Regulation of outflow from Lake Saimaa and the Vuoksi River Discharge Rule

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Finland and Soviet Union in early 1960s: needs for joint management of transboundary waters

- Severe water quality problems, hydropower development, flood risks and water allocation problems
- Common understanding of risks, benefits and costs
- Single agreement: all transboundary rivers and lakes (>400, about 19 significant)

Signing ceremony in 1964
Finnish - Russian Agreement on the Utilisation of Transboundary Watercourses (1964) – A case of IWRM before IWRM

- Regulations on impacts in neighbouring country
  - Water flow and structural measures
  - Floods and water scarcity
  - Timber floating and navigation
  - Fish migration
  - Pollution and water quality
  - Public health and economy

- Joint Finnish – Russian Commission on the Utilisation of Transboundary Watercourses
Finland – Russia Transboundary Water Cooperation
The Lake Saimaa - River Vuoksi System

- Catchment 70 000 km$^2$
  - Finland 77 %, Russia 23 %

- Lake Saimaa
  - surface 4 460 km$^2$
  - precipitation ~ 600 mm/a
  - water level fluctuation 3,3 m, annual mean 0,7 m

- River Vuoksi natural discharge
  - mean 600 m$^3$/s
  - max 1170 m$^3$/s
  - min 220 m$^3$/s
The profile and power plants of the River Vuoksi

**VUOKSI**

- Total head (utilized) = 63 m
- Installed power = 440 MW
- Normal annual production = 2500 GWh

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**FINLAND**

- Lake Saimaa
  - +75.75
  - 8 m
  - 1040 m/s

- IMATRA
  - +67.70
  - 24 m
  - 970 m/s

- SAVONLINNA
  - +42.20
  - 15 m
  - 750 m/s

- TAINIONKOSKI
  - +26.60
  - 15 m
  - 750 m/s

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**RUSSIA**

- Lake Ladoga
  - +5.00

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**Max. power**

- IMATRA: 62 MW
- SAVONLINNA: 178 MW
- TAINIONKOSKI: 100 MW
- LESOGORSK: 100 MW

**Normal annual production**

- IMATRA: 300 GWh
- SAVONLINNA: 1000 GWh
- TAINIONKOSKI: 600 GWh
- LESOGORSK: 600 GWh

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**Profiles and Power Plants**

- VUOKSI
  - Total head (utilized) = 63 m
  - Installed power = 440 MW
  - Normal annual production = 2500 GWh

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**River Details**

- Lake Saimaa: 75.75 m
- Lake Ladoga: 5.00 m

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**Power and Production**

- IMATRA: Max. power 62 MW, Normal annual production 300 GWh
- SAVONLINNA: Max. power 178 MW, Normal annual production 1000 GWh
- TAINIONKOSKI: Max. power 100 MW, Normal annual production 600 GWh
- LESOGORSK: Max. power 100 MW, Normal annual production 600 GWh
Hydropower and flood risks main challenges in 1970s
Initiative of the Russian Party at the Joint Transboundary Commission 1973
Development targets at the outset
  – Increase winter discharge and minimum flows in River Vuoksi
  – Prevent exceptionally high and low water levels in Lake Saimaa and in the River Vuoksi
Jointly accepted 1989, implemented 1991
The Discharge Rule

- Natural water level and discharge in normal circumstances
- When water level forecast goes beyond normal zone discharge may be increased or reduced
- Natural discharge resumed when flood or drought threat ceases
- Discharge above normal zone may cause losses on both sides
Risk-based water allocation

• Main objective: minimize damages in both countries under flood or drought
• Based on:
  – Continuous hydrological monitoring and forecasting
  – Real-time data and information exchange
  – Common principles for defining flood risk and flood hazard maps
  – Assessment of various risks, damages and benefits based on commensurate data
  – Potential losses for hydropower one factor among others
  – Discharges aim at minimizing total risks and damages
  – Common balance account of losses and gains due to exceptional discharge
  – Eventual compensation based on the balance to be agreed between governments
  – Goal of the Discharge Rule: optimal overall outcome for both countries
Finland - Russia Cooperation: Some General Observations

• Joint transboundary integrated water resources management is achievable for two very different societies
• Survived cold war and collapse of Soviet Union
• Common views on reasonable and equitable use of shared natural resource
• Clear focus on mutual management interests
• Pragmatic joint work aiming at beneficial outcomes for both sides
• After decades of collaboration still seen as a good example by both Parties
Thank you!