



3sCE417P3

Introduction of Regional Energy Concepts

„HOW TO DO IT WELL“ samples and guidelines 4.6.1



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1. INTRODUCTION, ENERGY OBJECTIVES AND TARGETS, DOMESTIC COMMITMENTS

Slovenian 20/20/20 targets are rather ambitious at 25% share of **renewables** in final energy production balance, divided in 39.3% for electricity production and 30.8% for heat production. Targets are being achieved mainly with bottom up approach so far. It means though there is a national RES action plan¹ set, there seems to be a lack of strategy on a national level concerning the related actions and need paths in achieving the goals. In stead government introduced mandatory local energy concepts (LEKs) for municipalities that include the obligation of aligning the local RES targets with national ones. The other system is the national financial support system for investment in RES and energy efficiency measures that undergone many alterations in the process.

Municipalities are of course not equally equipped with potential for RES hence combining their forces is of their interest. Regional energy concepts seem to be a somewhat logical choice. The main problem however is the fact that Slovenia hasn't got any regions as such just yet, not as political entities any way. For now they are only statistical entities. This means there is lack of unifying body that would link all the municipalities together and coordinate their actions. To some extent this function it is being performed by the local energy and development agencies, however they many times lack of the necessary means and authority.

Energy efficiency is another important topic that needs to go hand in hand with the renewable energy. In Slovenia we got a lot of potential in reducing specific energy consumption both in building as industry sector. According to the Second National Energy Efficiency Action Plan 2011 – 2016 (NEEAP 2)² the national target is 9% (minimal allowed). The evaluation of the first action plan (NEEAP 1)³ showed that the interim target of reducing 2.5% of the reference final energy consumption was achieved. The planned activities are mainly focused on accelerated development of the energy services market, in the first period prevalently in the public sector, which will be a generator of demand, and development of energy-efficient products and production processes.

Evaluation of the measures carried out has shown that between 2008 and 2010 Slovenia achieved and exceeded the planned interim target of saving 2.5% of reference end-use energy consumption. Expectations are that the target for 2008 - 2016, set at 9%, will also be successfully reached through implementation of the activities planned in the NEEAP 2. The planned additional activities were geared primarily towards accelerated development of the energy services market, in the period up to 2013 chiefly in the public sector, which would be generator of demand, and development of energy-efficient products and production processes, aimed at achieving the basic target as well as a range of additional short-term and long-term targets declared in NEEAP 2. These include in particular the accelerated retrofitting of public buildings, achieving the target share of almost zero-energy buildings among new and renovated buildings, increasing the share of renewable energy sources and further reduction of energy consumption.

Slovenian NEEAP has given special attention to the public sector. Several instruments have been introduced for the public sector (e.g. the energy-efficient renovation and sustainable construction of buildings, energy-efficient heating and ventilation systems and efficient electricity use). In addition to these instruments, green public procurement would serve for the public sector to highlight its exemplary role.

This template is aimed at creating a summary guide for third parties, to show how the supply side was managed within the CEP-REC project. As the available data, sources and other circumstances vary from region to region, it is important to create a local version of the document for every concept region.

In the Introduction of any regional energy concept, the features of the concerned municipality or region should be described. That is why the historical background, economic and demographic development, housing situation and specific characteristics of the region are illustrated.

In order for a concept region to create an integrated energy management concept (for energy service based on the conditions of energy demand and supply), it is necessary to first define the basic objectives. As for example in CEP-REC case, this means the introduction, widespread and use of renewable energy sources and improvements of energy efficiency to its best.

2. METHODOLOGY

The region Savinjska is only a statistical entity hence no regional data on energy are gathered for the time being. Hence the source would be of a level below – municipality level or one up – the national statistics) level. The CEP-REC regional energy demand assessment was based on two main approaches; first of all a bottom up approach was using the energy data from the municipalities, they were mainly gathered in local energy concepts that some municipalities choose to share. As not all municipalities were willing to participate, data were not sufficient to make a rounded picture for the whole region. Therefore a top-down approach was applied with the use of national and European statistics recalculated to the GPD and population share of the region.

For analysing of the existing situation a planning template can be elaborated based on the earlier assessments of regional energy management conditions carried out in the CEP-REC project. The template should contain:

- 2.1 assessment of the recent energy **demand** of the concept region (total energy consumption),
- 2.2 assessment of the structural **distribution** of the direct energy demand by main energy consuming sectors,
- 2.3 assessment of the structural distribution of the different **energy sources** – also including renewable energy sources - used to satisfy the direct final energy demands. (The above outlined assessments are to be found in Report 3.1.3⁴)
- 2.4 assessment of the **potential conditions** (theoretical, technically feasible and economically and politically realisable potentials) of the different local energy sources. It means potential energy supply that may serve the energy demand of the concept region and beyond. It is described in Report 4.1.2⁵.
- 2.5 After the regional **energy balance** (local deficit or surplus complemented with trade) is calculated from the energy demand and the energy supply in the regional energy economy, the introduction of the various types of energy supply systems may follow. They describe mainly the traditional energy transmission and distribution networks (grids and pipelines). These are the natural gas network and the secondary energy networks gained by transformation. Thus the electricity network and the heat (district heating and cooling) supply systems. Furthermore the recently developing decentralised electricity network system/smart grid initiatives incorporating mainly various renewable energies are also to be described if existent. (This topic is to be found in Report 4.2.1⁶)
- 2.6 The need of a common European economy – and within this energy cooperation initiated the need of establishing major international energy network systems and the therewith realisable energy trade between countries of better potential conditions (supply) and countries which have to import energy - mainly by the gradual construction of crude oil, natural gas and electricity transmission systems – already half a century ago. The potential conditions and long-term enhancement necessity of these are described in Report 3.3.2⁷, in which also the demand for and practice of renewable energy transfer appear (e.g. solid biomass trade).
- 2.7 In order to assess recent conditions territorial data are indispensable, which available at the following institutions and organisations:

Statistics

- Statistical Office of the Republic of Slovenia is the main producer and co-ordinator of

carrying out programs of statistical surveys. The energy sector covers enterprises performing the activity of electricity, gas and heat supply as well as enterprises producing and recovering energy materials and petroleum products. Some supply and use balances by individual energy materials are also available. Here is to note that for the time being the energy data are only available for Slovenia, not smaller geographical units e.g. regions. There are however some efforts within SORS to make this possible and in the future these data should be available.

- The main national level sectoral economic data are also given annually by Statistical Office of the Republic of Slovenia.

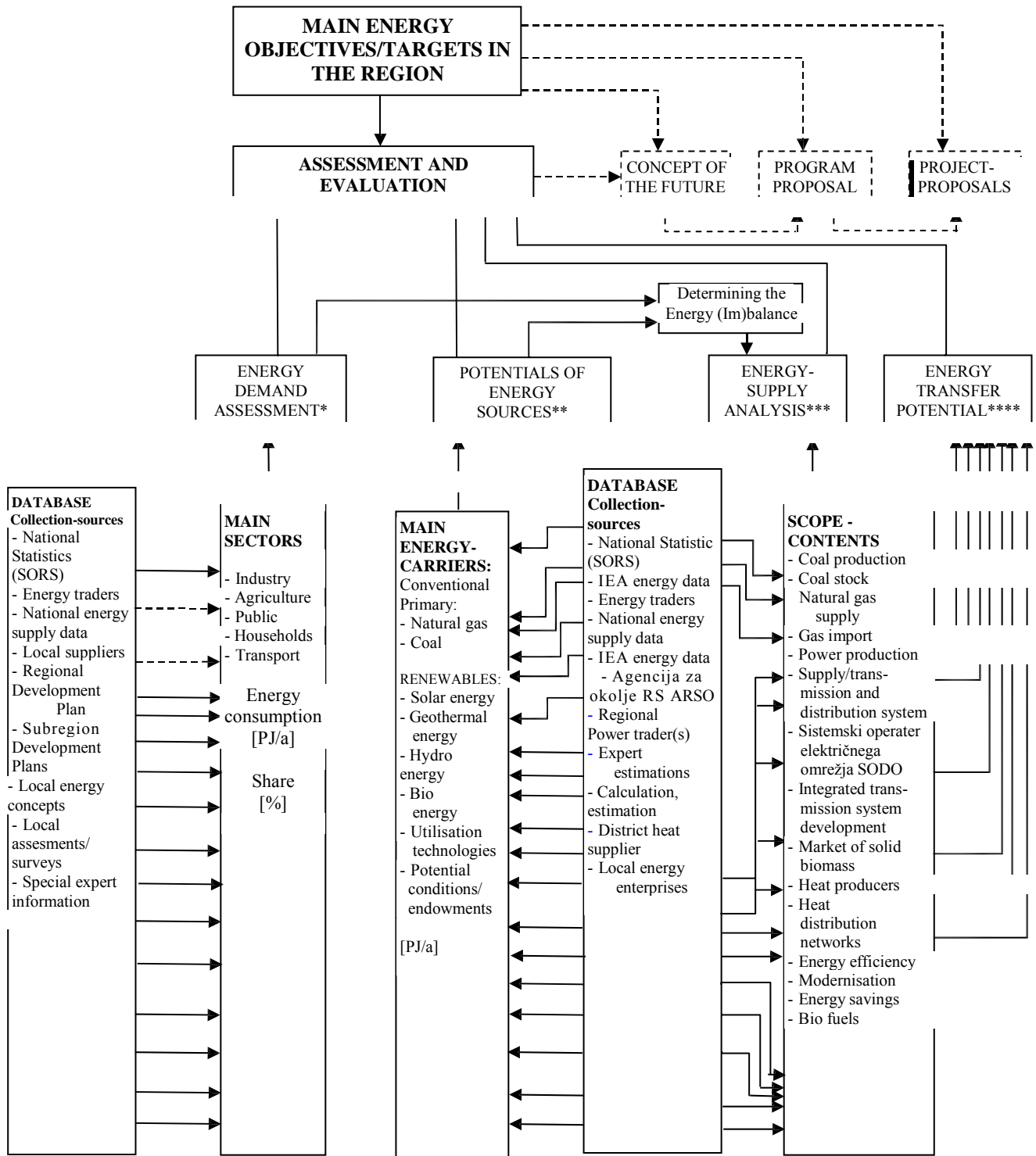
Energy supply

- Collection of statistics of realised renewable energy utilizations is available through energy geographical information system EnGIS. This holds true only for the state supported systems, however, and the data are not always up-to date. Nevertheless, almost all realised RES projects were supported through FIT system for electricity and subsidy or soft loans from Eco Fund for heating systems hence it makes for a pretty good overview. Apart from that also some results of the surveying work of special organizations and projects are available; e.g. Združenje slovenske fotovoltaike for PV installations and SLOBIOM for bioenergy.
- Useful source for the energy situation in the region are also the Regional (and Subregional) Development Plans, which are usually prepared by regional development agencies.
- Valuable and up to date data and network maps can be obtained from the various regional energy distribution companies unless they are classified as commercial secrets. (Which is in many cases the convenient excuse not to provide the requested data). These are the regional electricity and, natural gas supply system (network) owners and local energy suppliers working on a local level, e.g. companies supplying district heating.
- All the above data on the local – municipality should already be gathered in local energy concepts of the municipalities, which is a mandatory document for them. Many times, however, these data are not of very good quality as the problems with inexistent data and unwillingness to deliver them face also the developers of LEKs. For this reason the new Energy Act EZ-1 requires mandatory provision of the data from institutions.
- For electricity the local electricity supplier Elektro Celje, which is a public distribution company can be contacted. The same company is also the main regional supplier of natural gas. Company is owned by municipality Celje and it also operates a waste thermal treatment plant with district heating system for Celje.
- Data for coal production can be attained from the coal mine Velenje web site or yearly publications; they are also part of the national and Eurostat statistics.
- For district heating/cooling systems information can be obtained directly from the operator of a heating plant. In case the plants are combined heat and power plants, information about the electricity generation is to be given additionally. In Velenje/Šoštanj data can be gained from the TEŠ web site or yearly reports or from the utility company Komunalno podjetje Velenje. For DH in Vranksko the right address is Energetika projekt, etc.
- Information about wood based heating is a difficult task, as this type of fuel is distributed by many suppliers. Many private forest owners use their own wood resources privately. There are some estimation made by Forestry Institute and chimney sweepers could be used for these data, however the system is not yet in place.

3. ASSESSMENT OF THE ECONOMIC - FINANCIAL INCENTIVES

For the preparation of the optimal regional energy utilisation concept that builds on the regional energy demand and supply conditions as well as source potentials, it is indispensable to know the RES incentive/support system of the country in question and possibly other countries as well so as to propose and apply good practices.

- 3.1 It is expedient to identify and propose RES supply investments along a systemic economically sound based approach (Report 4.4.1).
- 3.2 It is expedient to identify and assess RES investors by a systemic approach (Report 4.4.2).
- 3.3 So as to collect and assess information on RES incentive/support systems of various countries, a questionnaire and guidance (Guidance for Report 4.5.1) was prepared and then circulated among the various countries of the project partners.
- 3.4 Responses were processed and various RES incentive systems and instruments of 8 countries (and if information was received, particularly of their regions) were listed and compared resulting in Report 4.5.1. When outlining mid term RES investment proposals (for Report 4.4.1 as described above), the RES incentives environment has also to be taken into account.
- 3.5 A summary report of recommendations to improve national and regional RES incentive systems was prepared (Report 4.5.2.).
- 3.6 The last guidance titled „How to do it well” summarises and gives recommendations related to an ideal regional RES concept elaboration process based on CEP-REC project (Guidance 4.6.1).
- 3.7 The energy concept preparation workflow chart (see Figure below) complemented with economic-financial considerations now contains the essential contents and relations of all reports and guidelines based on which – as a good practice - Phase I of **the situation assessment of a regional energy concept** can be elaborated.



*Content of Report 3.1.3; - **Content of Report 4.1.2; - ***Content of Report 4.2.1; - ****Content of Report 3.3.2;

Figure 1: Flow chart for the elaboration of the Assessment and Evaluation of the Current Situation part of the „Regional Energy Concept” of Savinjska Concept Region- linking of the components of the analysis (see reports 3.1.3, 4.1.2, 4.2.1, 3.3.2)

4. RECOMMENDATIONS

- 4.0. Recommendation “zero” is a must: observe the rules of EU state aid guidelines especially the new (2014) environmental and energy state aid guidelines⁸
- 4.1. Recommendation 1. Aim for uniting the aspects of economic efficiency, effectiveness, enforceability and political feasibility for the design of the incentive to be applied.

Recommendations regarding national incentive systems

- 4.2. Recommendation 2. Aim for advanced market integration for close to mature RES technologies, possibly
- maintain a transparent and flexible feed-in tariff system, in case the premium feed-in is not applied (also for less mature technologies);
 - RES-E should bear the self-caused system costs and be rewarded for benefits.
- 4.3. Recommendation 3. Give specific regional feature to the national system, where justified (e.g. regional bonus for RES-E feed in tariffs in most disadvantaged regions).
- 4.4. Recommendation 4. Pay special attention and strongly support the systematic approach for the development of RES heating and cooling, by
- applying a fix tariff operation support for RES-H as in the UK, or
 - applying a purchase obligation on energy traders with a premium system for RES-H, or
 - applying a RES-H obligation on new buildings and for major refurbishments (as the case in Slovenia).
- 4.5. Recommendation 5. Provide R&D funds and other incentives for innovative new technologies, energy systems (e.g. smart grids) and enterprises (e.g. registered power zones with higher rate of return for distribution network operators which apply innovative solutions for RES connections and integration as e.g. done in the UK).

Recommendations regarding regional incentive systems

(When region established)

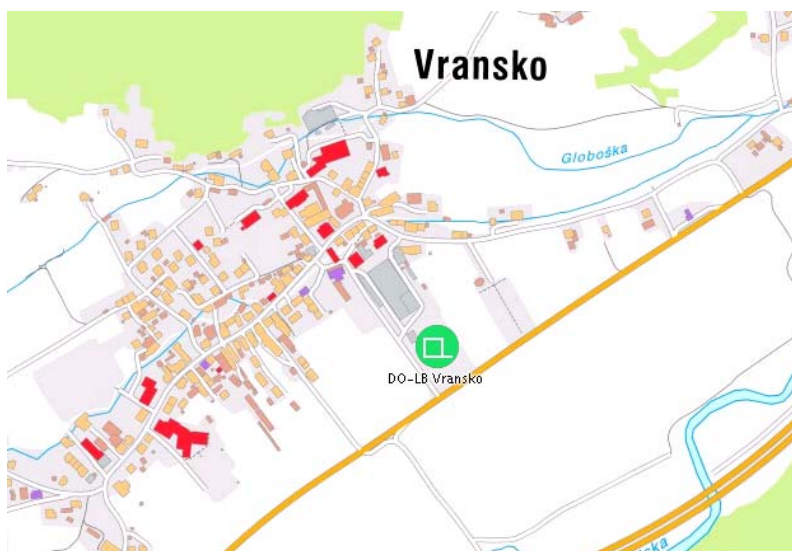
- 4.6. Recommendation 6. Rely on local forces, regional planning capacities and establish a department in the region (e.g. near the regional council) for designing of programmes/priorities for distributing EU funds for energy purposes and for making decisions on actual disbursement.
- 4.7. Recommendation 7 Establish a regionally managed revolving fund – Development and Investment Organisation (DIO) for sustainable energy if there is a large enough potential pool of sustainable energy projects and if access to capital is an impediment⁹.
- 4.8. Recommendation 8 Give incentives to mobilise local forces to establish RES Energy Cooperatives.

5. MUNICIPALITY VRANSKO AS AN EXAMPLE FOR A CONCEPTUAL APPROACH TOWARDS ENERGY EFFICIENCY AND THE UTILIZATION OF RES

Vransko is a regional renewable energy success story and a good example of the local character and importance of the bioenergy. Vransko is located in the middle of the forest and has a long tradition of using wood also for energy purposes. Municipality Vransko has something more than 2500 inhabitants and forests that cover 65% of its territory, which is above the Slovenian average. There is a factory of heating boilers KIV located in the town, where it all started. Unfortunately KIV is now in liquidation. Not far from there also a small family company Sedeljšak of small scale wood biomass boilers is completing the picture and continues also the KIV story to some extent.

To make a biomass district heating was therefore a logical choice. In 2005 it was built in the industrial zone of KIV and the grid connects majority of households and all public buildings (20 bigger consumers altogether such as schools, kindergartens, health centre, municipality building etc.) of town Vransko. It was built inline with the long-term development strategy of the municipality Vransko to remove old boilers and reduce greenhouse gas emissions. This was to be done by use of wood biomass from the surrounding area as domestic energy source in order to create new jobs and increase the employment in the local forests. And this is also the case as the very big majority of the wood biomass needed to operate the plant comes from the local framers, only a small strategic reserve from other sources. The project was financially supported through governmental and GEF (Global Environment Facility – “Removing barriers to increased use of biomass as energy sources”) project grants as a capital stake. Owners of the biomass district heating are the municipality, industrial companies and the government (GEF).

Municipality of Vransko is responsible for space heating of different public buildings which in the past used mostly old fuel oil and firewood boilers and needed to be renovated or exchanged with new ones. With building a biomass district heating system, expensive renovation of boilers was avoided.



Location of BDH and Energetika projekt in Vransko

Technical data of BDH:

The total heat power of 2 biomass boilers is 3.2 MW and there is also one fuel oil boiler of 1.5 MW heat power for peak load and reserve. The total heat production is around 6.6 GWh per year and the reduction of CO₂ emission is estimated at 1.670 t per year. The length of heat network is 3.04 km. The heat power of connected consumers is 4.6 MW.

Financial data:

The total investment was about 2.2 million Euros. The wood biomass district heating system was built with more than 75% financial support of the Slovenian government. Grant (23%), supported by the Global Environment Facility – GEF (23%) as a capital stake and soft loan of the Slovenian Eco-Fund (31%). The founder's share of the local community Vransko and industrial companies was about 23%.



Wood chip storage of DH Vransko



Smaller of the two KIV biomass boilers at Energetika Vransko district heating



Energetika Vransko PV plant and solar thermal installation on KIV

The experience with running a biomass district heating system gave rise to an Innovation Centre Vransko – officially named Centre for the development of alternative energy sources.

In the past this was mainly research work in combustion of various materials, prevalently biomass in the recent years, however they are developing also projects and conducting research projects also in other forms of renewable energy. For example photovoltaic, geothermal, electric mobility, etc.



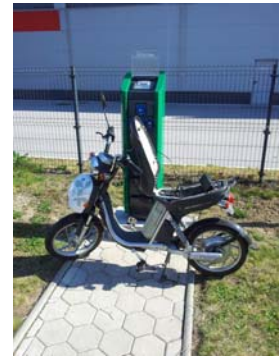
Combustion testing unit in Vransko

The good work in Vransko got also international recognition as Energetika Projekt is on one hand replicating such systems in other regions in Slovenia and abroad on the other hand it is active as promoter of bioenergy and renewables and sustainable development in general. In 2011 was nominated one of the first Central European Bionergy Centres - CEBC.

In Vransko they are also very active in raising awareness of environmental protection and they put a great emphasis on ecology in the town and region. This goes already from young generations up as Vransko elementary school Vransko is one of the so called Eco Schools of Slovenia.

Innovation Centre is also involved in RCERO Celje-Regional Centre for Waste Management for which they implemented a pilot plant for thermal waste treatment. Among other projects they have a research solar power plant, a hybrid station for charging electric vehicles, high efficiency charging station, solar street

lighting SLE 35/90. They also continue to improve the local district heating system. In year 2013 they upgraded the system with a system of solar collectors integrated into a BDH and only recently with a CHP unit of installed power 45 kWe (wood gasification unit). Both in function of optimising the BDH system and better operation and energy efficiency at lower loads of the heating system demand.



Vransko Innovation centre

References

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- ¹ Republic of Slovenia, Ministry of the Economy, Energy Directorate: “National Renewable Energy Action Plan 2010 – 2020”
 - ² Republic of Slovenia, Ministry of the Economy, Energy Directorate: “Second National Energy Efficiency Action Plan 2011 – 2016”
 - ³ Republic of Slovenia, Ministry of the Economy, Energy Directorate: “Second National Energy Efficiency Action Plan 2011 – 2016”
 - ⁴ 3.1.3 Report on the regional energy demand of the concept region, Savinjska regija, Slovenia.
 - ⁵ 4.1.2 Report on assessment of energy source potentials
 - ⁶ 4.2.1 Energy supply analysis
 - ⁷ 3.3.2 Report on energy transfer potentials