



Designing collaborative and adaptive approaches to river basin development



International Hydropower Association

Origin

Created in 1995, under the auspices of UNESCO International Hydrological Programme

Mission

Advancing sustainable hydropower

Four strategic objectives

- Advancing policies and strategies for the sector
- Building a vibrant community
- Creating a platform for knowledge
- Delivering value for members

Members

100+

Global players



Regional players



Research & non-profit



Utilities and IPP



Partners

50+

Finance and development



Research & academia



NGO and civil society



International organisations



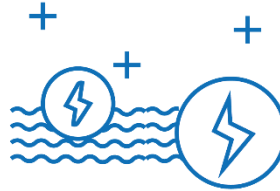
Governments



Hydropower system services

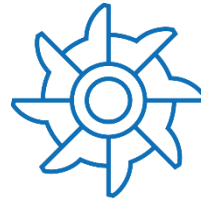
Broad range of low-carbon capacity available

- From kW to GW in a single project
- Option to export electricity in regional grids



Operational flexibility and efficiency

- Fast start-up and shut-down
- Highly efficient and adjustable output



Storage and back-up

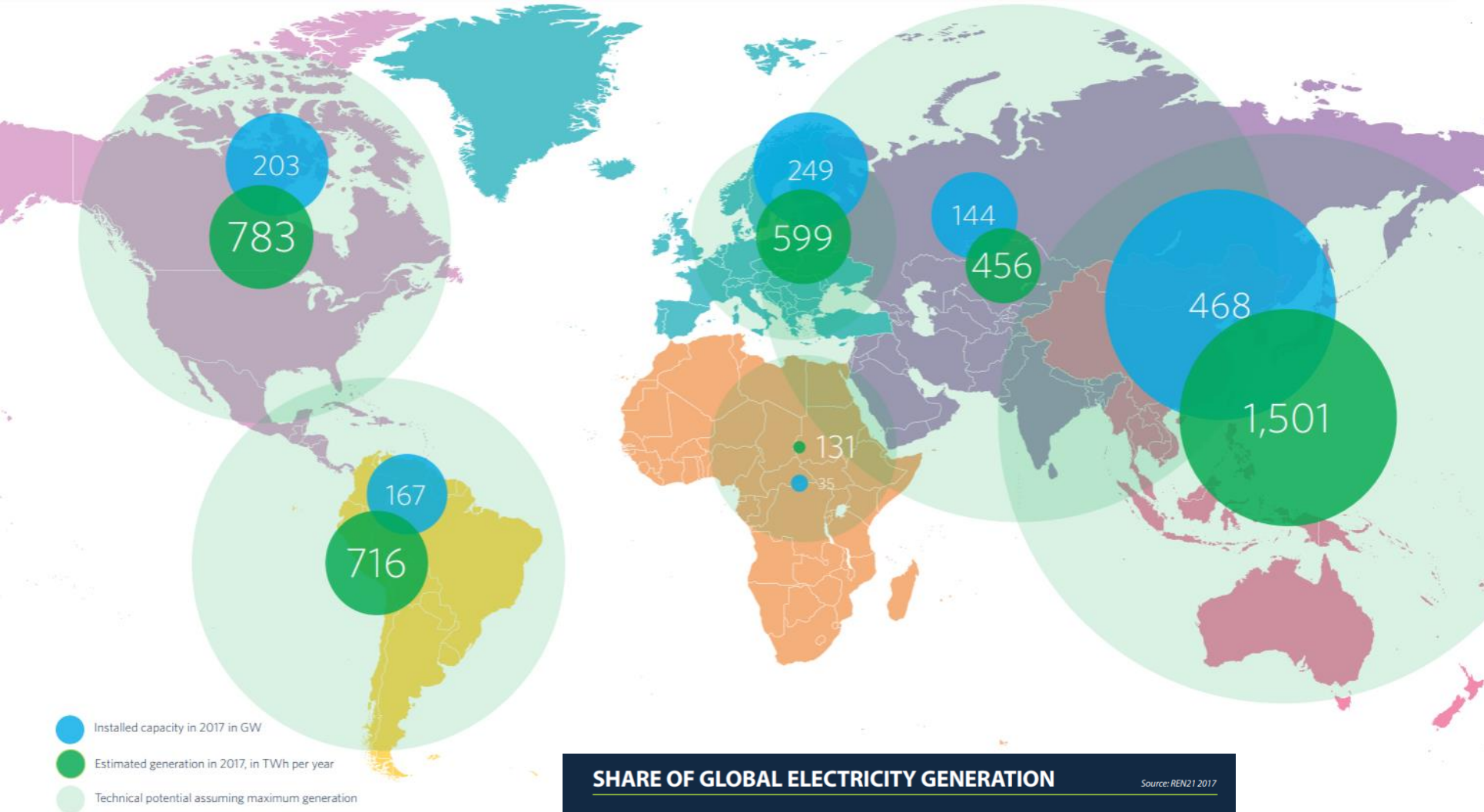
- Rapid availability, and ancillary services
- Option to absorb surplus (pumped storage)



Multiple freshwater services

- Water supply, irrigation, navigation, tourism
- Climate-change adaptation (flood and drought mitigation)





China
9.12 GW
Brazil **3.38 GW**
India **1.91 GW** Portugal 1.05GW
Angola 1.02 GW Turkey 0.59 GW
Iran 0.52 GW Vietnam 0.37 GW Russia 0.36 GW

1,267GW

global hydropower installed capacity in 2017

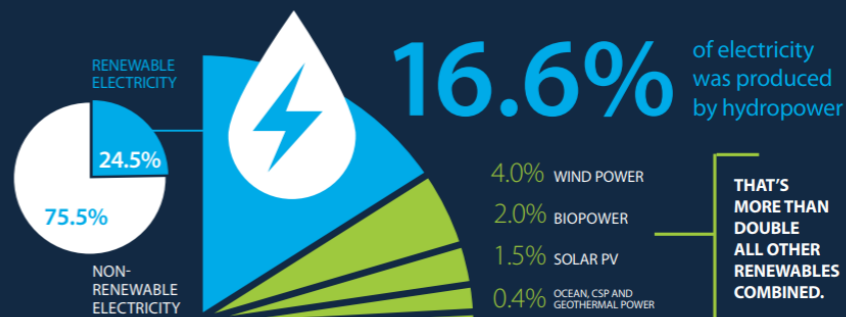
4,185TWh

estimated electricity generated from hydropower in 2017

SHARE OF GLOBAL ELECTRICITY GENERATION

Source: REN21 2017

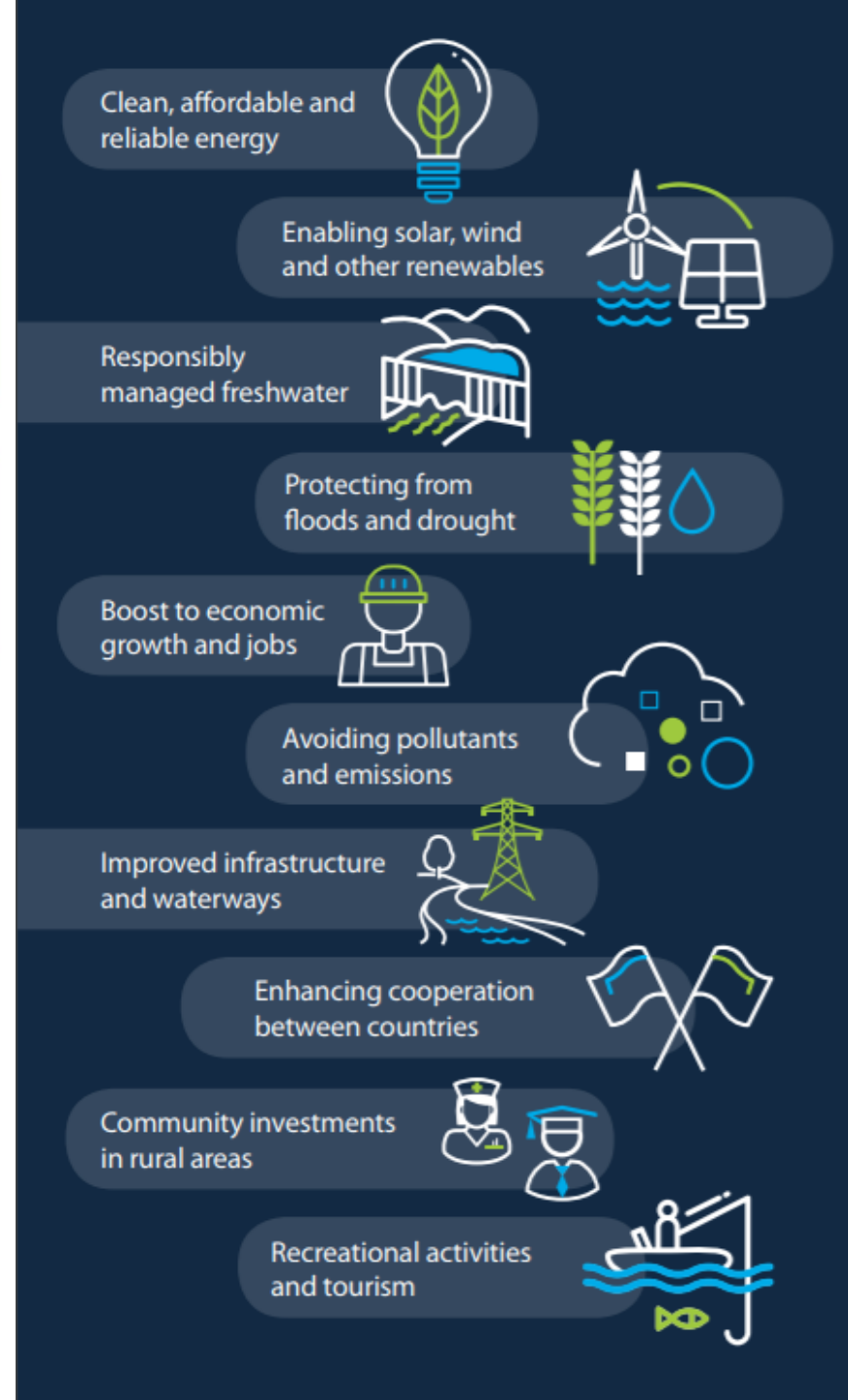
Hydropower is the world's largest source of renewable electricity generation.



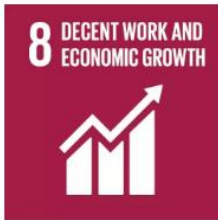
Hydropower and the SDGs



ENERGY
ECONOMY
SOCIETY
ENVIRONMENT
RISK MITIGATION



Hydropower and the SDGs



ENERGY

ECONOMY

SOCIETY

ENVIRONMENT

RISK MITIGATION



Clean, affordable and reliable energy



Enabling solar, wind and other renewables



Responsibly managed freshwater



Protecting from floods and drought



Boost to economic growth and jobs



Avoiding pollutants and emissions



Improved infrastructure and waterways



Enhancing cooperation between countries



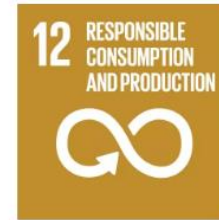
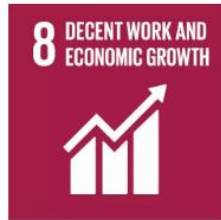
Community investments in rural areas



Recreational activities and tourism



Hydropower and the SDGs



ENERGY

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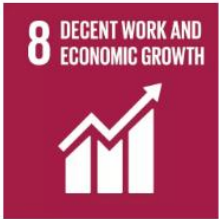
Community investments in rural areas



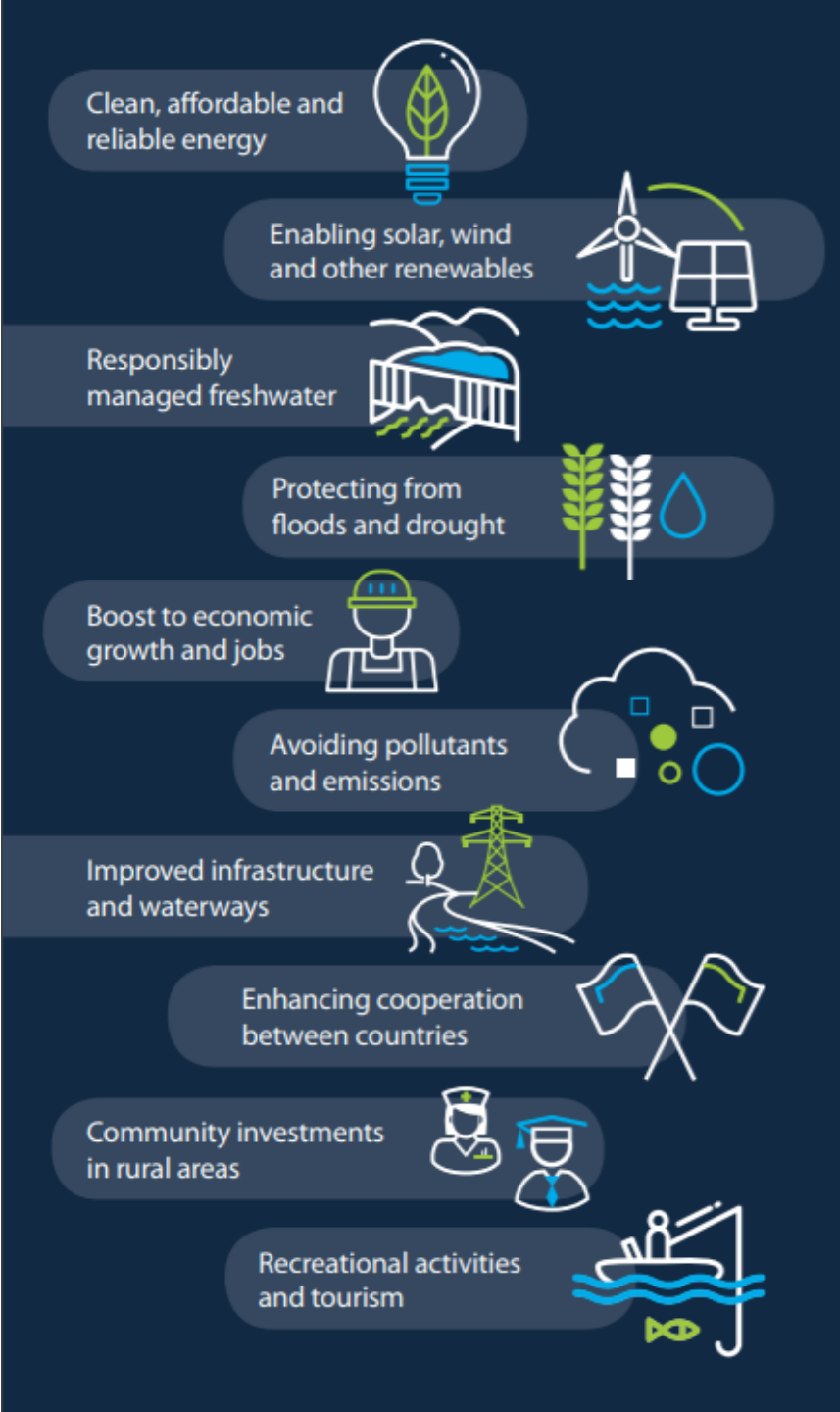
Recreational activities and tourism



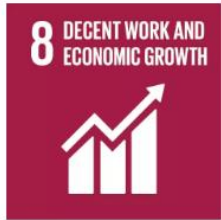
Hydropower and the SDGs



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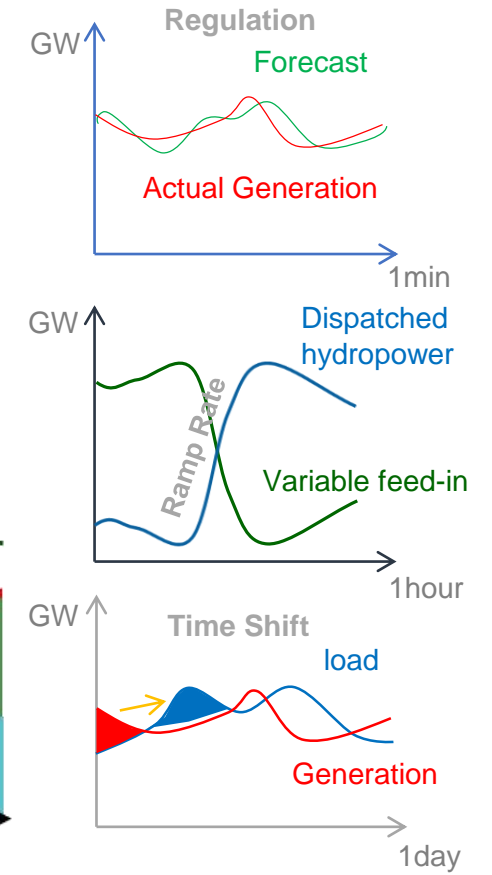
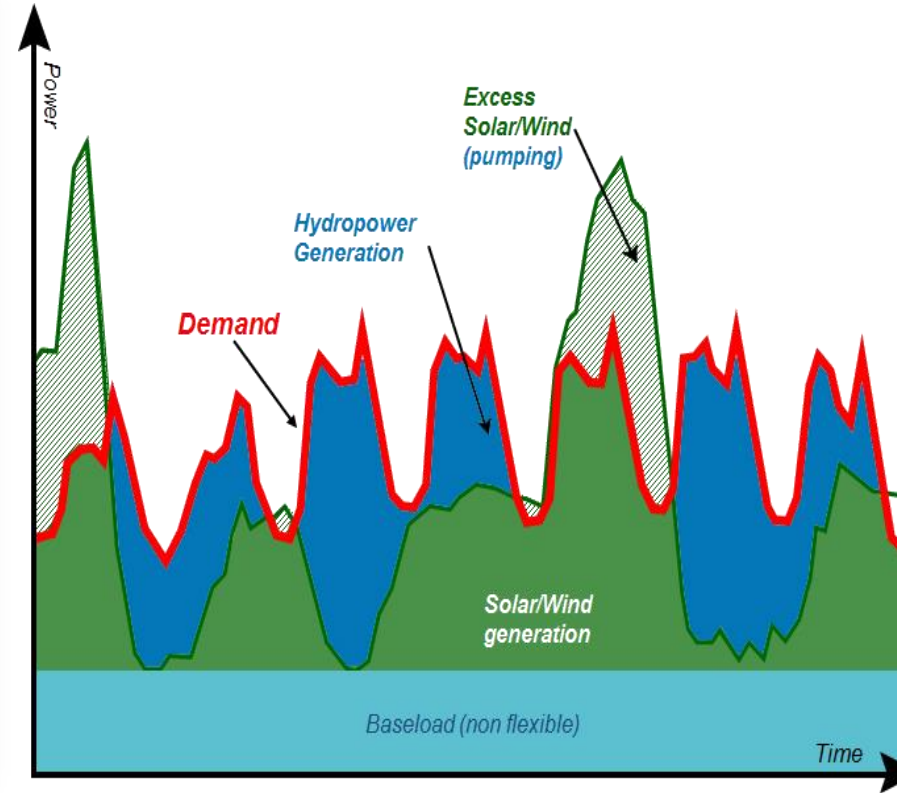
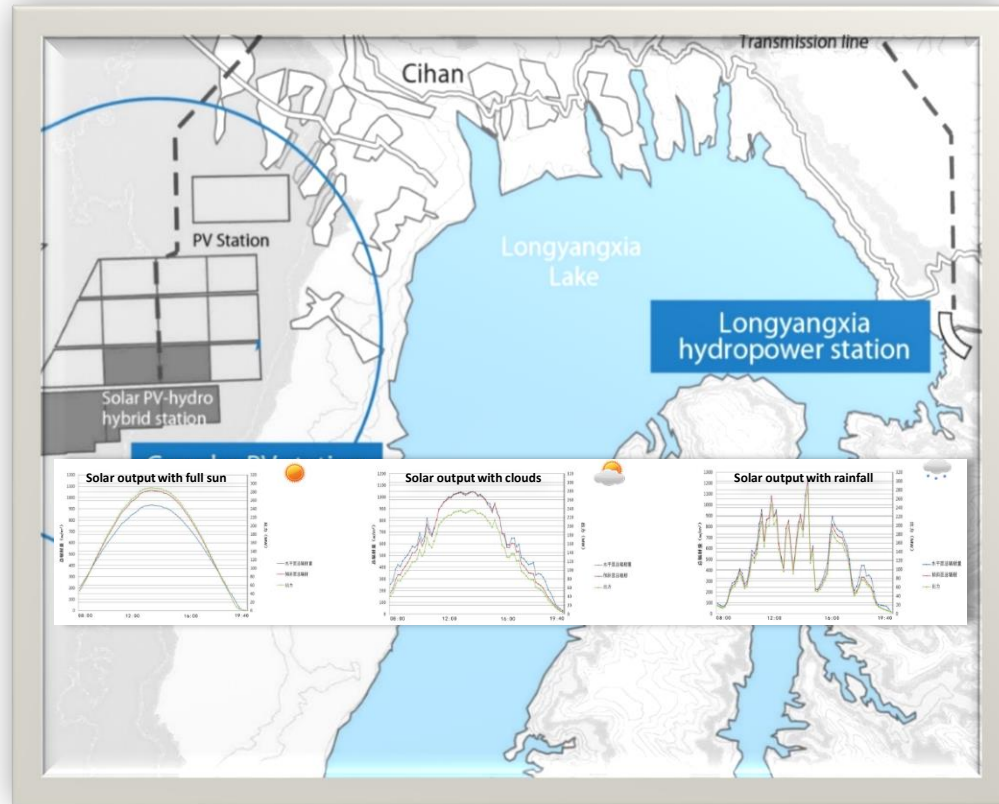
Hydropower and the SDGs



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Smart modernisation, hybrids and digitisation



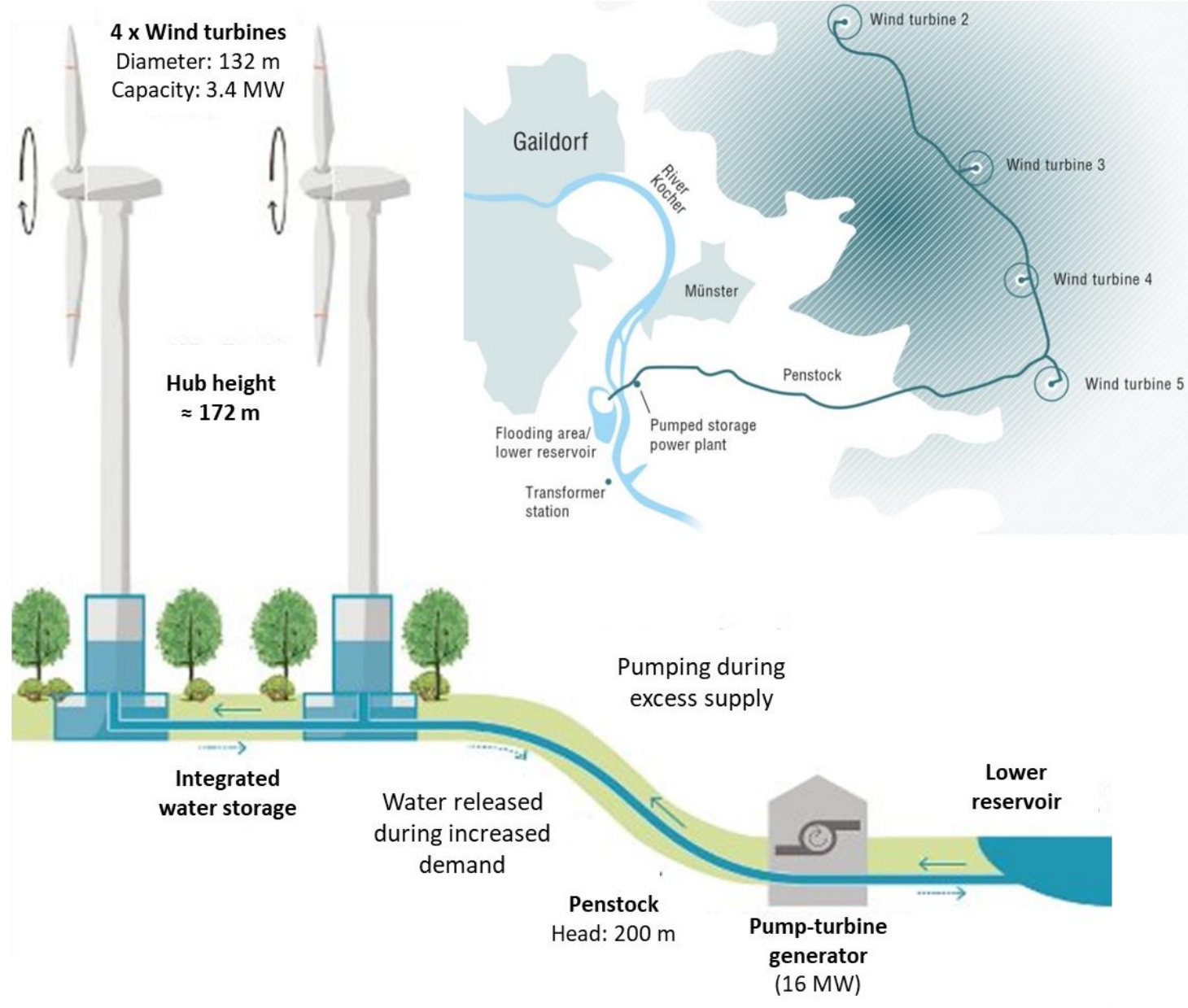
Floato-voltaics: Solar + hydropower



Benefits of floato-voltaics on hydropower reservoirs

- Uses existing transmission infrastructure
- Water helps PV cooling and increases efficiency (10%)
PV panels may reduce water evaporation

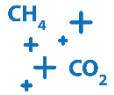
Naturstromspeicher: wind-pumped Storage



Building and sharing knowledge on sustainable hydropower



Trends and statistics



Climate mitigation (GHG emissions)



Climate resilience



Sediment management



Climate bonds



Preparation Support Facility



Water Footprint



Sustainability assessment



River basin development



Regional interconnections



Operations and maintenance



Modernisation



Clean Energy Systems

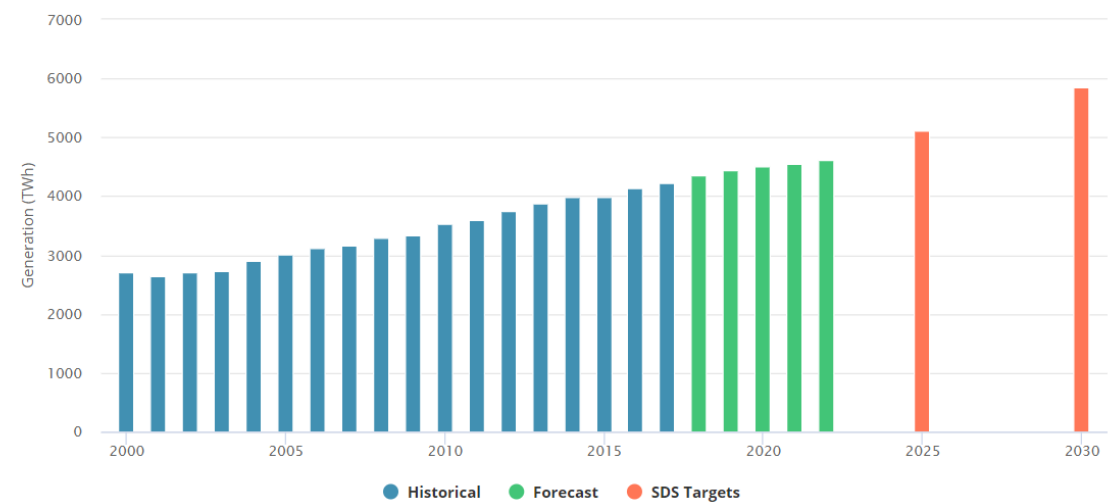


Project benefits

Impacts of hydropower

Hydropower generation

Historical development and targets



Source: International Energy Agency (2018)

- **180** million hectares of irrigated land, providing between **US\$100** and **US\$410** billion in annual economic value.
- **660** million people and **145,000** square kilometers at risk of flooding within urban areas
- Annual flood damages within the **HIB** range of **USD20-40** billion and can be interpreted as the potential value of flood management.

Source: The Nature Conservancy (2017)

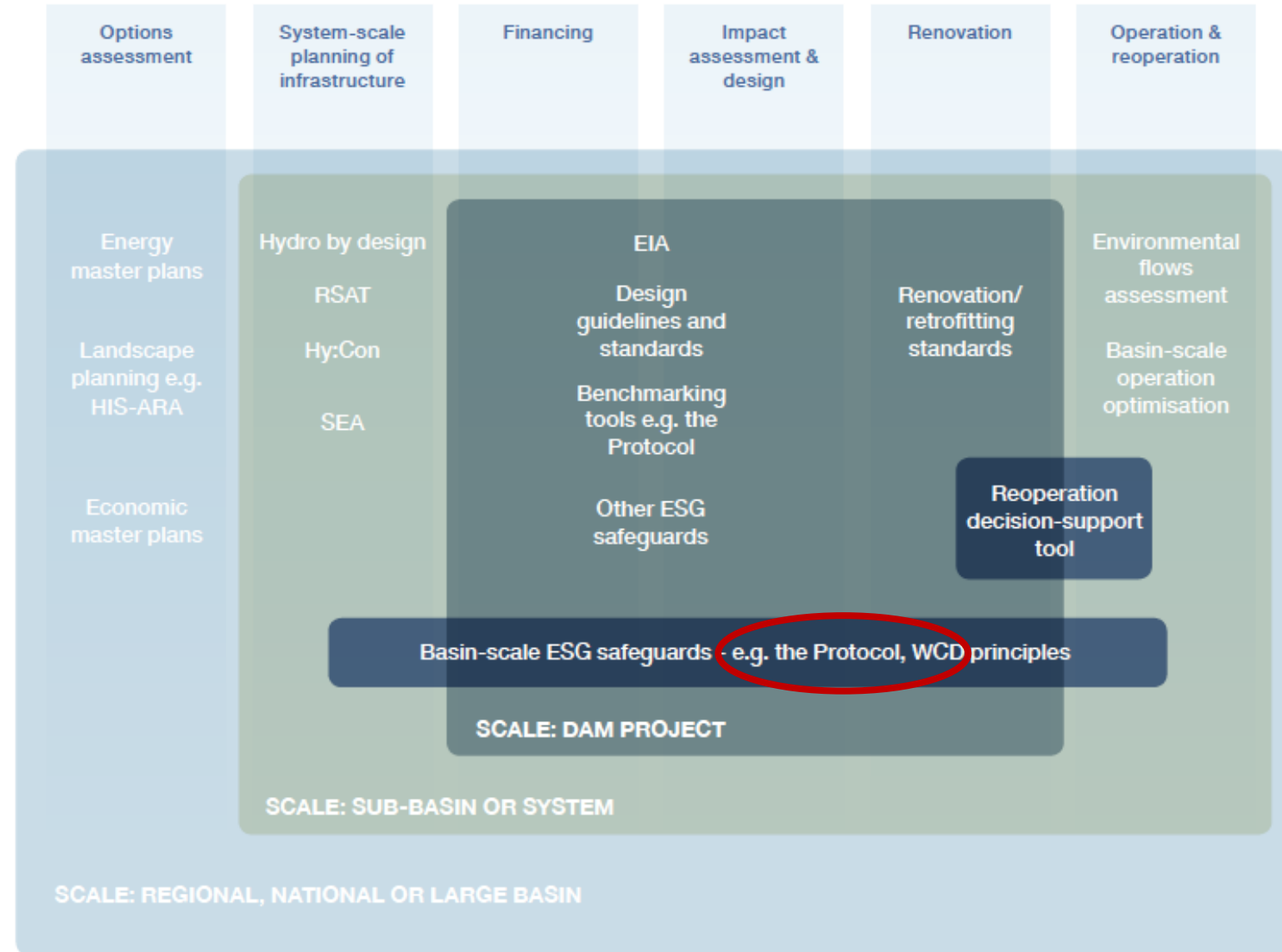
BASIN TYPE	WATER SUPPLY STORAGE (MCM)	FLOOD RISK (MILLION OF PERSONS)	IRRIGATED LAND (HA)
FUTURE ABUNDANT	888 <div></div>	70 <div></div>	16 <div></div>
MATURE ABUNDANT	42,317 <div></div>	238 <div></div>	22 <div></div>
FUTURE SCARCE	6,531 <div></div>	97 <div></div>	53 <div></div>
MATURE SCARCE	38,157 <div></div>	256 <div></div>	88 <div></div>

Source: The Nature Conservancy (2017)

Tools

..... AVOID (C.1) | MINIMISE & RESTORE (C.2 & C.3) |

Reducing impacts & optimising benefits



Source: World Wildlife Fund (2018), Available tools to support a strategic approach to dams.

Hydropower Sustainability Assessment Protocol

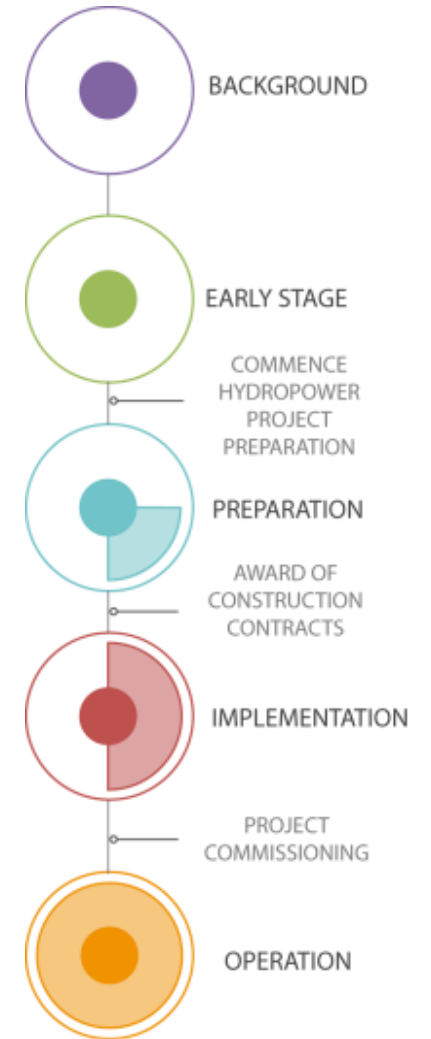
What is it?

- A **methodology** designed for all project stages
- A **definition** of sustainability in hydropower, consisting of over 20 sustainability topics
- **Multi-stakeholder**, internationally-agreed, and globally-applicable
- **Governed** by a council, and terms and conditions

What is it for?

- **Assessment** of sustainability in hydropower
- A neutral platform for **dialogue**
- Identification and **targeting** of gaps in performance

To advance sustainable hydropower globally and ensure hydro contributes to a low carbon future



Hydropower Sustainability Assessment Protocol

Progress to date

- 🌀 Strong uptake since its launch 7 years ago

Governance Council

- 🌀 90 representatives from all parts of the world
- 🌀 Working to establish the business drivers, including from financial institutions and NGOs

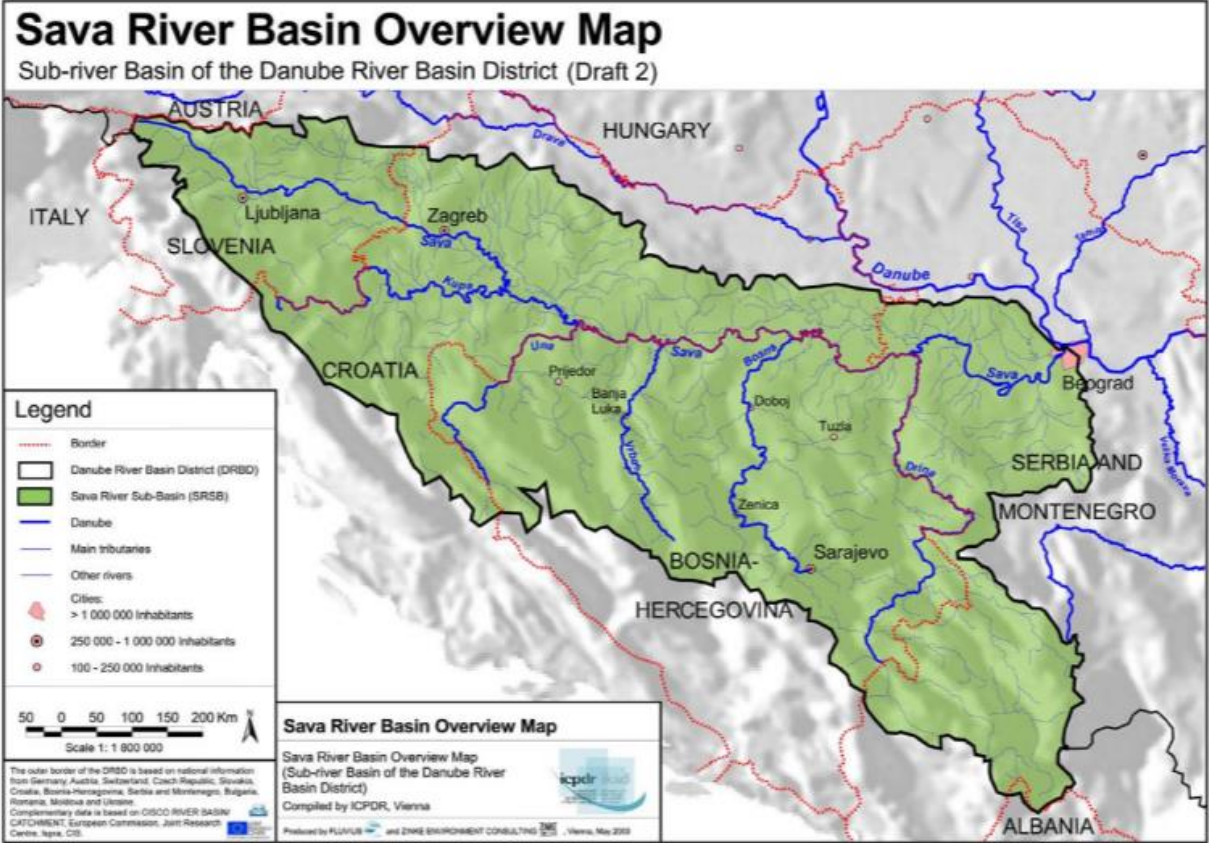
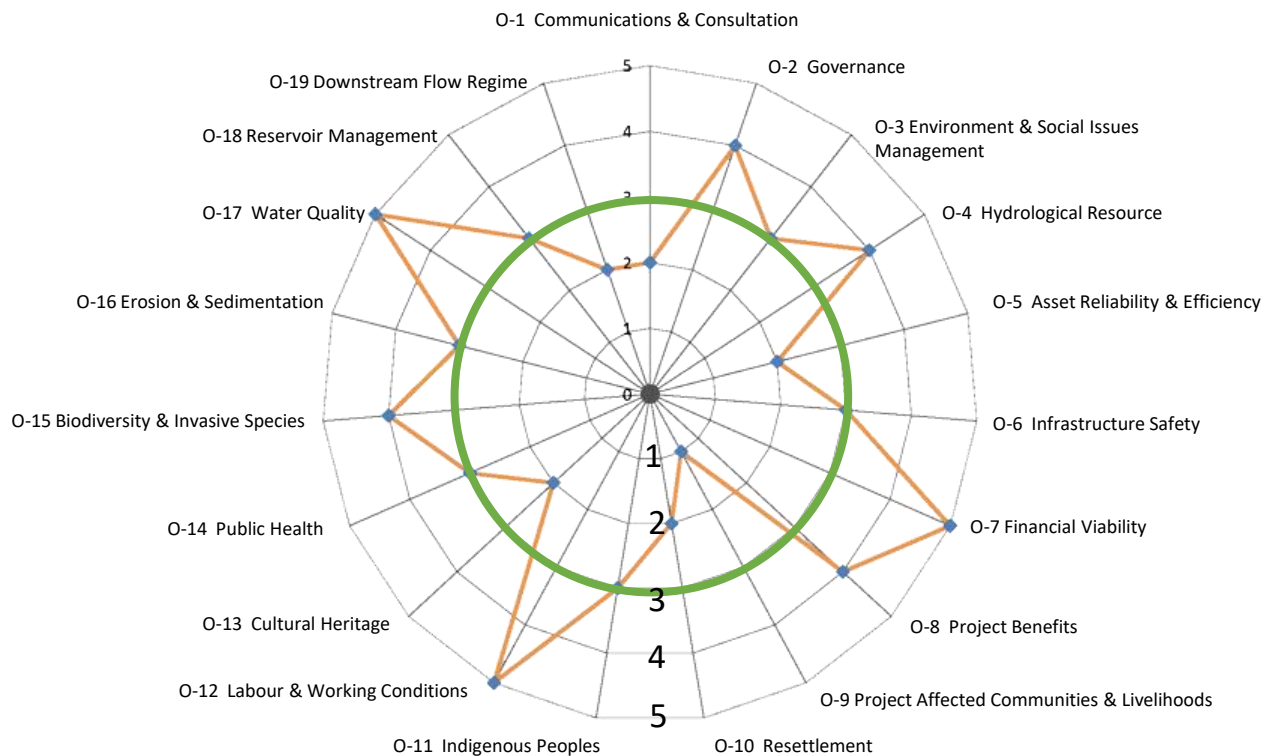
Assessments

- 🌀 24 000 MW power assessed
- 🌀 40 assessments to date

Training

- 🌀 50 training events
- 🌀 600 attendees

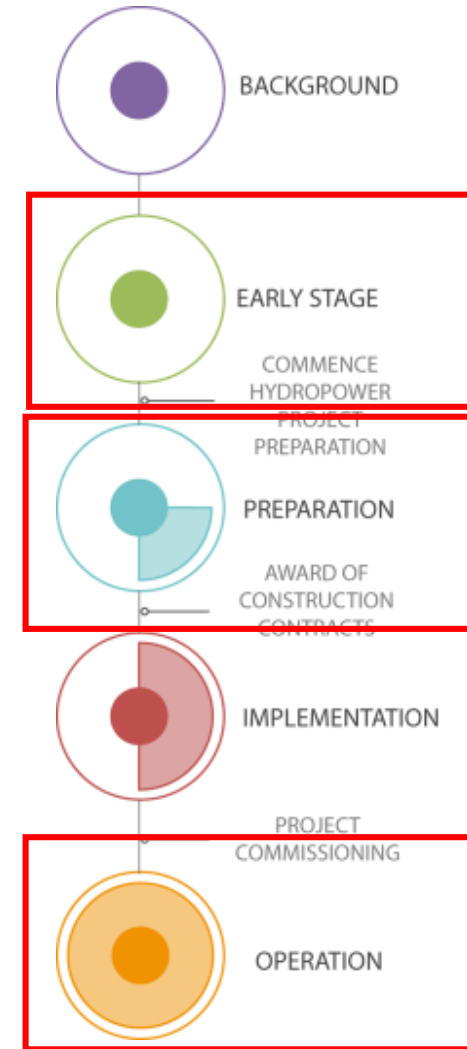
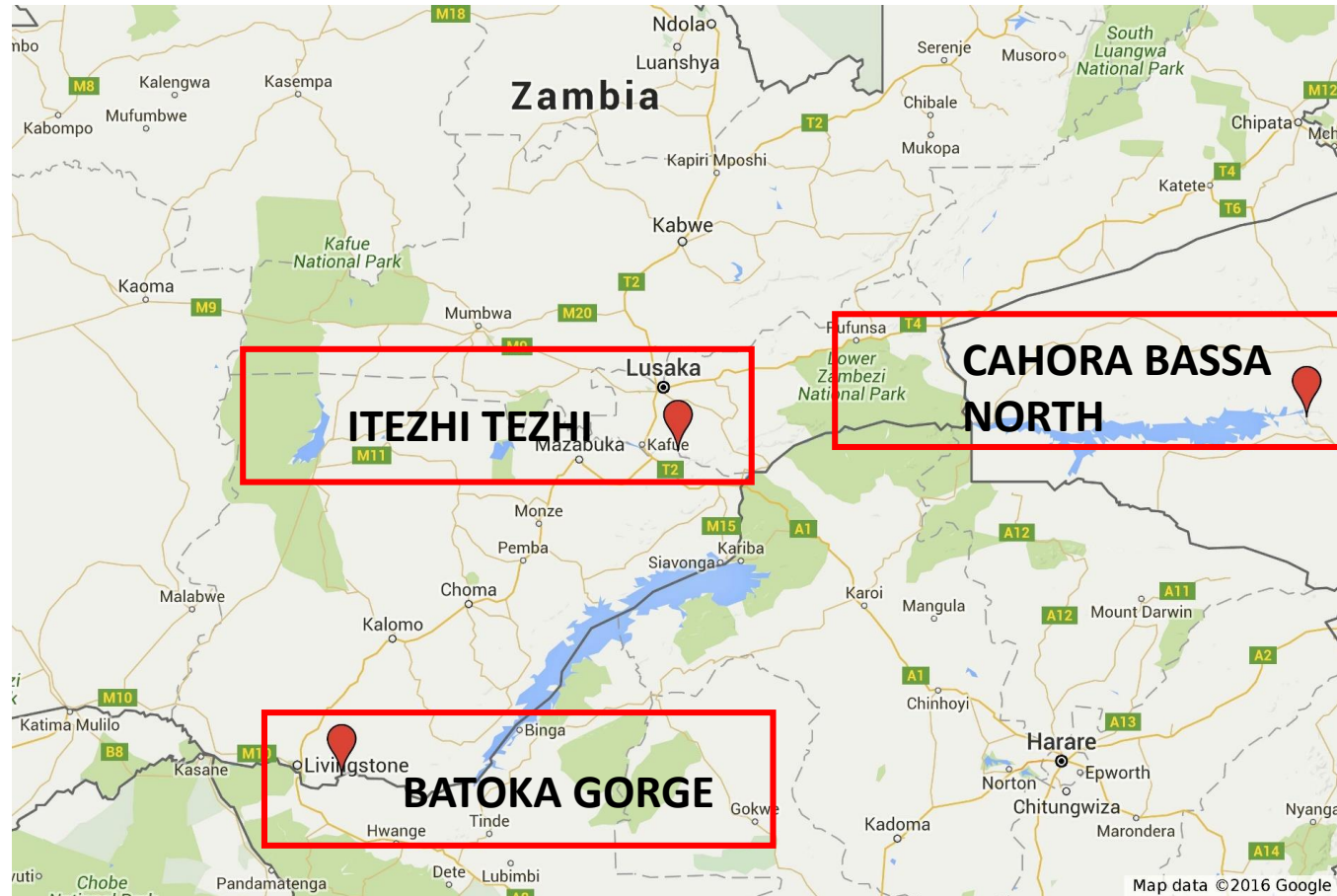
Early stage application



Application of the Protocol in the Zambezi Basin

Objectives

- Assist the riparian states to develop and utilize the hydropower potential of the basin in a sustainable and responsible way
- Support the key water organizations to understand, use and adopt the Hydropower Sustainability Assessment Protocol.



Lessons learned

Using the IHA Protocol for the Zambezi Basin provided a neutral platform for project developers and hydropower operators to work together

- The Protocol helped hydropower operators to develop **management systems and actions plans** to address gaps identified in the internal assessments
- The Protocol provided means through workshops and conferences to **communicate and share experiences** of the application of the Protocol
- The Protocol can be used to promote the sharing of information and **promote improved cooperation** between the developers and operators in the Zambezi basin
- Developers and operators would be willing to **share an annual summary on each project**, based on the Protocol with other developers and operators in the basin.
- Enthusiasm for using the Protocol to promote **sharing of information** and improved coordination



14-16 May 2019 | World Hydropower Congress

