

Potentials in a large-scale hydropower river

- Skellefteå River



Skellefteå Kraft

Skellefteå Kraft in figures



130

Wind turbines



670

employees



782

GWh heat



28

hydro stations



Nuclear
power



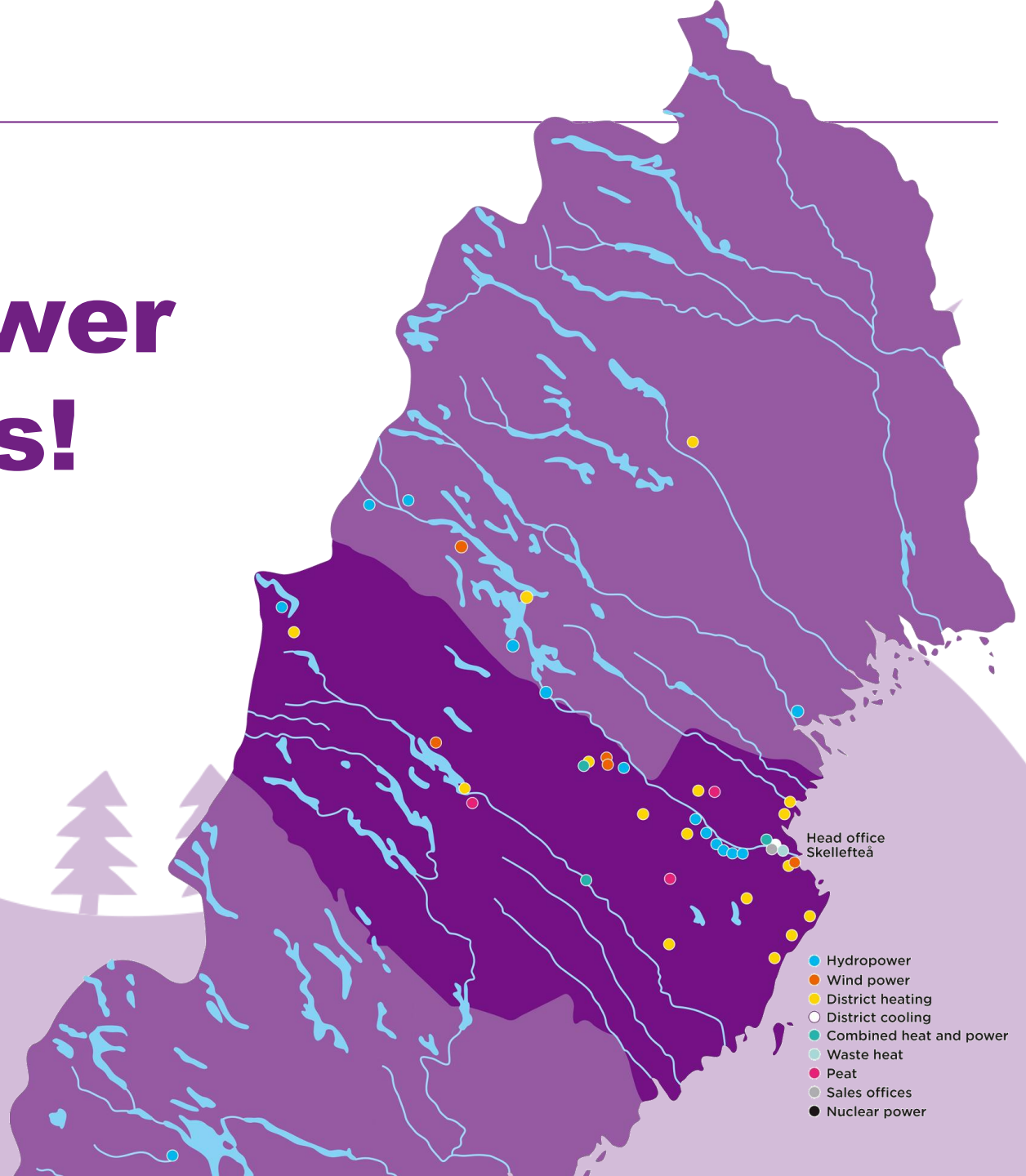
4,089

GWh electricity

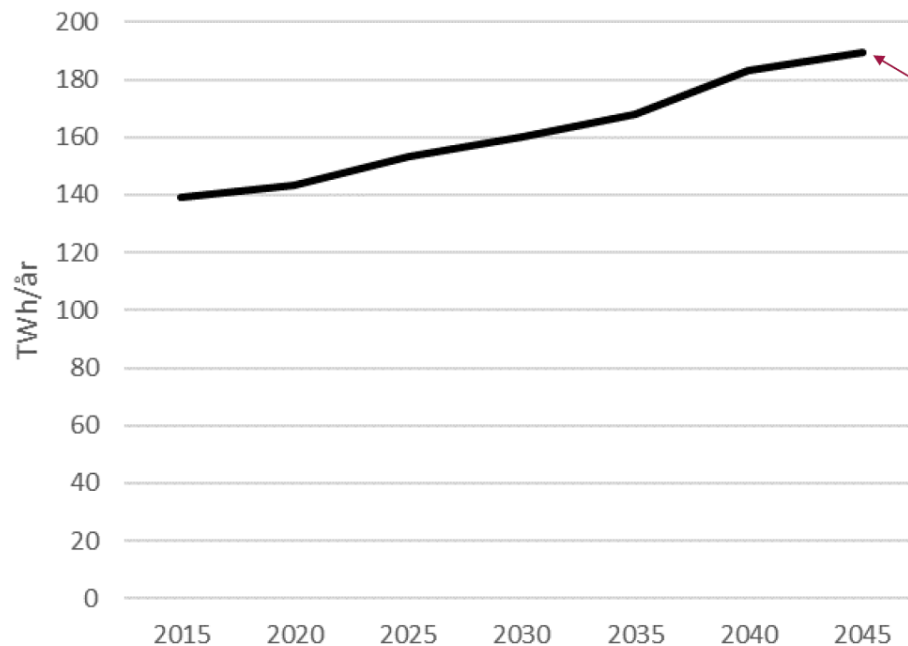
1,200

km power lines

Our power sources!



Transition to renewable/fossile free energy



190 TWh

- Transportation
- Industry

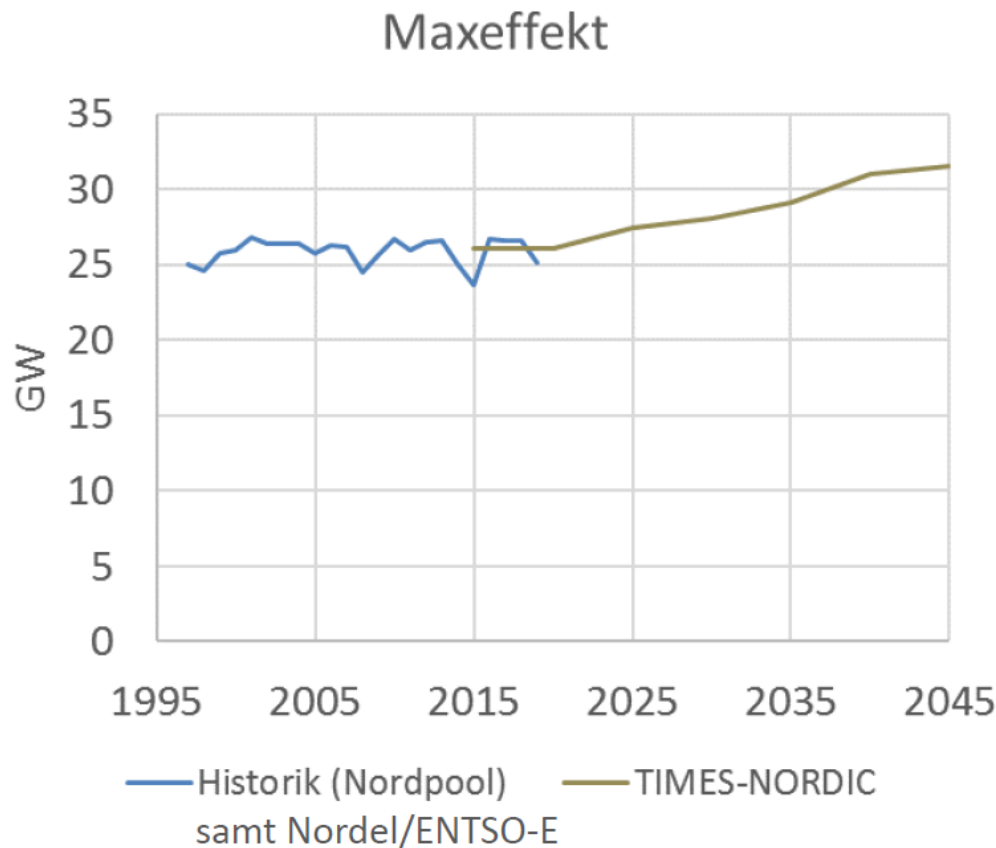
- New large consumers (data centers, batteries)

> More electricity

nepp

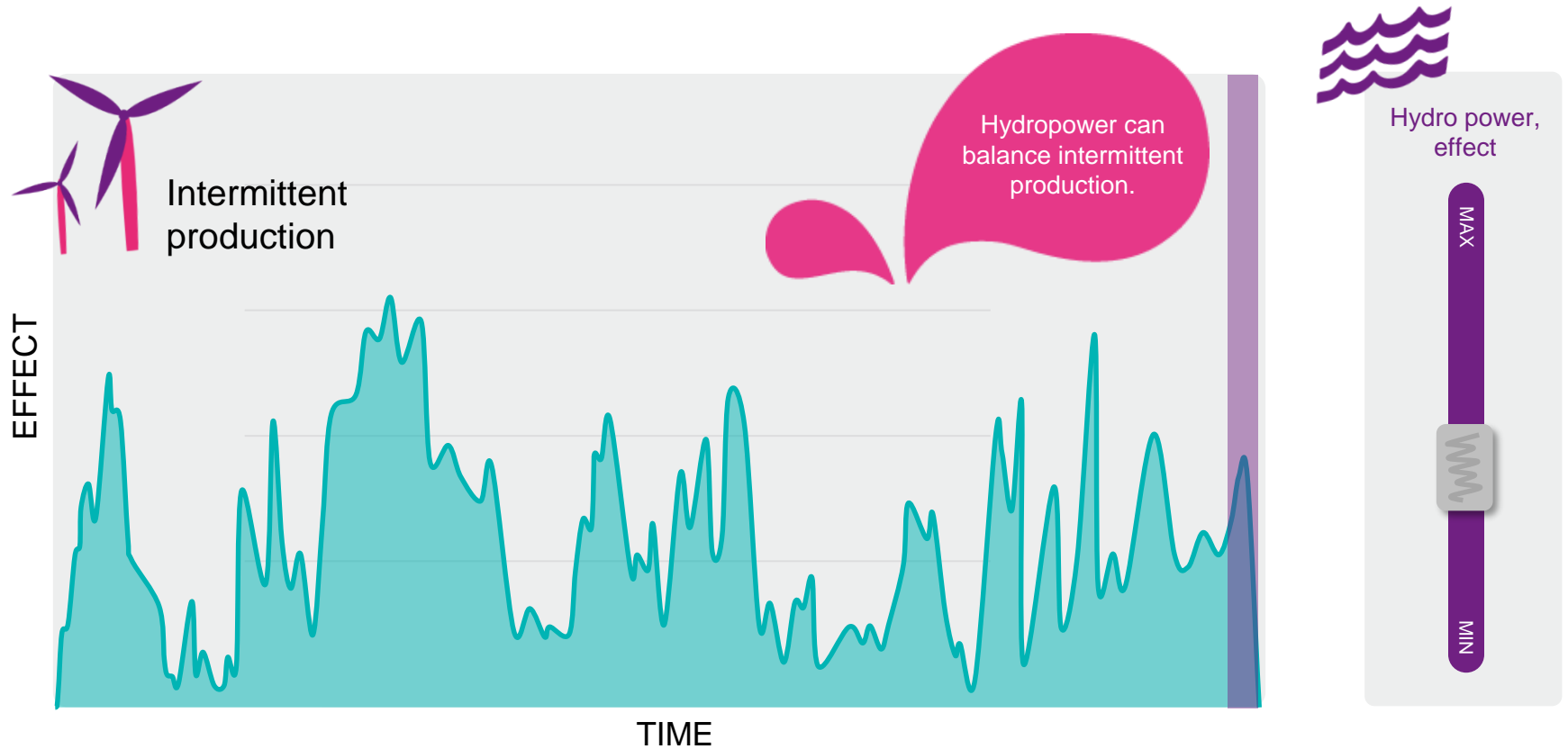
Research project:
North European Energy Perspectives Project


Transition to renewable/fossile free energy



> More power, more flexibility

More wind- and solarpower demands more balancing power





Hydropower
an important
asset for the
renewable energy
system

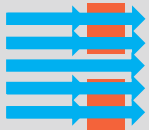
2018



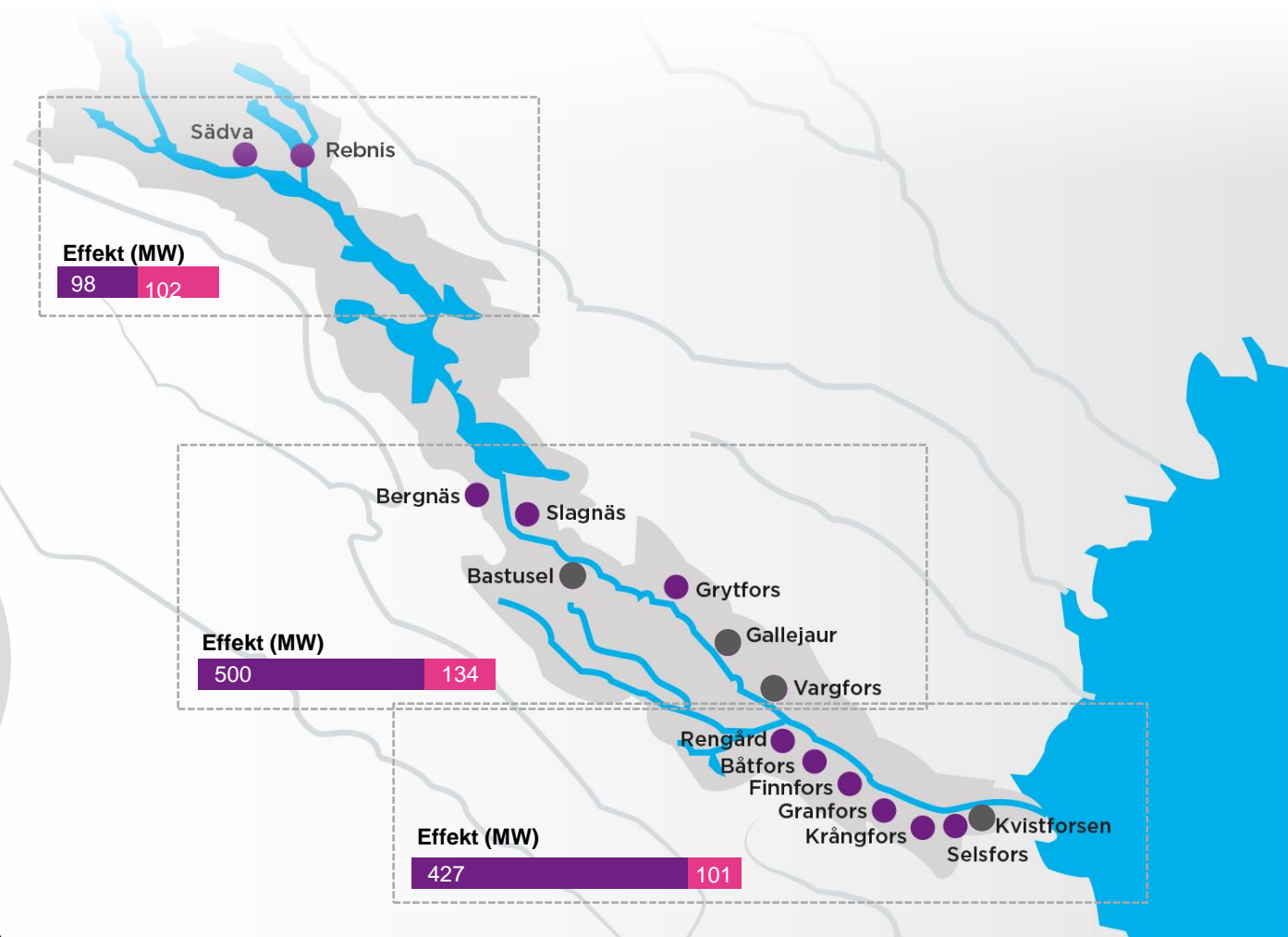
Bottlenecks reduce the flow in the river and reduce flexibility



2040



Without bottlenecks, the river can maintain maximum power for a longer period of time



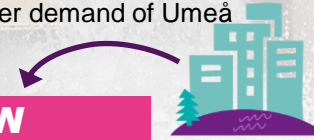
No change in the waterlevels in reservoirs

Potential
Skellefteå river

1 025 MW

337 MW

Corresponds to the
power demand of Umeå



Potential Sweden
Swedens 10 largest powerproducing rivers

14 180 MW

**3 400
MW**

Benefits

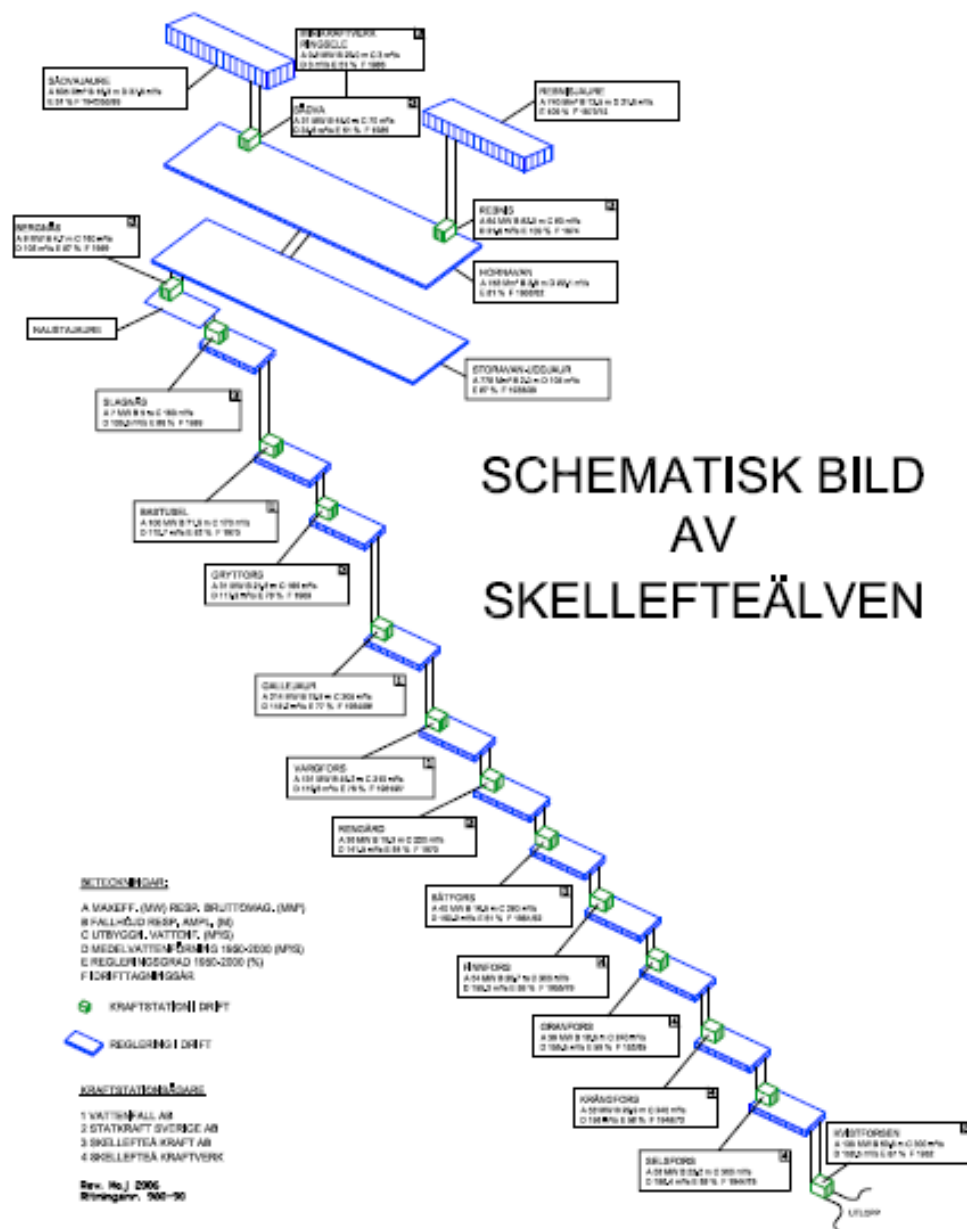
- » More power – more flexibility
- » Higher capacity to balance other renewable energy sources
- » Smoother water regulation
- » Modern technology, less chemicals/oils

But what do we want?



**Skellefteå
River**

**The result of
hundreds of
years of use**



Skellefteå River 2040

Environmental goals

Improve environmental conditions on the basis of a hydropower river. Improve efficiency and flexibility of existing plants to balance more renewable energy.

Connectivity to tributaries

Habitat adjustment

Restoration after log-driving

River in the river

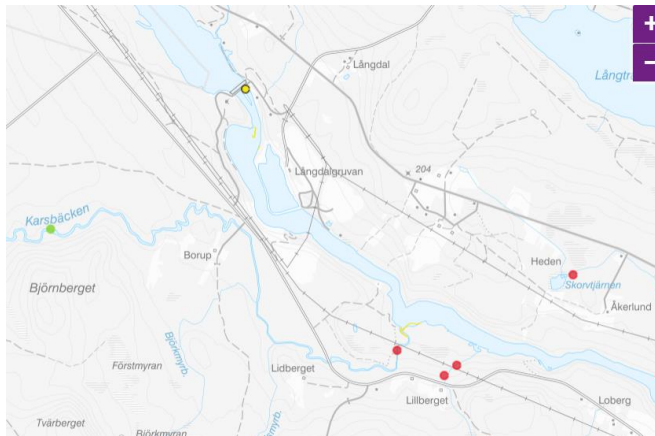
Measures to reduce erosion

Compensatory measures in tributaries/other rivers?

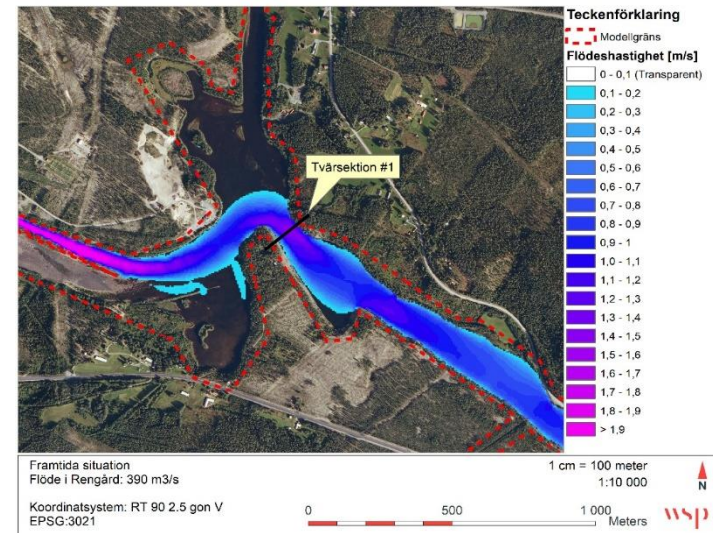


We're in the beginning

- » Analysis of power potential
- » Data collection
- » 2D hydraulic model
- » Habitat analysis



Modell #2: Nedströms Rengård



Mitigation measures with ecological effect and minimum impact on hydropower flexibility

Potentials

- » Improved efficiency in existing power plants
- » Improved environmental conditions without lowering hydro power flexibility (?)
- » Renewable energy system



Important aspects

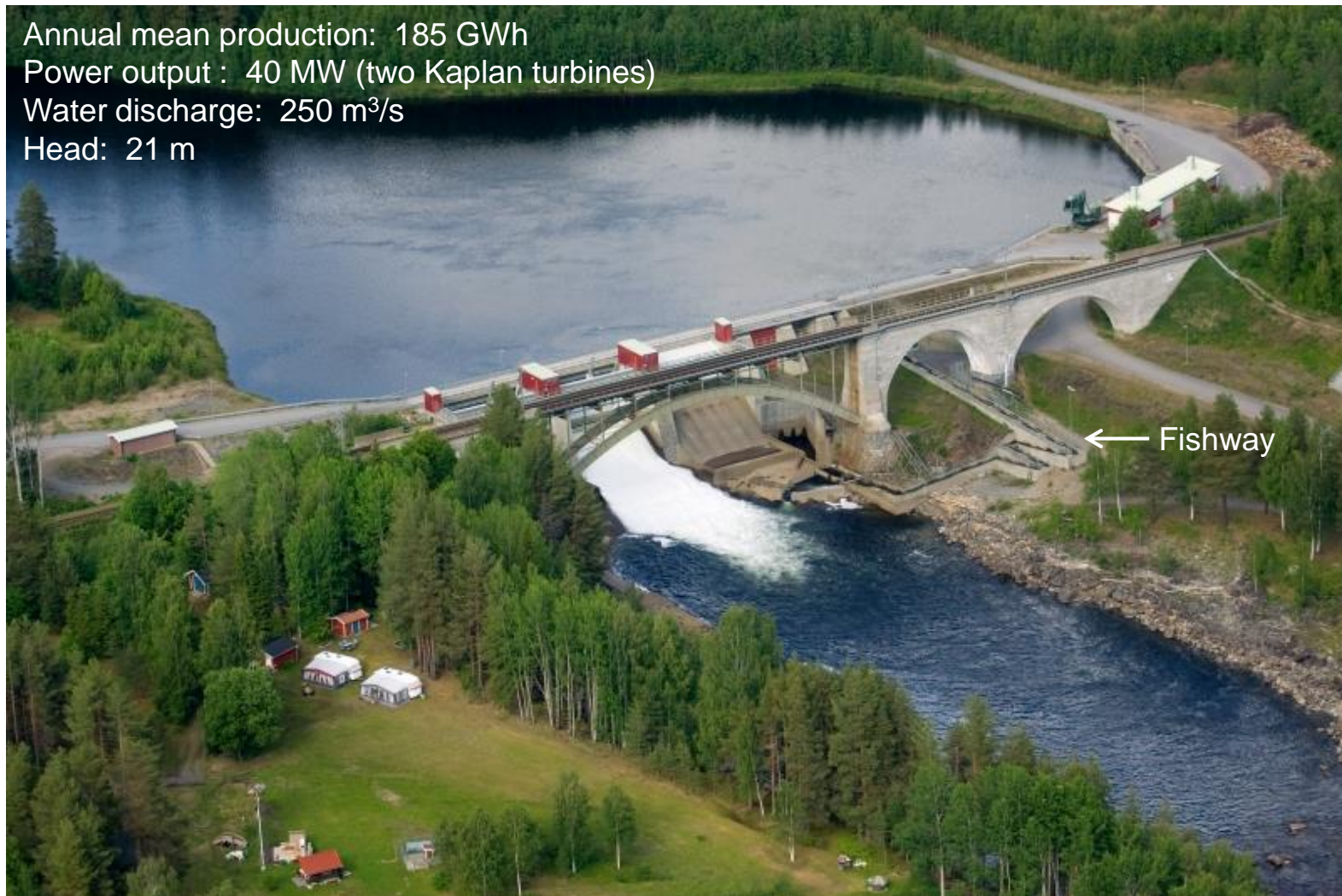
- » Value of flexibility
- » Define significant impact on hydropower/flexibility
- » Mitigation measures that doesn't "cost" flexibility

Thank you!

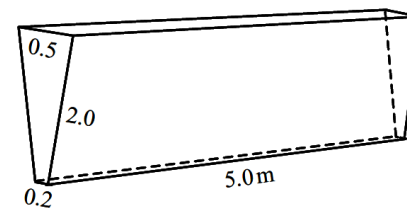


Sikfors hydropower plant

Annual mean production: 185 GWh
Power output : 40 MW (two Kaplan turbines)
Water discharge: 250 m³/s
Head: 21 m



Sikfors hydropower plant



Floating element

Upstream migration Sikfors

