Roadmap for SHOP

SINTEF User Meeting
6th – 7th May 2025

Christian Øyn Naversen

SHOP team at SINTEF

Researchers

Christian Ø. Naversen

Shweta Tiwari

Jiehong “Kiki” Kong

Kristine Schüller

Bjørnar Fjelldal

Fredrik Hildrum

Management

Hans Ivar Skjelbred

Hans Christian Bolstad

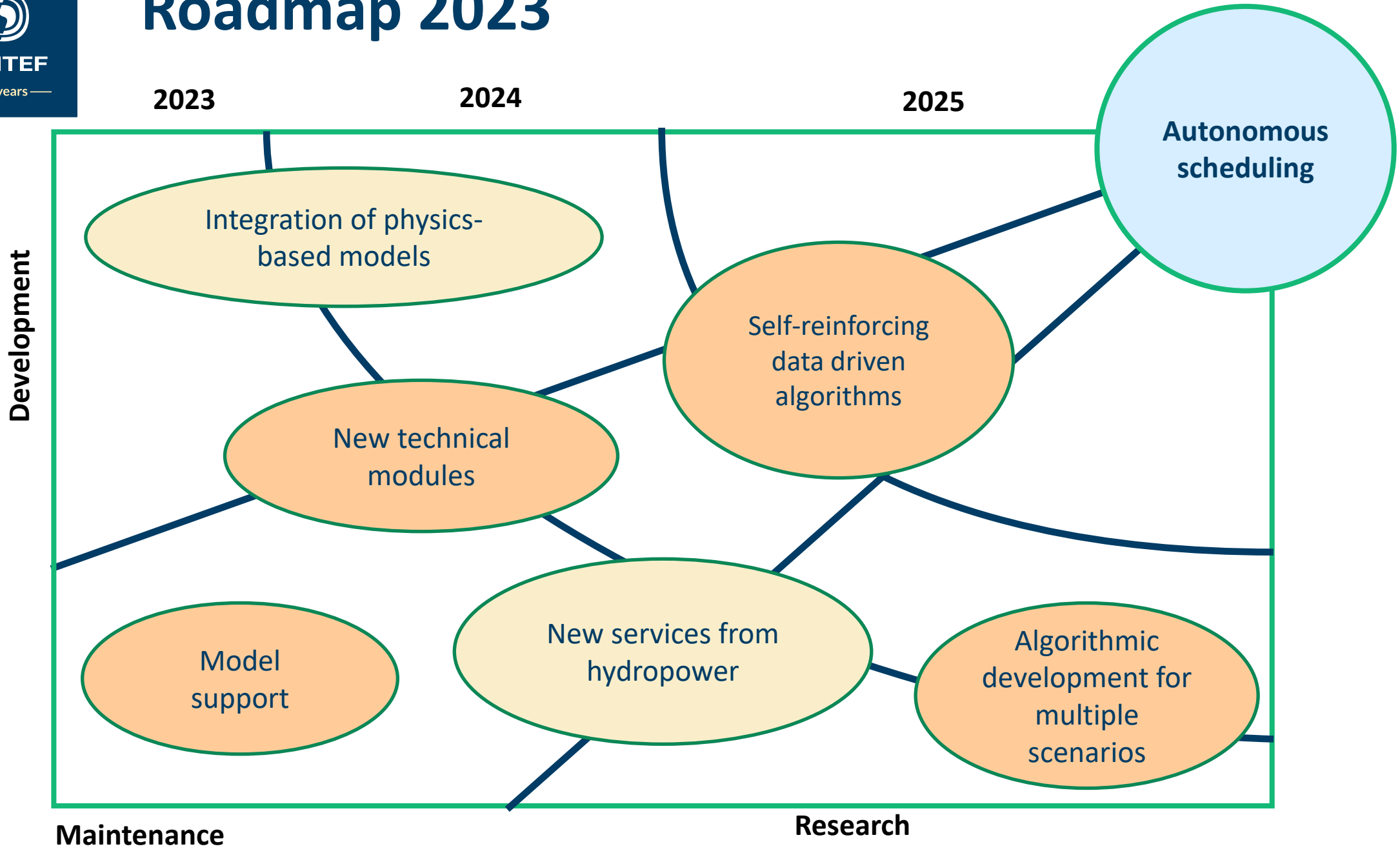
Eline Opdalshei

Developers

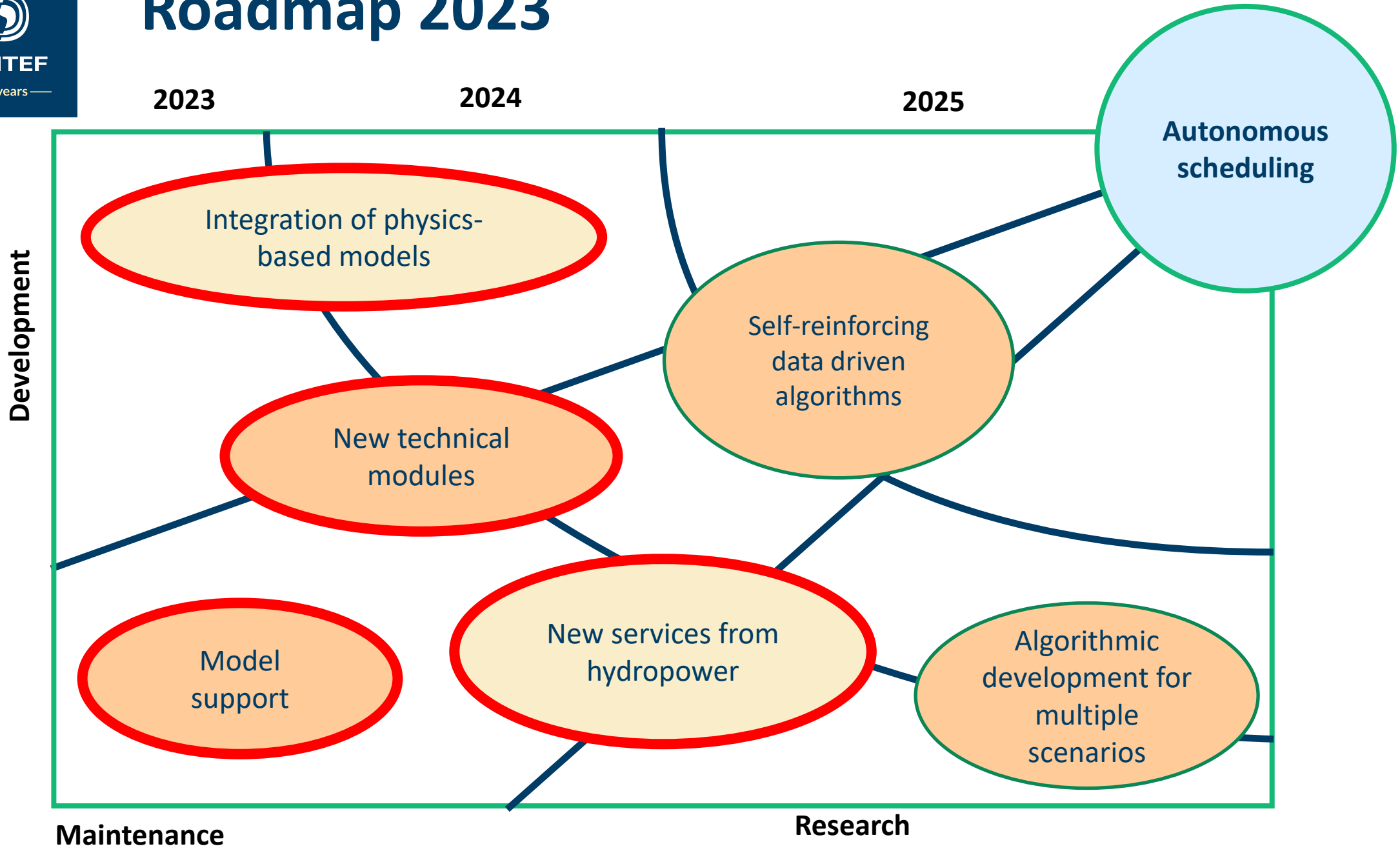
Kent R. B. Fagerjord

Jonatan Lund

Roadmap 2023



Roadmap 2023



SHOP vision and goals

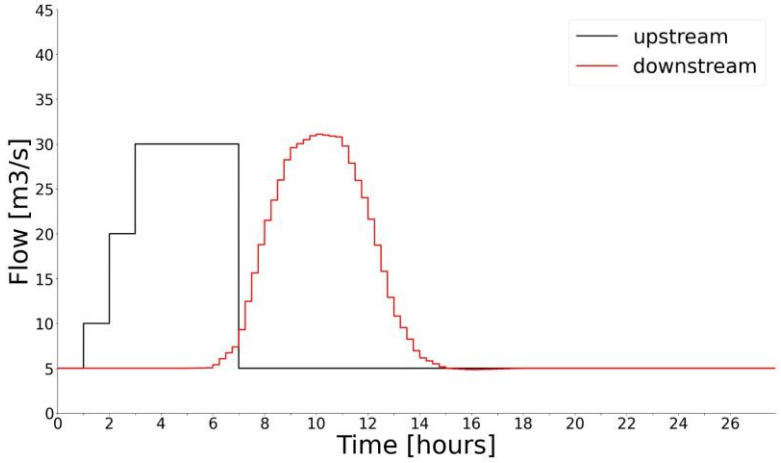
- SHOP should be:
  - As close to the physical world as necessary
  - Relevant for all markets and services
  - Pushing the limits of what is possible to optimize
  - Flexible and easy to integrate
  - Robust, fast, and reliable

- How do we achieve this?
  - Close collaboration with the industry
  - Strive to use SHOP in research and participate in the scientific community
  - Focus on testing and code quality from start to finish

SHOP development since last user meeting

- From SHOP 15.5.0.0 to SHOP 16.8.0
  - 38 releases, about 2 times per month
  - 318 tickets (bugs, support etc)

- Some highlights
  - A lot of new documentation
  - License restructuring
  - About 8 user-prioritized developments
  - Increased robustness of the SHOP Simulator
  - Time delay on rivers in the SHOP Simulator



Type | Category | Complexity | Objective

Implemented
Proposal

Show 100 entries

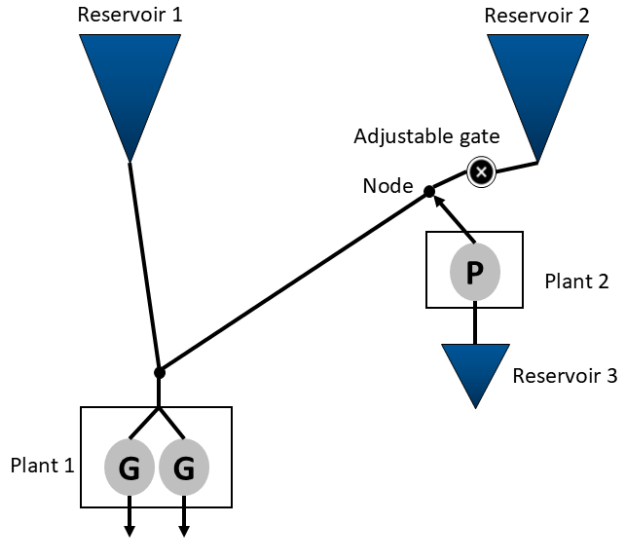
Title	Type	Category	Complexity	O
Plant rr_down_min	Proposal	User prioritized development	Low	In
Global water value for delayed water in rivers	Proposal	User prioritized development	Low	In
Implement tactical limits in masl	Proposal	User prioritized development	Low	In
Unlinking discharge limits from turbine efficiency data	Proposal	User prioritized development	Medium	In
Replace the use of max/min_p_constr_flag = 2 to specify if reserves should be included in plant constraints	Proposal	General maintenance	Low	R
Time-dependent max and min consumption limits on pumps	Proposal	User prioritized development	Medium	A
Ensure the delivery of RR-DOWN and spinning reserves are mutually exclusive on generators	Proposal	User prioritized development	Medium	In
Calculate new result attributes for the min and max production levels of plants and generators	Proposal	User prioritized development	Medium	C

Edit

Future SHOP development

Armadillo
C++ library for linear algebra & scientific computing

- SHOP has a yearly major release cycle in Q2 (before summer)
- SHOP 17
  - Improved speed and robustness of tunnel network simulations
  - Consistent handling of shared tunnel losses in full model
- Updated simulator documentation
- User prioritized development whenever we have time (and budget)



Decommissioning of old functionality

- SHOP contains a lot of old and deprecated functionality
- SHOP 19 (Q2 2027) will be a big change, where several deprecated objects will be removed from SHOP
  - Gate, junction, junction_gate, creek_intake, multi_object can all be modelled with newer (and better) functionality

```
Overview SHOP environment variables (on), see shop.log:
SHOP_DYNAMIC_DELAY                          UNLIMITED access         Will be decommissioned by SHOP 19.0.0 (Q2 2027)
SHOP_COMMON_OUTLET                          UNLIMITED access         Will be decommissioned by SHOP 19.0.0 (Q2 2027)
SHOP_JUNCTION_BELOW_PLANT                   UNLIMITED access         Will be decommissioned by SHOP 19.0.0 (Q2 2027)
SHOP_CREEK_INTAKE                           UNLIMITED access         Will be decommissioned by SHOP 19.0.0 (Q2 2027)
SHOP_GATE_RAMPING                           UNLIMITED access         Will be decommissioned by SHOP 19.0.0 (Q2 2027)
SHOP_JUNCG_SERIES                           UNLIMITED access         Will be decommissioned by SHOP 19.0.0 (Q2 2027)
SHOP_JUNC_GATE                              UNLIMITED access         Will be decommissioned by SHOP 19.0.0 (Q2 2027)
SHOP_JUNCG_TWOWAY                           UNLIMITED access         Will be decommissioned by SHOP 19.0.0 (Q2 2027)
SHOP_MULTI_OBJECT                           UNLIMITED access         Will be decommissioned by SHOP 19.0.0 (Q2 2027)
SHOP_MULTIPLE_LOAD_MARKETS                  UNLIMITED access         Will be decommissioned by SHOP 19.0.0 (Q2 2027)
SHOP_GATE_FLOW_LIN_REL                      UNLIMITED access         Will be decommissioned by SHOP 19.0.0 (Q2 2027)
SHOP_PRESSURE_LINK                          UNLIMITED access         Will be decommissioned by SHOP 19.0.0 (Q2 2027)
SHOP_ELEVATION_ADJUSTMENT                   UNLIMITED access         Will be decommissioned by SHOP 19.0.0 (Q2 2027)
```

Warning

The gate object is old and will be deprecated in the future. A gate can be replaced with either the newer river or tunnel objects.

Supporting research projects and publications

- KSP InterOpt (2024 – 2027)
  - Investigate techniques for decreasing calculation time in SHOP by using machine learning between SHOP iterations
- FME RenewHydro (2025 – 2027)
  - SHOP will be used in Work Package 2.4 with the aim of investigating optimal block bidding of hydropower units
- Hydropower scheduling conference in Brazil (2025)
- IPN ShortFlex?
  - Market decisions have to be taken quicker and more often. We can use SHOP in new and innovative ways to create and benchmark different strategies for participating in all electricity markets

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1950 – 2025
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