Environment and Climate Regional Accession Network ECRAN

Environment and Climate Regional Accession Network (ECRAN)

Expert Training on Risk and Vulnerability Assessment and Adaptation Planning – Energy Planning

16-17 April 2015, Tirana

ENVIRONMENTAL AND CLIMA REGIONAL NETWORK FOR ACCESSION - ECRAN

WORKSHOP REPORT

Activity No 4.1B

EXPERT TRAINING ON RISK AND VULNERABIITY ASSESSMENT AND ADAPTATION PLANNING – ENERGY PLANNING

16-17 APRIL 2015, TIRANA, ALBANIA

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LIST OF ABREVIATIONS	
2DS	2°C Scenario
ASCII	American Standard Code for Information Interchange
BIH	Bosnia and Herzegovina
DG	Directorate General
EC	European Commission
ECRAN	Environment and Climate Regional Accession Network
EE	Energy Efficiency
EEA	European Environment Agency
EPM	Energy Potential Mapping
ETC/ CCA	European Topic Centre on Climate Change impacts, vulnerability and Adaptation
ETP	Energy Technology Perspective
ETS	Emissions Trading System
EU	European Union
GHG	Greenhouse Gas
HPP	Hydropower Plant
HWS	Hot Water System
IEA	International Energy Agency
LIFE	EU Financial Instrument for Environment
LSEL	Large Scale Energy Landscapes
MS	Member State
MW	Mega Watt
PV	Photo Voltaic
REAP	Rotterdam Energy Approach and Planning
RENA	Regional Environmental Network for Accession
RES	Renewable Energy Sources
TSO	Transmission System Operator
TWh	Terra Watt hours
UNFCCC	United Nations Framework Convention on Climate Change
VRES	Variable Renewable Energy Sources

I. Background/Rationale

General

Today, all countries recognise the reality and the challenges caused by global warming and its effects. Two subsequent World Bank 'Turn down the Heat' Reports confirm climate change as a fundamental threat to development.

Many countries are already affected by climate change including the Western Balkans and Turkey. These countries are considered to be highly vulnerable and expected to experience the effects of rising temperatures and disruption to their precipitation regimes, along with more extreme events, including droughts, floods, heat waves, windstorms and forest fires. Water availability and quality will be affected, energy supply disturbed, food production will come under pressure and food prices will rise while biodiversity will decline.

Not in the least climate change effects will regard to the energy planning and supply sector. These inter alia include increased demand for cooling in the summer potentially requiring new infrastructure investments. Decreased precipitation will affect hydropower capacity as well as causes increased competition between energy production and other uses of water. A raise of surface and sea water temperature can put cooling systems of power plants at risk, which is especially sensitive in the field of nuclear energy. Black outs by storms or floods can damage electricity infrastructure which will affect food- and industrial production and business as a whole Such damage will furthermore put health care facilities and emergency services at risk; severely disturb urban and household life. All this will call for intensive disaster risk management. If energy problems arise they will, beyond doubt, severely impact on the lives of many citizens, and on the economic situation of the areas that are struck.

This makes it a must to manoeuvre economic, environmental and social interests and costs to safe havens through adaptation measures. Adaptation in the energy planning and supply sector means anticipating the adverse effects of climate change and taking the appropriate action in order to prevent or minimise the damage that the effects of disrupted climate regimes can cause, or taking advantage of opportunities that may arise, such as e.g. through an increase in wind and solar options. Identification of vulnerabilities and risks is at the forefront of adaptation action.

In the energy planning sector the link between climate change mitigation and adaptation is obvious.

Climate Change Vulnerability

There are different ways in which vulnerability and risk can be defined and analysed. Vulnerability is often defined as a function of the character, magnitude, and rate of climate variation and change to which a system is exposed, together with its sensitivity and adaptive capacity. Humans can increase their vulnerability by e.g. urbanisation of coastal flood plains, by canalisation of rivers, the way energy production and supply has been shaped, deforestation of hill slopes or by constructing buildings in risk-prone areas.

In the framework of the UNFCCC seven criteria are distinguished to identify key vulnerabilities:

- magnitude of impacts;
- timing of impacts;

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- persistence and reversibility of impacts;
- likelihood (estimates of uncertainty) of impacts and vulnerabilities and confidence in those estimates;
- potential for adaptation;
- distributional aspects of impacts and vulnerabilities;
- importance of the system(s) at risk.

Key vulnerabilities are associated with many climate-sensitive systems, including food supply, infrastructure, health, water resources, coastal systems, ecosystems, global biogeochemical cycles, ice sheets and modes of oceanic and atmospheric circulation.

During the regional ECRAN Adapt Seminar in Skopje in July 2014, the ECRAN beneficiaries (Albania, Bosnia and Herzegovina, Croatia, former Yugoslav Republic of Macedonia, Kosovo*, Serbia, and Turkey) have identified the sectors in the Western Balkans and Turkey that are most vulnerable to climate change. Energy planning is one of these sectors.

Measures have been proposed for effective adaptation. However, the key to adaptation to climate change is the integration of the issue of climate change in the energy sector's relevant strategic, planning and programme documents both at national and regional levels as well as the local level.

The EU's Adaptation Strategy provides a framework for a more climate-resilient Europe by enhancing the preparedness and capacity to respond to the impacts of climate change at local, regional, national and EU levels. The Strategy consists of three priorities: (1) Promoting action by Member States, (2) Better Informed Decision making and (3) Climate proofing EU action.

Proper information about climate vulnerabilities is an important starting point for any form of adaptation action. Detailed understanding of vulnerable areas[1] brings focus to the adaptation priorities and the tools to be used.

ECRAN Support

Within its Climate Component, ECRAN will promote 'climate-proofing' action by further encouraging adaptation in key vulnerable sectors ensuring that the infrastructure is made more resilient, and will support better informed decision-making by addressing gaps in knowledge about adaptation. ECRAN will address adaptation action by optimizing the coordination of adaptation activities with the European Climate Adaptation Platform (Climate-ADAPT) as the 'one-stop shop' for adaptation information in Europe.

In October 2014 the ECRAN Environment Ministers/Climate Coordinators have been requested by the European Commission to nominate NATIONAL ECRAN ADAPTATION TEAMS which with the assistance of EU Member States experts will work together on the following:

- Climate Adapt tool – Prioritisation of Adaptation Needs
- Identification of Adaptation Options
- Prioritisation of Adaptation Options

[1] This designation is without prejudice to positions on status, and is in line with UNSCR 1244 and the ICJ Opinion on the Kosovo Declaration of Independence.

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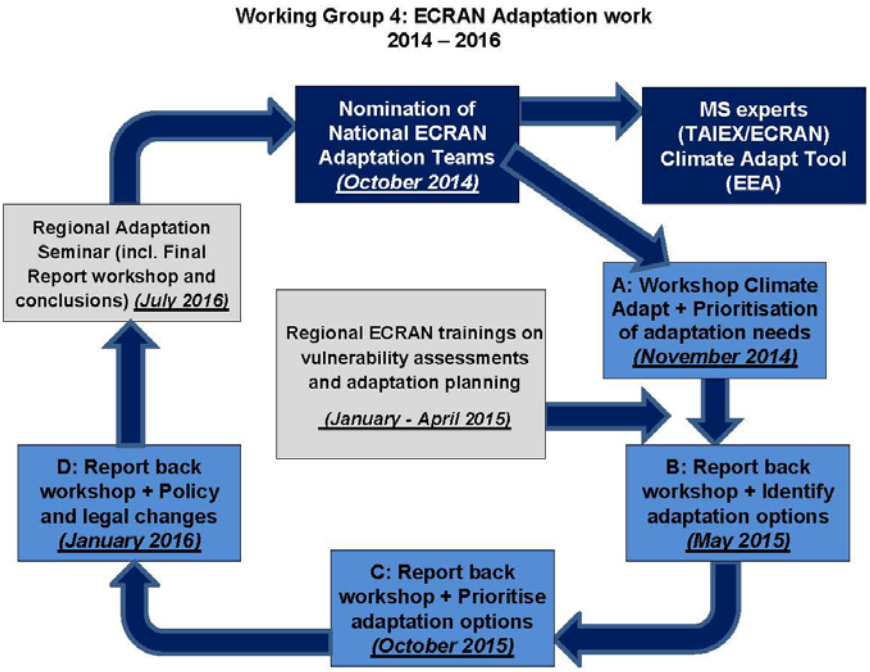
- Policy and Legal Changes



Training and Workshops Programme outline

General considerations

The ECRAN Adaptation Programme includes a series of workshops that will guide the National ECRAN Adaptation Teams through the different stages towards developing national climate adaptation policies and legislation, combined with regional technical training sessions that support Beneficiary Countries' experts from selected technical areas to carry out risk and vulnerability assessments and adaptation planning.

The programme envisages three regional technical training workshops, each to last for up to two days. The three priority fields that have been selected for the training are:

- Water Management;
- Urban Planning and Development;
- Energy Planning.

Each of these fields relates to a large variety of other (non-)selected fields, calling for strong cooperation among stakeholders in general and public administration sectors more in particular. The overall theme for the training inevitably includes aspects of cooperation and collaboration, mainstreaming, and inter linkages. These are aspects that are a key to successful (adaptation) responses to climate vulnerabilities in each of the selected (and other) fields. In this context there is a link with disaster risk management, as disaster risk reduction and climate change mitigation and adaptation share common goals. Both fields aim to reduce the vulnerability of communities and achieve sustainable development. The training incorporates options for reducing disaster risks related to climate change.

The programme outline is as follows:

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Step A	Climate Adapt Tool - Prioritisation of adaptation needs	24-25 November 2014
*Technical experts that will contribute to the step-by-step process carried out by the ECRAN ADAPTATION TEAMS will receive **specific technical training** after Step A. This will enhance Beneficiary Countries' adaptation skills securing a harmonised approach among all participants in the Teams and thus contribute to adaptation practice coherence and effectiveness.*		
***3 targeted training programmes** on vulnerability assessment and adaptation planning (**Water Management**, **Urban Planning and Development**, and **Energy Planning**) will be provided*		19-20 January 2015 23-24 February 2015 16-17 April 2015
Step B	Report back workshop + Identification of adaptation options	3-4 June 2015
Step C	Report back workshop + Prioritisation of adaptation options	15-16 October 2015
Step D	Report back workshop + Introduction of Policy and legal changes	14-15 January 2016
	Final Report at Regional Adaptation Seminar	28-29 July 2016

As shown in the outline the National Teams' workshops and development actions are supported through targeted training on vulnerability assessment and adaptation planning for selected categories of technical experts (January – April 2015). The first of these three training sessions was on Water Management (held in Ankara on 19 and 20 January 2015) and the second on Urban Planning and Development (held in Podgorica on 23 and 24 February 2015).

ECRAN will assist the Beneficiary Countries in further enhancing their knowledge and understanding of their climate vulnerabilities and thus prepare them to take better adaptation actions[2]. The training also draws on the EU Guidelines for National Adaptation Strategies and strengthens regional climate adaptation networking. The outline of the trainings is basically identical for all three training sessions. However, the technical area to be addressed differs per training.

National ECRAN Adaptation Teams Workshops

As indicated above the National Adaptation Teams will, supported by EU Member States experts, carry out their activities in 4 steps. These will be addressed in 4 consecutive workshops: Steps A to D. The Teams consist of representatives of public administration sectors that are relevant for climate change adaptation. Their composition differs per country depending on the most important adaptation aspects and current possibilities to mobilise sectors.

The Steps A to D workshops accommodate up to 10 National Team members per country. The workshops programme will build on the Climate Adapt Tool to establish a common framework among climate adaptation practitioners in the region and will allow sufficient space until the next workshop for the teams to carry out the national policy development activities that are required in each phase of the process, while inter alia supported by country experts that attended the technical training programme.

[2] ECRAN Climate Work Programme, Activity 4.1.b

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These three technical training workshops are delivered in the period January – April 2015, and providing knowledge and skills that feed into the policy development process.

Technical Training programme in more detail

Each of the Beneficiary Countries is invited to delegate some 5 to 7 relevant staff members to each of the three technical trainings. Per workshop an overall number of 35 to 55 people may attend. Selection of participants with a reasonable level of working knowledge of the English language is advised to enhance training effectiveness and sustainability. Lack of English language skills of a participant is expected to limit the benefit that his/her country can draw from this training.

This April 2015 workshop is meant for staff coming from the energy planning sector. At least 60% of the training participants that are delegated by the beneficiary countries should be full-time employed in this sector.

Using the Climate Adapt Tool, as well as other available tools, the participants will be guided through the framework and process of assessing climate-related risks and vulnerabilities in their own technical areas. They will learn to understand and assess current and future hazards, identify sources of climate data and information, assess risks and impacts and assess a selection of societal components of risk and vulnerability.

The Adaptation Planning part of the training will cover a general introduction to this area. More detailed adaptation planning training activities will be carried out under Activity 4.2 of the ECRAN Climate Programme.

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II. Objectives of the training

General objectives

The aim of this training seminar is to promote climate adaptation action in the Western Balkan countries and Turkey.

Specific objectives

To enhance the understanding about climate adaptation action in the energy planning sector among a core of Beneficiary countries' representatives, supporting the creation of national climate adaptation policies and planning as a basis for action.

Results/outputs

The following results were expected from the regional exercise:

- Strengthened awareness and understanding of climate change adaptation needs and options among energy planning experts from Western Balkan countries and Turkey;
- Improved understanding of applicability of tools (including the Climate Adapt Tool[3]) for risk and vulnerability assessment in the energy sector;
- Foundation for improved cooperation and coordination among authorities in Western Balkan countries and Turkey in the area of climate adaptation action established;
- Awareness of the need to speed up and enhance climate adaptation action planning in the Western Balkan countries and Turkey.

[3] http://climate-adapt.eea.europa.eu/

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III. EU policy and legislation covered by the training

EU Adaptation Strategy

Adaptation means anticipating the adverse effects of climate change and taking appropriate action to prevent or minimise the damage they can cause, or taking advantage of opportunities that may arise. It has been shown that well planned, early adaptation action saves money and lives later.

Examples of adaptation measures include: using scarce water resources more efficiently; adapting building codes to future climate conditions and extreme weather events; building flood defences and raising the levels of dykes; developing drought-tolerant crops; choosing tree species and forestry practices less vulnerable to storms and fires; and setting aside land corridors to help species migrate.

Adaptation strategies are needed at all levels of administration: at the local, regional, national, EU and also the international level. Due to the varying severity and nature of climate impacts between regions in Europe, most adaptation initiatives will be taken at the regional or local levels. The ability to cope and adapt also differs across populations, economic sectors and regions within Europe.

In April 2013 the European Commission adopted an EU Strategy on Adaptation to Climate Change. The strategy aims to make Europe more climate-resilient. By taking a coherent approach and providing for improved coordination, it will enhance the preparedness and capacity of all governance levels to respond to the impacts of climate change.

The EU Adaptation Strategy focuses on three key objectives:

- Promoting action by Member States: The Commission will encourage all Member States to adopt comprehensive adaptation strategies (currently 20 have strategies) and will provide funding to help them build up their adaptation capacities and take action. It will also support adaptation in cities through the Mayors Adapt initiative, a voluntary commitment within the framework of the Covenant of Mayors.
- 'Climate-proofing' action at EU level by further promoting adaptation in key vulnerable sectors such as agriculture, fisheries and cohesion policy, ensuring that Europe's infrastructure is made more resilient, and promoting the use of insurance against natural and man-made disasters.
- Better informed decision-making by addressing gaps in knowledge about adaptation and further developing the European climate adaptation platform (Climate-ADAPT) as the 'one-stop shop' for adaptation information in Europe.

EU adaptation actions include mainstreaming of climate change (mitigation and adaptation) into EU sector policies and funds, including marine and inland water issues, forestry, agriculture, biodiversity, infrastructure and buildings, but also migration and social issues.

The EU also addresses knowledge gaps through research and the European climate adaptation platform (Climate-ADAPT). This platform, launched in March 2012, provides several useful resources to support adaptation policy and decision making, such as: a toolset for adaptation planning; a projects and case studies' database; and information on adaptation action at all levels, from the EU through regional and national to the local level.

Moreover, stakeholders from the local, regional and national level are encouraged to participate in the development of the EU Adaptation Strategy. The EU is providing guidelines on integrating climate into policies and investments and on how to use the instruments and funds provided by the Commission for climate change adaptation.

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IV. Highlights from the training workshop

Day 1 – Tirana, Albania, 16 April 2015

EU adaptation Strategy and the ECRAN Network - Rob Bakx

- The workshop started with several examples of floods in the Balkans in the last five years. The city of Shkoder in Albania was completely flooded in 2010; the town of Sveti Nikole in the Former Yugoslav Republic of Macedonia in 2013; and a disastrous flood that occurred in Bosnia and Herzegovina, Croatia, and Serbia in May 2014. May 2014 was the warmest month ever recorded, with 15.54 °C, which is 0.74 °C above the average mean of the 20th Century.
- It is not necessary only to apply mitigation action in this case, but also to have a proper adaptation action. Mitigation and adaptation are both necessary and complementary. For example, 1 euro invested in flood protection, saves up to 6 euros of damage costs. So far, 17 EU MS have adopted national Adaptation Strategies; several countries have developed Action Plans and made a vulnerability assessment, while the monitoring and evaluation is at a starting point.
- The overall objective of the EU Adaptation Strategy is to contribute to a more climate-resilient Europe, having three priority issues that need to be developed:
  - Priority 1: Promoting Action by Member states:
    - **Action 1: Encourage MS to adopt Adaptation Strategies and Action Plans** – Guideline needs to be provided on adaptation strategies, as well as adaptation preparedness scoreboard;
    - **Action 2: LIFE funding, including adaptation priority areas** – It is important to develop cross-border floods and coastal management, urban environment, mountain and island areas, as well as drought-prone areas;
    - **Action 3: Promoting action by cities along the Covenant of Mayor initiative** – The objective is to support local authorities in taking coherent action on both mitigation and adaptation as part of integrated approach.
  - Priority 2: Better informed decision-making:
    - **Action 4: Knowledge-gap strategy** – It is important to identify and prioritise knowledge gaps and provide better interfaces policy. This can be included into Horizon 2020 programme.
    - **Action 5: Climate – ADAPT** – Development of interfaces with other databases and climate services and inclusion of Copernicus climate services.
  - Priority 5: Climate –proofing Action:
    - **Action 6: Climate proofing the Common Agricultural Policy, Cohesion Policy, and the Common Fisheries Policy** – Provision of guidance and capacity building.
    - **Action 7: Making infrastructure more resilient** – Mapping standards through CEN/CENELEC/ETSI and project development.
    - **Action 8**: **Promote products and services by insurance and finance markets** – Promotion of green paper insurance of disasters and stakeholders dialogue.

- The Environment and Climate Regional Accession Network's (ECRAN) Climate Working Group was introduced. The kick-off was in October 2013, and presents a follow –up of the so-called RENA project, building Climate issues on RENA Climate results achieved. Active engagement of public

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sector expertise is organised through TAIEX for eight beneficiary countries. ECRAN Climate has four sub-groups:

- Working Group 1: Climate Policy;
- Working Group 2: GHG Inventories and MMR;
- Working Group 3: Emissions Trading System (ETS);
- Working Group 4: Adaptation.

- The ECRAN activities in the period from 2013 to 2016 will focus more on information sharing through practical work. It is necessary to ensure that capacity is built truly at the beneficiaries, as well as to increase involvement from other sectors with direct relevance to climate work. Regarding Adaptation policies, the EU strategy on Adaptation to Climate Change was adopted in April 2013. Emphasis will as much as possible be put on adaptation options that are low cost, good for the economy and for climate resilience. All these considerations have been used when developing the ECRAN work plan for adaptation. The ECRAN Adaptation Seminar was held in Skopje in July 2014, and certain conclusion regarding further steps were drawn, such as the need to develop public awareness, enhancing public administrations' knowledge and the need for enhanced cooperation and coordination with EU Member States and between ECRAN beneficiaries.

The Climate Adaptation Tool – Linda Romanovska

- Ms Linda Romanovska is a Climate – ADAPT thematic editor and editor for adaptation in the energy sector for the Climate Adaptation Platform for the Alps. She presented the European Climate Adaptation Platform, Climate – ADAPT, that was launched in 2012 by DG CLIMA and is maintained by the European Environment Agency (EEA) - http://climate-adapt.eea.europa.eu/
- The purpose of the ADAPT tool is to support governmental policy and decision makers developing and implementing climate change adaptation strategies, policies and actions on national, regional and local levels. It is a one-step adaptation information portal supported as well by the European Topic Centre on Climate Change impacts, vulnerability and Adaptation (ETC/CCA). The platform was described in details, providing participants with enough information to further explore and gather necessary data for their work.
- The first useful element of the platform is the Adaptation Support Tool – a guidance tool that is further divided into six adaptation cycle steps; and each step contains numerous sub-topics with concise explanatory text linking to the relevant items in the database of Climate-ADAPT. The steps are:
    - Step 1 – Preparing the ground for adaptation;
    - Step 2 – Assessing risks and vulnerabilities to climate change;
    - Step 3 – Identifying adaptation options;
    - Step 4 – Assessing adaptation options;
    - Step 5 – Implementation;
    - Step 6 – Monitoring and evaluation.
- The second tool that could help the viewer is the information on countries' adaptation strategies and actions. All EU MS and also Norway, Switzerland, Turkey, Iceland and Liechtenstein have adaptation strategies and/or other adaptation action; only, not all of them have an official national adaptation strategy adopted. In this section, several issues are addressed, such as legal

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framework, assessment, priority sectors and local action. But beside countries, strategies and actions are also available by regions and cities/ towns.

- Apart from the regional, national and local strategies, it is also possible to find case studies via the Case Study Search Tool. There are strict quality criteria for the selection of case studies, such as implementation action. Each case study has a detailed description with success factors and cost-benefit information, and is linked to an adaptation options section. What might be very useful as well are the contacts provided, so the viewers can inform more on the case from first hand.
- Further presentation was given on searching the climate adaptation knowledge database by keywords, country and sector.

Climate Change and Energy Planning – Linda Romanovska

- Within the "Climate Proofing" study of the energy sector and the background work of EU Adaptation Strategy development, energy is presented as one of key policy areas for adaptation action outlining:
    - Most significant threats;
    - Key technical measures for addressing the threats;
    - Most appropriate policy actions.
- All parts of the energy system are potentially vulnerable, namely fuel extraction, fuel transport, energy production and transmission. Disruptions in energy systems lead to significant economy-wide losses and have serious implications on the functioning and life of societies.
- Key vulnerable elements are shown in the table below:

	Changes in precipitation, flooding and drought	Temperature changes	Changes in sunlight/cloudiness	Extreme weather events	Glacier and permafrost melt	See-level rise
	Impacts on Energy Generation					
Renewable resources	*Impacts on hydropower production*	*Decreased solar power production due to heat*	*Impacts on solar power production*	*Impacts on windpower production*	*Land movements impacting installations*	*Impacts on coastal and off-shore installations*
Thermal energy generation	*Impacts on cooling water supply Flooding of powerplants*	*Impacts on cooling*				*Impacts on coastal installations*
	Impacts on Energy Transport and Distributon (grids)					
Transmission and distribution grids	*Potential snow-load or icing* *Impacts from mudslides and landslides*	*Potential line sagging or icing Decreased capacity due to heat*		*Damage to transmission and distribution lines*	*Damage to transmission and distribution lines*	*Impacts on coastal installations*
Pipelines					*Damage to pipelines due to land mass movements*	*Impacts on coastal installations*
	Impacts on Energy Demand					
	Increased energy demand for water pumping during droughts	*Increased demand for cooling and air conditioning. decreased for heating*				

- Vulnerability of energy production in other parts of the world can affect energy supply security and energy prices. Increased reliance on electricity and renewable energy may increase the vulnerability of Europe's energy system to climate change, but decreases vulnerability to non-climate factors such as dependence on fuel imports from unstable regions. Also, there is a need

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for new investments to cope with intermittency and need for more transmission capacities regarding infrastructure.

- Proposed key technical measures in these studies include:
  - Climate-proofing electricity grids, especially ex-ante proofing of new developments:
    - Additional capacities;
    - Vulnerability hot-spot detection;
    - Installation of underground cables;
    - Expanding tree-free aisles in forests;
    - Slope stability measure in mountainous areas;
    - Relocate flood-prone elements where possible;
  - Employment of technologies for renewable energy production that counteract negative climatic impacts;
  - Installation of additional cooling for thermal power plants;
  - Introduction of early warning systems for extreme weather events for power plants;
  - Installation of high energy-efficiency ventilation for buildings (e.g. 'solar cooling');
  - Smart grids and smart-metering for demand management;
  - Increase of energy storage capacities.
- On the other hand, there are proposed key policy actions:
  - At the demand side – Improve energy efficiency in buildings and appliances via energy performance labelling;
  - At the supply side – Support introduction of water saving technologies for cooling in thermal power production and climate-resilient renewable technologies;
  - Transmission and distribution – Oblige TSOs to ensure climate risks are taken into account in the planning, development and management of electricity networks;
  - In general – Mainstream climate change into relevant industry standards and enhance international cooperation in the energy sector.

<u>How to Identify Climate Vulnerabilities in the Energy Sector – Jonas Cognell</u>

- Mr. Cognell from Göteborg Energi AB started with a brief introduction of Gothenburg city and its energy company, Göteborg Energi AB. The company has around 300,000 customers and approximately 1,000 employees. Yearly income of the company goes up to 780 million euros, out of which 80 million are earnings. The company supplies 90% of the apartments block district heating. Interesting fact is that 95% of district heating is obtained from co-generated, recycled and renewable energy sources, while the remaining heating is produced in plants that primarily burn biofuels. Sulphur emissions are close to zero, while emissions of nitrogen oxides have fallen by around 90% since 1985. Apart from district heating the company provides numerous more services such as energy services, electricity supply and trading, gas distribution and trading, and much more.
- Next topic of the discussion was the CELSIUS project. It is a four-year project (April 2013 – March 2017) coordinated by the City of Gothenburg and it presents best practice solutions in the area of smart district heating and cooling by taking a holistic approach to overcome technical, social, political, administrative, legal and economic barriers. The project brings together excellence and expertise from five European cities with complementary energy baseline positions: Cologne, Genoa, London, Gothenburg and Rotterdam. The consortium includes technical expertise from leading energy utility organisations as well as international renowned research and innovation organisations. Through the delivery of 12 new ambitious and innovative demonstration projects

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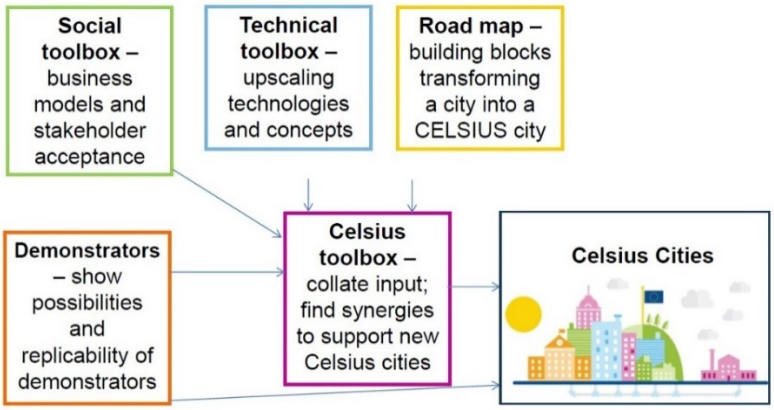
and the additional more than 20 projects already in operation, the CELSIUS project covers all aspects of urban heating and cooling systems, including technical and deployment innovation and approaches to financing and stakeholder engagement.

- Since the beginning of the project, there are 50 new Celsius cities. I In order to receive this status, certain steps need to be fulfilled:
    - Early communication – engagement with potential Celsius cities;
    - City status – filling of Celsius city questionnaire;
    - Identification/support – discussion between project and city;
    - Letter of Commitment – city's commitment to become Celsius city;
    - Offerings – provision of demonstrators, toolboxes, workshops and expert groups.
- The entire support scheme is shown on the picture below:



- When comparing Gothenburg District heating system now, with one connected system with 1,000 km of pipes, using mostly co-generation and renewable energy, in 1980s, there were 8 separate district heating systems. Oil prices were high, and the city was highly dependable on oil as fuel. In the same period, at the beginning of the 1980s, annual oil supply to Swedish district heating systems began to decrease, while the use of biofuels became more popular. Also, fossil fuels are still very expensive, causing the rise of electricity and heating energy.
- Since Gothenburg is a coastal city, at the delta of Gothia River into the North Sea, it has high risk of floods. Adaptation measures, such as coastal flood defences, water management, inland flood protection, as well as adaptive measures for waterways, urban and landscape planning, transport infrastructure are constructed. There are nine risk areas of Gothenburg, such as extreme weather conditions and transportation supply systems. But the similar situation is all over the country. Thus, in order to organise in the process, there is a Swedish Crisis management System with three basic principles:
    - **Responsibility principle** - Anyone who has responsibility for a business of everyday life will have it as well during an emergency;
    - **The equality principle** - During an emergency, the operations function in a similar way as it does in everyday life - as far as it goes. The operation shall, if possible, be managed in the same place as under normal conditions;
    - **The proximity principle** - The proximity principle means that a crisis should be handled where it occurs, and by those who are most concerned and responsible.
- In Gothenburg, they have even managed to produce a tool which helps them to visualise and create different scenarios regarding climate disasters. In the city, three major adaptation challenges had been identified:
    - Electricity;
    - District heating and cooling;

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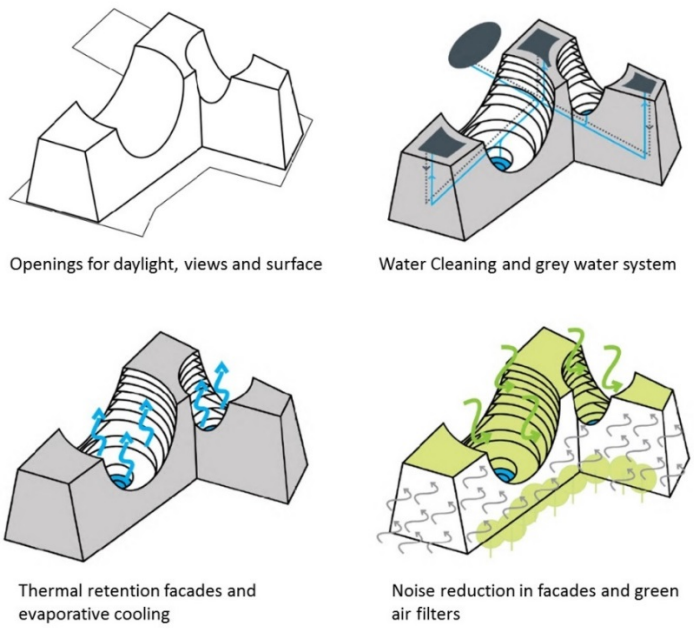
- Gas distributions.

Impressions from ECRAN countries – Energy Neutral Construction – Marc Joubert

- The city of Rotterdam has the largest port in Europe, and by 2025, it aims to reduce its CO_2 emissions by half, which is an ambitious plan that will require a revolutionary approach to urban areas. One proactive response to this challenge is an exploratory study of the Hart van Zuid district, where a team has investigated how to tackle CO_2 issues in a structured way. This has resulted in the Rotterdam Energy Approach and Planning (REAP) methodology. REAP supports initial demand for energy, propagates the use of waste flows and advocates use of renewable energy sources to satisfy the remaining demand. REAP can be applied at all levels: individual buildings, clusters of buildings and even whole neighbourhoods. Applying REAP to the Hart van Zuid district has shown that this area can become carbon neutral. Most importantly, REAP can be applied regardless of location.
- Mr. Joubert gave numerous examples how people and companies are investing in energy and energy adaptation. One of the examples was Apple's investment of $850 in solar farms in California. He also added that climate change adaptation in the energy sector can be done through two other sectors, urban planning and architecture. In the urban planning sector, we should strive to reduce transport, promote cycling and remote heating, reuse waste energy, provide natural ventilation and be aware of the orientation (regarding light and sunlight). On the other hand, more concrete measures are foreseen in the architecture and construction, such as use of local materials, provision of better insulation, use of local energy production and providing local energy storage, such as batteries and geothermal storage. Mr. Joubert provided some of these examples that are either implemented or are to be constructed:
    - Greenery on a building in Istanbul, Turkey;
    - Greenery, renewable energy sources (RES), waste water treatment, collecting rainwater in Yerevan, Armenia;
    - The Hague project of integrated design on 60,000 m^2;
    - Greenside out and park life in Tirana, Albania, as can be seen on the picture below:



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Exercise 1: Identification of Vulnerabilities in the Energy Planning Sector

- Following the presentations of Linda Romanovska, Jonas Cognell and Marc Joubert on vulnerabilities and impressions from ECRAN beneficiary countries, the participants were divided into four groups with the task to identify energy planning sector adaptation options. The groups were:
    - Montenegro – 8 participants;
    - Albania and fYR of Macedonia – 6 participants;
    - Bosnia and Herzegovina and Kosovo* - 9 participants;
    - Serbia and Turkey – 8 participants.
- Groups were asked to brainstorm about energy planning related sources of information that they have available in their countries with regards to climate change and in particular those that are of interest or importance for adaptation action, more in particular the identification of vulnerabilities. The groups are asked to select five most important sources and list them from 1 to 5 in their sequence of importance. This is what they have presented.

Montenegro

Sources:

1. Electric Power Company of Montenegro;
2. Ministries;
3. Montenegro Electro Transmission System;
4. Statistical Office of Montenegro;
5. Regulatory Agency for Energy;
6. Faculties;
7. Ministry of Interior – in terms of different laws and strategies).

Vulnerabilities:

- Cities – in terms of cooling and heating;
- Industry – aluminium industry in Montenegro;

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- Transport – usage of fossil fuels;
- Energy sector – production and transmission in extreme weather;
- Tourism.

Serbia and Turkey - Even though that Serbia and Turkey differ in many issues (territory, population, exit to sea, etc.), they have managed to determine adaptation options and potential vulnerabilities.

Sources:

1. Historical data of meteorology – temperature, precipitation, humidity, etc.;
2. Statistical data of investments – fuel consumption rates, fuel quality, etc.;
3. Balance of demand and supply;
4. Online climate info tools – websites, academic references, modelling and analysis software.

Vulnerabilities:

- Droughts on hydropower and thermal power plants;
- Floods and storms on transmission and distribution lines;
- Efficiency of thermal power plants and temperature on cooling water;
- Water level rise on coastal line facilities;
- Clouding on PV electricity production;
- Storms for wind turbines;
- Drawdown of groundwater level due to floods.

Bosnia and Herzegovina and Kosovo*

Sources:

1. Energy Operators;
2. Ministry of Energy;
3. Energy Regulatory Agency;
4. Ministry of Environment;
5. Statistical Agency.

Vulnerabilities:

- Energy Transmission and Distribution;
- Road Infrastructure;
- Coal production;
- Energy generation;
- Old technologies and equipment.

Albania and the former Yugoslav Republic of Macedonia

Sources:

1. Power corporation;
2. Energy operators;
3. Ministry of Economy, Trade and Energy (Ministry of Economy);
4. Energy Community;
5. Statistical Agencies

Vulnerabilities:

- Infrastructure;
- Energy transmission and distribution;
- Old equipment and technologies;

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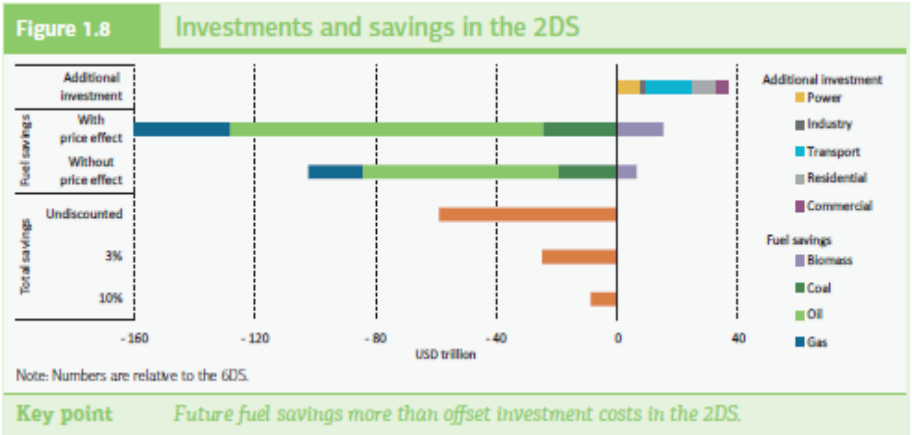
- Water level rise causing floods;
- Energy demand rise.

Energy Planning Practice vs. Vulnerabilities – Boris Cosic

- The deployment of a low-carbon energy system, as laid out in the Energy Technical Perspective (ETP) of International Energy Agency (IEA) from 2012, a 2°C Scenario (2DS), delivers wide benefits by enhancing energy security, environmental protection and economic growth. The world today is heavily dependent on finite fossil fuels, leading not only to significant emissions of climate-changing carbon dioxide (CO_2), but also posing broader environmental, economic, energy security and geopolitical challenges. The transition to a low-carbon economy as envisaged in the 2DS gives the world an 80% chance of keeping average global temperature rise below 2°C compared to pre-industrial levels. Future fuel savings are calculated in the picture below:



- In 2012, it was estimated that subsidies for global fossil fuels were 775 billion dollars, which was around 10 times more than the amount provided for the renewable energy. Estimated fossil fuel – related subsidies in the Balkan countries vary from 7-11%, except in Kosovo* where are around 35-36%.
- According to the EU energy context, energy supply import dependence will be between 50-70% by 2030. Employment and regional development policies will be based on deindustrialisation and trade liberalisation. The energy context will be based on mitigation of global warming, environmental protection, sustainable development and 20-20-20 climate and energy package.
- With the current predictions, decoupling is possible in the EU. Having 1990 as a base year, GHG emissions have been slowly decreasing, targeting a 40% decrease by 2030. On the other hand GDP has been constantly growing, targeting a 100% increase by 2030. Even the electricity consumption from 2010 to 2013 has decreased for approximately 50 TWh. Electricity generation installed capacity in the EU has risen from 2000 to 2013, especially regarding wind, gas and photovoltaic (PV) energy production. For example, wind share in electricity demand in 2013 in Denmark was astonishing 34%, while in Portugal 24%. Use of solar energy in electricity production has boomed since 2010. However, solar share in electricity demand in the EU is highest in Greece and it amounts to 7%.

* This designation is without prejudice to positions on status, and is in line with UNSCR 1244 and the ICJ Opinion on the Kosovo Declaration of Independence.

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- After having a 2020 strategy, a new strategy has been developed looking more ahead of 2020, which is the EU 2030 framework for climate and energy policies, targeting 40% lower GHG emissions, 27% of RES and 27% less energy consumption by 2030. The 2050 Roadmap projects that GHG emissions should decrease by 80%, while RES would have 40% share in energy production.
- Next issues discussed were research methods of energy adaptation:
    - Bottom up demand forecasting - with this method, it is necessary to do sector by sector analysis based on policies and financial mechanisms. Regarding decoupling, it cannot be done by using econometrics models based on historic elasticity. This situation focuses on finding flexible demands that could be used to balance variable renewables.
    - Renewable potentials – in this scenario, using wind and solar energy is quite easy, which cannot be stated for biomass. However, certain connections can be made, such as between food and biomass, wood industry and biomass, etc.
    - Energy planning – this method relies on Variable Renewable Energy Sources (VRES) planning, non-dispatchable renewable sources such as wind and solar. This method would include energy storage, integration of power and heating/cooling, water, waste, etc.
    - Electric Vehicle integration – this methods would include driving cycle optimisation with different driving patterns, charging pattern, VRES balancing and vehicles to grid.
- In the ECRAN beneficiary countries, electricity is produced mainly from fossil fuels (e.g coal), especially in the former Yugoslav Republic of Macedonia, Serbia and Kosovo*. In Bosnia, there is a significant share of hydro energy, while in Albania more than 90% of electricity production comes from hydro energy. In Croatia, there are eight scenarios following the National Energy Strategy, Transmission System Operators (TSO) development plan and RES implementation. However, there are two possible scenarios in south east Europe and those are:
    - National Scenario – analyses conducted for countries (such as for wind penetration);
    - Integrated Scenario – analyses conducted for integrated energy system of south east Europe.

Assessment of Response Strategies in the Energy Planning Sector - Michiel Fremouw

- To facilitate the transition to a fully renewable energy system, (reduced) demand and (renewable) supply need to be matched. In order to achieve this, the main question should be which sources are available, where they are located and especially how much they can potentially provide. The method of 'Energy Potential Mapping' (EPM) developed at the TU Delft Chair of Climate Design and Sustainability aims to provide these geographically quantifiable energy potentials. The resulting maps and data can subsequently be used to shape urban and regional energy plans, increasing both the share of renewables and resilience, by shortening the supply chain and reducing dependence on foreign energy imports.

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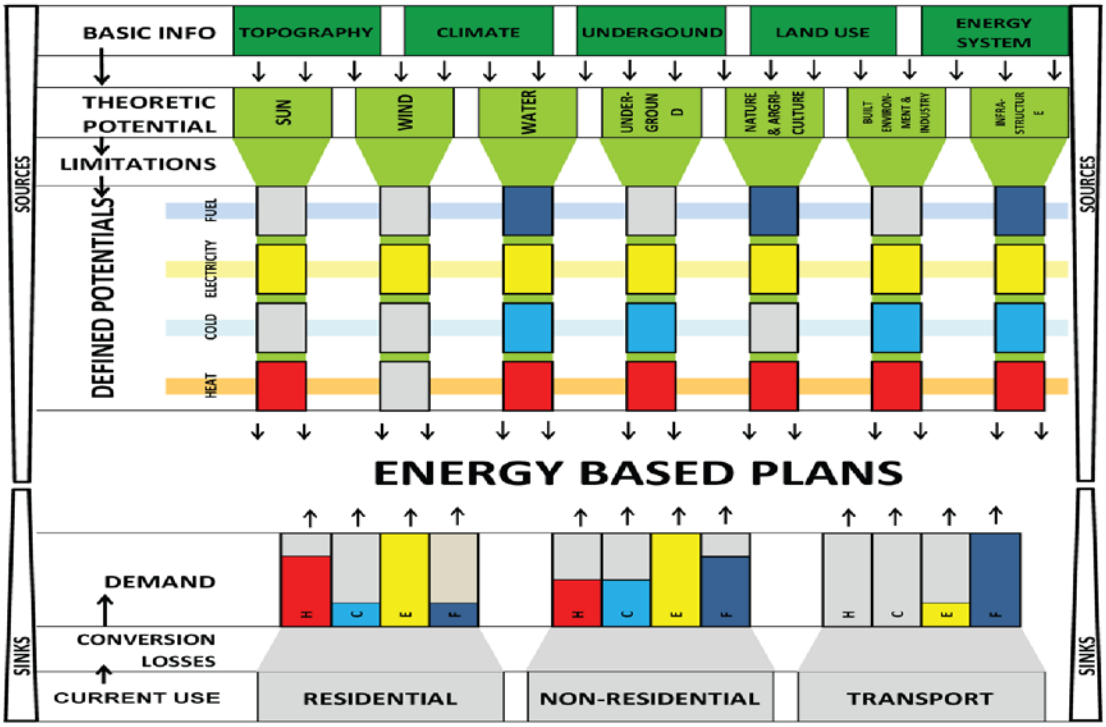

- The EPM method is depicted above. On the left side, demand is considered (the 'sinks'). As the data available trends quantify energy carriers like m^3 of natural gas or kWh of electricity, a conversion needs to be made in order to arrive at the actual, functional types of demand, like heat, cold, electricity (the share of electricity not used for heating or cooling) and fuels. Furthermore, a reduction potential may be present. Older buildings will be less well insulated, or have large glass facades and a resulting significant cooling load in warmer regions.

- On the right side, renewable supply is considered (the 'sources'). Using various types of basic geographical information, theoretical potentials can be derived for the available types of renewable energy. As this theoretical potential does not take into account spatial, conversion and other limitations, this will have to be further reduced in order to arrive at a more feasible technical ('defined') potential.
  A common example is roof photovoltaics, where solar radiation data ($kWh/m^2/year$) can be combined with a high resolution digital elevation map and building footprints (from a topographical map) in order to arrive at a roof solar electric potential for an urban area.

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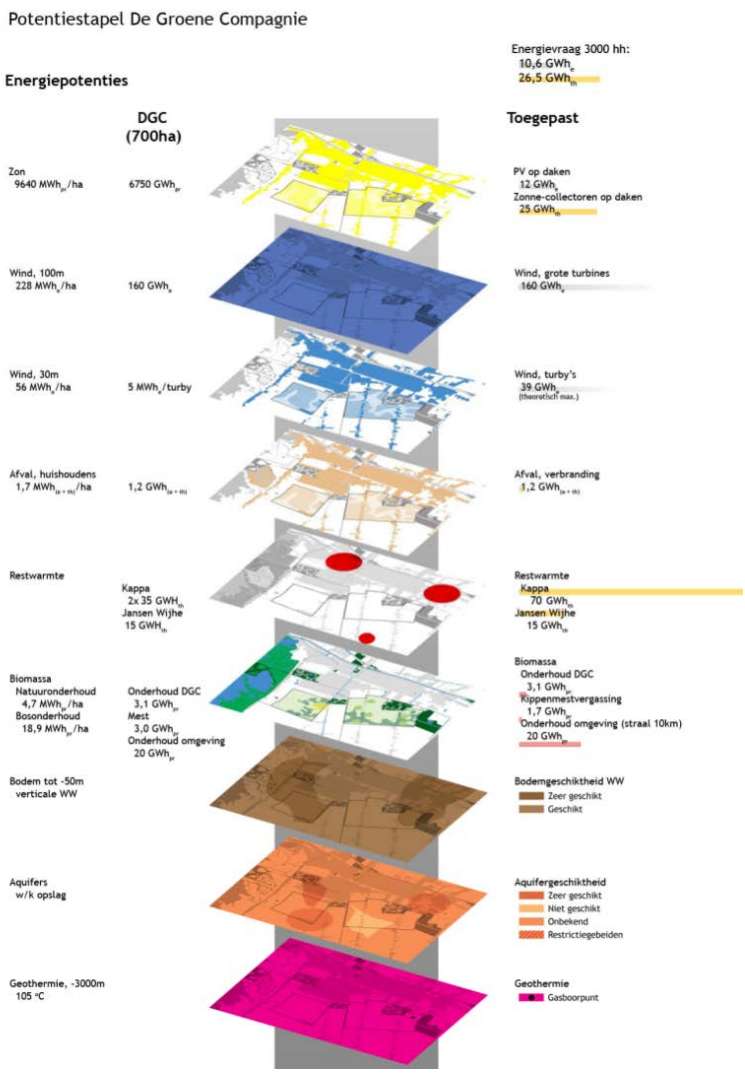
- The result will be an energy atlas that provides both geographical and numerical data on demand and supply potentials and helps shape energy based urban and regional plans. The stacked example below analyses a neighbourhood in the north of the Netherlands. The emphasis here is on the energy accounting aspect, required in order to arrive at a net zero energy system.



- Even though uniformity in the maps (especially quantification wise) is important in order to facilitate energy accounting, specific studies can be visualised in any way that facilitates the planning process. An example of this is a 3D heat map of the city of Rotterdam, shown below. Because the focus here is on a single type of energy, the Z axis is used to depict quantities, with demand (the heat 'sinks') represented as hollow glass cores and various types of supply (the heat 'sources') as the solid blocks that fill these. Although for this study only a limited number of fully renewable sources was included and data availability on residual industrial heat was limited, the discrepancy between the dense, high rise dominated centre and sparsely populated areas in the south is quite visible, and the focus will have to be on exchanging and cascading heat between areas.

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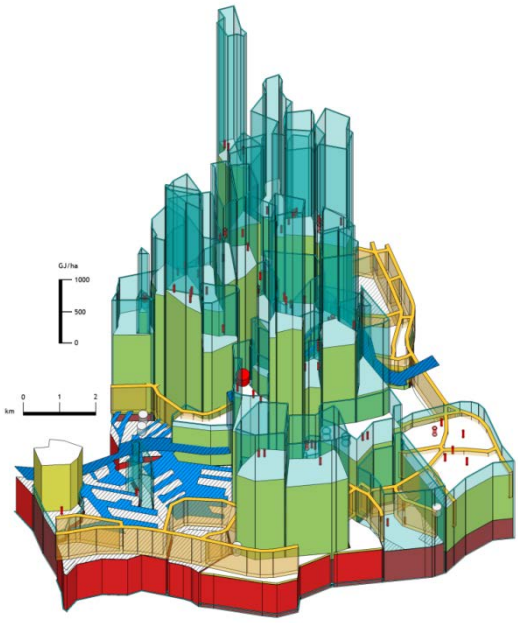
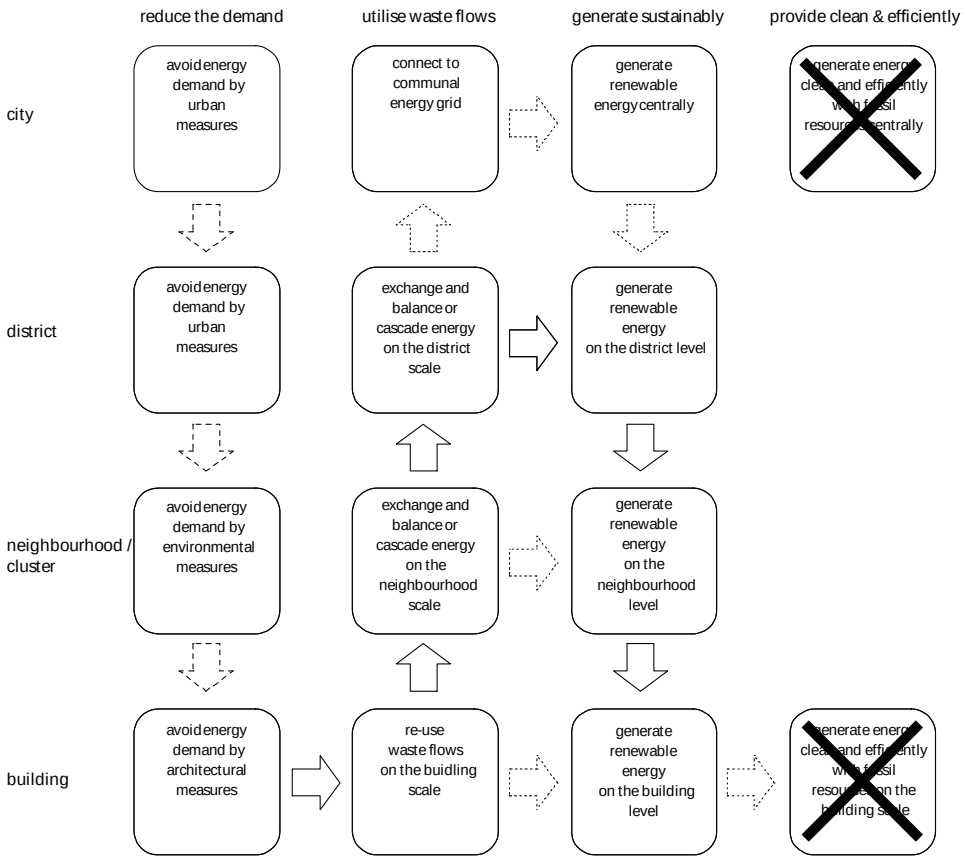
- The energy atlas that EPM provides can be used to shape energy based plans. An example is the Rotterdam Energy Approach and Planning (REAP) model, based on the earlier New Stepped Strategy (NSS).The NSS provides three basic steps:
    - Reduce the demands – avoid energy demand by urban measures;
    - Utilise waste flows – connect to communal energy grid, reuse waste flows on a building scale, exchange or cascade energy on the neighbour-hood scale;
    - Generate sustainably – generate renewable energy on a building, neighbourhood, district and central level;





- REAP (above) builds on this by introducing different levels within the city, emphasising the spatial component (housing, neighbourhood, district, city) and the influence measures at each of these levels have on the others. Gradually improving insulation at the dwelling level for example will reduce heat demand of the city as a whole (which influences district heating planning), and a local factory may have sufficient residual heat for the next ten years to provide a neighbourhood or district. These relations are important considerations for energy based planning, and allow the establishment of intelligent cities.

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- An example of this is the case of Oostland, a greenhouse rich area with two large towns, where a plan was shaped to gradually utilise local sources (biomass, deep geothermal and solar thermal). Several smaller heat networks built over time can be interconnected at a later moment, which both spread investments over time while still eventually resulting in a larger, more resilient multi source network. The example furthermore represents the possibility to additionally connect to a regional heat network, allowing inter-municipal exchange.

Economic Aspects – Dionisio Perez-Blanco

- The presentation of economic consequences of maladaptation started with the goal of responsible energy public policy, which is welfare. In this case, the purpose of economics is to maximise welfare with limited resources. According to Mr. Perez-Blanco, social welfare can be measured through utility; however, utility can only be ranked. Thus, a proxy is typically used, which is gross domestic product (GDP). Nonetheless, a responsible energy policy needs also to account for other variables, such as income distribution or environmental (i.e. non-market) impacts.
- In the energy policy, planners rely on a combination of adaptation and mitigation strategies. Mitigation covers reduction of GHG emission and enhancement of sinks, supported by 20-20-20 goal by 2020. On the other hand, **adaptation** covers adjustment in natural or human systems to a new or changing environment. Adaptation comprises actions to tackle climate variability, extreme events and also to manage demand. According to Schaeffer (2012), the effects of extreme weather events and climate change on all parts of the energy system deserve particular further attention. For each energy sector, the impacts of extreme events and climate change were shown.
- In the complex socio-ecological system in which we live, resources have been put to the limit. Comprehensive economic assessment is necessary in order to prevent maladaptation and its economic consequences. Maladaptation is and adaptation strategy that actually harms the socio-ecological system. Some strategies to develop a successful adaptation policy, using examples from other Mediterranean countries already in the EU, were shown in the following slides.
- Hydropower is an increasingly relevant energy source in the Balkans and Turkey. Advantages of this renewable are that it is emission-free and easily exploitable. On the other hand, hydropower generation is conditioned to water availability and vulnerable to changing rainfall patterns (water-energy nexus); also hydropower plants may need large water impoundments that modify the structure of water sources. In this situation there is a “trade-off” between renewable energy generation and river restoration/conservation objectives. Two analyses are possible in this case:
    - Qualitative assessment of the nexus – accounting for market and environmental income;
    - Monetisation of environmental income and quantitative comparison.
- The example of Spain was used to illustrate how mismanaging this trade-off, and ignoring nature’s limits, may generate negative environmental impacts with little gains in terms of energy production (while the installed hydropower capacity now eight times larger than in the 1940’s, the producible hydropower remains similar).
- In the case of sea level rise, the problems that may occur are flooding and erosion. In the EU, there are 158 major terminals and 71 operating nuclear reactors on the coast. The impacts of sea level rise on Italy (only market income) using a Computable General Equilibrium model were shown (Standardi et a.l., 2015). Adaptation options in these situations include soft engineering (shore nourishment, dune building) and hard engineering (dikes, seawalls, breakwaters).
- Global warming impacts on heating and cooling demand, from different parts of Europe were also discussed. In Northern and Central EU, models typically indicate a decrease in heating demand,

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while in Southern EU show an increase in cooling demand. Adaptation in this case may rely on hard engineering (new investments, energy saving programmes, etc.) but also economic instruments to manage demand are necessary, both price-driven and quantity-driven.

- Climate change may also increase the likelihood of extreme events such as floods, extreme winds and ice loads. The impacts of extreme events on the energy sector may be direct (e.g. damage to some infrastructure), but also indirect (e.g. through the collapse of critical infrastructure and subsequent disruptions in energy supply, affecting the whole economy in some cases). The example of the 2003 black out in Italy was used to illustrate how local failures may escalate in modern interconnected networks.
- The conclusion stressed that climate change is here to stay, and urgent action is needed. Even if mitigation succeeds above expectations, adaptation will be necessary against extreme events, variable resources and changing energy demand. Adaptation strategies must be tailored to the specific characteristics of the area, although some valuable lessons can be drawn from other experiences in the EU countries (specifically from Mediterranean countries with similar challenges) and elsewhere. Maladaptation and/or neglecting adaptation may have significant, negative impacts on Southern European countries. Thus, climate change impacts need to be incorporated into energy planning.

Cooperation and Coordination among Authorities – Peter Heiland

- Authorities in some of the cities will say that adaptation in cities is luxury and that more important tasks come first. This is one of the problems that adaptation faces. In some of the cases, there is no transparent division of tasks, so some of the departments will say that they are not responsible for climate change. If climate change consequences will happen in 300 years, then why bother now, it is better to save money!
- But if nothing is done at the very moment, there might not be another opportunity to act. Heat stresses, droughts and flooding are all consequences of climate change. Thus, there is a need for adaptation, even though not all adaptation actions are attractive. But even with obstacles, opportunities and chances can be found. In the adaptation scenarios, there is a freedom of development, growth, extension and individual ideas, with implied restrictions and recommendations. Opportunities include a combination of mitigation and no-regret measures.
- Cooperation among authorities usually is not at a remarkable level. Without proper strategies and action planning, communication on adaptation can be difficult.
- The instrument of environmental and urban politics is a 4 C's challenge: Combination, Coordination, Cooperation and Communication. Three instruments are dependent upon these challenges, regulative, economic and discursive, as it is shown on the following picture:

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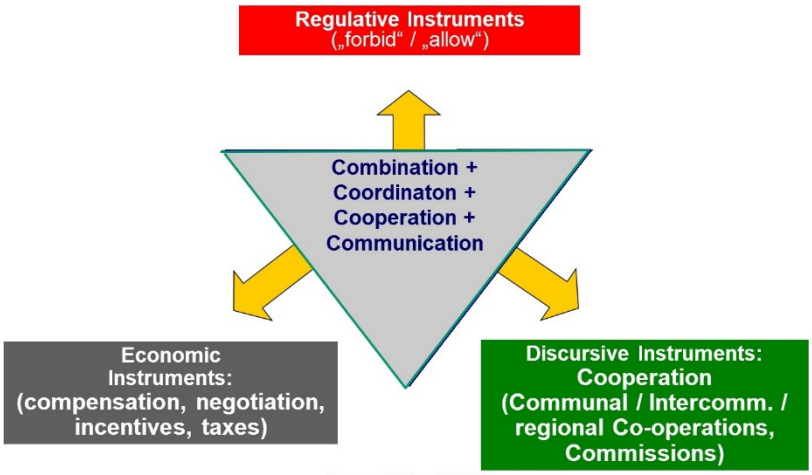

Source: Heiland (2002)

- Practical relevance for adaptation includes five levels of cooperation: local, regional, (federal state), national and European. Relevance for setting the framework policy has a bottom-up approach; while on the other hand, relevance for implementing specific measures has a top-down approach, having most implementation relevance at the local level. Cooperation levels for municipalities have their own goals, according to the type of cooperation, as shown in the table below:

Type of municipality's cooperation	Cooperation goal / benefit
A. Within the municipality	• Cross sector coordination (strategy, exchange) • Implementation of cross sector CCA-measures • Awareness raising (in municipality, public) • Political visibility of CCA-actions
B. Between the municipality and stakeholders	• Joint realisation of CCA-measures • Integration of stakeholders in strategy development • Awareness raising
C. Between municipalities	• Exchange of experiences • Joint lobbying • Joint development of transferable tools

- Climate Change adaptation concerns all sectors of a city or a community:
  - Population (health and social services, civil protection):
  - Infrastructure (water supply, waste water management, floods, transport, etc.);
  - Built environment (urban planning, housing, etc.);
  - Economy (public and private companies);
  - Natural resources (green urban and landscape planning, etc.).
- The flood risk management plan I Shkoder region in Albania was briefly presented. In 2010, this region suffered from catastrophic floods, affecting more than 25,000 inhabitants. According to public statistics, around 98% of electricity production in Albania comes from hydropower. Three major hydropower plants (HPP) are in northern Albania (Komani, Fierza, Vau Dejes) and one smaller one (Ashta), totalling 1400 MW of installed capacity. Adaptation measures for reservoirs mean that sufficient volume of water is stored to sustain droughts but not to be threatened during floods. There are eight communal Floods Regional Management (FRM) plans. Five steps are required in preparing those:
  - Flood Hazard Mapping;
  - Flood Risk Mapping;

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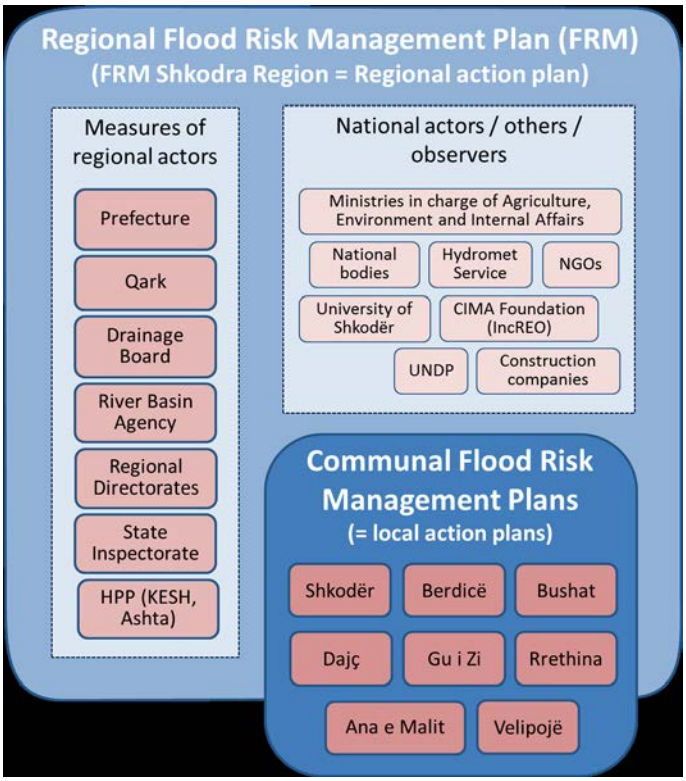
- Risk Assessment;
- Standard catalogue of measures;
- Identification of measures.



Renewable Energy Landscapes – Anneloes van Noordt

- According to the 20-20-20 target, all EU countries should have 20% of energy production from renewables. In 2013, some countries have even reached this target, such as Sweden, where more than 50% of energy consumption comes from RES energy production. Countries that have reached this target as well are Spain, Romania, Lithuania, Bulgaria and Italy. As mentioned in some of the previous presentations, the EU even goes beyond 2020 and prepares plans for further reduction by 2050.
- In this strategy, we are also talking about Large Scale Energy Landscapes (LSEL), which is "*an area where the most important function is to supply a considerable amount of the energy needs of the society. It accomplishes this function by the large scale generation of renewable energy. This generation structures the area into a new and attractive landscape*". LSEL relies on utility value, perception value and future value.
- The Territorial Energy Tool has been developed, for energy potential mapping in Flanders. It is an interactive cartographic tool that is able to identify areas with the highest energy potential. The model is based on American Standard Code for Information Interchange (ASCII) raster images, and it covers current energy production from both fossil fuel energy and renewables. Tool process was described as shown on the following picture:

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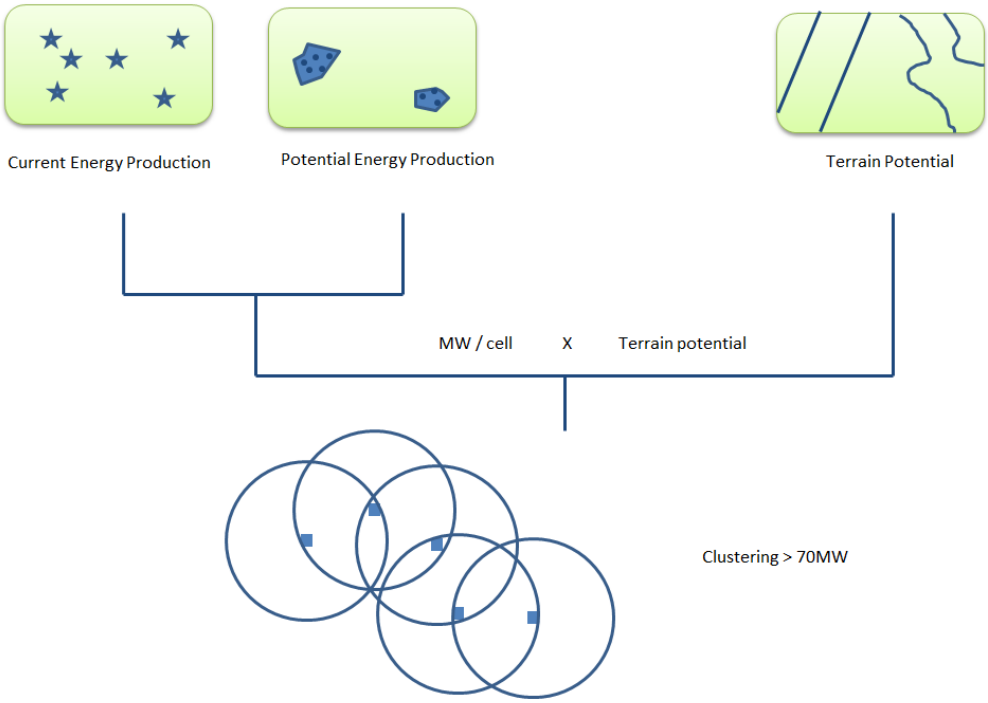

- Input variables include surface, radius, and minimum installed capacity in MW and MW per wind turbine. In Flanders, current energy production includes energy from fossil fuel and nuclear energy, plus including all renewable energy production. With the help of the tool, now it is known that the potential of energy production from solar energy is allocated to be 52.5 Watt/m^2. This means that approximately 40% of roof surface is suitable for PV.
- Advantages of Territorial Energy Tool are integration of different sources a providing interactive map. In the map, new data is being added both on energy resources and positive and negative factors. It is also possible to provide different scenarios and work with them.

Exercise 2: Identifying Energy Planning Sector Adaptation Options

- Participants were divided into groups as the previous day. However, Montenegrin group merged with Albanian and Macedonian. They were asked to break out and discuss the cooperation and coordination among the authorities within the energy sector. To describe in brief the actual situation, what model or actions would be needed to realise improvements (3 actions per country).
    - **Albania, fYR of Macedonia and Montenegro** – in this case, the conclusion was that in all three countries there a huge problem with communication, especially with high authorities. Montenegro counted the Drim river basin as the most important action to be considered, followed with the rising of public awareness and improving the work of the National Committee for Sustainable Development. In Albania, the most important is to have training of working group that will do the work responsibly and professionally. This is followed by the promotion of solar PH and Hot Water Systems (HWS) and by energy efficiency of buildings. In the fYR of Macedonia, since Skopje and several other cities are in valleys, the problem that needs to be assessed first is air conditioning, then communication and coordination among different authorities, and in the end enabling and improving the RES Investment Forum.

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- **Bosnia and Herzegovina and Kosovo*** - A lot of similarities in this situation. They addressed two actions:
  - Actual situation on coordination and cooperation – In BiH, legislation is well defined, but not put in practice, while in Kosovo*, legislation and cooperation overall is pretty much established at national level, but this is not the case at local level.
  - Actions in Adaptation – this is particularly needed in land use. TAIEX expert missions can be used in implementation of existing regulation and strategies. Capacity building needs to be provided at local level, but adaptation awareness needs to be raised at all levels.
- **Serbia and Turkey** – Ministries that are dealing with energy adaptation include the Ministry of energy and natural resources, Ministries of forestry and water, Ministries of environment and urbanisation/infrastructure and Ministry of economy. Along with local governments and energy investors and companies, they constitute a communication circle crucial for proper energy adaptation. Action to promote coordination and cooperation were listed:
  - Implementation of strategy plans;
  - Education of related staff;
  - Preparation of vulnerability assessment of energy regions.

<u>Exercise 3: Identifying energy planning sector adaptation options</u>

Participants were asked to count several adaptation options that have been mentioned, as well as how they see technical, economic, social and legal feasibility. These issues were addressed:

1. Mapping energy areas;
2. Modelling energy system;
3. Scenario analysis;
4. Diversification of supply;
5. Energy efficiency;
6. Transport optimisation;
7. Flood prevention;
8. Monitoring/data collection;
9. Financial measures;
10. Reducing losses/ accumulation;
11. Free solar water heaters;
12. Subsidies;
13. Climate-proof grids;
14. Vulnerability hot-spot analysis;
15. Optimisation of water management, “buffering”;
16. International cooperation;
17. Modernisation of infrastructure.

Participants were asked to take up to five coloured stickers and put them on maximum five issues that they believe are the most important. This is how they were ranked:

1. Optimisation of water management – 11 votes;
2. Energy efficiency – 9 votes;

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3. Flood prevention – 9 votes;
4. Modernisation of infrastructure – 7 votes;
5. Modelling energy system – 6 votes.

Exercise 4 – Country action towards robust climate adaptation in the energy planning sector

Participants were broken out per country to brainstorm on country specific climate adaptation options to be taken in the energy sector, also including options that are seen for continued cooperation among ECRAN beneficiary countries in the area. The most important options were put on paper.

- **Montenegro**
  - Public awareness and education;
  - Energy efficiency in industry;
  - Energy efficiency (EE) in buildings, labelling, audit, public sector, construction, etc.;
  - Green procurement;
  - Use of renewables – determination of localities for solar/wind/ small HPP, etc.;
  - More efficient transport modalities – public transportation, electric vehicles.
- **Bosnia and Herzegovina**
  - Replacing old technology;
  - Reducing old processes and involving new renewable processes in the energy sector;
  - Optimisation processes with new technology;
  - Optimisation in distribution sector;
  - Raising awareness of society.
- **Turkey** – Turkey put emphasis on the optimisation of water management.
  - Determination of water portfolio;
  - Refinement of water potential by use of climate models in terms on energy, agriculture, etc.;
  - Determination of flood and drought risks;
  - Determination of non-energy activities – agriculture, forestry, irrigation, etc.;
  - Determination of buffering options and HPP types;
  - Planning and optimisation of basins;
  - Prevention of erosion – deforestation;
  - Supporting climate-resilient agriculture;
  - Raising awareness of agriculture-related workers on water usage and efficiency.
- **Former Yugoslav Republic of Macedonia**
  - Programme for energy efficiency in public buildings;
  - Renewal of vehicles fleet;
  - Public awareness;
  - Reduction losses.
- **Kosovo*** puts emphasis on energy efficiency, since majority of energy production comes from coal-fired power plants.
  - Finalising legal framework – preparing the EE law and its adoption;
  - Establishing EE fund;

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- Strengthening EE capacities;
- Implementing EE audit;
- Raising awareness.

- **Albania** – Above all, two issues that need to be addressed in Albania are buffering and infrastructure.
  - Awareness rising;
  - Establishing vulnerable areas;
  - Regulating river flows potential;
  - Designing and financing of potential projects;
  - Incorporating strategy (into what?);
  - Identifying source of funding.
- **Serbia** – after flooding in 2014, Serbia also pays more attention to water management.
  - Water Management portfolio;
  - Floods and drought prevention;
  - EE in industry;
  - EE in building and construction;
  - Raising awareness and developing climate communication strategy.

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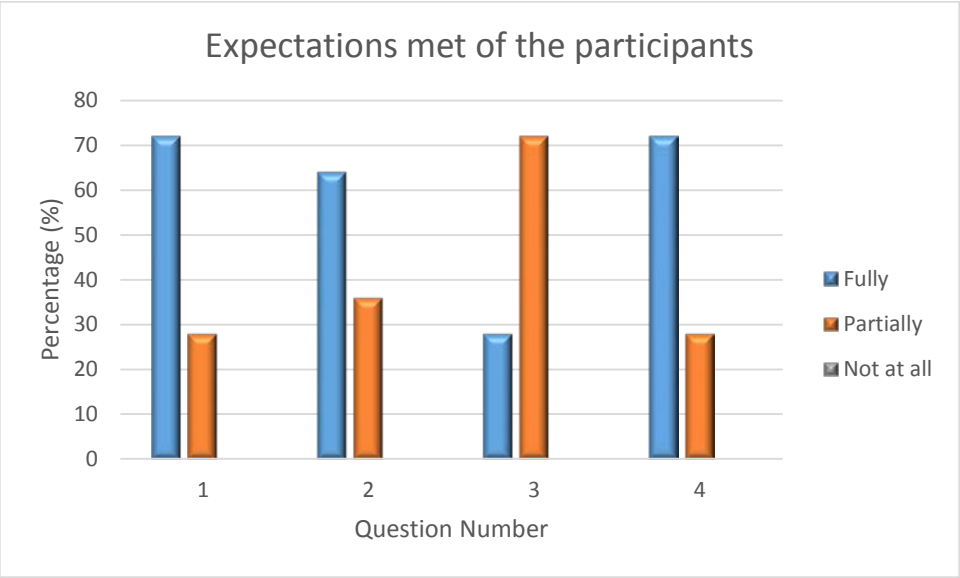
V. Evaluation

In the evaluation of the workshop most participants indicated that their expectations were fully met in the areas of strengthened awareness and understanding of climate change adaptation needs and options in the energy sector, the applicability of tools for risk and vulnerability in the sector (including Climate-ADAPT) and the need to speed up and enhance climate adaptation action.
Concerning the foundation of improved cooperation and coordination between authorities in the Western Balkans most participants indicated that their expectations were partially met. Overall expectations fully met rated 59% and partially met 41%.

Almost 95% of the evaluation scores regarding the quality aspects of the workshop such as presentations, facilitators, and logistics, obtained the marks 'excellent' (52%) too 'good' (43%) with 5% scoring 'average'.

EXPECTATIONS OF PARTICIPANTS

1.	The workshop Strengthened awareness and understanding of climate change adaptation needs and options among energy experts from Western Balkan countries and Turkey established.
2.	The workshop Improved understanding of (the applicability of tools for) risk and vulnerability assessment in energy sector, including the applicability of the Climate Adapt Tool.
3.	Foundation for improved cooperation and coordination among authorities in Western Balkan countries and Turkey in the area of climate adaptation action established.
4.	Awareness was risen of the need to speed up and enhance climate adaptation action planning in the Western Balkan countries and Turkey.



WORKSHOP AND PRESENTATION

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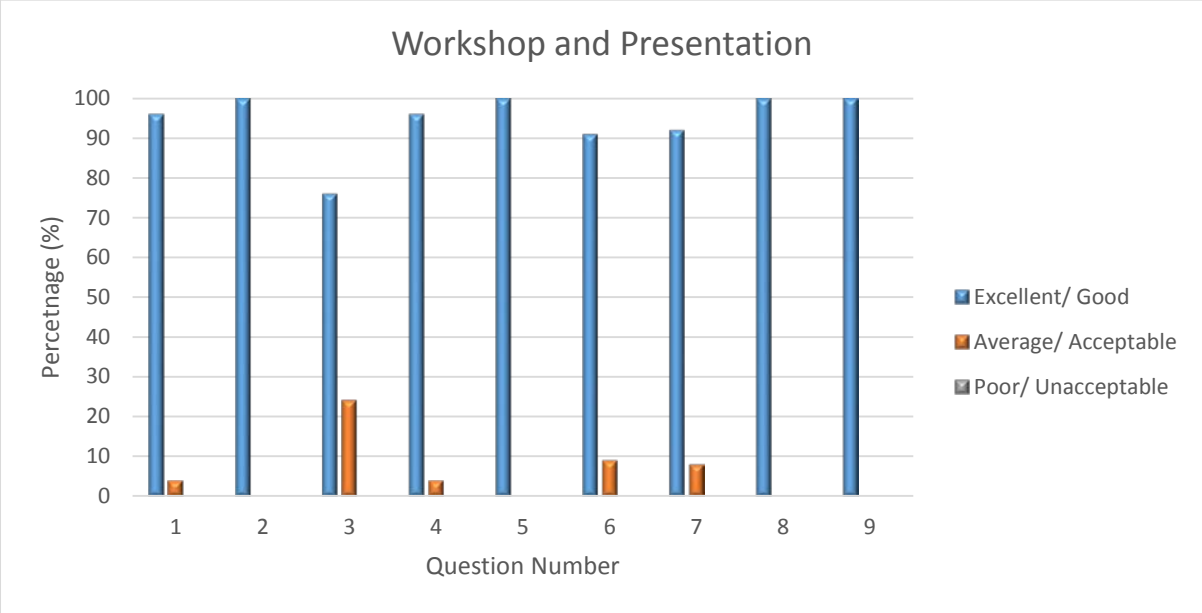
1 The workshop achieved the objectives set
2 The quality of the workshop was of a high standard
3 The content of the workshop was well suited to my level of understanding and experience
4 The practical work was relevant and informative
5 The workshop was interactive
6 Facilitators were well prepared and knowledgeable on the subject matter
7 The duration of this workshop was neither too long nor too short
8 The logistical arrangements (venue, refreshments, equipment) were satisfactory
9 Attending this workshop was time well spent



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ANNEX I – Agenda

Day 1 : Thursday 16 April 2015

Topic: **Expert Training on Risk and Vulnerability Assessment and Adaptation Planning – Energy Planning sector**

Chair: **Rob Bakx**

Venue: **Tirana, Albania**

Start	Finish	Topic	Speaker	Sub topic/Content
09:00	**09:30**	***Registration***		
09:30	09:45	Welcome and Introduction	**Rob Bakx**, Moderator	- Introduction participants - Programme outline and logistics
09:45	10:15	EU Adaptation Strategy 2013 and role of ECRAN	**Rob Bakx,** ECRAN	- Outline of EU Adaptation Strategy - Links with adaptation practice - Climate projections in the beneficiary countries
10:15	10:30	Preparing for adaptation; the Climate Adapt Tool	**Linda Romanovska,** Fresh Thoughts, Latvia	- EU tool on climate adaptation action - Usage of the Adapt Tool in the energy sector
10:30	10:50	Climate change and energy planning – mitigation or adaptation	**Linda Romanovska,** Fresh Thoughts, Latvia	- Energy sector within the impact assessment of the EU adaptation strategy - Climate impacts on energy and its infrastructure – main challenges identified - Main drivers and causes - Key actions identified that could be taken
10:50	**11:15**	***Coffee Break***		
11:15	11:45	Potential vulnerabilities in the energy planning sector	**Michiel Fremouw**, Delft University, Netherlands	- How do climate vulnerabilities in the energy sector look like? - How tangible are or can vulnerabilities be? - Examples of (potential) vulnerabilities - What is the role of energy experts?
11:45	12:10	How to identify climate vulnerabilities in the energy planning sector	**Jonas Cognell,** Göteborg Energi, Sweden	- Is it difficult to identify energy related adaptation challenges? - How to organise the identification process? - Climate adaptation vis-à vis district heating

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12:10	12:30	Impressions from ECRAN countries – energy neutral construction	**Marc Joubert**, JA Joubert Architecture, Netherlands	- Examples of decreasing vulnerability for black-outs in buildings - Initial information exchange
12:30	**13:30**	***Lunch Break***		
13:30	15:00	Exercise on 'Identification of vulnerabilities in the energy planning sector'	**Rob Bakx**, Moderator **Linda Romanovska,** Fresh Thoughts, Latvia **Michiel Fremouw**, Delft University, Netherlands **Marc Joubert**, JA Joubert Architects, Netherlands **Jonas Cognell,** Göteborg Energi, Sweden **Dionisio Pérez-Blanco**, FEEM, Italy **Anneloes van Noordt**, Flemish Government, Belgium	- Break out session, findings and conclusions, plenary feedback - Brainstorming, discussion groups - Information sources and tools - Use of online climate information and adaptation tools - Identification of key vulnerabilities
15:00	**15:30**	***Coffee Break***		
15:30	16:00	Energy planning practice vs. vulnerabilities	**Boris Cosic,** University of Zagreb, Croatia	- How do vulnerabilities impact on energy practice; should it change? - The role of research in energy supply - National/regional versus local perspective
16:00	16:25	Assessment of Response Strategies in the energy planning sector	**Michiel Fremouw**, Delft University, Netherlands	- Response strategies: a definition - How to use them - Their impact on adaptation practice
16:25	16:50	Economic aspects	**Dionisio Pérez-Blanco**, FEEM, Italy	- Economic consequences of neglecting adaptation options - Questions and answers, exchange of experience, discussion
16:50	17:00	Wrap-up	**Rob Bakx,** Moderator	Conclusions day 1

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Day 2 : Friday 17 April 2015

Topic: **Expert Training on Risk and Vulnerability Assessment and Adaptation Planning – Energy Planning sector**

Chair: **Robert Bakx**

Venue: **Tirana, Albania**

Start	Finish	Topic	Speaker	Sub topic/Content
08:30	**09:00**	**Registration**		
09:00	10:30	Cooperation and coordination among authorities	**Peter Heiland**, Infrastruktur & Umwelt, Germany **Rob Bakx,** Moderator	- Presentation and discussion towards solutions for inter-authority cooperation - Models and actions - Break out session, plenary feedback
10:30	10:50	***Coffee Break***		
10:50	11:10	Renewable Energy Landscapes	**Anneloes van Noordt**, Flemish Government, Belgium	- Turning threats into opportunities - Renewable Energy Landscapes Tool
11:10	12:30	Identifying energy planning sector adaptation options	**Rob Bakx**, Moderator **Boris Cosic**, University of Zagreb, Croatia **Dionisio Pérez-Blanco**, FEEM, Italy **Anneloes van Noordt**, Flemish Government, Belgium **Peter Heiland**, Infrastruktur & Umwelt, Germany **Marc Joubert**, JA Joubert Architects, Netherlands **Jonas Cognell,** Göteborg Energi, Sweden **Linda Romanovska,** Fresh Thoughts, Latvia	- Interactive plenary session: combined Q&A, forum discussion, group discussion and brainstorm - Identification of potential adaptation options - Specificities that determine options to be chosen - Feasibility aspects: technical, economic, legal, social - Role of the public and CSOs
12:30	14:30	***Lunch Break (extended, allowing participants to collect per diems)***		
14:30	16:00	Exercise: Country action towards robust	**Rob Bakx**, Moderator	- Break out groups, plenary feedback and conclusions;

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		climate adaptation in the energy planning sector	Break out groups moderated by experts	- Identifying country options for adaptation in the energy planning sector; who contributes and how does that look like? - Options for continued cooperation among Western Balkan countries and Turkey in the (energy) adaptation area
16:00	16:30	Conclusions and wrap-up	**Rob Bakx**, Moderator	- Conclusions workshop - Training evaluation - Next workshop(s)

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ANNEX II – Participants

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		Environmental Protection Agency		
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ANNEX III – Presentations (under separate cover)

Presentations can be downloaded from:

http://www.ecranetwork.org/Files/Presentations_Adaptation_Energy_Sector,_April_2015,_Tirana.zip

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ANNEX IV – Evaluation

Statistical Information

The extent to which specific expectations were met, or not met:

My Expectations	My expectations were met		
	Fully	Partially	Not at all
5. Strengthened awareness and understanding of climate change adaptation needs and options among energy experts from Western Balkan countries and Turkey established.	IIIII IIIII IIIII III (72%)	IIIII II (28%)	
6. Improved understanding of (the applicability of tools for) risk and vulnerability assessment in energy sector, including the applicability of the Climate Adapt Tool.	IIIII IIIII IIIII I (64%)	IIIII IIII (36%)	
7. Foundation for improved cooperation and coordination among authorities in Western Balkan countries and Turkey in the area of climate adaptation action established.	IIIII II (28%)	IIIII IIIII IIIII III (72%)	
8. Risen awareness of the need to speed up and enhance climate adaptation action planning in the Western Balkan countries and Turkey.	IIIII IIIII IIIII III (72%)	IIIII II (28%)	

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Workshop and Presentations

Aspect of Workshop	Excellent	Good	Average	Acceptable	Poor	Unacceptable
1 The workshop achieved the objectives set	IIIII I (24%)	IIIII IIIII IIIII III (72%)	I (4%)			
2 The quality of the workshop was of a high standard	IIIII IIIII I (44%)	IIIII IIIII IIII (56%)				
3 The content of the workshop was well suited to my level of understanding and experience	IIIII IIIII III (52%)	IIIII I (24%)	IIIII I (24%)			
4 The practical work was relevant and informative	IIIII III (32%)	IIIII IIIII IIIII I (64%)	I (4%)			
5 The workshop was interactive	IIIII IIIII IIII (56%)	IIIII IIIII I (44%)				
6 Facilitators were well prepared and knowledgeable on the subject matter	IIIII IIIII IIIII (65%)	IIIII I (26%)	II (9%)			
7 The duration of this workshop was neither too long nor too short	IIIII IIIII IIIII II (71%)	IIIII (21%)	II (8%)			
8 The logistical arrangements (venue, refreshments, equipment) were satisfactory	IIIII IIIII IIIII II (68%)	IIIII III (32%)				
9 Attending this workshop was time well spent	IIIII IIIII IIIII (60%)	IIIII IIIII (40%)				

Comments and suggestions

The following comments and/or suggestions were submitted in addition to questions already answered:

Workshop Sessions:

- More adaptation presentations and measures;
- Very beneficial;
- Well described in the agenda.

Facilitators:

- The facilitator was excellent;
- Polite and understanding;

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- I liked the presentations on Landscape planning very much. Good measure of scientific and informative;
- They did their job correctly – Rob is perfect;

Workshop level and content:

- Content good, but a bit off topic. Concrete examples of adaptation needed. Case studies, costs – to show;
- Sufficient. Note: The lunch should be offered based on religious preferences (for instance, Muslims and Jews do not eat pork meat and pork fat, etc.);
- Fine, but some of the presentations can be more focused on energy adaptation.

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