Balancing different water uses in the Sava Basin

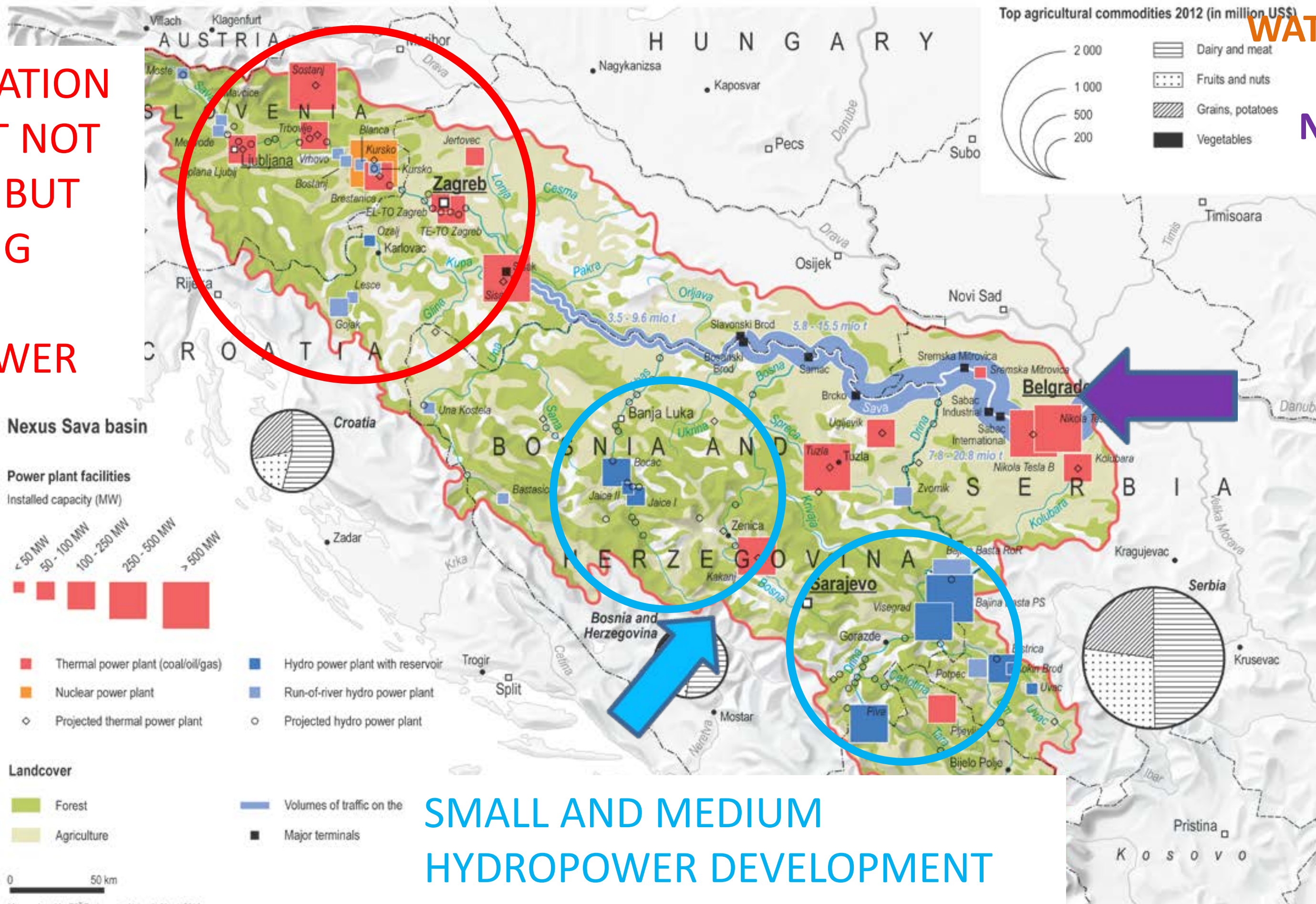
FLOW REGULATION TO ACCOUNT NOT ONLY HYDRO BUT ALSO COOLING THERMAL & NUCLEAR POWER

EXPANSION OF IRRIGATION PLANNED

INCREASED WATER SCARCITY PREDICTED

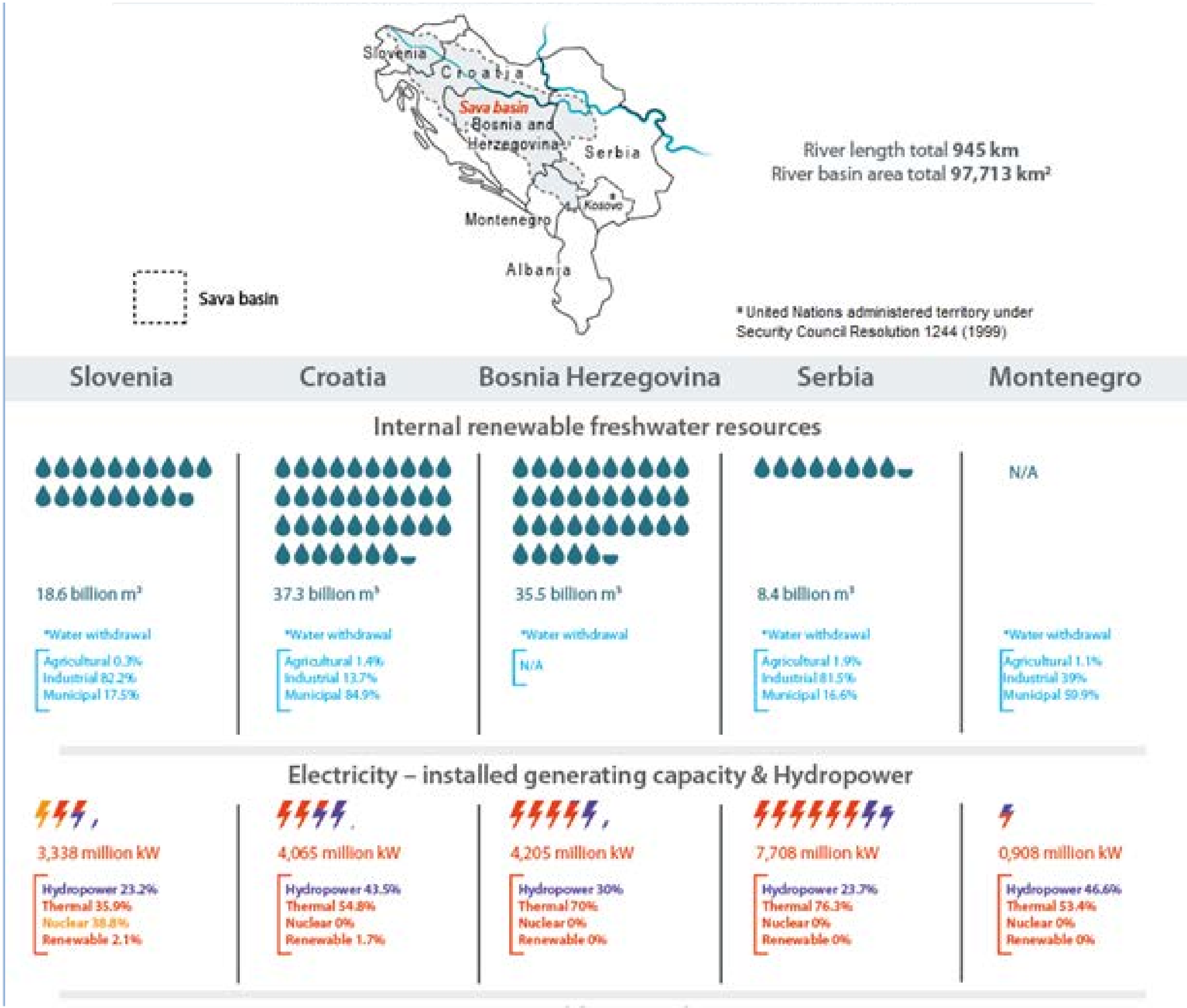
NAVIGABILITY NEEDS TO BE ENSURED

WETLANDS SERVE FLOOD PROTECTION



SMALL AND MEDIUM HYDROPOWER DEVELOPMENT ON THE TRIBUTARIES

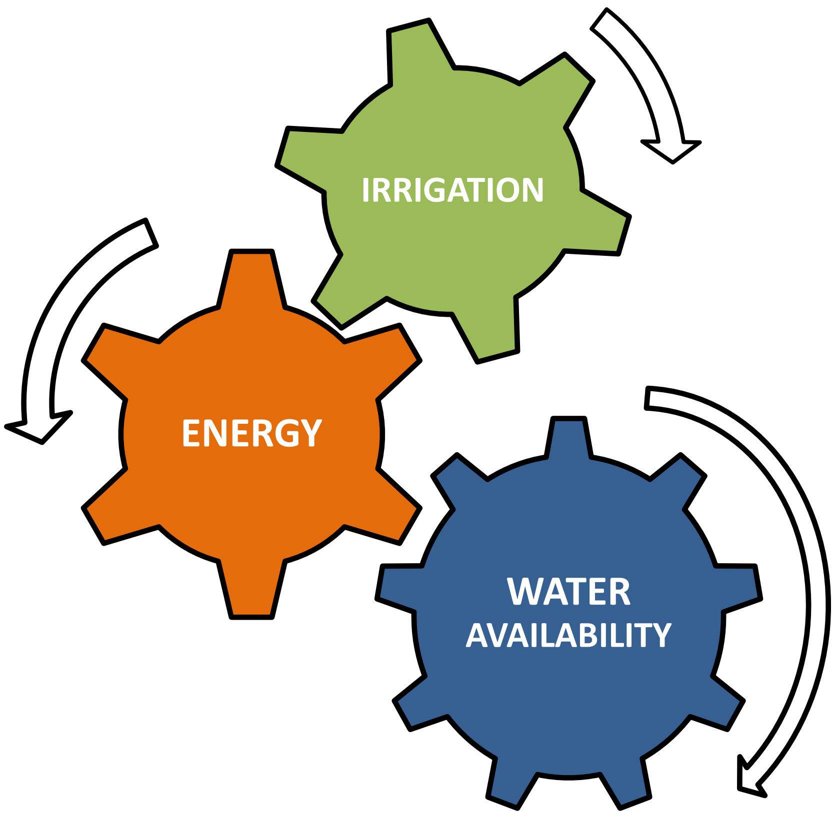
Differences between the riparian countries



Zoi Environment Network 2015

Integrated water-energy analysis - basis for identifying opportunities

Development of a **multi-country water-energy model** focusing on the electricity generation facilities located in the Sava River Basin.



- Investigate the dependences between the SRB water resources and the energy sector;
- Identify the **impacts of climate change on hydropower generation** through changes in water availability in the region and at a country level;
- Assess the implications of an increase in **water demand for irrigation on electricity generation**;
- Study the **trade dynamic-response of the multi-country energy system** under water availability constraints;
- Environmental issues: **CO_2 emissions and water resources use** in electricity generation.

Integrated water-energy analysis - basis for identifying opportunities

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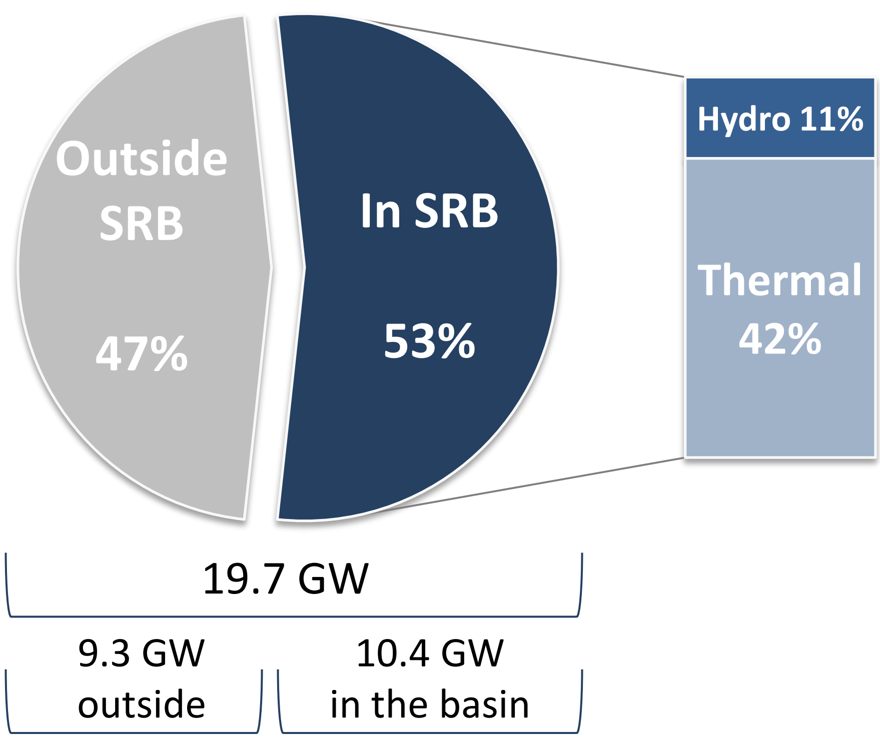
The Sava River Basin water resources are of paramount importance for the energy security of the countries in the basin.

Installed capacity in the region in 2012

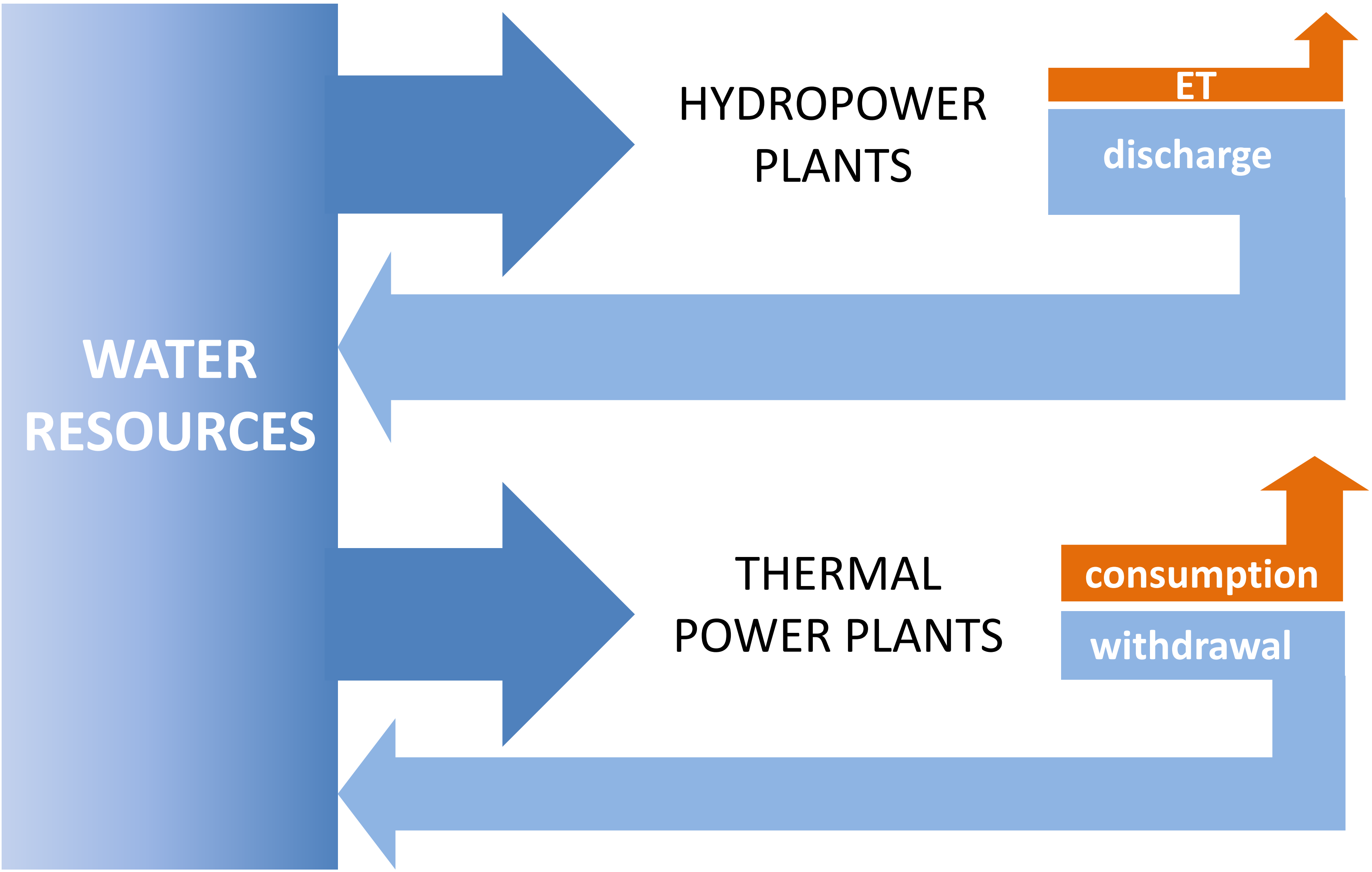


New hydropower plants projected in the basin.

Thermal facilities being upgraded or decommissioned.

The only nuclear power plant in the region is located in the basin.

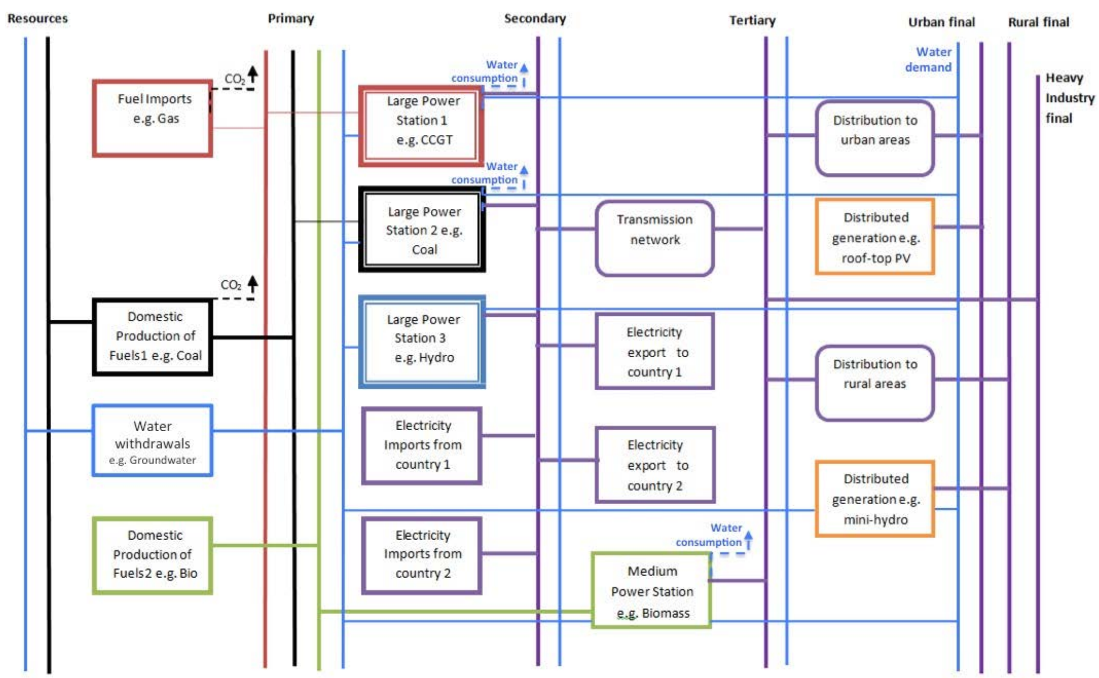
Integrated water-energy analysis - basis for identifying opportunities



Integrated water-energy analysis - basis for identifying opportunities

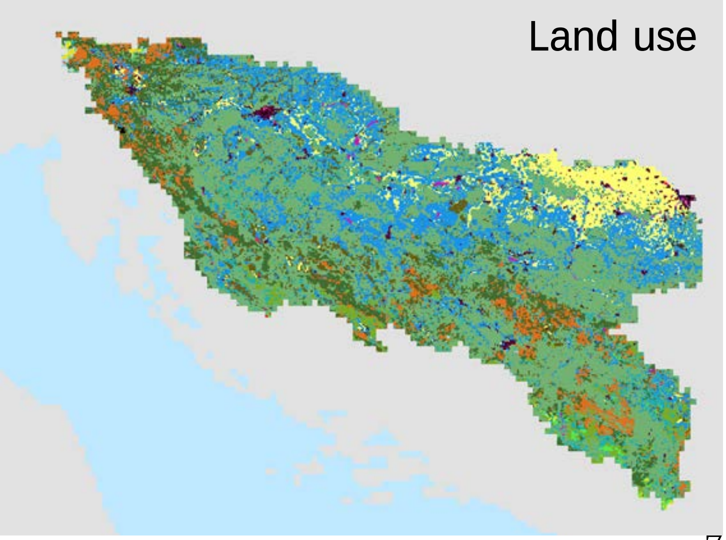
The water-energy model took into account…

- Electricity demand of the SRB countries;
- Countries’ load profile;
- Existing and planned electricity generation facilities;
- NREAP targets;
- CO_2 emission factors;
- Water consumption factors of thermal power plants;
- Electricity trade in the region;
- Inflows at selected hydropower plants locations.



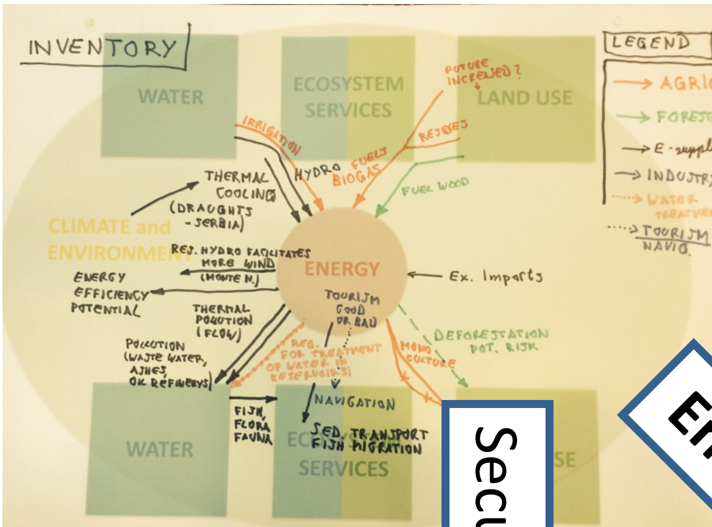
Which cost-effective measures could reduce flood risk and ensure sufficient and good quality water to all relevant sectors: modelling by JRC

- Modelling **water availability** versus **water demand** (identifying areas and sectors with water scarcity) and how this might change
  - Under **future climate** as compared to **current climate**
  - Under **modified land use / measures** (e.g. increased irrigation) as compared to **current land use**
- **Water demands** (agriculture, industry, public sector) taken into account, and how they change under future GDP, population etc.
- Addressing **ecological flow**
- Estimating of **economic damage** for sectors (agriculture, navigation, industry etc) water scarcity and how this changes after taking measures
- Including **investment** and maintenance costs of measures

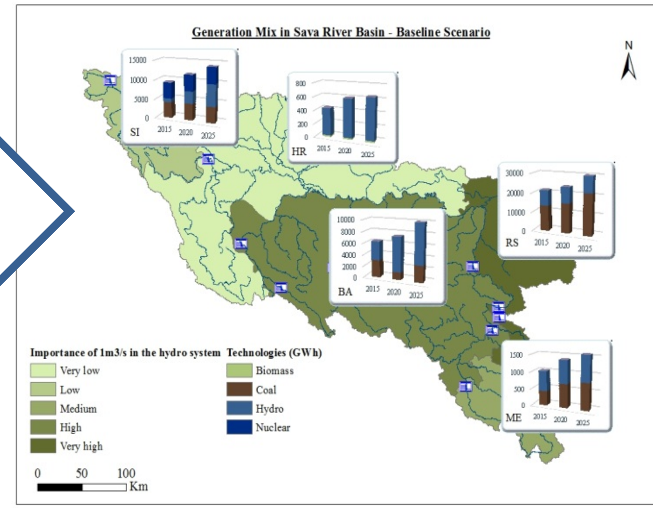


Taken from JRC, 2014

Integrated water-energy analysis - basis for identifying opportunities

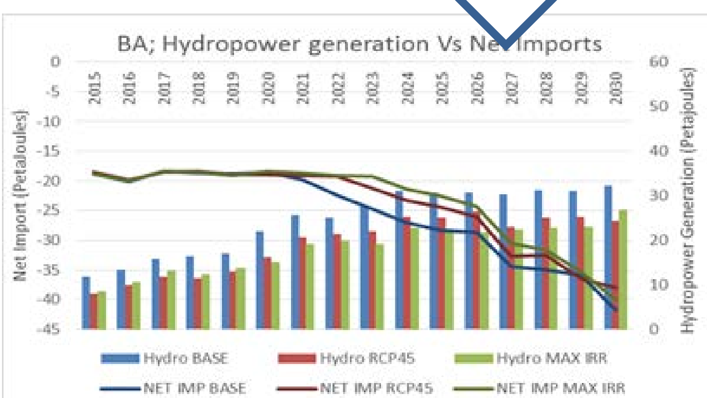


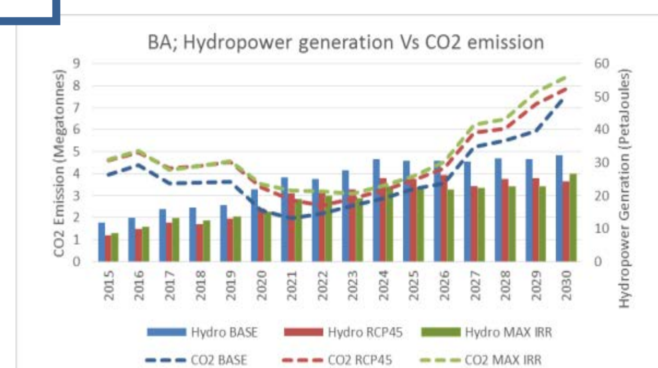
Value



Security

Environment





Selected finding

- ***Higher levels of irrigation would reduce water availability for hydropower generation****on some of the tributaries. Displacement of hydropower with alternative sources incurs costs and greenhouse gas emissions.*
- ***The impact of climate change will change needs for and dynamics of trade and investment in the SRB****. The effects include a redistribution of generation. Certain countries are likely to be able to generate more, and others less hydropower. This effects investment, operation and trade in the region.*
- ***The SRB is central to electricity development in the region.*** *A high proportion of new power plant investment in the riparian countries is expected to be interwoven with SRB water. Thermal and nuclear power plants require water for cooling. By 2030 approximately 30% of new thermal power plants and 19% of new hydro plants of all riparian countries are expected to rely on SRB water.*
- ***The SRB is central to riparian countries renewable energy targets****. SRB hydro accounts for a high proportion of the RE targets to be met by riparian countries. It accounts for between 10-36% of SRB country national RET contributions. It is therefore central to the long term energy strategies of each SRB country.*

Selected finding

- ***The SRB is central to the SRB riparian countries GHG emissions targets.*** *SRB hydro investments account for a high percentage of the carbon dioxide mitigated. By 2030 this corresponds to almost 43% of the total riparian countries mitigation targets. The SRB is therefore central to the long term GHG mitigation strategies of each SRB country.*
- *With new investment in hydro comes potential new investment in* ***multi-functional reservoirs****. Approximately 200 MW of hydro will be built in the region with reservoirs. These may help serve as* ***flood control, maintaining appropriate navigation*** *depths and rationalising investments and maximising the utility to be had from the water.*
- ***Flood control will continue to be important for power plant cooling*** *as new thermal power plants will necessarily be built in downstream countries. Yet during times of flooding when power is in high demand, flooded cooling systems can cause generation failures.*
- *A* ***mismatch exists in target setting for GHG mitigation, Renewable Energy deployment and the SRBMP*** *cycles. Both GHG and RE deployment targets are made with several decades in mind and will sharply shape the development of the Sava River Basin. These involve the deployment of billions of Euros. Yet the management plan has only a six year time horizon. Thus it is blind to longer term development. Yet, it both needs to inform it, and be informed by it.*

Policy Implications

- Global, Regional, National policy and process:
    - Have implications for the basin
    - The basin has implications for compliance / delivery
- Beyond IWRM Master Plan and ISRBC mandate (6yr planning cycle) these include (amongst others):
    - (decades) Energy: Expansion, Security, RET Targets
    - (decades) GHG: Mitigation and climate proofing
    - (variable) Agriculture: Employment policies
- Yet the SAVA river basin's water is needed:
    - Water value differs by use and country - but limited quantification
    - There are trade-offs that require (new) coordination
- Long term strategies may be at risk
- Long term benefits may be missed