Drina River Basin nexus assessment-Phase II
Proposal for quantification analysis and discussion on scenario development

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OBJECTIVE

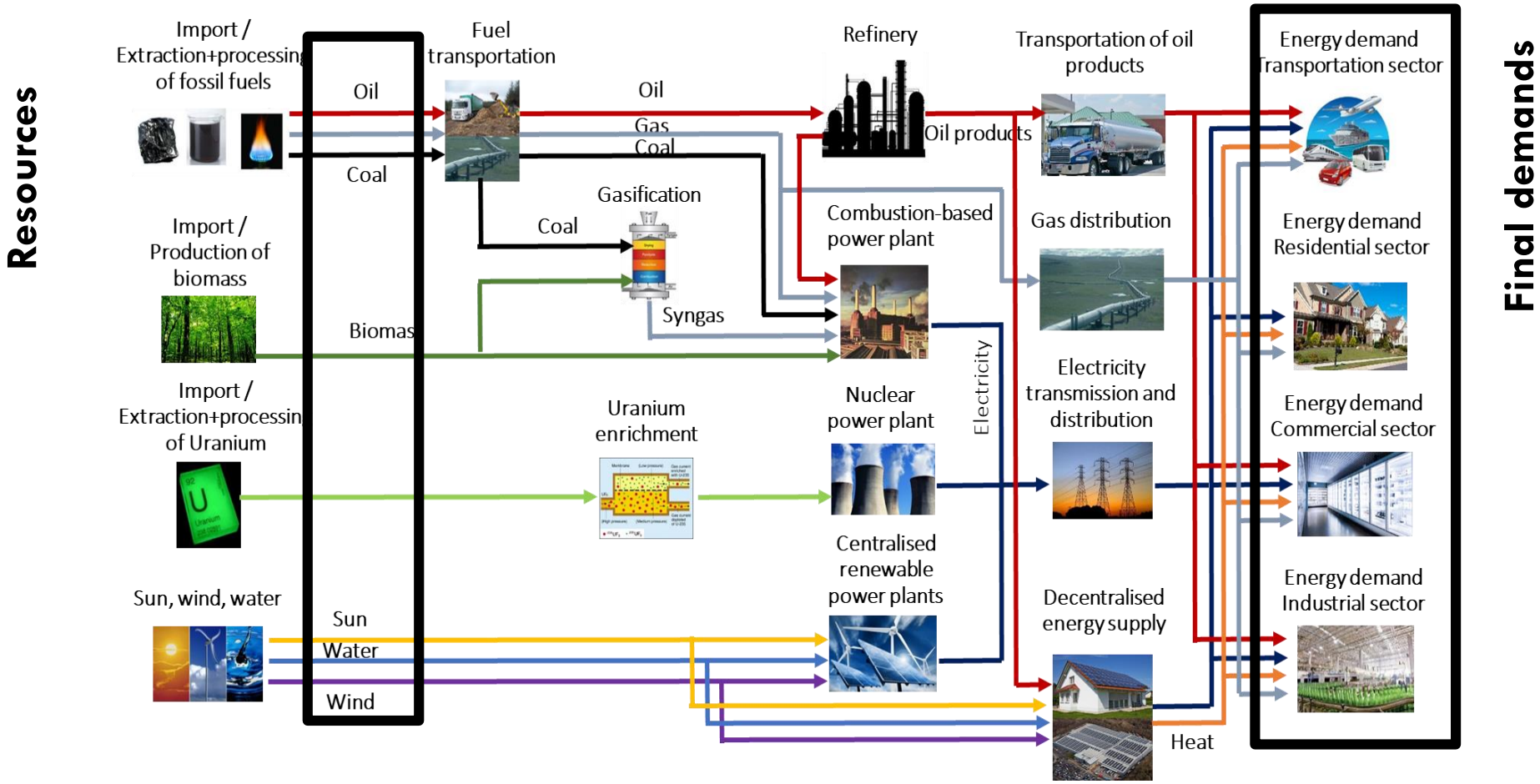
How to increase the share of renewable energy (RE) in the Drina River Basin riparians in order to:

- Optimize the usage of available resources (including financial)
- Minimize the negative impact on the environment (including transboundary)
- Maximize the multi-sectoral benefits of projects

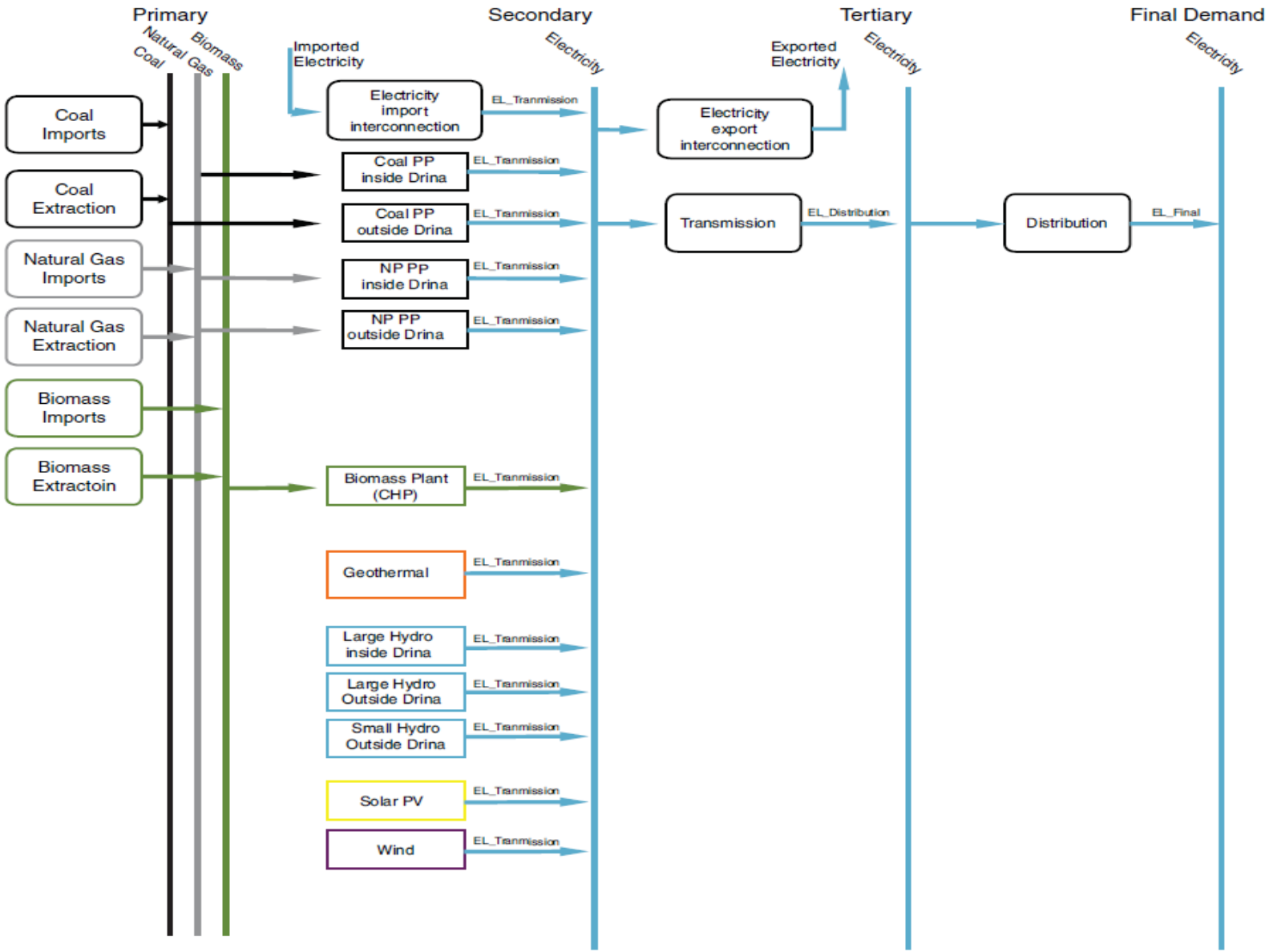
APPROACH

- Electricity sector expansion model developed for Drina River Basin nexus assessment phase I to be used for this study
- It is developed in an open source framework (OSeMOSYS) to facilitate replicability and transparency (data and assumptions)
- The model is a techno/economic least cost optimization model of the power sector
- Power sector in all three Drina River Basin riparian countries (BA, ME and RS) represented with good technological detail
- Emphasis on the operation of hydropower in cascade

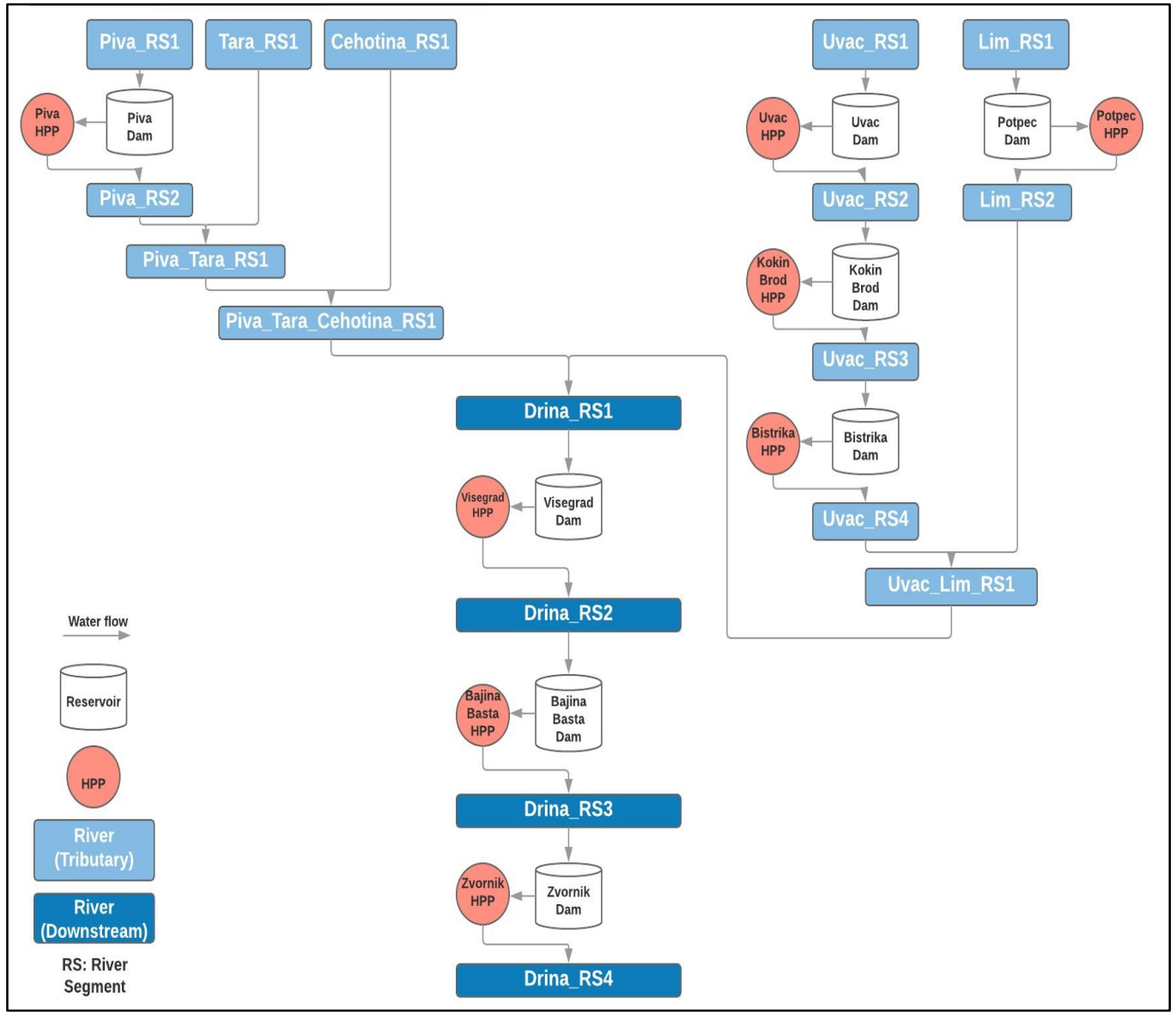
ENERGY SYSTEMS MODELLING



ENERGY SYSTEMS MODELLING



REPRESENTATION OF HYDROPOWER CASCADES ON THE DRINA AND ITS TRIBUTARIES



UVAC RIVER

Uvac (213 MCM)

Kokin Brod (250 MCM)

Bistrica (7.6 MCM)

LIM RIVER

Potpec (27.5 MCM)

PIVA RIVER

PIVA (880 MCM)

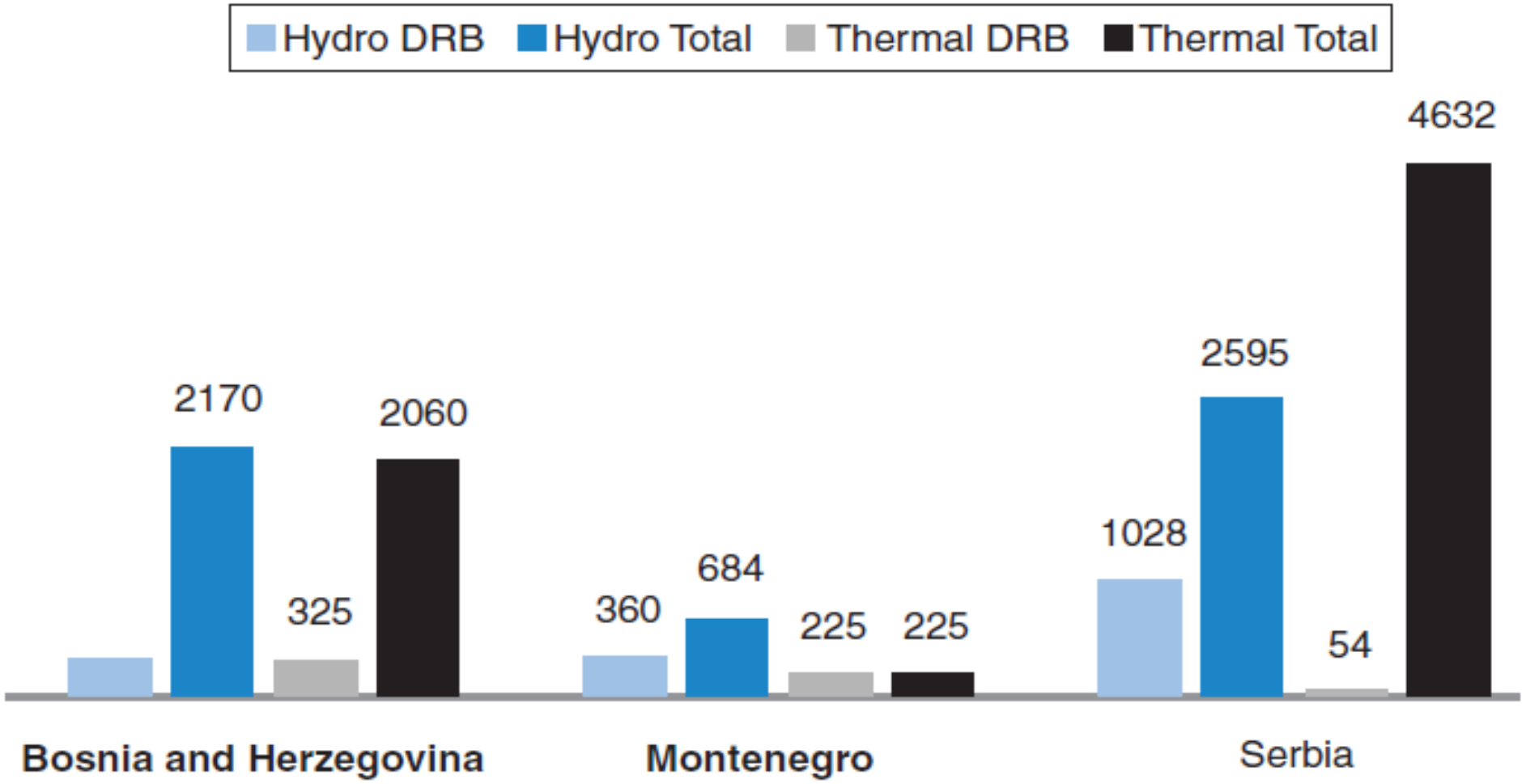
DRINA RIVER

Visegrad (161 MCM)

Bajina Basta (218 MCM)

Zvornik (89 MCM)

Hydro and thermal power distribution in the Drina River Basin Countries



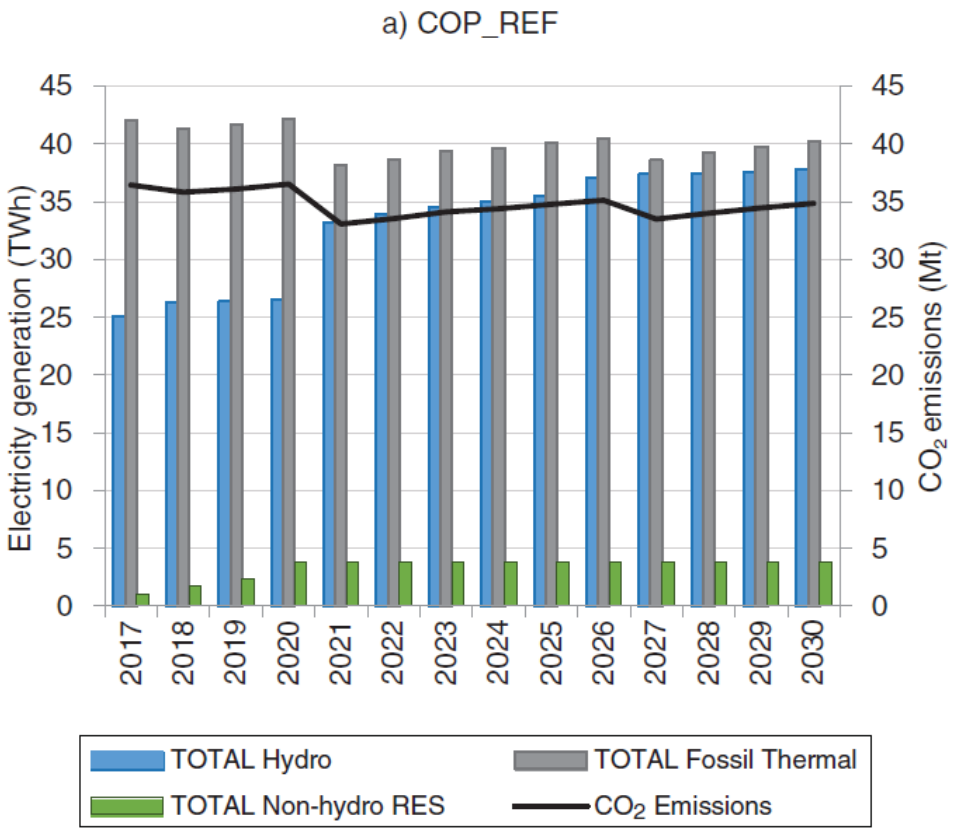
Megawatts

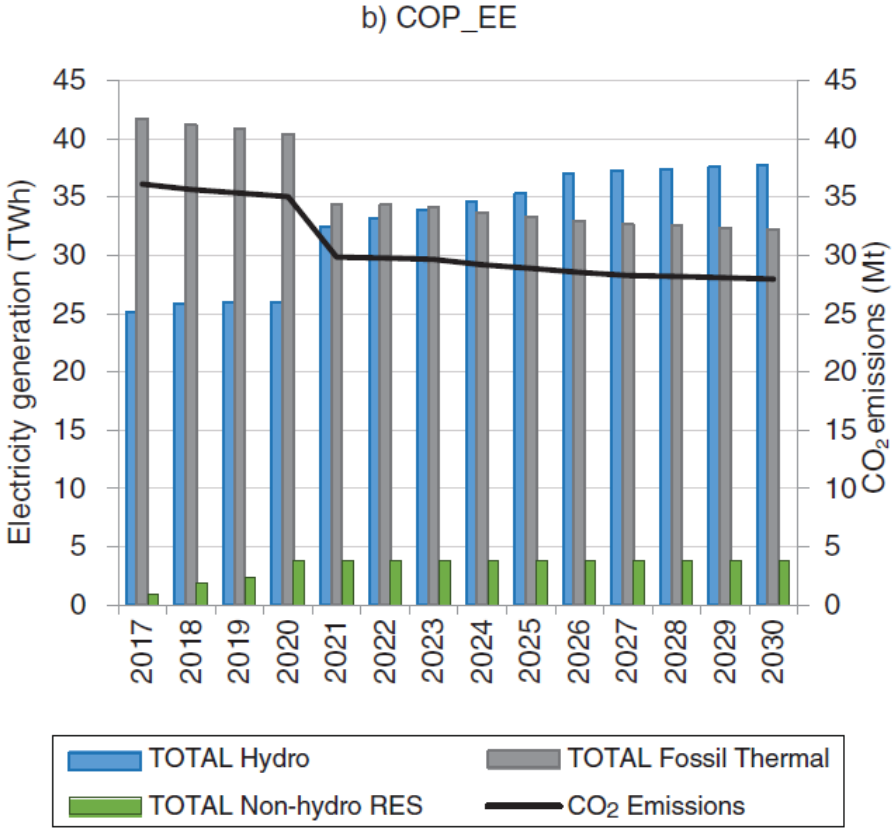
SCENARIOS- PHASE I

- **Base scenario (BASE)**: representing the existing levels of cooperative operation of HPPs in DRB. Upstream HPPs are operated on a single unit basis and those downstream are responding to their best.

- **Cooperative scenario (COP)**: representing a cooperative planning and operation of all the hydro power plants in the basin.
  - **Increased Trade (COP_TRD):** explores the opportunities of improving interconnections and trade of electricity.
  - **Energy efficiency (COP_EE):** investigates the impact of implementing energy efficiency measures on the electricity generation mix.

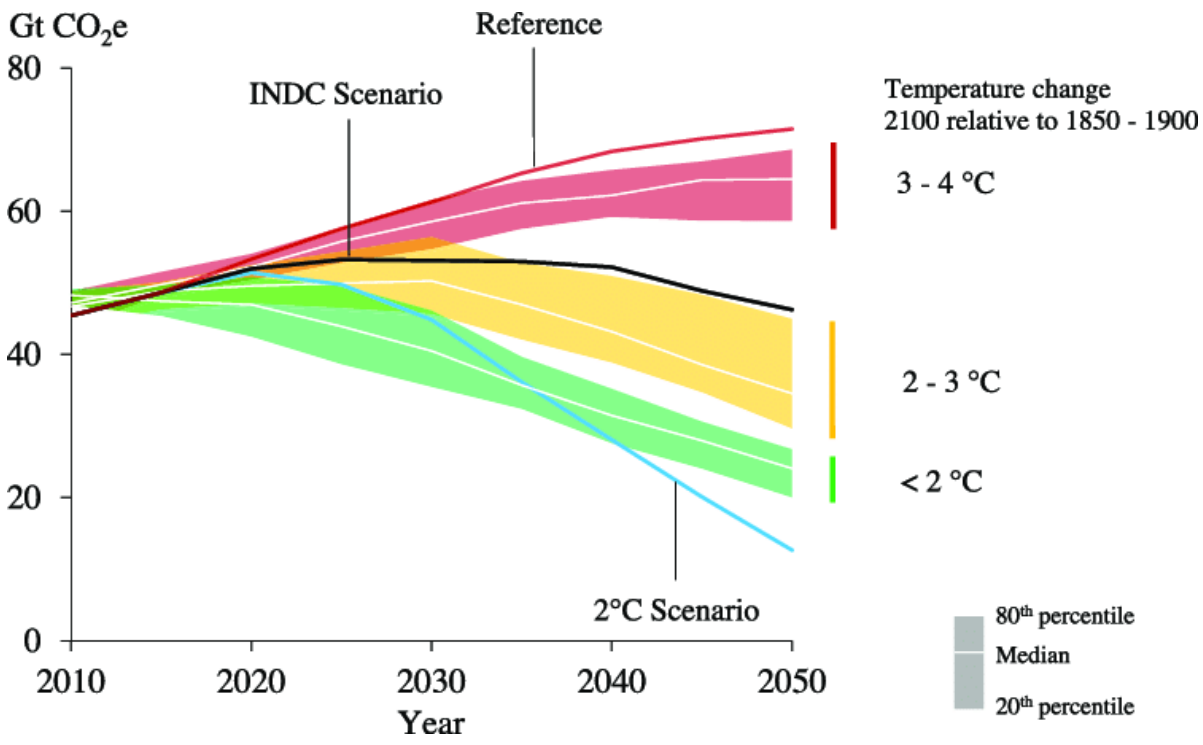
SCENARIOS- PHASE I





SUGGESTED NEXUS QUESTIONS TO BE ADDRESSED IN PHASE II

- Power sector INDCs
  - RE penetration in the Drina River Basin
  - Cost implications
  - Future electricity generation mix



Source: UNFCCC

SUGGESTED NEXUS QUESTIONS TO BE ADDRESSED IN PHASE II

- Increased Non-hydro Renewable energy penetration
  - How will the generation mix change ?
  - Until when hydropower be cost competitive ?
  - How it will affect the cost of electricity generation ?

Photo by Enrico Mantegazza on Unsplash

SUGGESTED NEXUS QUESTIONS TO BE ADDRESSED IN PHASE II

- Climate induced variability in hydropower generation (dry and wet scenarios)
  - Implications of loss in hydropower generation
  - Cost of adaptation to climate change
  - Energy security in the Riparian countries

Photo by Patrick Hendry on Unsplash

SUGGESTED NEXUS QUESTIONS TO BE ADDRESSED:

Potentially (**depending on data available**), also:

- Considering potential of solar, wind, biomass, and hydro to estimating the total renewable potential of the Drina River Basin countries, including and excluding environmentally sensitive areas (a spatially explicit approach)
- Model production taking into account environmental constraints (e.g. environmental flows, flood control, and sediment control). If such information will be available from local utilities or international projects (e.g. GEF SCCF Drina River Basin project).

TO DISCUSS:

- Does the suggested key questions reflect real, pressing issues related to renewable energy development in the Drina River Basin riparian countries and Republic of Serbia in particular?
- Among the scenarios proposed, which ones should be given priority?
- Which key actors should be consulted while developing the model to ensure that the best available data is used?