **Public Financial Agencies and Private Financial Intermediaries involved for Energy investments**

Private banks.
Financial intermediaries (https://rpo.bgk.pl/posrednicy-finansowi/) selected by National Economy Bank to provide support for the development of the SME sector:
- Consortium: Regional Development Agency AGROREG SA and Sudeckie Economic Initiatives Association,
- Consortium: ECDF S.A. and Mega Sonic S.A.,
- Consortium: Fund of the Wałbrzych Region Wałbrzyskiego and Wrocław Regional Development Agency WARR SA,

- The Polish Enterprise Foundation

Lubelskie (PL)

1. **Do you have in your area a "Regional Energy Plan" or any similar tool?**

In Lubelskie Voivodeship there are:
(1) Energy development program for Lubelskie Voivodeship - 2009 (main document);
(2) Renawable Energy Sources development program for Lubelskie Voivodeship - 2013 (extension of the RES theme created on the basis of the previous mentioned document).

The purpose of the Energy development program for Lubelskie Voivodeship is mainly to assess the problems and needs as well as the proposal of directions of energy development in the Lubelskie Voivodeship, taking into account the energy and environmental policy of the state and the economic development needs of the region.
The actions proposed in the Program are aimed at:
- improvement of the region's energy security;
- fuller use of local energy resources, both fossil and renewable;
- improvement of the region's energy infrastructure;
- reducing the negative impact of energy on the environment;
- getting proper relationship between centralized and distributed energy.

The work on the Program has been divided into three main stages:
- Stage I - Collecting applications for the Program from the relevant entities from the energy sector.
269 entities were invited to cooperate, including: municipalities; voivodeship power system administrators; voivodeship government and local self-government authorities; professional, social and economic institutions and organizations dealing with energy matters. Applications submitted by the above entities were analyzed and assessed in terms of their suitability for the Program.;
- Stage II - Diagnosis of the existing state.
At this stage of the study was made an assessment of the state of the energy economy in the region and the legal conditions of its functioning. Diagnosis defines complex conditions in order to identify resources and potentials, deploy and use of infrastructure, and limit of the development of the energy sector.;
- Stage III - Directions of energy development.
The program sets the direction of energy development in the region with the needs, goals and tasks in the various energy sectors, which will enable realization of the adopted directions of development. The draft document was subjected to public consultation and evaluation by the competent energy bodies.
This document also contains development scenarios for the programming period of EU cohesion policy 2014-2020 as well as recommendations that were included in other strategic documents such as:
"Regional Innovation Strategy for the Lubelskie Voivodeship 2020" and ""Regional Operational Programme of Lubelskie Voivodeship 2014-2020""."

2. **Do you have any specific objectives in the above, dedicated to SMEs/ Enterprises? And /or any similar instruments? And any funds supporting it?**

This document contains recommendations, also for entrepreneurs, which were later included in the "Regional Operational Program of Lubelskie Voivodeship 2014-2020"

3. **Is there any database or just data reporting already existing cases of Best Practices in the field concerned?**

No such database, only reporting existing cases.

4. **Do you have any specific measures in your ROP (Regional Operational Plan) – ERDF about Energy efficiency/saving addressed and supporting SMEs/Enterprises?**

Yes, in the Regional Operational Program of LV there are two priority Axes addressed Energy efficiency and supporting SMEs:

- Priority Axis 4. Environmentally-friendly energy (supporting the generation and distribution of renewable energy);
- Priority Axis 5. Energy Efficiency and Low Emissivity (Promoting Energy Efficiency and the Use of Renewable Energy in Enterprises).

5. Authorities in charge for the Energy Plan (s) / Strategy

Department of Regional Policy; Regional Office of Energy (both in Marshal's Office structures).

6. Authorities in charge to manage ERDF Funds (2014-2020) addressed to Energy

Department of Regional Operational Program Management of Marshal's Office of the Lubelskie Voivodship in Lublin.

7. Is there any direct link between the Partner and the Authorities mentioned? Which one? How it will be established?

All authorities mentioned above are in structures of Marshal's Office of LV.

8. Financial Instruments planned to support Industry low-carbon transition

The use of financial instruments was foreseen in Priority Axis 4 ""Environmentally-friendly energy"" and Priority Axis 5 ""Energy efficiency and low-emissivity"" (Regional Operational Program for Lubelskie Voivodeship 2014-2020).
In the case of the ROP, the following projects are/will be supported:
- construction and reconstruction of the infrastructure used for the production of RES energy; investments in the construction and modernization of heat production units; Distributed cogeneration based on identified local resources like the construction of local, small energy sources producing both electricity and heat for local needs (Ax 4);
- support for deep thermal modernization of enterprises; Business projects that reduce the amount of energy, heat and water loss; construction and reconstruction of RES installations (Ax 5).

9. Other Authorities to be involved (ministries, regional department dealing with FIRECE topics)

Ministry of Energy, Ministry of Regional Development.

10. Public Financial Agencies and Private Financial Intermediaries involved for Energy investments

Lublin Business Support Agency.

Jadranska Hrvatska (HR)

1. Do you have in your area a "Regional Energy Plan" or any similar tool?

The following documents are relevant on the regional energy planning (please note that the language is Croatian):

1. County Development Strategy for Istrian County 2011. – 2013 [37](cro. Županijska razvojna strategija za Istarsku županiju 2011. - 2013.), Note that this is currently active strategy.

The basic analysis provides an overview of the situation, trends, problems and needs of the Istrian County, structured into six basic features: position and administrative division, demographic and natural characteristics, environmental protection, infrastructure, economy and social activity.
The development strategy identified five strategic goals that consist of 24 priorities and 100 measures. The goals and priorities identified in the Development Strategy will lead to activities in strengthening the socio-economic situation in the county in the period 2011-2013.

2. Istrian County Energy Efficiency Action Plan for the Period 2017 - 2020[38] (cro. Akcijski plan energetske učinkovitosti Istarske županije za razdoblje od 2017. do 2019. godine), December 2016

The purpose of the Energy Efficiency Action Plan for the period 2017 to 2019 is to set guidelines for the implementation of the energy efficiency improvement policy through energy savings, respecting the energy needs of the Istrian County and the principles of sustainability and environmental protection. During implementation, the EEAP may be supplemented and amended, subject to prior consent of the National Coordination Body.
The Action Plan sets out the strategic goals for rationalizing consumption and energy costs and emissions into the environment, which is aligned with national and European directives, strategies and plans.

3. Istrian County Annual Energy Efficiency Plan for 2017[39] (cro. Godišnji plan energetske učinkovitosti Istarske županije za 2017. godinu), December 2016
The Annual Energy Efficiency Plan is a plan document to be submitted by the end of the current year for the next year, and it sets out the implementation of policies for improving energy efficiency in the area of regional self-government unit in accordance with the National Action Plan.
Implementing the plan seeks to reduce energy consumption and CO2 emissions in households, as well as in the sectors of services, transport and industry.

4. Istrian County Spatial Plan[40] (cro. Prostorni plan Istarske Županije), SNIŽ 14/16
Sets a strategic direction for the development of a Istrian County area, states the policies, priorities, programs and land allocations that will implement the strategic direction and influences the distribution of people and activities in spaces of various scales.
It is made of Text part of the Plan (provisions for implementation), graphical part and annexes.

2. Do you have any specific objectives in the above, dedicated to SMEs/ Enterprises? And /or any similar instruments? And any funds supporting it?

There are no specific objectives for SMEs but there is a general credit line meant to be used for general purposes in the improvement of business conditions where the support is given in sense of small interest on loans etc.

[37] http://www.ida.hr/fileadmin/sadrzaji/datoteke/ZRS/ZRS_Istarske_zupanije_2011_-2013.pdf
[38] https://www.istra-istria.hr/fileadmin/dokumenti/novosti/sjednice_skupstine_2013/38/38-25-En_ucinkovitost_IZ_2017_2019.pdf
[39] https://www.istra-istria.hr/index.php?id=4454
[40] http://www.zpuiz.hr/fileadmin/dokumenti/prostorni_plan/Ostali/PPIZ_2016/broj14-od-29-07-2016.pdf

3. **Is there any database or just data reporting already existing cases of Best Practices in the field concerned?**

No database available. As example the case of investment of one company (which goes under category SME) in small 245kW hydroelectric plant on lake Letaj in Istrian County is known. There are government incentives for every kW of produced energy from renewable sources. However, the exact method of funding in this case is not yet known.

4. **Do you have any specific measures in your ROP (Regional Operational Plan) – ERDF about Energy efficiency/saving addressed and supporting SMEs/Enterprises?**

Extract from County Development Strategy for Istrian County 2011. – 2013[41], Strategic goal: I Competitive Economy:

Priority 1.2 Encouraging and support the development of small and medium entrepreneurship,

Measure 1.2.1. Creating a favorable financial environment for small and medium entrepreneurship;

Measure 1.2.2. Entrepreneurship education with the aim of raising competitiveness

Measure 1.2.3. Development of entrepreneurial incubators with the aim of encouraging the creation of new jobs

Priority 1.10. Energy Efficiency and Renewable Energy Sources

Measure 1.10.1. Increasing the efficiency of using primary energy sources

Measure 1.10.2. Establish supports to promote energy efficiency projects

Measure 1.10.3. Using Renewable Energy Sources

Measure 1.10.4. Information and education of the population

5. **Authorities in charge for the Energy Plan (s) / Strategy**

Istrian County.

6. **Authorities in charge to manage ERDF Funds (2014-2020) addressed to Energy**

There are three levels of authorities present in the ERDF management system of Republic of Croatia. Ministry of Regional Development and European Union Funds acts as main coordination and management body with different other institutions (mainly ministries) appointed as intermediary management bodies that are responsible for specific investment priorities. Responsibility division is based on The Regulation on bodies in the management and control systems of the European Social Fund, the European Regional Development Fund and the Cohesion Fund, in conjunction with the objective of ""Investment for growth and jobs"" (OG 107/2014).

Since energy topics are addressed by several investment priorities within the only operational program available to Croatia, Operational Program Competitiveness and Cohesion 2014 - 2020 2014 there are multiple bodies responsible for management of these funds.
Energy related topics can be found under these investment priorities:

1. 4b - Promoting energy efficiency and renewable energy use in enterprises

Responsible bodies: Ministry of Economy, Entrepreneurship and Crafts (first intermediary level), The Environmental Protection and Energy Efficiency Fund (second intermediary level).

2. 4c - Supporting energy efficiency, smart energy management and renewable energy use in public infrastructure, including in public buildings, and in the housing sector

Responsible bodies: Ministry of Construction and Physical Planning (first intermediary level), The Environmental Protection and Energy Efficiency Fund (second intermediary level).

[41] Operational Program Under The 'Investment For Growth And Jobs' Goal (English version: http://www.strukturnifondovi.hr/UserDocsImages/Novosti/Programme_2014HR16M1OP001_1_2_en.pdf)

3. 4d - Developing and implementing smart distribution systems that operate at low and medium voltage levels
Responsible bodies: Ministry of Economy, Entrepreneurship and Crafts (first and second intermediary level).

4. 6c - Conserving, protecting, promoting and developing natural and cultural heritage

Responsible bodies: Ministry of Regional Development and European Union Funds (first intermediary level), SAFU (second intermediary level).

5. 6i - Investing in the waste sector to meet the requirements of the Union's environmental acquis and to address needs, identified by the Member States, for investment that goes beyond those requirements
Responsible bodies: Ministry of Environment and Energy (first intermediary level), The Environmental Protection and Energy Efficiency Fund (second intermediary level).

6. 7ii - Developing and improving environmentally-friendly (including low-noise) and low-carbon transport systems, including inland waterways and maritime transport, ports, multimodal links and airport infrastructure, in order to promote sustainable regional and local mobility
Responsible bodies: Ministry of Maritime Affairs, Transport and Infrastructure (first and second intermediary level).

7. Is there any direct link between the Partner and the Authorities mentioned? Which one? How it will be established?

In November 2015 IRENA joined the initiative to for establishment of close cooperation model between all five regional energy agencies that are functioning in Croatia. This cooperation is formed in order to deal with subjects related to energy efficiency and use of renewable energy sources. The main purpose is to strengthen technical cooperation between the Energy Agencies through joint development and implementation of common objectives on local level and exchange of information on matters of mutual interest. Cooperation between the energy agencies focuses on:

- joint presentation within international and national frameworks
- joint development of policy recommendations
- joint development of large scale projects or aggregation of small scale projects
- collaboration with regard to EU programmes
- joint identification of areas of mutual interest
- exchange of experience and best practice on matters of mutual interest
- dissemination and promotion of results

This initiative also has international character as it was joined by all seven Slovenian regional agencies and it was formalized by signing the document called “Memorandum of understanding between local and regional energy agencies of Croatia and Slovenia. The initiative is supported by FEDARENE – European Federation of Agencies and Regions for Energy and the Environment.
It is clearly visible that even though IRENA was initially formed as regional energy agency with Region of Istria in its prime focus, its scope of activities were eventually broadened onto national level through cooperation with other energy agencies which cover the rest of the territory of Republic of Croatia. Activities of all energy agencies are coordinated in order to ensure creation of nationally coherent energy policies and strategies that are applicable for whole area of Republic of Croatia. This form of cooperation between energy agencies in Croatia ensures dissemination of all project results across the country, but it also ensures the visibility of issues encountered in areas other than one in which the agency participating in any given project is situated. In this way, the scope of influence of any regional energy agency in Croatia, and also one of IRENA, is greatly broadened and it effectively becomes national. Additionally, since “Memorandum of understanding between local and regional

energy agencies of Croatia and Slovenia" includes Slovenian energy agencies, project results and possibility for knowledge transfer have additional transnational character.

8. Financial Instruments planned to support Industry low-carbon transition

- Istrian County budget
- Environmental Protection and Energy Efficiency Fund (cro. Fond za zaštitu okoliša i energetsku učinkovitost – FZOEU)
- The Croatian Bank for Reconstruction and Development (cro. Hrvatska banka za obnovu i razvitak - HABOR) has special lines for lending projects for environmental protection, energy efficiency and renewable energy sources.
- Various commercial banks have available green lending lines. One of the most significant is the credit line of the European Bank for Reconstruction and Development, which, by 2013, offers green loans to various companies and units of local government through various commercial banks. These loans will make it easier to invest in energy efficiency and renewable energy projects. This credit line is the result of the EBRD project implemented in co-operation with the European Union under the name of the Western Balkans Sustainable Energy Financing Facility II (WeBSEFF II). It is open to the public and private sector if they want to improve the efficiency of energy use and / or invest in renewable energy production facilities.
- EU funds - approximately three billion euros are available to the Republic of Croatia within the Operational Program for Competitiveness and Cohesion 2014-2020, through five competitiveness priorities: research and innovation, ICT, small and medium-sized enterprises, low carbon economy and education.
- Public Private Partnership - The basic foundation of a public-private partnership is the use of expertise in the private sector and their resources, in order to contribute to the infrastructure and to the provision of public sector service activities. In this way, the public sector triggers private sector activity, taking into account public interest and quality control.
- The ESCO (Energy Service Company) model includes development, implementation and financing of projects to improve energy efficiency and reduce operating and maintenance costs. The goal of each project is to reduce energy costs and maintenance by installing more efficient equipment and by optimizing energy systems. Therefore, ensuring the repayment of investments through realized savings over a period of several years, depending on the client and the project.
- Transnational Cooperation Programs
    - Interreg Mediterranean
    - Interreg Danube
    - Interreg Adriatic - Ionian
    - Interreg Central Europe
    - Interreg Italy - Croatia

9. Other Authorities to be involved (ministries, regional department dealing with FIRECE topics)

- Istrian County
- Ministry of Environment and Energy
- Ministry of Construction and Physical Planning
- Ministry of Economy, Entrepreneurship and Crafts
- Ministry of Regional Development and EU Funds
- Ministry of Maritime Affairs, Transport and Infrastructure
- Ministry of Agriculture"

10. Public Financial Agencies and Private Financial Intermediaries involved for Energy investments

- The Croatian Bank for Reconstruction and Development (cro. Hrvatska banka za obnovu i razvitak - HABOR) has special lines for lending projects for environmental protection, energy efficiency and renewable energy sources.

- Various commercial banks have available green lending lines. One of the most significant is the credit line of the European Bank for Reconstruction and Development, which, by 2013, offers green loans to various companies and units of local government through various commercial banks. These loans will make it easier to invest in energy efficiency and renewable energy projects. This credit line is the result of the EBRD project implemented in co-operation with the European Union under the name of the Western Balkans Sustainable Energy Financing Facility II (WeBSEFF II). It is open to the public and private sector if they want to improve the efficiency of energy use and / or invest in renewable energy production facilities.

Praha Capital Region (CZ)

1. **Do you have in your area a "Regional Energy Plan" or any similar tool?**

On national level, there is the National Action Plan on Energy Efficiency (NAPEE)[42].
On regional/local level, regions/cities can introduce the following strategies: Sustainable Energy Action Plan (SEAP), Sustainable Energy and Climate Action Plan (SECAP), Regional Energy Policy (REP). SEAP for the City of Ostrava and the towns of Hlinsko and Jesenik have already been approved and published[43]; some other cities has been developing their SEAP/SECAP plans, for instance cities Liberec, Chrudim and Litomerice. Development of such plans is not compulsory, cities usually implement them under Covenant of Mayors initiative on a voluntary basis.

NAPEE sets the national goal to achieve 50,67 PJ (14,08 TWh) of new energy savings in a final energy consumption from 2015 to 2020.
Regional/local SEAPs and SECAPs set goals to reduce CO2 emissions and to lower impact of climate change through implementation of energy efficient measures, installation of renewable energy sources, and introduction of adaptation measures. SEAPs have a CO2 reduction target of 20% until 2020 (based on 1990 level or later baseline year), SECAPs have a CO2 reduction target of 40% until 2030.

2. **Do you have any specific objectives in the above, dedicated to SMEs/ Enterprises? And /or any similar instruments? And any funds supporting it?**

Neither NAPEE nor above-listed regional/local documents address specifically SMEs. However, some financial mechanisms (subsidies, financial instruments) focus on SMEs

3. **Is there any database or just data reporting already existing cases of Best Practices in the field concerned?**

For some national operational programs (funded from ERDF), there exist annual reports / evaluation studies.
Examples:
1) OP Environment[44]
2) OP Environment, specific subsidy program for change of source of heating in households: ENVIROS carried out an evaluation study for the State Environmental Fund, however it is not published.
3) Integrated Regional OP[45]
4) OP Enterprise and Innovations for Competitiveness[46]

4. **Do you have any specific measures in your ROP (Regional Operational Plan) – ERDF about Energy efficiency/saving addressed and supporting SMEs/Enterprises?**

[42] https://www.mpo.cz/assets/dokumenty/50711/63238/651838/priloha004.pdf (version February 2017; last update from April 2017 has not been published yet published)
[43] http://mycovenant.eumayors.eu/docs/seap/3583_1389271923.pdf
[44] http://www.opzp2007-2013.cz/sekce/522/vyrocni-zpravy (for period 2007-2013), http://www.opzp.cz/vyrocni-zpravy-opzp (for current period 2014-2020), http://www.opzp.cz/dokumenty/download/407-1-20170919_Prehled%20vyzev.pdf (overview of financing).
[45] http://dotaceeu.cz/cs/Microsites/IROP/Verejnost/Prehledy-projektu-a-vyzev (overview of financing), http://dotaceeu.cz/cs/Microsites/IROP/Vyzvy/Vyzva-c-37-Energeticke-uspory-v-bytovych-domech-II (overview specifically for energy efficiency part of the program).
[46] https://www.mpo.cz/cz/podnikani/dotace-a-podpora-podnikani/oppik-2014-2020/podporene-projekty (overview of projects and financing) http://dotaceeu.cz/cs/Microsites/IROP/Verejnost/Prehledy-projektu-a-vyzev (overview of financing), http://dotaceeu.cz/cs/Microsites/IROP/Vyzvy/Vyzva-c-37-Energeticke-uspory-v-bytovych-domech-II (overview specifically for energy efficiency part of the program).

There exist several operational programs (OP) in the Czech Republic for the period 2014-2020, from which energy efficiency measures can be financed; some of them can be used by private enterprises/SMEs.

1***) OP Environment: Priority axis no. 5*** focuses on energy efficiency, in particular energy efficiency (and RES) in public buildings. Only public sector can apply for a subsidy (e.g. schools, municipalities, state- or municipality-funded institutions, etc.), private sector is excluded.

2) ***Integrated Regional OP***: Energy efficiency is supported under Priority axis no. 2 Improvement of Public Services, Investment priority no. 4c Support of Energy Efficiency and RES in Public Infrastructure that also supports energy efficiency in buildings. Eligible applicants include owners of housing blocks of flats. It can include private owners, i.e. SMEs too.

3) ***OP Prague***: Energy efficiency is supported under Priority axis no. 2 Sustainable Mobility and Energy Savings, Specific objective no. 2.1 Energy Savings in City's Buildings. Eligible applicants are the City of Prague and its organizations/companies (e.g. public transport company). The program cannot be used by private sector enterprises.

4***) OP Enterprise and Innovations for Competitiveness***: Energy efficiency is supported under Priority axis no. 3 "Effective energy management, development of the energy infrastructure and renewable energy sources, support for introduction of new technologies in the area of using energy and secondary raw materials". Eligible applicants are business companies both SMEs and large enterprises.

5) ***Rural Development Program***: Some energy efficiency measures can be funded under program priority no. 5 "Efficient use of resource and low-carbon economy". Eligible applicants are companies from agriculture, fishery and food processing industry."

5. Authorities in charge for the Energy Plan (s) / Strategy

National plans (i.e. NAPEE) are under responsibility of the Ministry of Industry and Trade.
Regional/local plans are introduced by cities and regions.

6. Authorities in charge to manage ERDF Funds (2014-2020) addressed to Energy

The Ministry of Regional Development is a coordinating authority for EU funds management in the Czech Republic. Each OP has its managing authority (usually ministry) and executive authority (usually ministerial agency or fund).

These are:

1) OP Environment: MA - Ministry of Environment, EA - State Environmental Fund

2) Integrated Regional OP: MA - Ministry of Regional Development, EA - Centre for Regional Development

3) OP Prague: MA and EA - City of Prague (Department of EU Funds)

4) OP Enterprise and Innovation for Competitiveness: MA - Ministry of Industry and Trade, EA - Agency for Enterprise and Innovation

5) Rural Development Programme: MA - Ministry of Agriculture, EA - State Agriculture Intervention Fund

7. Is there any direct link between the Partner and the Authorities mentioned? Which one? How it will be established?

There is no formal link between the partner (ENVIROS) and the above mentioned authorities. Both the regional energy plans and operational programs are managed by public authorities, while ENVIROS is a fully private company. ENVIROS has been hired to carry out evaluations of some programs and has been cooperating with the Ministry of Industry and Trade in developing the NAPEE. Cooperation with the Authorities mentioned has existed since a number of years.

8. Financial Instruments planned to support Industry low-carbon transition

Within operational programs, financial instruments are applied (or are intended to be applied) only to a limited extent.

1) OP Environment: Organizations applying for a subsidy in Priority axis no. 5, can also apply for a preferential loan to cover part of expenses, i.e. the difference between investment cost and a subsidy. Example: If investment cost is €100.000, a subsidy can be €40.000, so an organization can apply for €60.000 loan. It means that a loan is only supplementary instrument, it cannot be used as stand-alone instrument.
2) OP Enterprise and Innovation: Organizations will have a possibility to apply for a preferential loan instead of a subsidy; it will not be possible to combine subsidy and loan. Pilot call is planned to be published in few months.

There are two programs offering soft loans that are operated by public bank Czech Moravian Guarantee and Development Bank:
1) Program ENERG: Soft loan for SMEs from Prague to finance energy efficiency or renewable energy projects. It include a small grant component (7% from a loan).
2) Program Energy Savings: Soft loan for companies of any size, not located in Prague to finance energy savings investment.

Commercial banks:
Komerční banka (KB) / Commercial Bank - Euroenergie Programme - soft loan with guarantee
Investment loan with guarantee from the European Investment Bank for financing energy saving projects.

9. Other Authorities to be involved (ministries, regional department dealing with FIRECE topics)

Ministry of Regional Development is coordinating all operational programs as well as its own (Integrated Regional OP).

10. Public Financial Agencies and Private Financial Intermediaries involved for Energy investments

Public Bank - Czech Moravian Guarantee and Development Bank
Private Bank
- Commercial Bank, in the past (up to 2015) two other banks were involved in a soft loan scheme
- Czech Savings Bank and Raiffeisen Bank

Appendix 2. Regional profiles

Veneto Region (IT)[47]

Veneto is the eighth largest region in Italy, with a total area of 18,407.4 km2 (7,106.98 sq. miles). It borders to the East with Friuli Venezia Giulia, to the South by Emilia-Romagna, to the West with Lombardy and to the North by Trentino-Alto Adige. It has about 4.9 million inhabitants, which makes Veneto the fifth most populated region in Italy.

Economy

Veneto is a striking example of what in the sixties was called "Italian economic miracle". Until the mid-fifties Veneto was a land of peasants, poverty and migration, plagued by constant floods, while later on it became one of the leading Italian industrial regional economies. In 2015, the value of regional GDP was €151,634m (Eurostat, 2017), and it currently accounts for 9.2% of the Italian GDP.

Recently the regional performance was strongly affected by the international crisis. GDP decreased in 2008 (-2.9%) and in 2009 (-5.5 %), while a recovery process started during period 2010 (+1.7%) and 2011 (+1%). However, the recovery path towards pre-crisis levels has been interrupted by subsequent national problems linked to sovereign debt stability and the emergence of difficulties associated with credit access. In the recent period (2011-2014), the GDP has registered again a negative trend (-1.5%).

In 2014, the regional growth rate was slightly positive (+0.6%), above the national dynamics (+0.1%), but below the European average growth rate (+5.1%); exports have been the main positive growth factor.

GDP PPS per capita amounted to €31,600 in 2015, which is equal to app. 113% of the Italian average and to 109% of the one for EU.

The industrial sector has a highly specialized and competitive manufacturing base, mostly comprised of SMEs. According to ISTAT data, in 2013, the region had almost 400,000 companies: 13% in industry, 15% in construction and 57.6% in the service sector.

Agriculture is also important (nearly 10% of the national agricultural production) and agricultural companies, almost all high mechanics equipment and with a high level of specialization, are very competitive.

Veneto is characterized by the presence of the following "industrial districts": mechanics, agro-food industry and printing and publishing in Verona; textiles in Treviso and Vicenza; food industry in Rovigo; glasses production in Cadore and Belluno; gold and jewellery in Vicenza, electrical appliances in Conegliano, furniture in Bassano del Grappa.

In 2016, the employment rate is higher (64.7%) than the national average (57.2%) although still below the European level (71.1%). The employment rate increased between 2015 and 2016 by +1.1%.

The unemployment rate increased considerably in recent years, from 3.4% in 2008 to 6.8% in 2016 (Eurostat, 2017), below the National (from 6.7% to 11.7%) and the European trends (from 7.2% to 8.6%).

Research, Development & Innovation

The Veneto region shows a relatively low level of investment in RTDI and a de-specialization in high technology sectors; nonetheless it remains one of the most developed and competitive regions in Italy. There are clear difficulties for the regional economy in carrying out more intensive investments in innovation and in entering high value-added product markets due to the specialization in traditional manufacturing.

[47] https://ec.europa.eu/growth/tools-databases/regional-innovation-monitor/base-profile/veneto

In 2014, the total R&D expenditure represented 1.12% of regional GDP. The R&D intensity of Veneto is then lower than the Italian (1.38%) and the European average (2.04%). There was a slight increase since 2011, when the share was equal to 1.03%.
In 2014, the total amount of regional R&D expenditure represents the 7.39% of national R&D investment: it was about 1.647.7m in 2014, of which 34% in the public sector (Government sector, Higher Education sector) and 66% in the private sector (Business enterprise sector, Private non-profit sector).
In 2014, the human resources employed in high-tech sectors amounted to 58,000 units, about 1.6% of the total active population, below the Italian average (3.4%) and the one for Europe (4%).
In 2016, the rate of population that completed tertiary education (age between 30-34) was 29.6%, above the Italian average (26.2%) and below the one for Europe (39.1%).
Despite the limited intensity of R&D investment, in Veneto the percentage of enterprises with innovative activities in 2014 was 53% (the highest rate in Italy), above the Italian average (45%). The share of enterprises with innovative activities only for new processes and new products was about 40%, again above the national value (33%). Moreover, the region performs well in patenting activity. In 2012, EPO patents applications per million inhabitants (102) were below the European average (112) and above the one for Italy (60).
Finally, in 2016, Veneto has registered a good percentage of households with internet broadband access (80%), above the Italian average (77%) and below the one for Europe (88%).

Free State of Saxony[48] -Leipzing (DE)

The Free State of Saxony, located in the south-east of Germany, is one of the sixteen federal states. It borders the federal states of Brandenburg, Saxony-Anhalt and Thuringia as well as Poland to the east and the Czech Republic to the south.
With 4.084m inhabitants in 2016, accounting for 5.0% of the German population, it is the sixth most populous region in the country. Its surface area is 18,416km² and its population density is 221 inhabitants per km² (Eurostat, 2017). About 30% of its population lives in the three largest cities, namely Dresden, Leipzig, and Chemnitz. The capital city is Dresden.
Saxony's economy is characterized by a strong industrial sector specialized in the automobile industry, machine construction, metal production and electrical/ microelectronics.

Economy
In 2015, the regional gross domestic product (GDP) in Saxony was €112.9b, accounting for about 3.7% of the German GDP. In terms of growth, the regional average growth rate between 2006 and 2015 was 2.7%, equal to the German level and above the European one (2.1%). The regional GDP per capita, expressed in purchasing power standards reached €26,800, in 2015, amounting to 74.9% of the German average (2015: €35,800) (Eurostat, 2017).
The economically active population in 2016 amounted to 2.08m, 4.8% of the national total. Most employees work in services (68.9%), while 29.7% work in industry and only 1.4% in the agricultural sector, indicating a slightly above average focus on industry compared to the national averages (71.1 %/27.6%/1.2%). In 2014, unemployment in Saxony, at 5.0%, was relatively high when compared to other German regions (4.1%). Despite an overall substantial downward trend from 8.2% in 2012 unemployment in some districts still exceeds 10% (Eurostat, 2017).
The Saxon business sector is characterized by an above average share of SMEs not only in the service sector but also in the manufacturing sector. The most important industrial branches, in terms of their share of regional turnover, are the automobile industry (27%), machine construction (12.7%), the metal production sector (12.4%), as well as electrical/microelectronics sector (11.8%) (Business Saxony, 2018).
The overall value of imports was €20.8b in 2016, whilst that of exports amounted to €35.8b (Business Saxony, 2018).

Research, Development & Innovation
In terms of RTDI, Saxony is leading amongst the former East German regions but lagging nationally. In 2013, the gross expenditure on research and development was 2.73%, slightly below the national average (2.82%), but well above the European one (2.03%). Its RTDI sector is public-oriented by German standards. In, 2013, the share of regional business expenditure on R&D amounted to 40.5% (€1.16b) compared to 67.2% for the national average. Likewise, the region's overall expenditure on R&D contributes 3.6% (€2.87bn) to the German total, in line with the region's share in GDP (Eurostat, 2017).
Similarly, the number of EPO patent applications per 100,000 inhabitants (9.3 in 2012) remains significantly below the German average (23.03). The share of employment in high-tech industries and knowledge-intensive services amounted to 3.7%, notably below the national average of 4.1% (2016) (Eurostat, 2017).
The region hosts one of the nation's most renowned technical universities, the Dresden University of Technology (TU-Dresden), one of Germany's twelve Universities of Excellence with a notable focus in technical fields and natural sciences. The main fields are: health sciences, biomedicine and bioengineering information technology and microelectronics, smart materials and structures, energy, mobility and environment as well as culture and societal change.
In Saxony, there are five state universities, an institutionally separate graduate school and six state universities of applied sciences. Saxony's non-university research sector features three Helmholtz

[48] https://ec.europa.eu/growth/tools-databases/regional-innovation-monitor/base-profile/saxony

facilities, six institutes of the Max Planck Society, eighteen institutes of the Fraunhofer Society, seven institutes of the Leibniz Association, a branch of one such institute as well as ten institutes funded from the regional level.
Despite a large array of higher education and research institutions, only 29.3% of 30-34-year olds had attained tertiary education levels in Saxony (2016), a figure below the German average (33.2%) and well below the European average (39.1%).
Three highly cross-sectoral topics stand out in terms of innovation: electro-mobility, lightweight engineering and organic and flexible electronics (Business Saxony, 2018).
In Saxony, several platforms or infrastructures supporting innovation can be found. The incubators contribute towards the competitiveness of the development and growth of young enterprises in the region. Amongst them, the Technology Centre Dresden (TechnologieZentrumDresden, TZD), founded in 1990, is one of the largest German technology centres. The TZD provides customised infrastructure and services for innovative start-ups as well as SEMs. The Technology Centre Chemnitz (Technologie Centrum Chemnitz, TCC), offers a mix of creative spaces and professional workplace as well as an excellent infrastructure, combined with consulting and general assistance. The TCC's four locations are home to some 70 companies today. Meanwhile Chemnitz hosts the Smart Systems Campus, a technology park that focuses on microsystems technology and brings together science, research, and industry actors. The BIO CITY LEIPZIG houses an innovation incubator, researcher and entrepreneurs work together in the fields of biotechnology and biomedicine. At the BioInnovationCenter Dresden (BioInnovationsZentrumDresden, BioZ) offer a specific focus on molecular bioengineering, which also brings together scientists and young professionals in the field. A further 13 technology centres exist in the region.

Emilia-Romagna Region[49] (IT)

Emilia–Romagna is a region located in Northern Italy with about 4.4 million inhabitants. Emilia-Romagna today is one of the most developed regions in Europe, and it is surely a leading region in Southern Europe, in terms of competitiveness, GDP and activity and unemployment rates. Over the last decades the regional government was very active in reshaping regional innovation governance and developing policy initiatives in the area of research and innovation.

Economy

Emilia-Romagna is a leading region in Europe in terms of entrepreneurship and economic dynamism. Active people in working age are more than 70%, and the women activity rate is the highest in Italy. The unemployment rate is under 8% in 2015 with respect to the national average (12.8%).

With a total GDP over 146 billion €, the GDP per capita is equal to 33,238 €, one of the highest in Italy, after Lombardy (region of Milan, Italian financial pole) and some small autonomous and highly subsidized Alpin regions and provinces.

In 2008 and 2009 Emilia-Romagna economy was deeply affected by the global economic crisis. Unemployment rate sharply increased from 3% to 8.5%, export fell by about 25% and regional GDP fell by 5.5%. After some difficult years, since 2014 employment is growing again and exports are largely higher than 2008.

The region has the highest propensity to export in Italy. They are about 55 billion €, that represent 37,5% of GDP. The value of export per capita is equal to about 12,500 €.

There are 387,000 enterprises located in the region. Like in the rest of the country, the majority of enterprises has less than ten employees. A large number of companies (about 45,000) belong to manufacturing industry. Manufacturing plays the leading role for the whole regional economy. It is concentrated on some powerful clusters, apparently belonging to traditional sectors, but able to activate medium and medium-high technology activities and high innovation capabilities. The most relevant group of industries are linked to mechanical engineering and automotive. We can list: sport cars and motorcycles, agricultural machines, shipbuilding and off shore, industrial automation and robotics, various industrial sectors equipment (food processing and packaging, wood processing, ceramics, etc...), sensors and precision farming, medical equipment. Other powerful clusters are agri-food, construction materials and technologies, biomedical industries, fashion.

Tourism and entertainment industries are very important in the coast area. Cultural and gastronomic tourism is increasing in the last years.

Sectors that need to be reinforced are ICT and creative industries, still not enough developed and competitive. The service sectors in general is characterized by low productivity.

Other original aspects of the region are: the huge (and unique in Italy) presence of the co-operative economy, especially in the agri-food, construction, logistics, retail, social economy, but also with successful manufacturing cases; widespread handicraft and micro enterprise tradition; increasing presence of multinationals by mergers and acquisitions of existing firms, and recently, by green field investments.

Research, Development & Innovation

Emilia-Romagna is generally considered to offer a favorable environment for business and innovation, at least when compared to many other Italian regions: the business environment is highly dynamic, thanks to thousands of innovative SMEs and a number of strategic leaders in most of regional clusters.

The innovation ecosystem is further characterized by the presence of Universities in all major cities (4 regional Universities plus two branches of extra-regional Universities), the presence of important seats of national research organizations: CNR (National Research Council), ENEA (National Agency for Energy, Environment and Sustainable Innovation), INFN (National Institute for Nuclear Physics), INAF

[49] https://ec.europa.eu/growth/tools-databases/regional-innovation-monitor/base-profile/emilia-romagna

(National Institute of Astrophysics), INGV (National Institute of Geophysics and Volcanology), etc., and various regional and private research organizations and technology transfer initiatives. In the region, 18.7% of people between 20 and 29 years are graduated in S&T disciplines (EU 17.1%, Italy 13.2%).

In this context, institutional actors work together to facilitate economic growth, employment and competitiveness, generating a general pressure for growth and innovation, despite typical bureaucratic difficulties of the public system.

In 2013, Emilia-Romagna's R&D expenditure accounted for 1.66% of GDP, almost 0,35% less than the European average, but 0,35% more than the Italian average. More than two thirds of R&D expenditure is made by firms. It is important to note the business R&D almost doubled in a very few years.

R&D personnel in the region consists of 29.5 thousand work unit, of which 18.5 in firms. Employment in medium-high tech industries is 9.1% of total employment (more than the EU average), while employment in knowledge intensive services is 2.8% (less than EU average). The fact is that most of employment in knowledge-intensive services is embodied into manufacturing firms.

Emilia-Romagna is also one of the first regions in Italy in terms of number of patents (registered at EPO) per inhabitants. Patents are coherent with regional industry specialization concentrated on medium-high tech industries (like mechanical engineering and automotive) and more traditional industries, like, food, construction, and secondarily, fashion. Such industries, especially food and construction are, anyway, strong users of new applied technologies.

Another important feature is that Emilia-Romagna is a region with strong presence of innovative start-ups, including academic spin offs. Since they are officially registered (just 2 years), there are already 579 new innovative start-ups in the region, of which 107, academic spin offs.

Dél-Dunántúl[50] (HU)

South Transdanubia (regional capital: Pécs) encompasses three counties (Somogy, Tolna, Baranya). It is an underdeveloped, modest innovator region, characterized by relatively low share of manufacturing and foreign direct investment (FDI), few innovative companies and low support absorption capacity. South Transdanubia (ST) had a population of 900,868 inhabitants in 2016 (Eurostat, 2016) and an area of 14,169 km². Despite intensifying gross fixed capital formation and substantial investment in R&D infrastructure and in new technology, ST was still the 10th least developed European region in 2015.

Economy

South Transdanubia (ST) hosts 9.2% of the total population of Hungary. ST, like other Hungarian regions (except for Central Hungary) has experienced a decrease in population (9.7% since 2001). The population decline in ST has been quite significant. ST is relatively sparsely populated and has a large number of poorly accessible settlements. The population keeps declining and the aging index increasing: the number of old age (>65) inhabitants relative to that of children (0-14) increased from 96.8 to 140.9 between 2003 and 2016 (CSO, 2017).

ST's regional gross domestic product (GDP) has been increasing since 2012 (by 9.3%) and was €6,599m in 2015 (Eurostat, 2017), and the GDP per capita in purchasing power standards (PPS) was 12,900 PPS per inhabitant in the same year (Eurostat, 2017). However, it is still much below both the national and EU-28 average. Irrespective of the significantly increasing gross fixed capital formation, ST features marked divergence from the national average. This is mainly explained by the region's low potential for foreign direct investment (FDI) attraction.

In 2015, the regional stock of FDI was a mere 1.2% of the total (CSO, 2017). Foreign manufacturing investors in the region are not large global companies, rather relatively small multinational ones, such as Hauni Hungária (machinery), Eckerle (automotive) and Kronospan Mofa (wood panel production). One exception is the subsidiary of Flextronics. New investors (2015) with significant job creation capacity are Harman (automotive) and Hellmann Shared Services Centre. Manufacturing accounts for a relatively low share within total industrial production due to the large weight of the Paks Nuclear Power Plant. Past investments projects (highway to Budapest, Pécs: European Cultural Capital) have not achieved the region's convergence to the national average: for example, against all hopes, they did not improve the region's FDI attraction potential. On the other hand, the activity rate showed significant improvement: it is higher than its pre-crisis level (50.1% in 2007; 55.3% in 2015).

With indicators much below both the national and the European average, this region still possesses strengths that mark opportunities for development. The most important strengths are related to the region's cultural assets and to the presence of some outstanding science centres. Moreover, the non-negligible R&D infrastructure development at the University of Pécs hold significant potential.

In 2016, the unemployment rate was the lowest in recent years, at 6.2% (Eurostat, 2017). This value stays above the national average (5.1%) but below the EU-28 average (8.6%). Apart from increasing labour demands, factors such as state intervention (for example the public works scheme), significant emigration to other countries, among others, also contributed to achieving the good unemployment results.

Research, Development & Innovation

South Transdanubia (ST) RTDI performance indicators showed an overall decline in 2014 compared to the previous years. The regional R&D expenditure was €38.30m in 2014 (Eurostat, 2017) which shows a decline of almost 20% compared to 2013. This together with some increase in regional gross domestic product (GDP) led to a very weak R&D expenditure/GDP indicator of 0.6% in 2014 (Eurostat, 2017), which is less than half of the national average (1.4%) and far from the EU-28 average (2.0% in the same year). The number of research centres also declined by over 30% since 2013 and is now 152 (2016), similarly to the number of full time equivalent (FTE) researchers which dropped to 778 (CSO, 2017). This is less than half of the amount of FTE researchers in 2013. From the

[50] https://ec.europa.eu/growth/tools-databases/regional-innovation-monitor/base-profile/south-transdanubia

total R&D expenditures in 2014, only 46.6% have been assured by private companies (Eurostat, 2017), which stays below the national average (71.5%).
ST is a modest innovator region with a high share of the central budget in innovation financing. A major problem is the small number of large innovation-intensive foreign-owned enterprises. In contrast to other regions where the regional R&D expenditure is driven mainly by foreign-owned companies, regional R&D expenditure in ST is accounted for mainly by local innovative SMEs.
Major innovation stakeholders include the University of Pécs (specialized in medical sciences and health industry, ICT and environmental sciences), the University of Kaposvár (specialized mainly in agricultural and food sciences) and several regional knowledge clusters. The key players are the university affiliated research centres, e.g. Medipolisz, the Biosciences Centre (Szentágothai János Research Centre), the Environmental Sciences Centre and the Information Technology Centre.
The population aged 30-34 with tertiary education attainment has reached its highest level in years, being 28.7% in 2016 (Eurostat, 2017). This is still below the national average (33.0%) and below the EU-28 average (39.1%).
ST has a variety of innovation brokering institutions: industrial parks, incubators, technology transfer offices, non-governmental organizations (NGOs) specialized in innovation support, chambers of commerce. Nevertheless, neither these innovation intermediaries, nor the substantial amount of EU co-funded support to innovation (€77.7m was allocated to 359 beneficiaries of Research, Technology Development and Innovation (RTDI) related funding in the programming period 2007–2013) could provide a momentum that would boost the region's innovation-driven development. The outcome of government's support to business innovation efforts was below expectations. ST innovation potential is still much lower than the national average and innovation activities are sporadic and below the critical mass.
In 2016, there were 10.3 thousand people employed in the high-tech sector in the region (Eurostat, 2017). This represents 4.6% of the national employment in the sector (the lowest in recent years) and 2.0% of total regional employment (against the EU-28 average of 4.0%).
In terms of patent applications, only 5.97 per million of inhabitants were filed to the European Patent Office (EPO) in 2012 (Eurostat, 2017), which is the third lowest value in the country, much below the national average of 17.1 per million inhabitants. Regarding the broadband diffusion, in 2016 98% of the households in the region had internet access, which stays in line with the national average (99%) (Eurostat, 2017).

Burgenland (AT)[51]

In terms of its population, Burgenland is the smallest of the nine states (Bundesländer) in Austria and located in the east of the country. Currently there are 290,608 people living in Burgenland (Eurostat, 2017) representing approximately 3.3% of the national total. Compared to 2008, its population increased by about 9,630 people. Burgenland's capital is Eisenstadt with a total of 14,241 inhabitants. The federal state of Burgenland shares a border with Slovenia, Hungary and Slovakia as well as with the Austrian states of Lower Austria and Styria. While the northern part belongs to the wider Vienna area, the southern part is rather peripheral and has stronger linkages to the Graz area.
Burgenland is a rural region; the capital of Eisenstadt is the only community with more than 10,000 inhabitants. Burgenland has a total surface area of 3,965.5 km2 and a population density of 70 inhabitants/km2. It is strongly shaped by agriculture, viniculture, and has a focus on renewable energies, particularly in wind energy that reached a share of more than 40%. Most important economic sectors are retail, manufacturing, tourism and foreign trade.

Economy

In 2016, the regional GDP in Burgenland was €7.64b, accounting for 2.3% of the Austrian GDP (Eurostat, 2017). Regional GDP per capita reached €26,500, which amounts to 68.8% of the Austrian average. However, intraregional differences between Mittelburgenland (€21,800 per capita) and Nordburgenland (€29,000 per capita) are visible.
In 2014, the regional labour force amounted to 0.124 million, which is 2.7% of the national total. Most employees worked in the tertiary sector (67.0%), while 24.0% worked in the secondary and 8.9% in the primary sector. These figures differ slightly from the national averages (72.6%, 22.1% and 5.3%; Statistik Austria) and show above-average shares in the primary and secondary sectors. In 2016, the unemployment rate in Burgenland was 5.7%, thus below the national average of 6.0% and the EU-28 with 8.6% (Eurostat, 2017). Furthermore, about 38.4% of the population aged between 30-34 years received tertiary education.
The economic development of the region has been heavily influenced by Burgenland's eventful history as a peripheral region between Austria and Hungary. Following the downfall of the Austrian-Hungarian monarchy in the aftermath of World War I, the current Austrian region lost vital economic hubs to its Hungarian counterpart region. After WWII, it remained in the periphery during the "cold war". When Austria joined the EU in 1995, Burgenland was identified as an economically underdeveloped region and was ascribed Objective 1 status. EU funding was continued throughout the recent "phasing out" until 2013, and is in the 2014-2020 period characterized as transition region. EU funds have been instrumental factors in increasing overall economic performance, but the region is still somewhat lagging behind, as is obvious from having the lowest GDP per capita among Austrian regions. However, Burgenland is ranked second (with Upper Austria and Styria) concerning the average annual growth rate of its GDP per capita in the 2001-2013 period after Salzburg (3.2% compared to the national share of 2.8%). The region is characterised by intra-regional disparities, with a rather prosperous northern part in the vicinity of Vienna and rather underdeveloped central and southern areas.
Burgenland's largest enterprises are in steel construction (Unger Stahlbau), energy supply (Bewag), telecommunications (Nokia Austria), real estate (Designer Outlet Parndorf), the hotel sector (Reiter's), sweets industry (Mars Austria), and automotive supply (Delphi Packard Austria). Services branches mainly include retail, and the tourism sector plays an increasingly important role. The location of Coca-Cola Hellenic Austria in Edelstal gave impetus particularly for foreign trade. In 2014, exports reached €1.99b (1.55% of the national figures) and imports amounted to €2.7b (2.11% of the national figure). The highest importance as destination for Burgenland's export goods had Germany, Hungary and Italy, while imports mainly originated from Germany, Hungary and China. Main trading goods were electrical machines, plastics and machines and mechanical equipment (exports), as well as electrical machines, plastics, and clothing (imports; Statistik Austria).

[51] https://ec.europa.eu/growth/tools-databases/regional-innovation-monitor/base-profile/burgenland

Research, Development & Innovation

Corresponding to its size and its comparatively low overall economic output, Burgenland is characterized by a modest RTDI intensity. In 2013, the total intramural expenditure on R&D per GDP (0.90%) remained well below the national average (2.96%) and only slightly increased since 2011 (0.82%). Correspondingly, the region's overall expenditure on R&D contributed only 0.70% (€67.3m) to the Austrian total in 2013. The largest share (88.4%) of Burgenland's R&D expenditure is realized by the business sector, while the government sector has a share of 4.5% and the higher education sector a share of 7.1% of the total R&D expenditures. Burgenland had 97 R&D performers in 2013, and the highest share of expenditures (69.2%) is spent for experimental development, while applied research has a share of 26.9% and basic research holds 3.9%. Concerning funding of R&D, the business sector is also on first position: companies finance 71.7% of total R&D in 2013. The public sector follows with 19.3%, while 7.4% are funded by foreign sources and 1.5% originates from the European Union (Statistik Austria).

Similarly, Burgenland is in the last place nationally regarding patent applications. In 2016, 27 patents at the Austrian Patent Office originated from Burgenland, which is 1.3% of the national total (Austrian Patent Office, 2017). Patent applications at the European Patent Office (EPO) amounted to 17.57 in 2011 (1.0% of the national figure), which is 61.74 applications per million inhabitants. This figure remains significantly below the Austrian figure of 213.75 applications per 1 million inhabitants. In 2013, 0.47% of the active population belongs to Burgenland's R&D personnel. From 666 full-time equivalents, 91.14% are employed in the business sector. This confirms that R&D in Burgenland – though on a moderate level - is conducted in the private business sector.

About 3% of Austria's human resources in science and technology (HRST – persons with tertiary education and/or employed in science and technology) are in Burgenland. 38.4% of Burgenland's active population aged 30-34 belongs to this group in 2016. In the same year, 3.0% of Burgenland's total employment is registered in high-technology sectors (high-technology manufacturing and knowledge-intensive high-technology services), which is below the national average of 4.3% (Eurostat, 2017).

Burgenland features the following higher education institutions: the University of Applied Sciences with sites in Eisenstadt and Pinkafeld has the departments of economics (focus on Central and Eastern Europe), information technology and information management, Social Affairs, Energy and environmental management, and Health. The Pedagogical University targets research-based teaching and learning, education and training of teachers in the Burgenland school system. The Joseph-Haydn Conservatoire in Eisenstadt offers courses in Music Theory and Composition, Instrumental or Vocal Music Performance and Instrumental or Vocal Music Pedagogy. The Institute Oberschützen of the Arts Academy in Graz offers special training for concerts and training in education. In total, Burgenland has 2,136 students which is 0.66% of all students in Austria (Statistik Austria, 2016).

The above-mentioned Universities of Applied Sciences are representing the core of Burgenland's research and higher education institutions. Further stakeholders are Forschung Burgenland Research & Innovation (Research Burgenland), a 100% subsidiary of the Burgenland University of Applied Sciences. While the University of Applied Sciences develops its research projects in strong relation to teaching requirements, Research Burgenland focuses on research and development. This leads to the establishment of core research areas in relation with the University's education and training. The Center for Building Technology and the Center for Health and Work Research were established as the first two centres; further core areas are in heat pump research, smart city, social work research, methodological competence in social sciences, intercultural management communication, health care management, cloud and cyber -physical systems security and consumer insights. Güssing Energy Technologies is an Austrian non-profit research institute that targets basic and applied research in renewable energies, innovative system combinations, new processes and proceedings.

Lower Silesia[52] (PL)

The Dolnośląskie is located in the south-western part of Poland. In 2016 it had a population of 2,864,624 people (Eurostat 2017) and covered an area of 19,946.74 square km. The capital of the region is Wrocław, which is the fourth largest city in Poland with some 637.7 thousand residents. The main export products include machinery and energy equipment, metal products, textiles, motor vehicles and other transport equipment. There is also a large grouping of IT companies operating in the region. The region is one of the most important industrial centres in Poland with high innovation potential.

Economy

Looking at the most important key indicators of the region, the region's gross domestic product (GDP) was estimated to be €36,197 in 2015, which is 8.4% of the national GDP (Eurostat, 2017). The GDP per capita was 22,100 (PPS) in 2015, far above the national average of 19,800 (PPS) in the same year (Eurostat, 2017) and which constituted 76% of the EU average. Furthermore, the unemployment of the region was 5.5% in 2016, which is below the national average of 6,2% in 2016 (Eurostat, 2017).

The share of industry in the generation of GVA is estimated at 34.5% which is the highest result alongside Silesia and significantly above the national average (26.5%). Entities engaged in services generate slightly less than three-fifths of regional GVA. In 2017, there were 8,255 foreign firms in the Dolnośląskie which represents roughly about 8.9% of all foreign companies located in Poland (Central Polish Statistical Office 2017 Structural changes in national economy REGON register, Tab 16).

Particularly, two sectors with high potential are automotive and electro-mechanical. The region has attracted large investments in the both the automotive and transport sector. Among the main investors in the automotive sector are companies like Toyota, Volvo, Volkswagen, Bosch, Zakłady Samochodowe Jelcz (specialized in production of buses since 1952) and in the transport sector Greenbrier Company S.A (leading supplier of transportation equipment and services to the railroad industry). There is also a large grouping of IT companies operating in the region. It is estimated that one third of IT software production and services in Poland originates from the Dolnośląskie region. Traditionally, the Dolnośląskie was a leader in terms of manufacturing white goods. There are active strategic investors like LG Electronics, Whirpool, in addition to a network of potential sub-contractors and suppliers (Polish Investment and Trade Agency 2017).

Research, Development & Innovation

The gross R&D expenditure in Dolnośląskie was over €255m and accounted for 0.74% of GDP in 2014, which is both below the country and the EU average estimated at 0.94% and 2.04% respectively, but represents a larger proportion than in the previous years. According to the most recent data for 2014, business R&D expenditure represented only 0.43% of GDP. Business R&D investments are similar to the country average (0.44%) and are below the EU average estimated at 1.3% (Eurostat 2017).

The revenues from sales of new or significantly improved products in industrial enterprises constituted 15% of total turnover in 2015, which is the highest percentage in Poland. Dolnośląskie had also the highest revenues from sales of innovative products in service enterprises in the country (at 3% of the total turnover). The Dolnośląskie region is also 1st in Poland when it comes to the proportion of innovation active enterprises in 2013-2015, both in the service and in the industry sectors (Central Statistics Office of Poland 2017).

The number of 30 to 34-year olds with tertiary education is below the national average and amounts to 41.9% of that age group, with a higher proportion of females than males (respectively 48% and 36,2%). Nonetheless, there are many people employed in high technology sector- 54 000- which represents an increase since last year, and constitutes the second highest number in Poland after the Mazowieckie region (Eurostat 2017).

[52] Dolnoslaskie
https://ec.europa.eu/growth/tools-databases/regional-innovation-monitor/base-profile/dolnosl%C4%85skie

The Dolnośląskie has a rather well-developed network of pro-innovation institutions. Those include academic entrepreneurship incubators, four science-technology parks, and Technology Transfer Centre of the Wrocław Technical University. The Wrocław Research Centre EIT+ is a flagship scientific and technological investment in Wrocław. The University is considered among the best technical universities in Poland. The University is a leader in the modern technologies disciplines, such as computer science, electronics, and materials science. It also acts as the co-coordinator of the Lower Silesian Centre for Advanced Technologies, set up by a consortium of Wrocław universities and local companies. The activity of the Centre focuses on the following four areas: advanced materials, computer science, renewable energy sources, and life quality (i.e. clean technologies, biotechnology, pharmaceutics, health food production technologies). Among the main areas representing regional strengths are: biotechnology, pharmaceuticals, nanotechnology, chemistry, ICT and energy.

Lubelskie (PL)[53]

The Lubelskie region is situated in the east of Poland at the external borders of both Poland and the EU with Ukraine and Belarus. It is one of the least developed regions of Poland. The region had a total population of 2,118,528 citizens in 2016 (Eurostat 2017) and covers an area of 25,122.46 square km. The capital of the region is Lublin, a city of some 341.7 thousand inhabitants according to data of 2014 (Lublin.EU 2017). While it is primarily an agricultural region, it is also a region of academic centres with several scientific research facilities, especially in the natural and medical sciences, located in Lublin.

Economy

The region of Lubelskie is one of the most underdeveloped regions of Poland, like most regions in the eastern part of Poland. Looking at the most important key indicators of the region, the Lubelskie gross domestic product (GDP) was estimated to be € 16,42m in 2015, which is 3.8% of the national GDP (Eurostat 2017). The GDP per capita was 13,600 (PPS) in 2015, which is the worst in Poland and way below the national average of 19,800 in the same year. Furthermore, the unemployment of the region was 8% in 2016, which is much worse than the national average of 6.2% (Eurostat 2017).

The share of industry accounted for 28.5% in 2014, below the national average of 34.3% (Regions of Poland 2017 Report). Entities engaged in services generate more roughly 2/3 of regional GVA with a figure of 66.2% that is above the national average of 62.8%. Agriculture has the second highest percentage in Poland of 5.3%, compared to the national average of 2.8%. In 2017, there are 1,186 foreign firms in the region, a steady growth compared to the amount of 1097 foreign firms in Lubelskie in 2015. Out of all firms in Lubelskie, they represent 8.3% of the total and make up almost 2.8% of all firms located in Poland (Central Statistical Office of Poland 2017).

With a view to the quality of the natural environment, investments connected with ecological products are being pursued in the agrofood industry. The region's natural resources as well as the scientific research being conducted at higher education institutions have led to the development of renewable energy sources. The region also has a tradition in the industrial machinery and motor sectors (Polish Information and Foreign Investment Agency 2017). In Lubelskie few large companies such as Grupa Azoty Puławy (one of the largest European chemical producers), Black Red White (furniture) or Lubelski Węgiel Bogdanka (coal mining) have their headquarters. The Lubelskie region is among the biggest and most important agricultural regions of the country. It is a leading region in agriculture and orchard cultivation (Polish Investment and Trade Agency 2017).

Research, Development & Innovation

The business R&D investment in Lubelskie accounts for 1.03% of GDP (2014), which is higher than the country average of 0.94% but lower than the EU average of 2.03% of that year (Eurostat 2017). While the funding other than business at the national level accounts for 53.4% of total R&D expenditure, it represents 75.7% in Lubelskie. R&D investments grew during the 2009-2012 period, then sharply fell in 2013, and grew again in 2014 (Eurostat 2017, data from 2014).

The proportion of innovation active enterprises is close to the Polish average both within the industry and the service sector (at 18.7% and 9.1% of all enterprises respectively) (Central Statistical Office Science and technology data 2015, Innovation activities of enterprises).

The Lubelskie region, most notably due to its capital city Lublin, plays an important role in the Polish scientific landscape. In total, Lublin has 18 higher education institutions, including 5 universities. These are Maria Curie-Skłodowska University, John Paul II Catholic University of Lublin, University of Life Sciences (former Agricultural Academy), Lublin Medical University and Lublin University of Technology. Moreover, a number of R&D institutes are located in the region. The most important are the Institute of Agrophysics of the Polish Academy of Sciences in Lublin, the Institute of Soil Science and Plant Cultivation, State Research Institute in Pulawy and the National Veterinary Research Institute in Pulawy.

[53] Source: Regional Innovation Monitor Plus: https://ec.europa.eu/growth/tools-databases/regional-innovation-monitor/base-profile/lubelskie

The level of tertiary education in the region amongst 30-34-year old is 41.3%, which is slightly lower than the national average (44.6%). There is a significantly higher proportion of educated females than of males in this age group, with 55% of females with tertiary education compared to 28.8% of males (Eurostat 2017).

However, the fairly high level of tertiary education has not caused a large percentage of people to be employed in the high technology sector; there are 15,900 people working in this sector, which constitutes only 1.8% of total employment (Eurostat 2016).
An advantage of the region is the growing science and industry cooperation, mainly through business and technology parks, e.g. the Lublin Science and Technology Park or Pulawy Science and Technology Park. In addition, recent years have seen the dynamic growth of business liaisons through cluster activity, e.g. the Eastern ICT Cluster, the Lublin Medical Cluster and the Waste Management and Recycling Cluster.

Praha Capital Region (CZ)[54]

Prague is the largest city in the Czech Republic with a population of 1,267,449 inhabitants in 2016 while total regional population is about 2,5 Ml. It is the capital city of the Czech Republic (CR) and politically, economically and culturally the most important city in the country. Moreover, Prague is one of the most economically developed regions within the EU and also economically the best-performing region (Eurostat Regional Yearbook, 2017) in Central and Eastern Europe, with a high potential for further economic growth.

Economy

High level of urbanization, concentration of many functions and the proximity of key players in the capital makes Prague a distinct centre of development at a national level and places Prague above the other regions in nearly all of the structural indicators. For instance, it accounts for approximately one-quarter of the Czech GDP (24,4%, Eurostat 2017).

As for the economy, Prague has a unique position within the Czech Republic: it is the economic centre of the state and also a centre for intermediation when it comes to multinational economic relations in the whole state. Apart from all main authorities of the state administration, most financial institutions and foreign enterprises are based in Prague. All this has a significant effect on the regional economy.

The total GDP in Prague amounts to 40,7 billion and the GDP per capita is at 51.400 (PPS per inhabitant, Eurostat 2017).With this GDP per capita the region reached 203% of the Czech Republic's average. At present, Prague highly exceeds the average values for the entire EU-28 (GDP per capita in Prague at 178% of the EU average). Higher GDP (generally typical for a metropolis) is related to a higher level of wages, localization of activities with a high added value and the concentration of central bodies of both the public and private sector.

Descriptive features of the economic development of Prague include the strengthening of the sphere of services and the decrease of the share of production industries. Tertiary industries in Prague now represent more than 80% of the value added. Moreover, the employment rate in Prague markedly exceeds the figures of other regions, with only 2,2% of the workforce being unemployed (Eurostat, 2017). 74,1% of all employed in Prague worked in services in 2017 (Regional Innovation Scoresheet, 2017).

The structure of the processing industry is currently showing a slight shift towards hi-tech production due to activities of multi-national enterprises, but the development of the hi-tech sector in Prague, and in the Czech Republic in general, is still lagging behind other countries. This can be seen by the low share of hi-tech output in exports, and the lower value added of exported goods.

As for high-growth manufacturing industries, a massive increase of value added and employment have been observed in the pharmaceutical industry and the ICT sector in the period 2000-2014. These industries belong to the most innovative branches not only in Prague's economy but the whole Czech economy as well. Their growth is driven mainly by activities of multi-national enterprises as well as newly established small and medium enterprises

Research, Development & Innovation

Prague's unique position in the field of research, development and innovation among the Czech regions is given by the specific historical development resulted in a traditionally high concentration of research institutions, universities and innovating firms. Almost one-third of all the organizations performing research and development are located in Prague. Prague has almost a 50% share of all the organizations performing R&D in the governmental sector and more than a 35% share in the public university sector. To be more specific, 21% of innovating firms, 75% of institutes of the Academy of Sciences of the Czech Republic, 43% of universities (public and private) and 30% of other research institutes (including private companies) are based in Prague.

This fact also relates to other characteristics such as the employment rate in R&D and expenditure on R&D. Prague accounted for 34,8% of the total intramural R&D expenditure in 2014 (Eurostat,

[54] https://ec.europa.eu/growth/tools-databases/regional-innovation-monitor/base-profile/prague

2017). Its value has increased in current prices by 172.4% since 2000, while the growth in the whole of Czech Republic reached only 126%. Per inhabitant, the Prague region spends 865,7 euro on R&D, this is almost three times the national average (294 euro per inhabitant). The spending in R&D comes down to 2,86% of the GDP; this figure is exceeded by only one region (Jihovychod, 2,91%, Eurostat 2017).

Although Prague dominates in a concentration of innovative firms, universities and public research institutions, the intensity of co-operation among the business and public research sectors is rather weak in general. Innovative firms most often co-operate with their suppliers. The highest intensity of co-operation is associated with research and development, machinery and automotive industries. The low level of co-operation between academic and private sectors could be seen as a severe barrier for the further strengthening of Prague's competitiveness, and reveals that the technology transfer offices of universities and research institutes are lacking in the scope and intensity of their services.

Several highly innovative industries exist in Prague, such as the chemical industry (represented mainly by the pharmaceutical industry), automotive, ICT and financial intermediation. Besides these industries, activities of innovative companies are important in many other branches as well.

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