

KraftHack – Townhall

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– hosted by –



unifai

Agenda

I **Welcome and introduction to the event**

Into to the organising committee, jury, timeline and expectations for Monday & Tuesday.

II **Introduction to the domain**

Which plant are we looking at? What is a turbine? Other relevant aspects to the upcoming challenge.

III **Introduction to the challenge**

What type of data will you receive? Expectations to modelling and what will need to be delivered at the end of the hackathon.

Organized by



unifai

Judging committee



Camilla Feurst



Alexandra Gunderson



Thor Arne Hvam Bruun



Kristian Nymoen



Andreas Solberg



Asu Deniz

Timeline for the event

Monday, March 7th

- 09:00 - 10:00 Introduction to the challenge
- 10:00 Data set will be released
- 10:00 - 16:00 Statkraft & Unifai will be available to answer questions

Tuesday, March 8th

- 10:00 Deadline for uploading results
- 10:00 - 11:00 Results will be reviewed and evaluated
- 11:00 - 13:00 Top 5 (**in person**) teams will present their solutions to the jury
- 13:00 - 15:00 Jury will deliberate and select the winners
- 15:30 - 16:15 Winners will be announced on the PTK main stage
- 16:15 - 17:00 Winners will present their solutions

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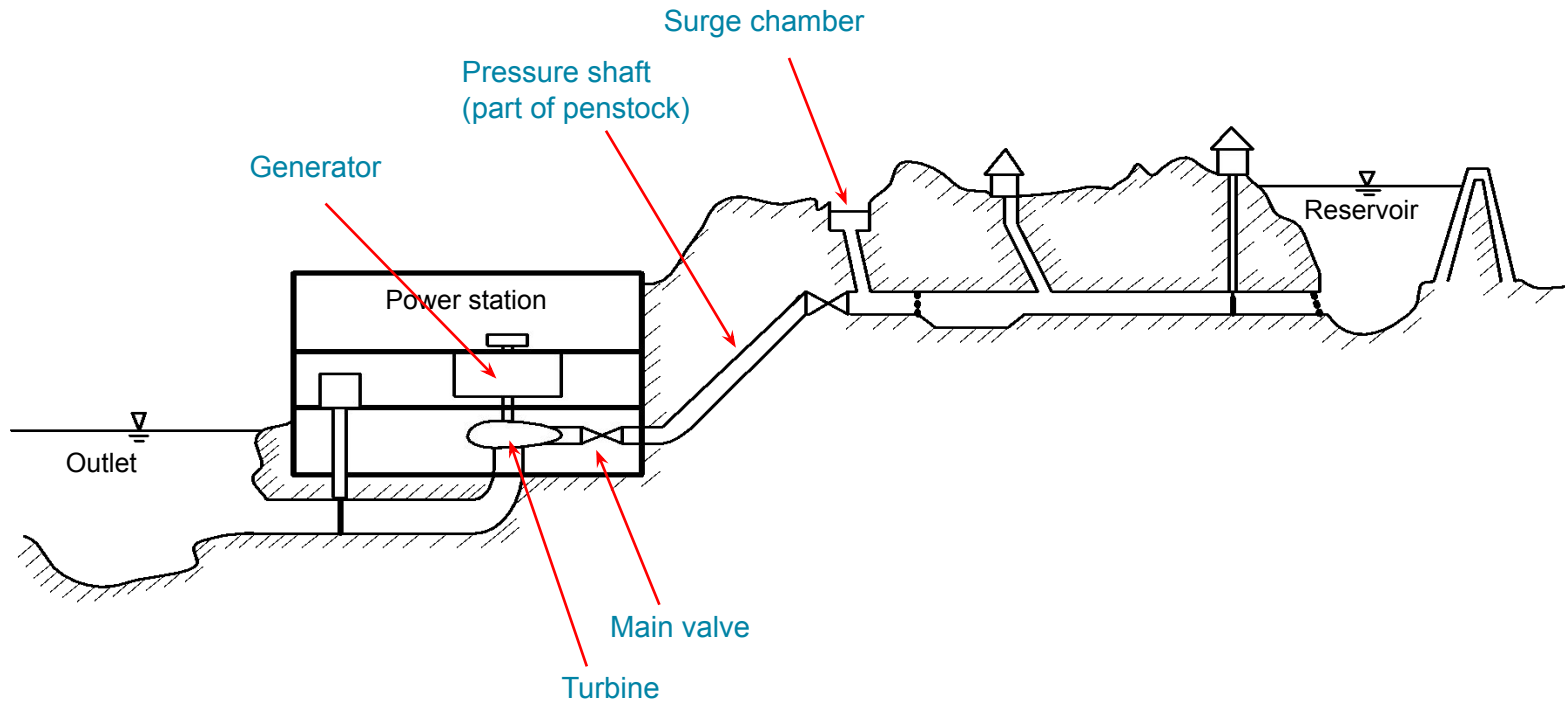
What type of data will you receive? Expectations to modelling and what will need to be delivered at the end of the hackathon.

Kvilldal

Kvilldal hydropower plant

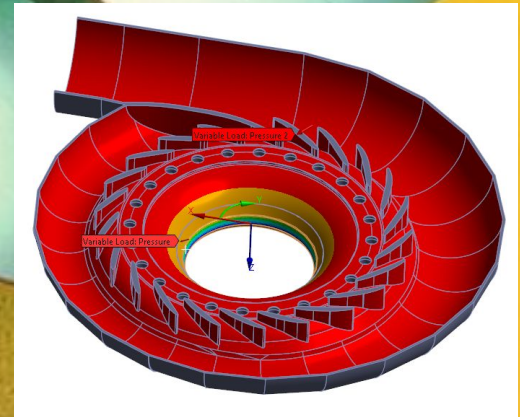
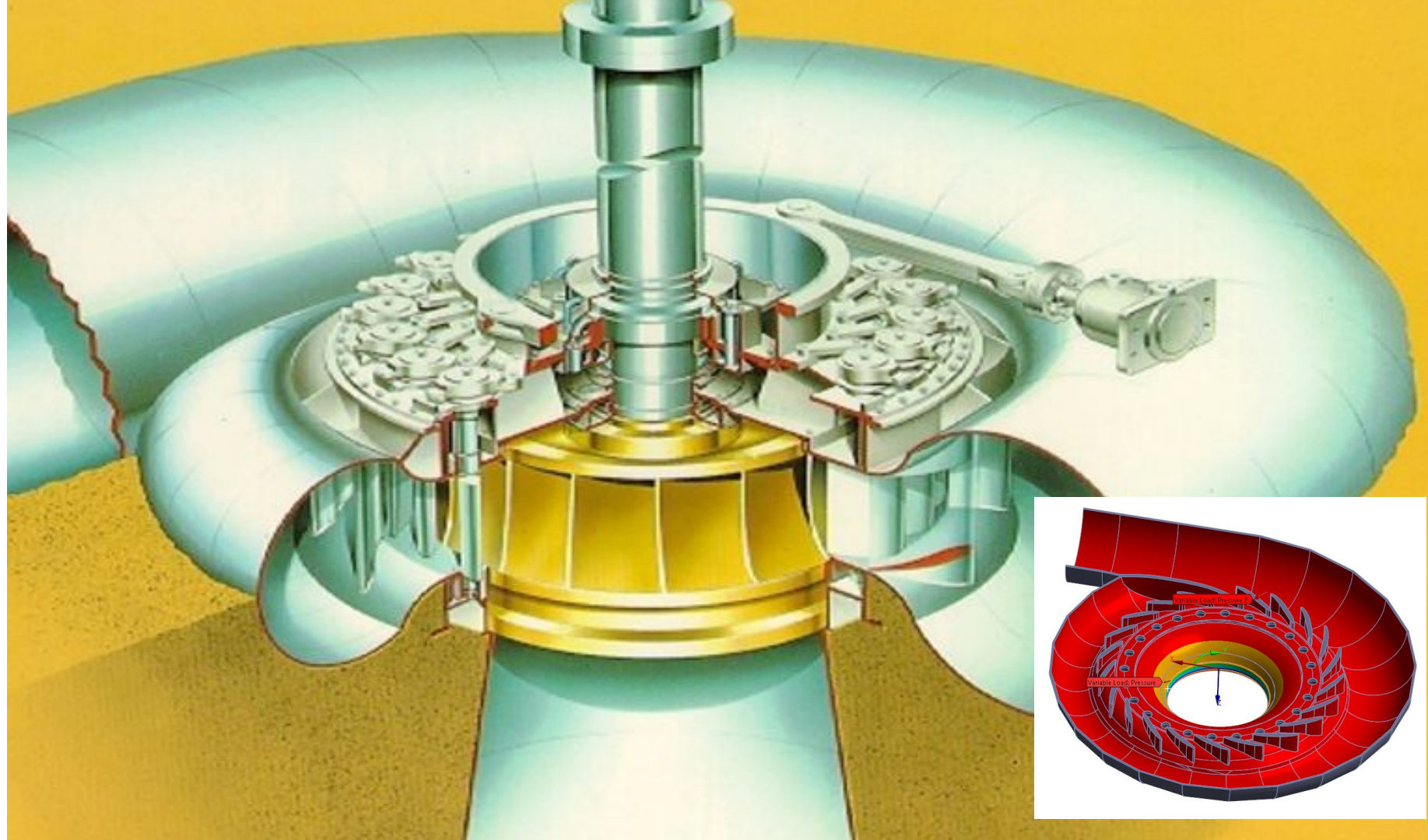
- Biggest plant in Norway, 3 TWh
- **Head 538 m**
- Blåsjön reservoir 125 m regulation head
- 1240 MW at 4 units
- **Commissioned in 1984**



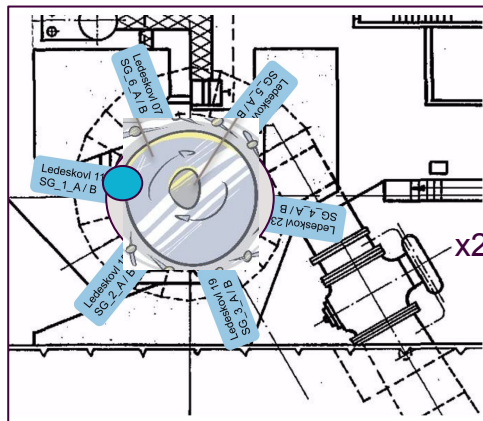
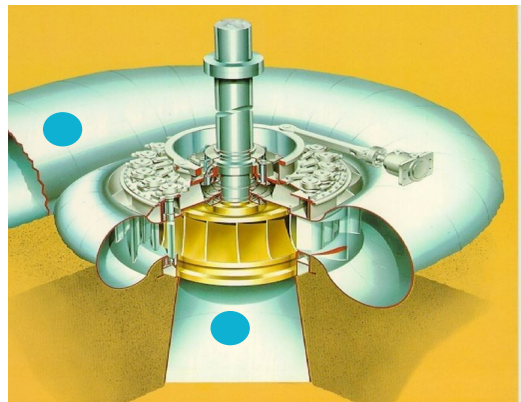
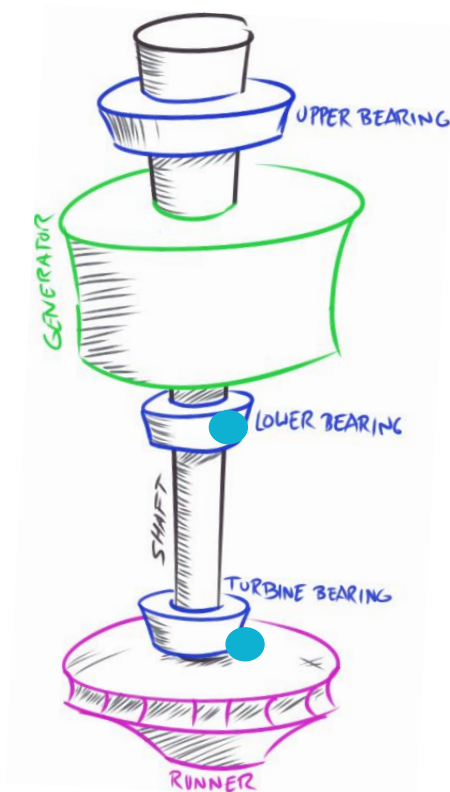








Sensors for monitoring



Sensor Name

Unit_4_Power

Unit_4_Reactive Power

Turbine_Guide Vane Opening

Turbine_Pressure Drafttube

Turbine_Pressure Spiral Casing

Turbine_Rotational Speed

mode

Bolt_1_Steel tmp

Bolt_1_Tensile

Bolt_2_Tensile

Bolt_3_Tensile

Bolt_4_Tensile

Bolt_5_Tensile

Bolt_6_Tensile

Bolt_1_Torsion

Bolt_2_Torsion

Bolt_3_Torsion

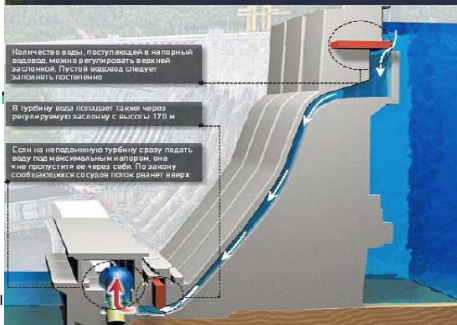
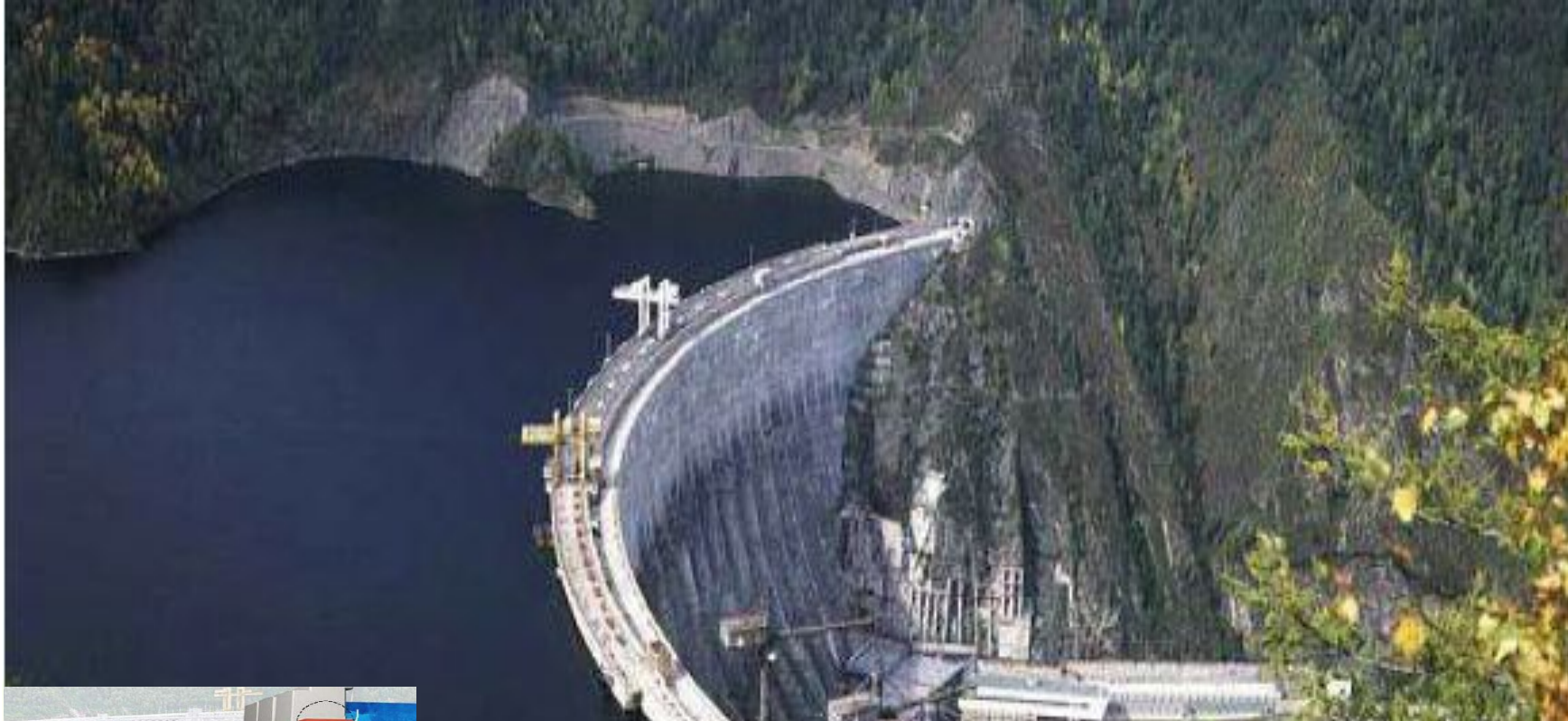
Bolt_4_Torsion

Bolt_5_Torsion

Bolt_6_Torsion

lower_bearing_vib_vrt

turbine_bearing_vib_vrt



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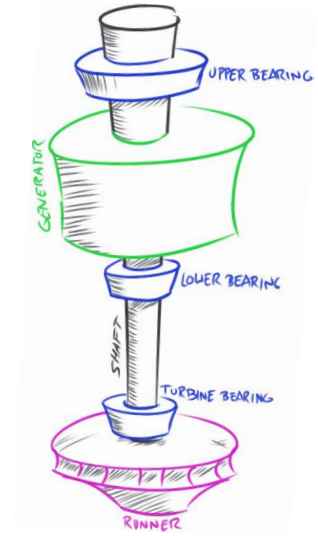
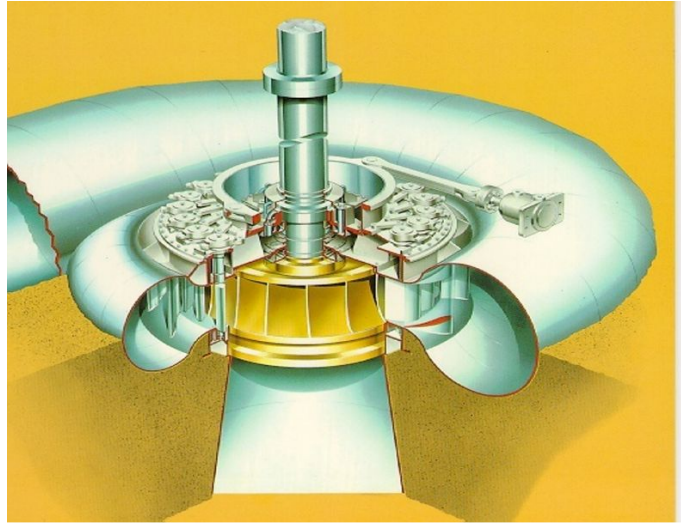
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23 sensors measuring operating conditions, bolt conditions, and vibrations

- **Operating conditions** - including power, guide vane opening, pressure, speed.
- **Bolt conditions** - strain gauges measuring tension and torsion in the bolts, and temperature of the bolts
- **Vibrations** - in the turbine and lower bearing



Note: Dataset will be provided in a clean format, and all compute can be done locally (no need for cloud compute resources!!)

What should be completed in 24 hours


- **Model results**
- **Code** - to be uploaded to an open GitHub repository (please use CC BY 4.0 license:)
- **Pitch deck** - a short PDF presenting your work
 - **Data exploration** - note any interesting findings, if/how/why you augmented your dataset, etc.
 - **Model considerations** - how did you train your model(s); how did you test performance; model specific details (libraries used, parameters specific to the model)
 - **Putting it into production** - how would you propose to utilize this model in a real-life setting (e.g. by presenting a mock-up, work-flow, ...)? How would you extend the model/approach if given more time?
 - **Scalability and transferability** - what other problems do you think your approach could be used for? Do you think your approach could be used on other assets, equipment categories, domains?

Note: Ambition is to share learning across the industry. Models and insight may be used and further developed. In order to create a level playing field, it is suggested to use open source tools and software wherever possible.

What the jury will judge for

- **Code availability and understanding** - is the code available and can it be leveraged by others easily?
- **Model performance** - *metrics will be shared on Monday**
- **Real-world application** - does the model take into account real-world complexity and operator needs? Domain experts will be available for questions on Monday.

Prizes

- **Cash prizes** for the winning teams 
 - In person: 25 000 NOK
 - Online: 5 000 NOK
- **Summer internship** for 1-3 lucky students 