EC Consultation Meeting
Preparation of a guidance document on hydropower development and Natura 2000
Brussels, 08 July 2015

ICPDR Guiding Principles on Sustainable Hydropower Development in the Danube Basin

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The Danube River Basin

- 19 countries: Most international River Basin in the World
- Water cooperation: International Commission for the Protection of the Danube River (ICPDR)

- Contracting parties: 14 countries - 9 EU Member States, 5 Non EU Member States + European Union
- ICPDR: The platform for countries to draft and adopt the **Danube River Basin Management** and **Danube Flood Risk Management Plans** (EU Water Framework Directive and EU Floods Directive)

Guiding Principles on Sustainable Hydropower

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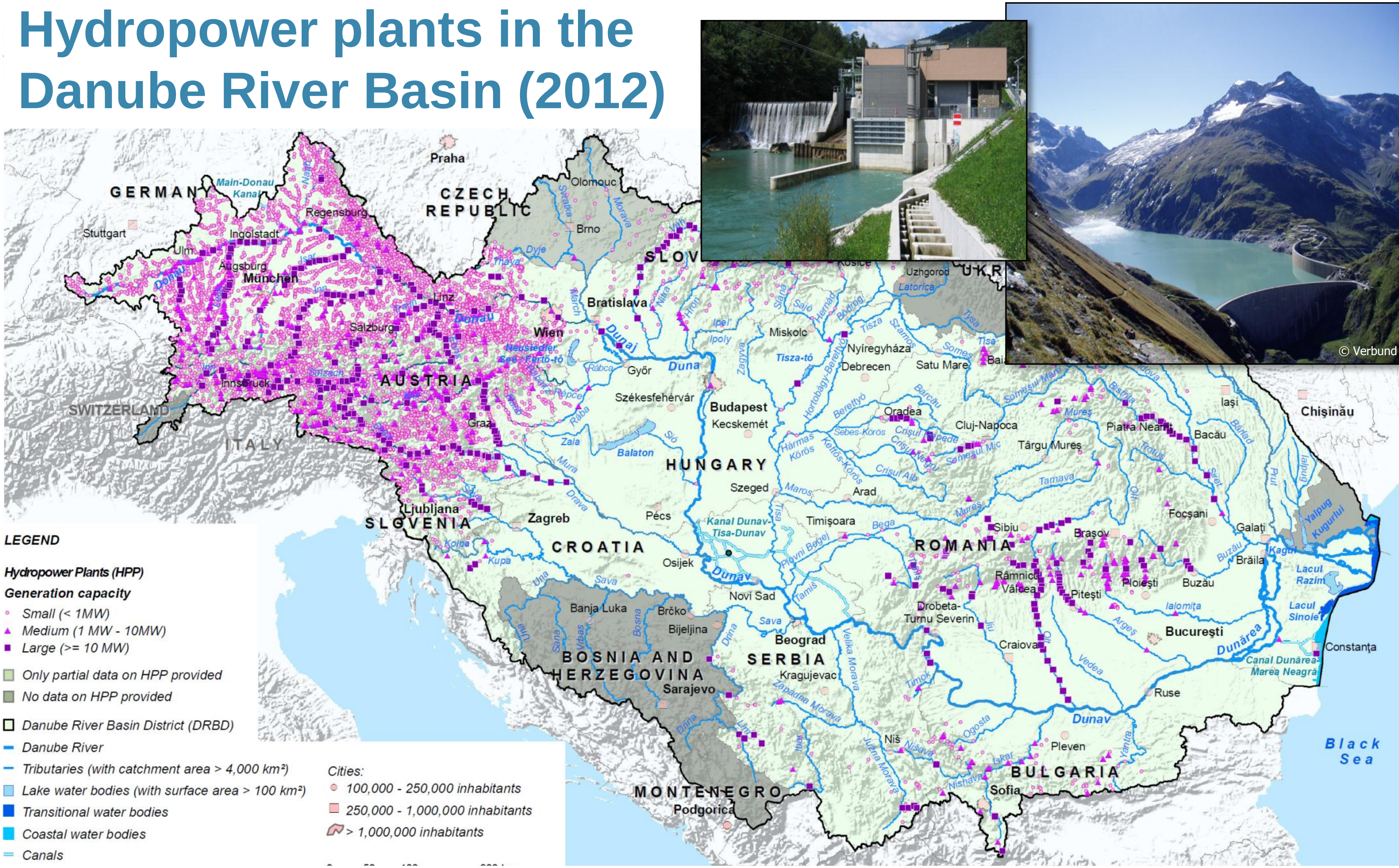
Hydropower plants in the Danube River Basin (2012)



Majority of electricity generated by large hydropower

➔ **~ 300 large facilities** (>10MW) generate **~ 90%** of electricity from HP

➔ **> 8,000 small facilities** (<10MW) generate **~ 10%** of electricity from HP

Hydropower
Outlook: Increasing trends

Outlook hydropower:

➔ Intention to increase hydropower capacities by Danube countries

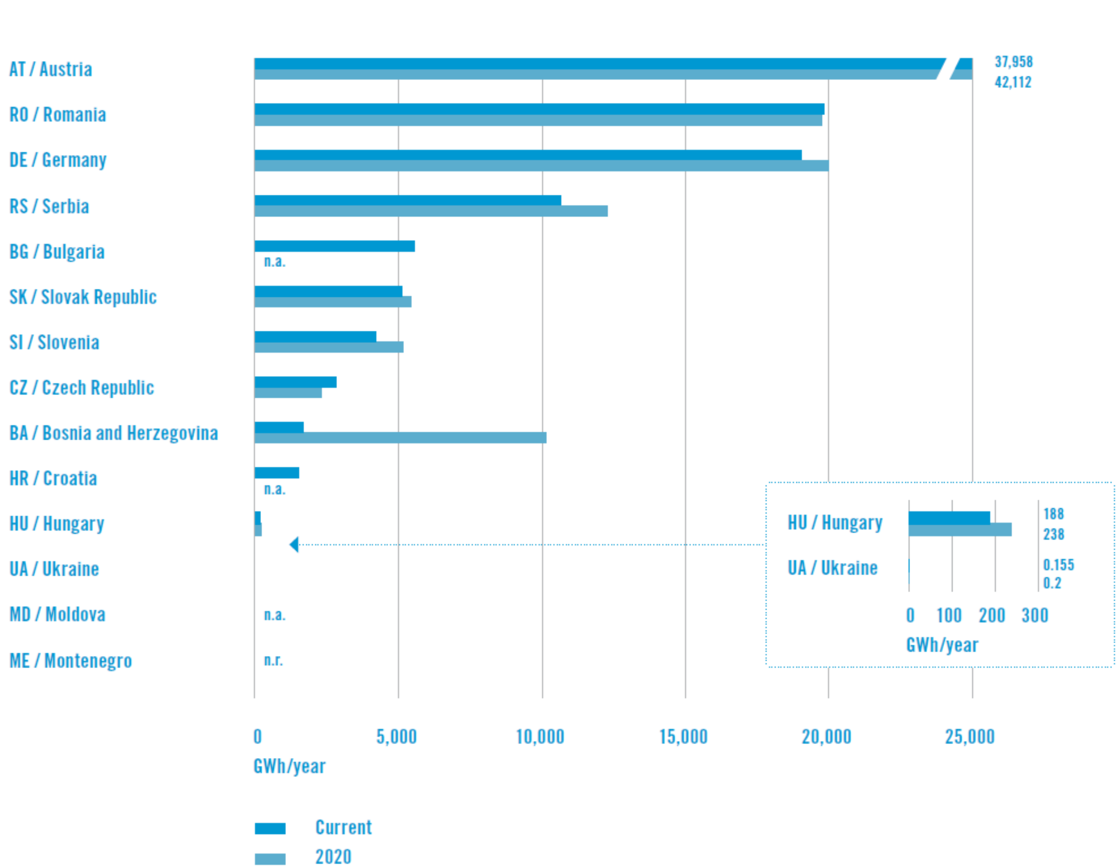
Main drivers:

➔ To increase share of renewable energy

➔ Reduction of greenhouse gas emissions and climate protection policies

➔ Integration of other forms of renewable energy (wind, solar)

Electricity production from hydropower currently and expected in 2020, in GWh/year (excluding pumped storage)* FIGURE 3



Impacts of hydropower

Challenge for environmental policies

Altered flow regime

Altered sediment dynamics

Ecological impacts

Legal framework

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Ambitious EU legislation for energy + water

Energy Community

RES-e **European Renewable Energy Directive 2009/28/EC** **Objectives:** to **increase share of energy from renewable sources** with target figures for 2020 for each state States set national targets + decide on strategy; e.g. by targets for HP	**WFD** **EU Water Framework Directive 2000/60/EC** **Objectives:** **good ecological status** of water bodies No deterioration of status

Without cross-sectoral dialogue both sectors are at risk to fail achieving the objectives and legal compliance!

Sustainable Hydropower in the Danube Basin

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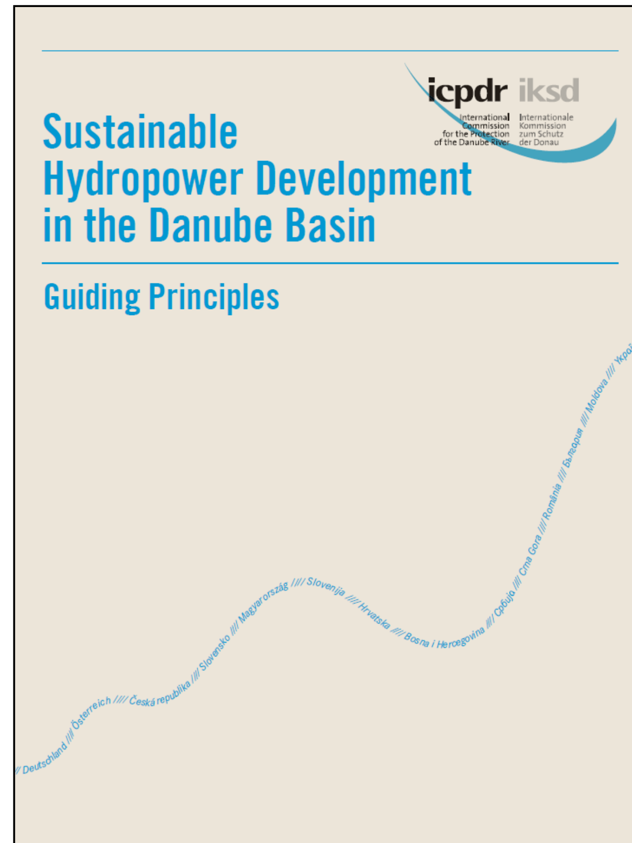
- **2010: Political mandate** to develop „Guiding Principles on Sustainable Hydropower Development in the Danube Basin“
- Lead: **Austria, Romania and Slovenia** in the frame of the ICPDR
- **2011: Process launched**
- **6 Meetings, 2 Workshops**
- **June 2013:** Consensus reached and **Guiding Principles adopted**



Participating countries and institutions

Danube Countries

- Austria
- Bosnia and Herzegovina
- Bulgaria
- Czech Republic
- Croatia
- Hungary
- Moldova
- Montenegro
- Germany
- Romania
- Republic of Serbia
- Slovak Republic
- Slovenia
- Ukraine

European Commission

- Directorate General Environment
- Directorate General Energy

Stakeholders and NGOs

- Association of Austrian Electricity Companies
- Danube Environmental Forum
- Energy Community Secretariat
- European Small Hydropower Association
- European Anglers Association
- International Association for Danube Research (IAD)
- International Hydropower Association (IHA)
- VGB Powertech (Verbund Hydropower AG)
- WWF International and DCP

Guiding Principles Sustainable Hydropower

Based on EU policy documents and recommendations

CIS Hydropower Workshop 2007

- (…) more **holistic approaches for hydropower** use are needed. The focus should be on catchment level and **not only site-specific** or on water body level.
- (…) participants recognised the **advantages of pre-planning mechanisms** to facilitate the (proper location) **identification of suitable areas** for new hydropower projects (…) assist the authorisation process
- At least 3 categories of areas could be distinguished for pre-planning: **suitable, less favourable and non-favourable areas** (…) identified with the **involvement of all stakeholders** based on transparent criteria
- (…) ensuring **fish migration and ecological flow** identified as priority measures

Statement of the Water Directors, Segovia, 2010

- **Pre-planning mechanisms** allocating “no-go” areas for new hydro-power projects should be developed (…) **based on a dialogue** between the different competent authorities, stakeholders and NGOs

CIS Hydropower Workshop 2011

- Good practice uses of **strategic plans** (…) **upfront information to developers** about where (geographically) gaining authorisation will be more or less difficult (…) strategic plans are **framework for project level** decision-making
- Good practice examples on **WFD Article 4.7** (…) when considering better alternative options (…) whether alternative would provide equivalent benefit (…) **alternative locations** for a hydropower scheme usually **cannot be restricted to the local level**

EU Blueprint to Safeguard Europe‘s Water Resources 2012

- Context of **Article 4.7** (…) hydropower deserves specific attention (…) refurbishing and expanding existing installations should be given priority over new developments which should be underpinned by a **strategic assessment** at the river basin scale, selecting **optimal locations** in terms of energy production and lowest environmental impact

Hydropower Guiding Principles
Main elements

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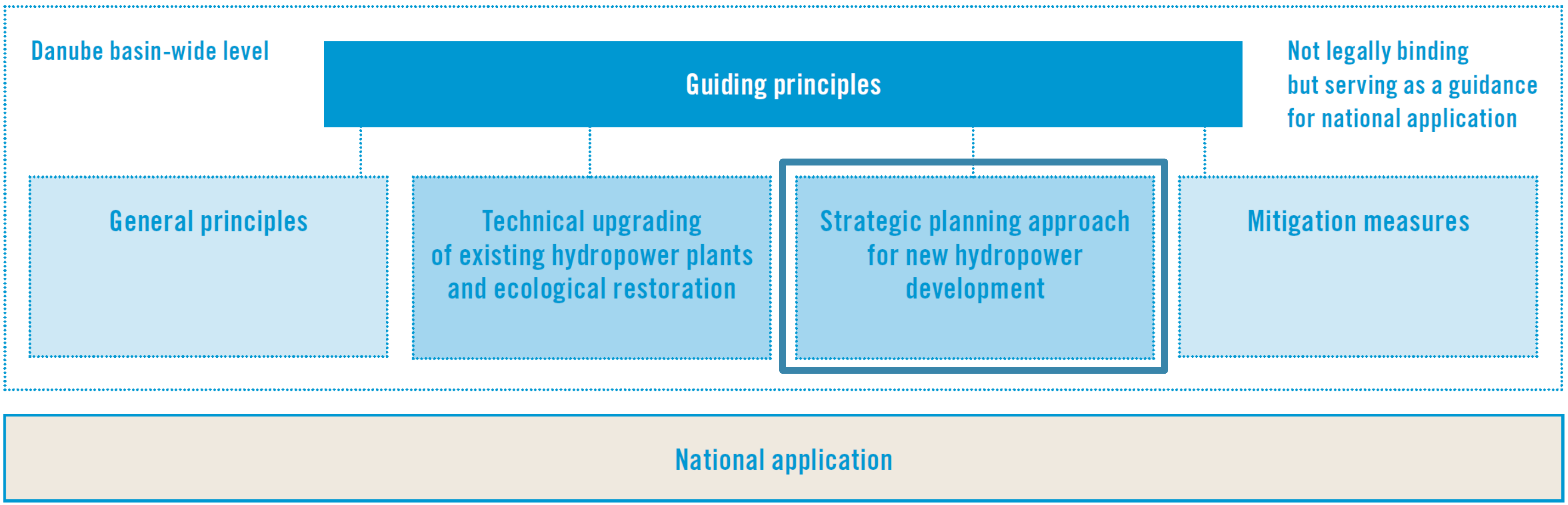

- **Recommendations** based on EU legislation & EU policies
- **Strike for balance**, represent state of the art in Europe
- **Need for practical application** at **national level**

Legal requirements for new hydropower projects?

- New **hydropower projects** can deteriorate water status and **conflict with WFD** “no deterioration principle”
- WFD Article 4(7) **exceptionally allows deterioration** of water status provided certain explicit conditions are met:

  - **Benefits** of project **outweigh** environmental **impacts**
  - No significantly better environmental options (i.e. **alternative locations** for projects!)
  - All practicable **mitigation measures** taken to minimize negative effects
  - Reasons to be explained in **River Basin Management Plan**
- Compliance with other relevant (environmental) legislation, i.e. **Natura 2000**, environmenal impact assessment, etc.

Strategic planning for new hydropower development

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Underlying principle for planning:

The **higher the ecological/landscape value** of a river stretch the **higher the energy output and other project-related benefits** have to be

Strategic planning approach for new hydropower development

Two-level assessment

1 National/Regional level – „WHERE“?

2 Project-Specific Level – „HOW“?

1 Favorable locations – “WHERE”

2 Technical solutions – “HOW”

Danube basin-wide framework

Transparent, structured, reproducible and criteria based approach on two levels

Not legally binding but serving as a guidance for national application

National/Regional Level

Regional assessment, classifying the potential appropriateness of water bodies for hydropower use, independently from individual application

> Hydroelectric potential
> Ecological and landscape value

Interactions

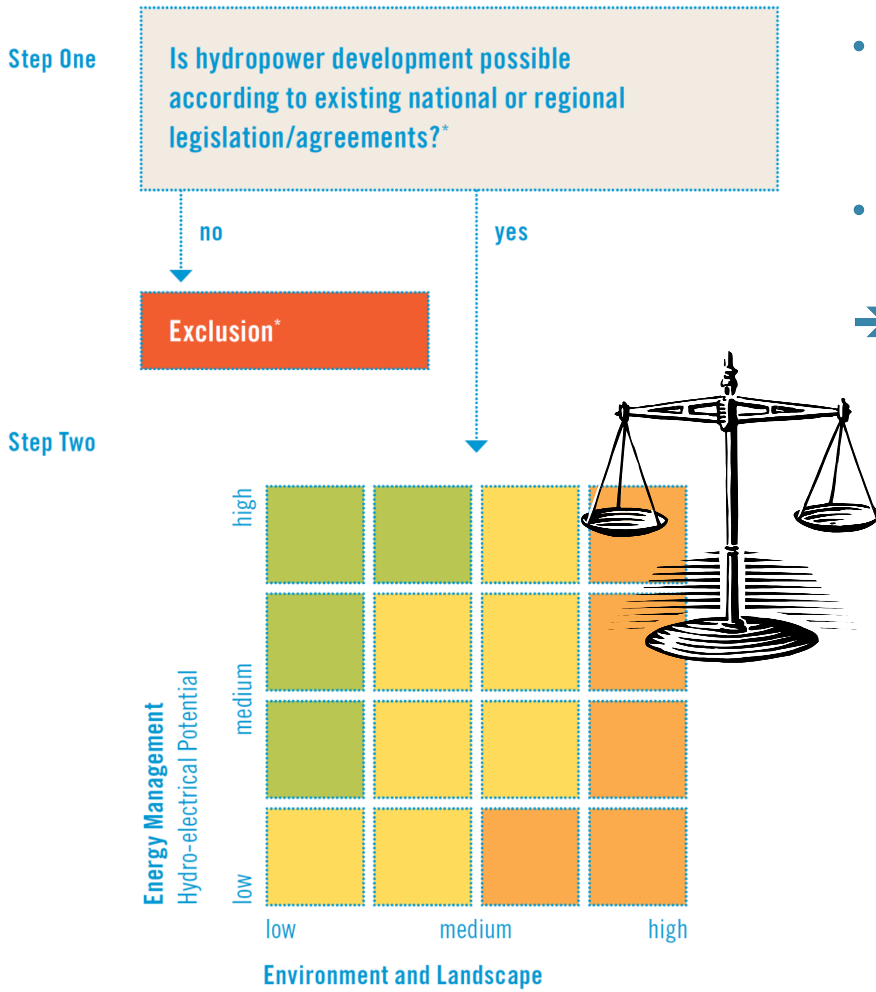
Project-Specific Level

Project-specific assessment of the individual application by weighing all pros and cons

> Results of the regional assessment
> Project-specific criteria
> Further socio-economic aspects

Strategic planning for new hydropower

1 National/Regional level assessment – WHERE?



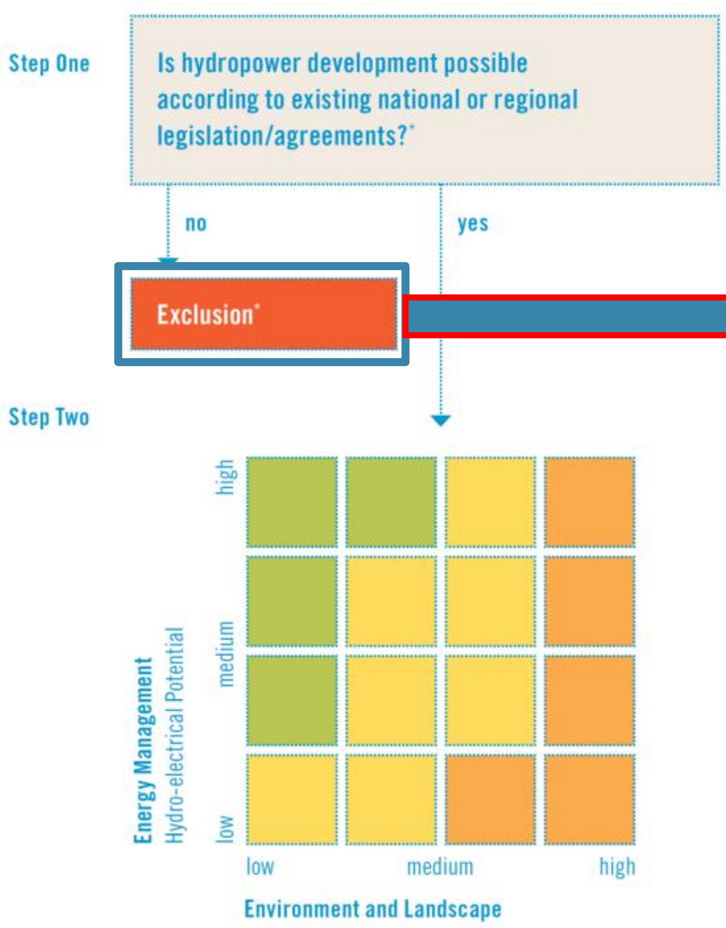
- **Criteria-based assessment** of river stretches (energy management, environment and landscape value)
- **Weighing process** with involvement of stakeholders and public

➔ Provides information on **suitability of river stretches** for new hydropower development

FAVOURABLE for hydropower development	LESS-FAVOURABLE for hydropower development	NON-FAVOURABLE for hydropower development
Generally considered as possible	Possible under specific circumstances	Possible in exceptional cases**

Strategic planning for new hydropower

1 National/Regional level assessment – WHERE?



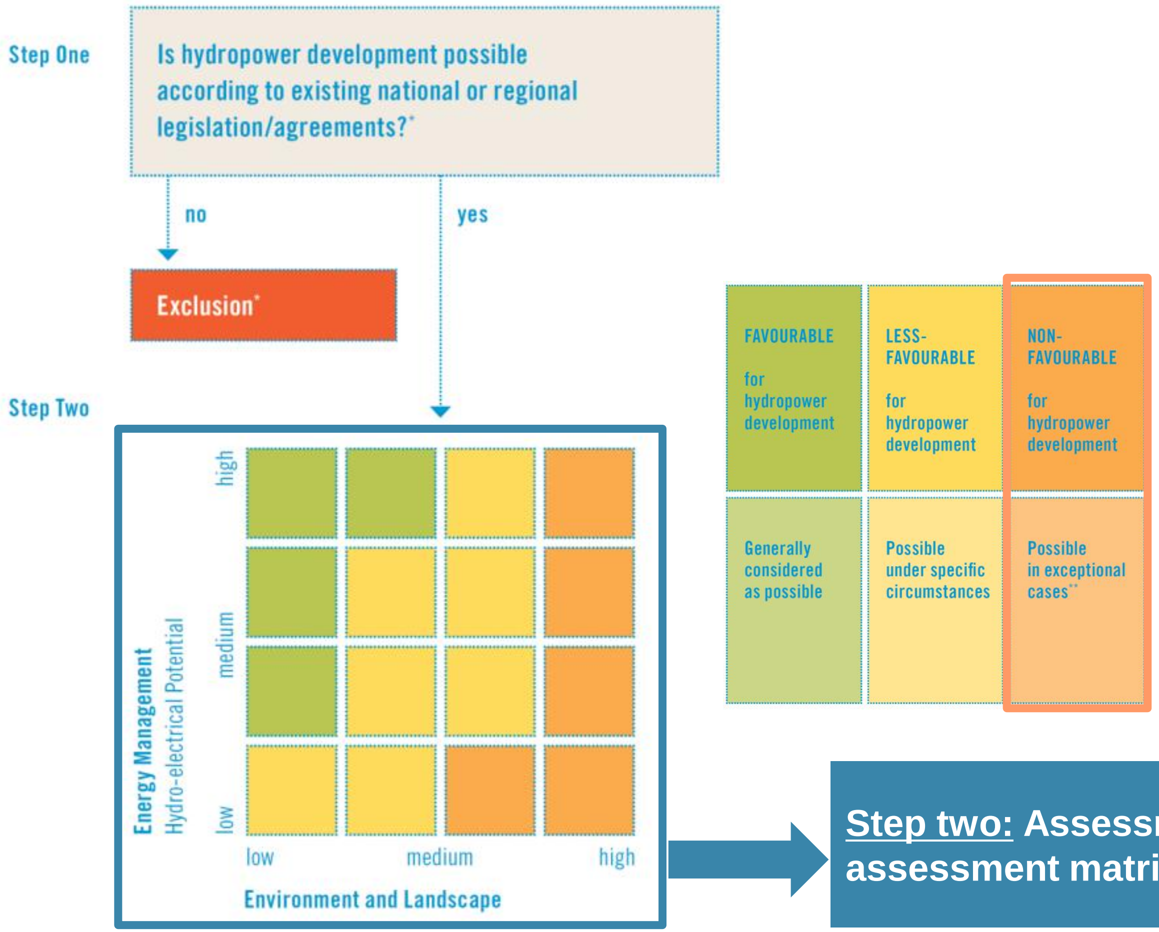
* **Step one:** **Identification of river stretches where hydropower development is forbidden according to relevant international agreements, national or regional legislation/agreements (exclusion zones).**

Criteria which are in place in some European countries for this category are for example (non-exhaustive list): protected areas, high ecological status stretches, reference stretches, catchment size. Those criteria are principally suitable for basin-wide application.

The exclusion category is set for a specific period of time or permanently, including cases where a dialogue between the competent authorities, stakeholders and NGOs has taken place.

Strategic planning for new hydropower

1 National/Regional level assessment – WHERE?



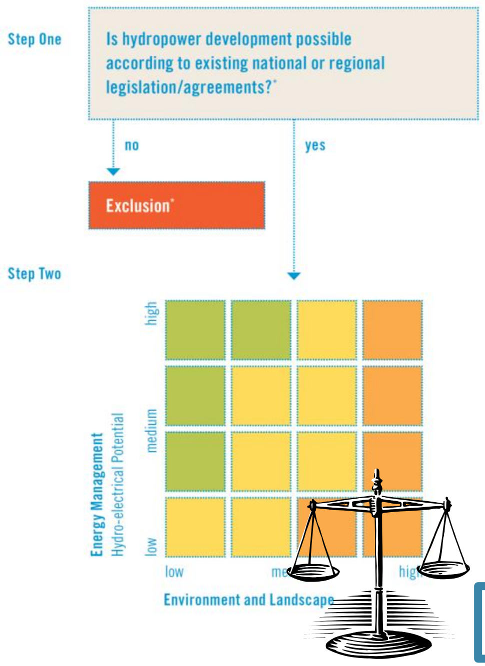
<u> Non-favourable for hydropower development:</u>**
e.g. Natura 2000 sites due to exemptions according to Article 6.3 and 6.4

Provisions and requirements according to the management and protection of Natura 2000 sites and the need for an appropriate assessment of impacts of possible projects in the concerned areas need to be additionally taken into account.

<u>Step two:</u> Assessment of all other stretches using the assessment matrix and classification scheme.

Strategic planning for new hydropower

1 National/Regional level assessment – WHERE?



Recommended list for national/regional criteria	TABLE 1
National/Regional criteria	**Description**
Energy Management	
Hydro-electrical potential (theoretical or line Potential)	Product between quantity of flow and head [GWh/TWh]
Environment	
Naturalness	Status of river stretches/water body in relation to the deviation from type-specific natural conditions regarding hydrology, morphology biological and sediment continuity as well as biological communities
Status of water body with regard to rarity and ecological value	Rarity of the river type, ecological status of a river stretch and sensitivity
Specific ecological structure and function of the river stretch also with regard to the whole catchment/ sub-basin and in relation to ecosystem services	e.g. Particular habitats for sensitive/valuable fish species or other biological quality elements in the riverine ecology (e.g. red list species)
Conservation areas and protected sites	e.g. Natura 2000 areas (Birds and Habitats Directive), Ramsar sites (Ramsar Convention), UNESCO Biosphere Reserves, National, Regional and Nature Parks (IUCN I-IV)
Landscape	
Naturalness	no significant anthropogenic impacts
Diversity	Intact terrestrial ecology with extensive use (e.g. small agriculture with low fertilizer use, sustainable forestry); diverse patterns of land use
Landscape scenery	e.g. aesthetic values, high architectonic and historical quality
Recreation value	Use for soft tourism and recreation, such as organized camping sites, canoeing, etc.
Cultural heritage	Historical buildings and villages or towns Traditional practice such as handicrafts and culturing,
Spatial planning obligations	Legal regulation for different areas and uses

Set of relevant criteria for national/regional level assessment

Strategic planning for new hydropower

2

Set of criteria for project specific assessment – HOW?

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Recommended list for project-specific criteria TABLE 2

Project-specific criteria	Description
Energy Management	
Hydropower plant size	Installed capacity
Hydropower plant type	e.g. run-of-river, diversion, storage, pumped storage
Security of supply	Production and supply of energy (Auto supply),
Quality of supply	Production characteristics – base load/ peak load (storage option, pumping storage)
Contribution to climate protection	lower CO_2 emissions of the energy mix
Technical efficiency	Grid connection, potential use, size of plants
Environment and water management	
Ecological impacts of the project	Longitudinal/lateral/vertical connectivity; impacts on habitats and biota taking into account already existing impacts
Flood control	Protection of sites at flood risk; alteration of flow regime
Irrigation	Positive or negative effects on water availability for irrigation
Sediment management	Reservoir siltation, bedload transport, sediment contamination, plant design
Surface and groundwater quantity	Infiltration and exfiltration, minimum ecological flow,
Surface and groundwater quality	Nutrients, persistent organic substances, hazardous substances, thermal effects
Drinking water supply	Positive or negative effects on quality and service security
Bank protection and restoration	Foster erosive banks
Fisheries	Ensuring natural reproduction and fish migration across dams and residual water stretches
Effects of climate change	Changes in flow regime and impacts on economic feasibility of projects
Effects on water bodies already restored	water bodies restored by public money should not be effected again
Socio-economic criteria	
Conformity with local spatial planning	Compliance with the local regulations
Necessity of further infrastructure for construction and operation	Access, energy grids, etc.
Regional economic effects	Taxes, income for the public; investments in local economy, induced employment
Recreation, tourism	Potential positive and negative effects on tourism
Other socio-political considerations	depending on the local situation

Set of relevant criteria for project specific assessment

Strategic planning for new hydropower

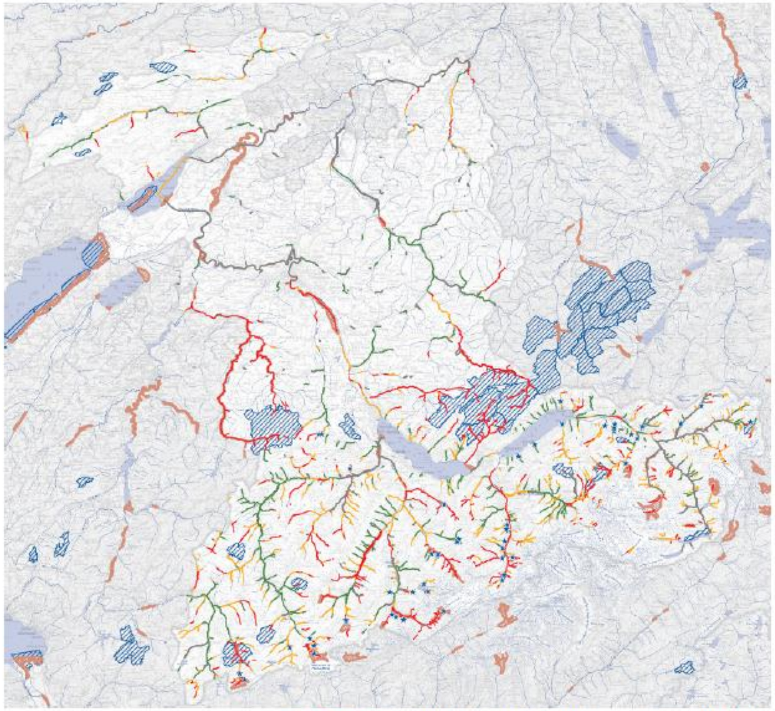
Example 1: Strategic planning in Switzerland (Canton Bern)

Kanton Bern

Hydrographic Map –
Central Basis to Estimate the Use and Protection

Three utilisation categories:

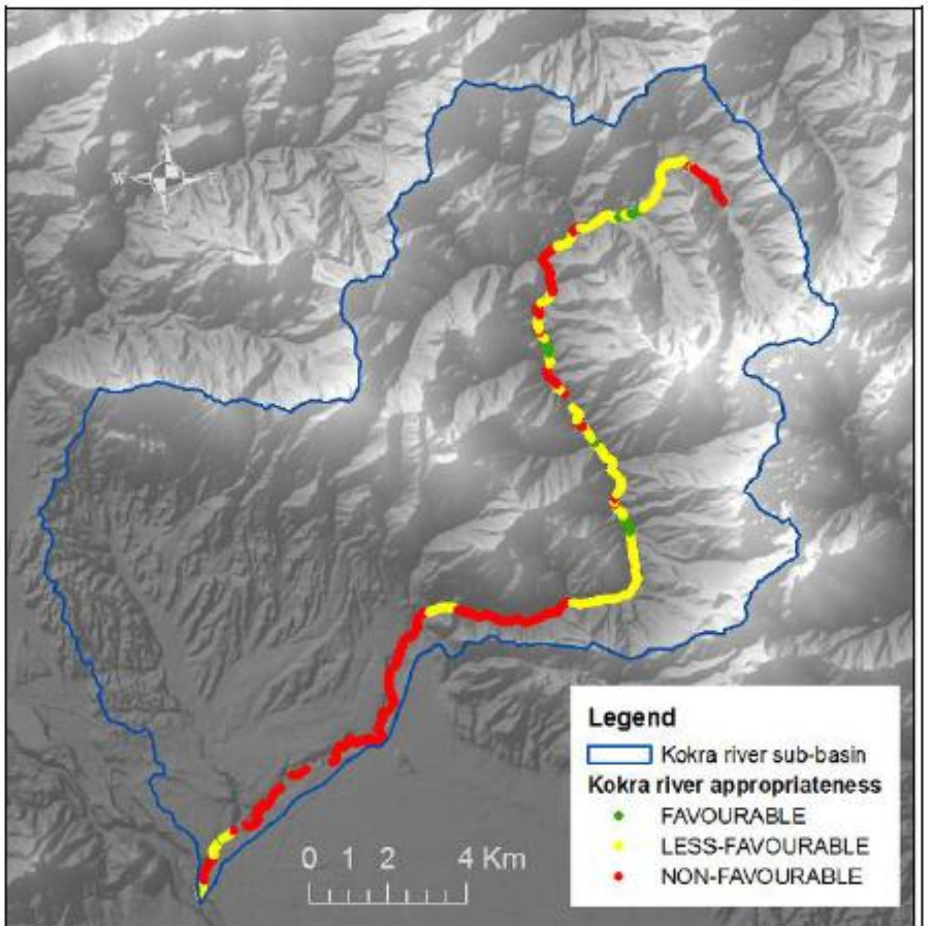
- **green:** utilisation of hydropower intended
- **yellow:** utilisation with limitated possibilities
- **red:** no use possible

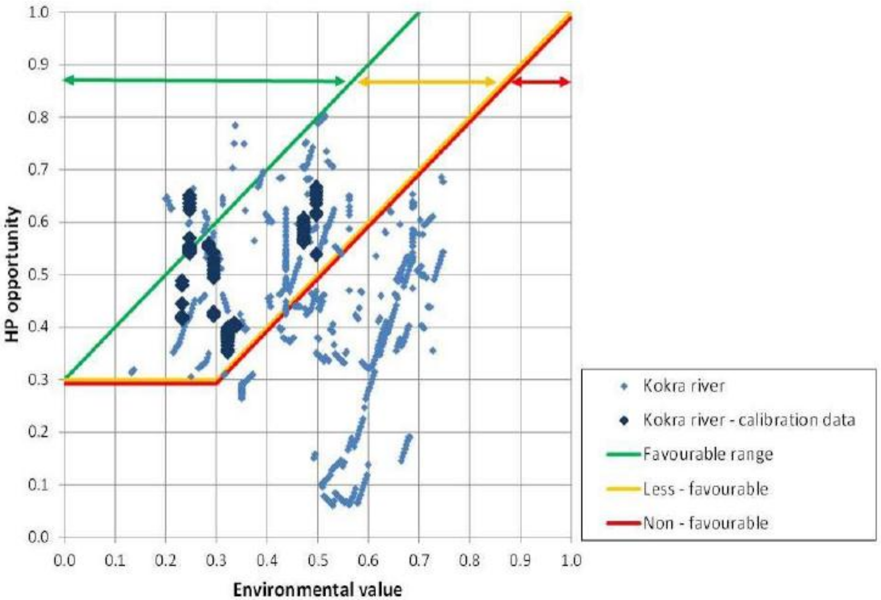


AWA Amt für Wasser und Abfall

Reference:
Presentation Mr. Heinz Habegger, ICPDR Workshop Hydropower and Water Management, March 2013

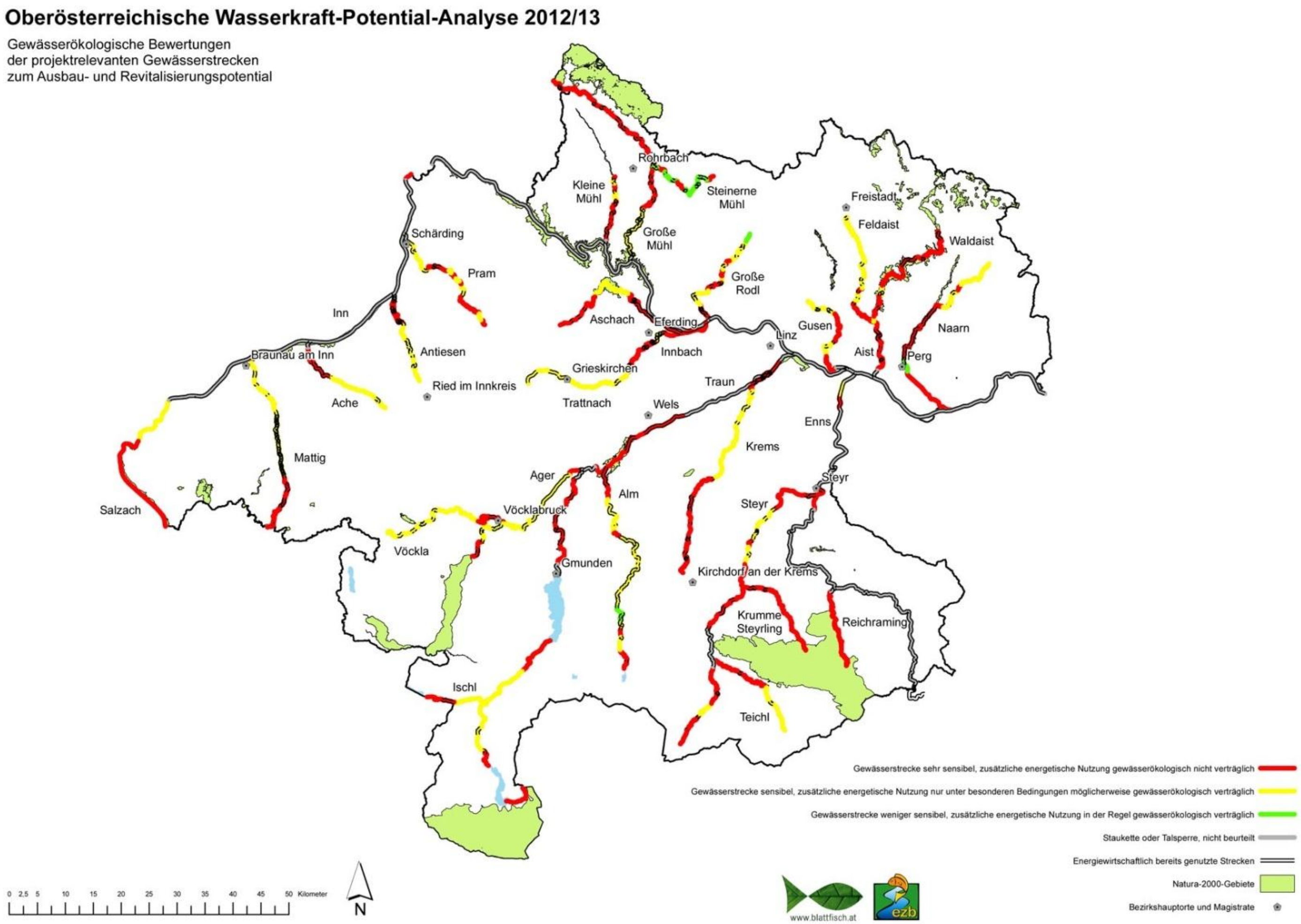
Strategic planning for new hydropower Example 2: Method development to support strategic planning in Slovenia





<u>Reference:</u>
Mag. Sašo Šantl, Chair of Fluid Mechanics with Laboratory, Ljubljana, Slovenia

Strategic planning for new hydropower
Example 3: Upper Austria



<u>Reference:</u> Presentation V. Koller-Kreimel, JASPERS Workshop on the implementation of the WFD in projects, 9-10 June 2015

Strategic planning for new hydropower

Example 4: Styria (Austria)

Category A: Protection

(high status stretches)

No impoundment, no barrier,

only very slight flow alterations

Category B: Priority for ecology

(hymo slight altered, ecologically important)

No impoundments, no barriers ,

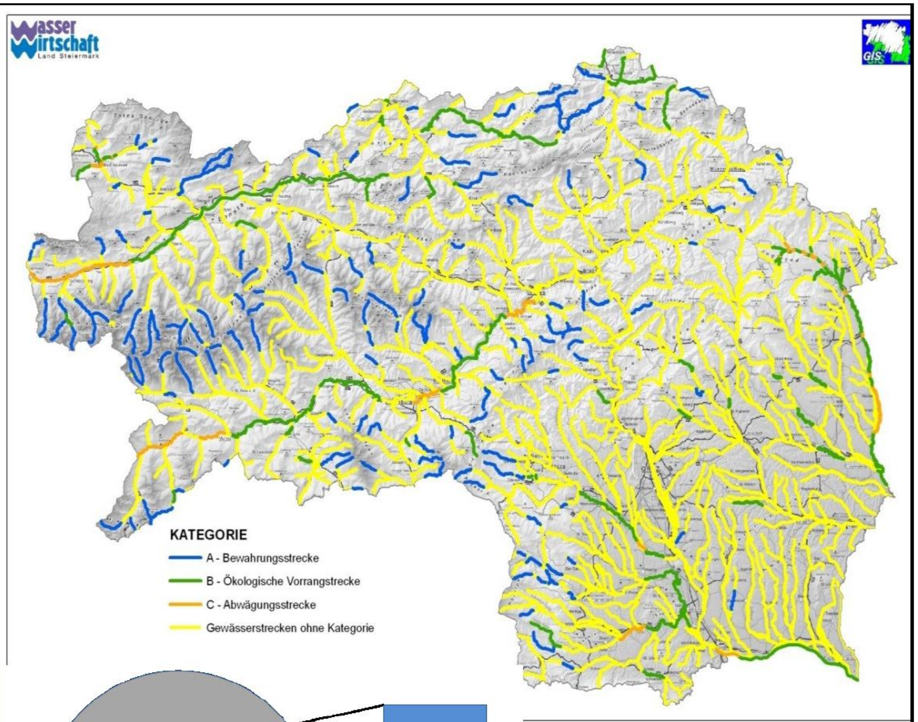
Only slight flow alterations

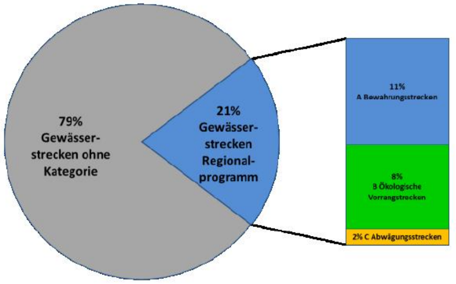
Category C: **Weighting sites**

(high electricity potential)

Hydropower use possible

but no Art. 4.7 exemption allowed!





Strategic planning for new hydropower
Benefits

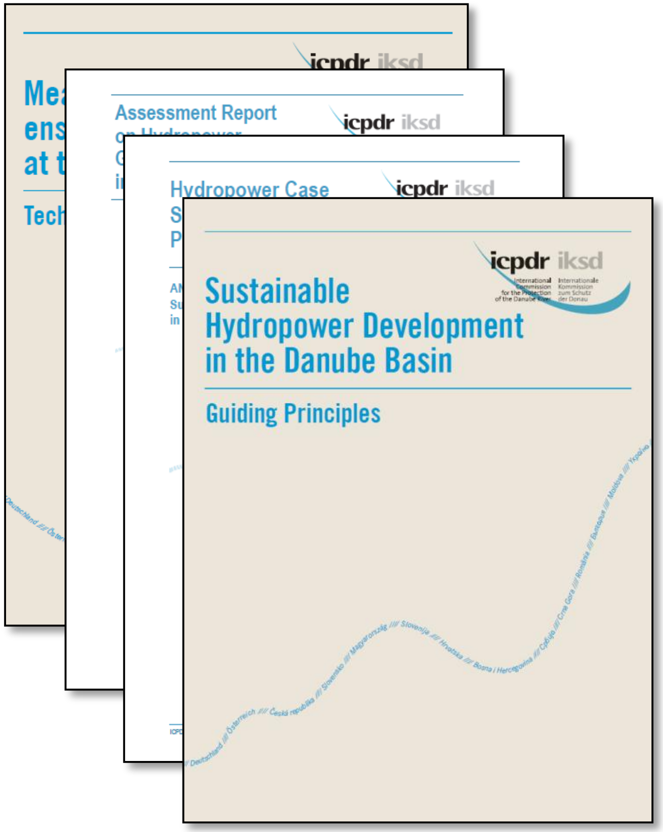
Practical application of **strategic planning** approach for new hydropower provides **broad range of potential benefits**:

- **Energy sector**: Streamlined authorisation processes, improvement of predictability and upfront information where authorisation is likely
- **Environmental sector**: Transparency, involvement in decision making process, protection of sensitive areas and river stretches
- **Authorities**: Increase of security for legal compliance, balanced approached with involvement of relevant actors at an early stage, accelerated implementation of legislation




Summary and conclusions

- Ambitious **EU legislation in place** for energy and water – **challenge is implementation**
- Hydropower **relevant for different legislation – RED, WFD, Natura 2000, ...**
- **Strategic planning** for new projects - assessment of suitability of river stretches – supports **streamlined authorisation** process
  - „**Protected areas**“ inter alia considered to be principally suitable for „**exclusion zones**“ – decision e.g. based on **dialogue** between authorities, stakeholders and NGOs
  - **Natura 2000** sites pointed out as example for „**non-favourable**“ category
- **Coordinated approach** is key for accelerated achievement of renewable energy targets and environmental protection



Thank you for your kind attention!

More information and related documents are available for download under

http://www.icpdr.org

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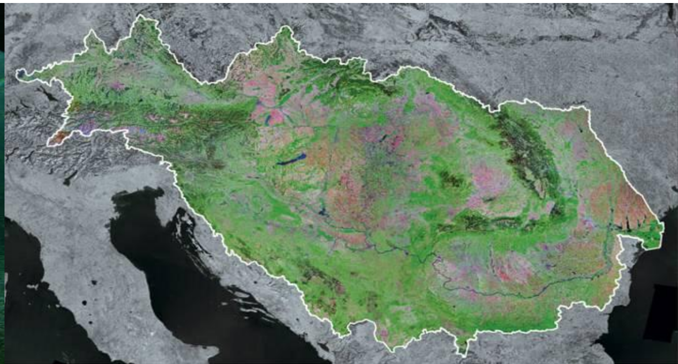

Impacts – why should we care?

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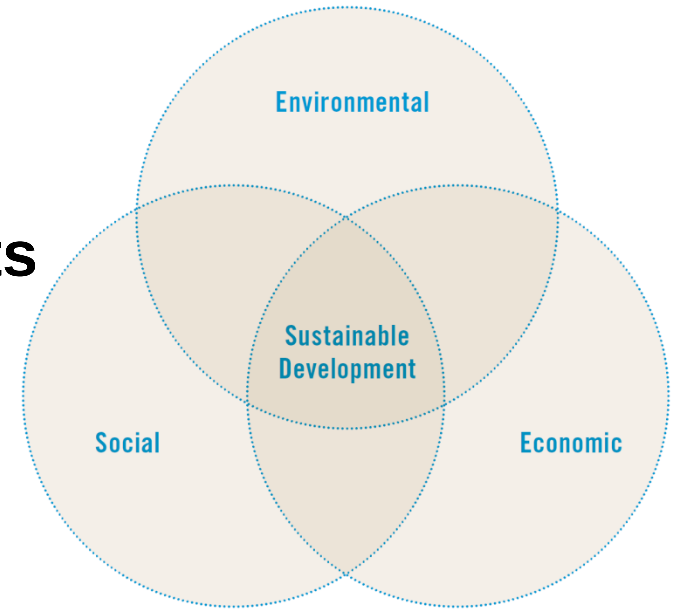
- Environmental protection and **biodiversity conservation** issues
- Negative impacts of hydropower generation have led to rather **negative reception of new projects** by civil society and financial institutions → assess impacts in detail
- Economic, social and environmental **benefits can be maximised** in case all benefits and impacts are considered from the very beginning
- Significant investments needed to **remediate negative impacts of existing facilities** to meet requirements of EU environmental legislation - **costs (much) higher** compared to initial consideration
- **Legal compliance** with existing legislation, i.e. WFD and N2000

Hydropower Guiding Principles

General principles

- Principle of **sustainability**
- Holistic approach in **energy policies**, incl. energy efficiency gains
- **Consideration of plant size** and capacities – taking **cumulative impacts** into account
- Weighing public interests in decision making → **hydropower is not automatically of overriding public interest** because it generates renewable energy
- Consideration of **climate change**



Issues related to existing hydropower plants?

Technical upgrading and ecological restoration

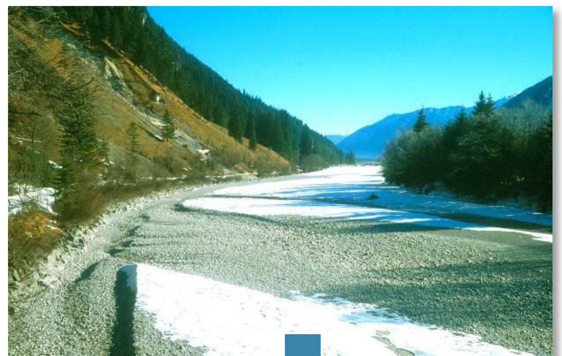
- Reaching WFD objectives (good ecological status/potential**) requires mitigation measures** (fish migration aids, ecological flows, etc.)
- Potential to **increase energy production** from existing facilities via **technical upgrading**
- **Combination** of technical upgrading with ecological restoration can imply **win-win solution** – increase of energy production <u>and</u> improvement of ecology

Existing and new projects

Mitigation measures to make hydropower more sustainable

Fish migration aids for ensuring connectivity and access to habitats

Ensuring ecological flow requirements



Mitigating artificial flow fluctuations (hydropeaking)

+ other issues (sediment transport, improvement of lateral connectivity, etc.)