

Cold Climate Test Centre

Test and validation for the wind power industry

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www.coldclimatetest.com



Tre blir ett - RISE

Innventia, SP och Swedish ICT har gått samman i RISE för att bli en starkare forsknings- och innovationspartner för näringsliv och samhälle.



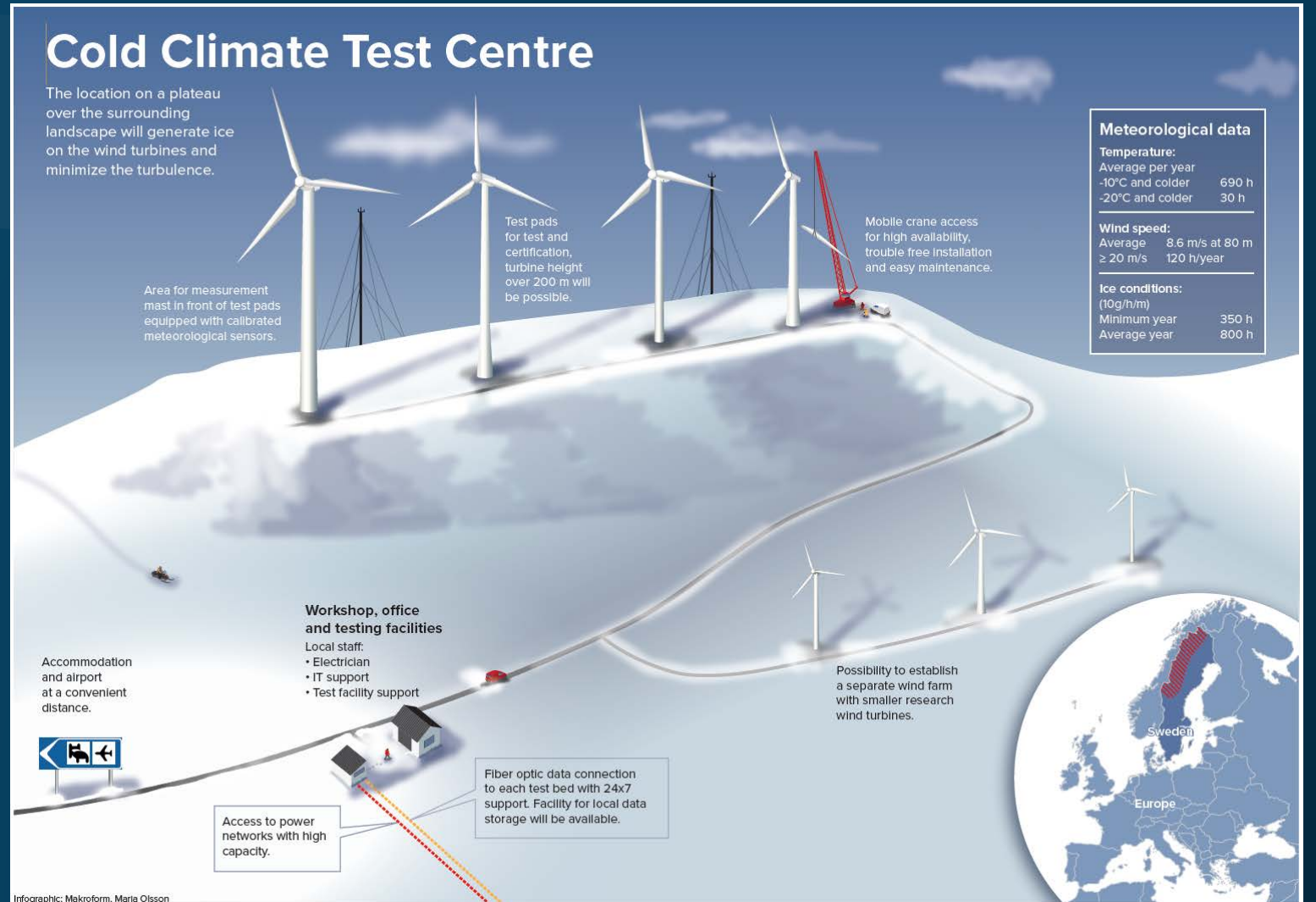
Partners

- **RISE** – the largest research institute in Sweden specialising in energy technology, material properties and safety, focusing on research, test and validation services to a variety of industries.
- **Vattenfall** – a utility company producing 4 TWh wind power per year, operating more than 1 000 wind turbines from the cold Nordic to places further south in Europe.
- **Skellefteå Kraft** – a regional developer and power utility operating more than 100 wind turbines, all in cold climate conditions, producing 930 GWh wind power per year.
- **Swedish Wind Power Technology Centre (SWPTC)** – a research centre formed by the technical universities of Chalmers and Luleå.
- **Vindkraftcentrum** – an organisation in the northern part of Sweden who promotes the establishment of wind power.
- **Vinnova** – the Swedish national research funding agency for innovation and sustainable growth.



Cold Climate Test Center

- Ice:
Average 350 h or more
(10g/h/m)
- Wind:
Average 7 m/s or more
at 80m
- IEA Ice Class 3 or higher
- IEC 61400 wind class III



Cold Climate Test

Cold Climate Test Center



- Prototype testing with all permits in place
- Calibrated site for certification according to IEC 61400
- Test programs according to standards
- Measurement mast
 - Wind measurements
 - Temperature
 - Humidity
 - Liquid water content
- Service & Operation
 - On-site operation personnel
 - Safe access to test site & to the test pads
 - Crane access
- Forecasting
 - Subscription of detailed local weather forecasts
- Infrastructure
 - Grid connection
 - Fibre optic data connection & data storage
 - Workshop, offices, accommodation,...

Cold Climate Test

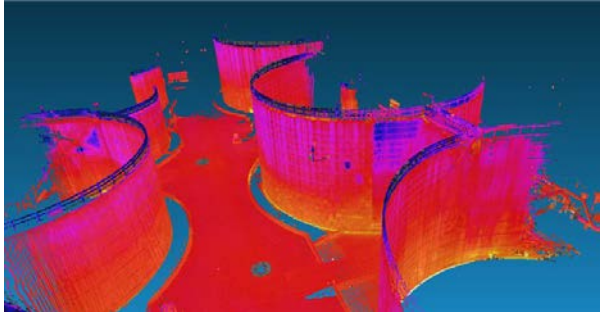
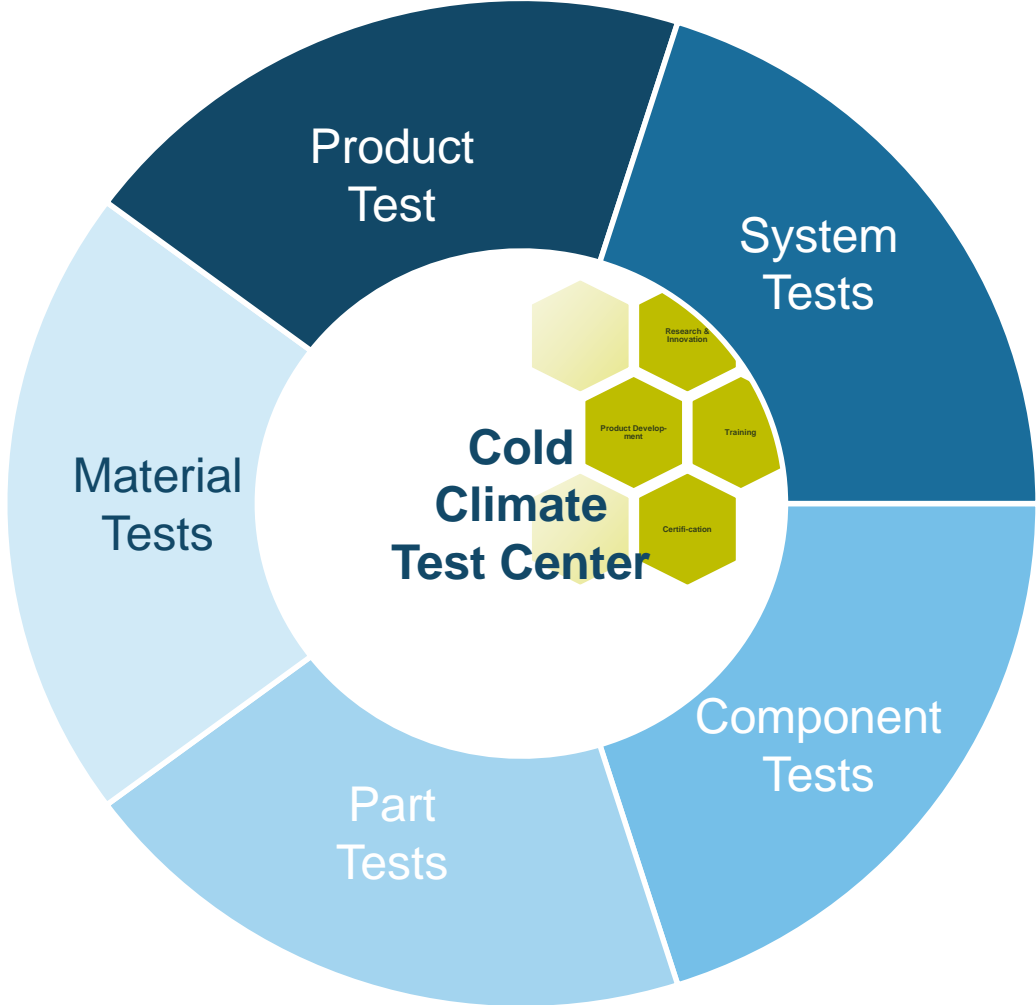
Cold
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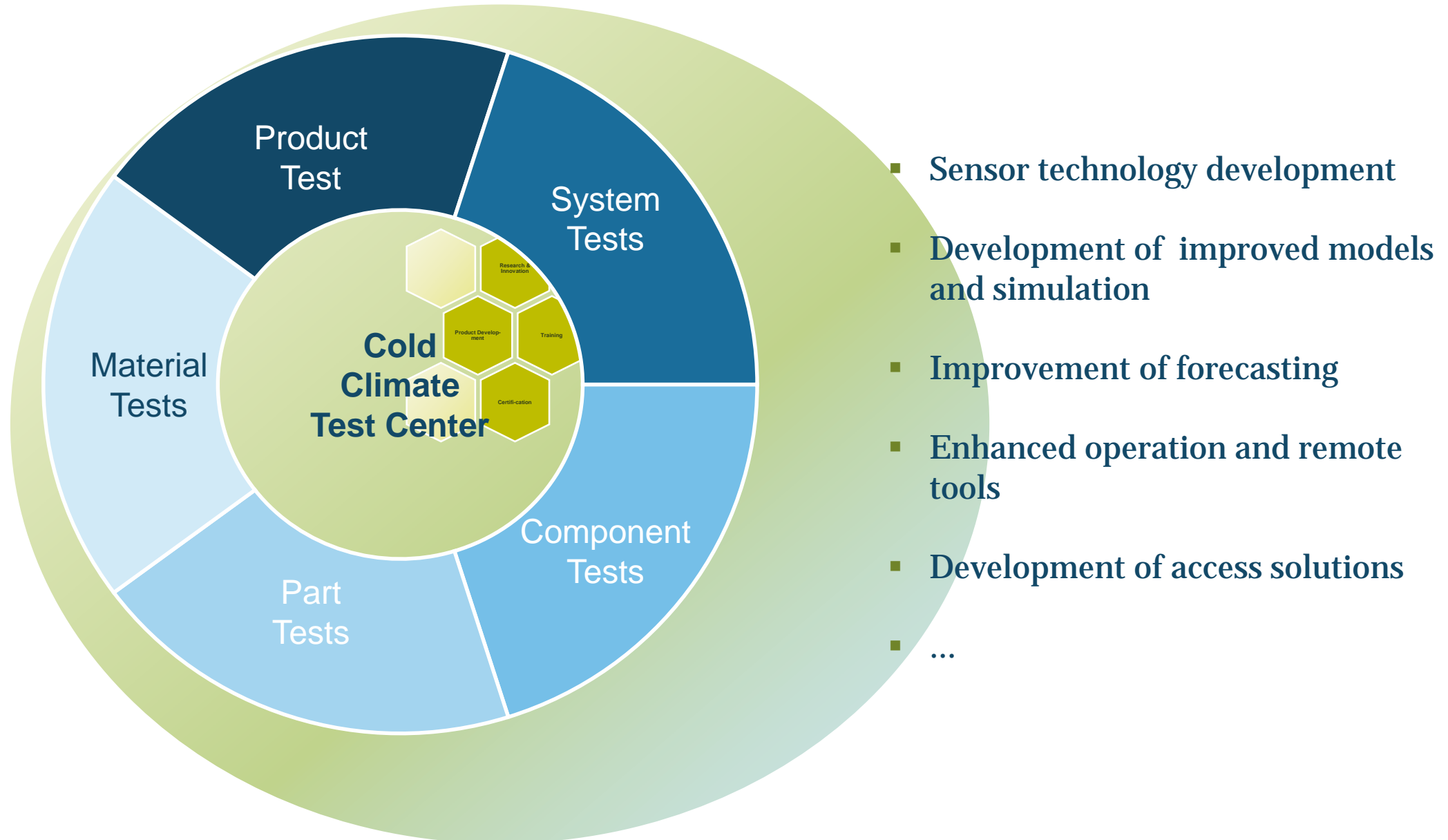


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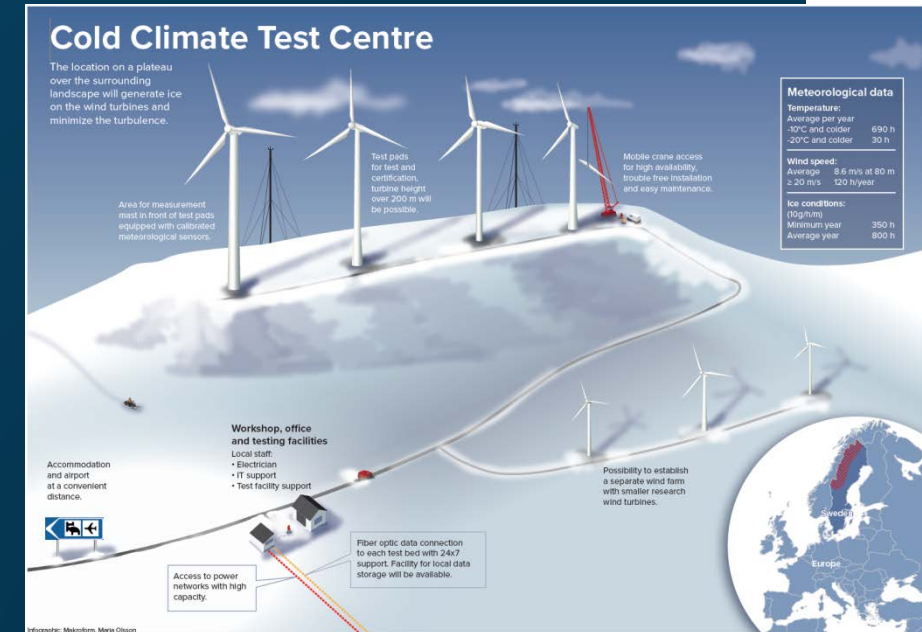


Cold Climate Test



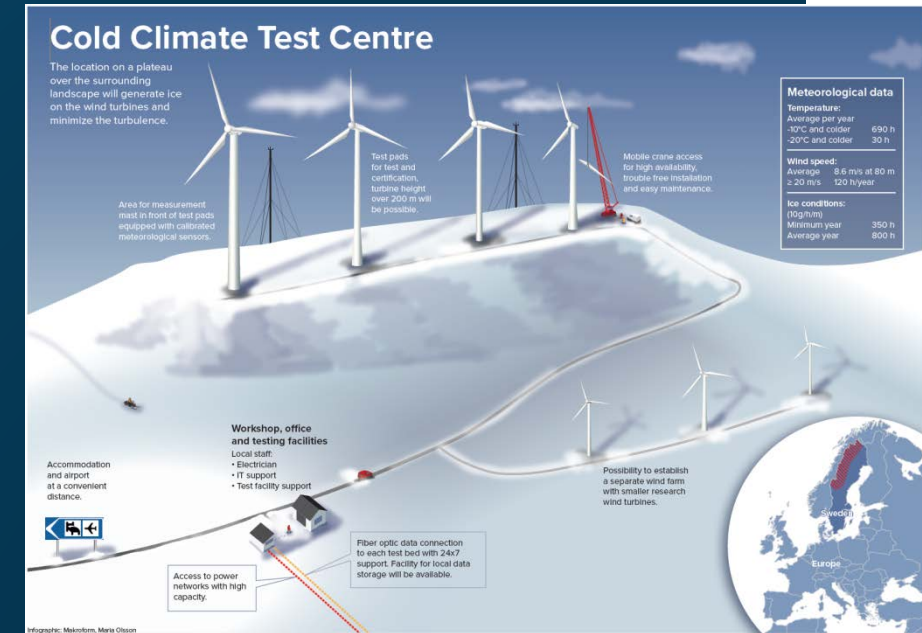
Why industry needs the full-scale test site?

- Owners and operators want to purchase proven products
- Suppliers need to prove suitability of their products
- Developing safe routines for installation, operation and maintenance in harsh conditions
- Field testing at production sites effects production at the site
- R&D dependent on the site service personal at a real production site – low priority
- There are limited degrees of freedom for R&D at a real production site
- Influence and be part of the development of standards and regulations



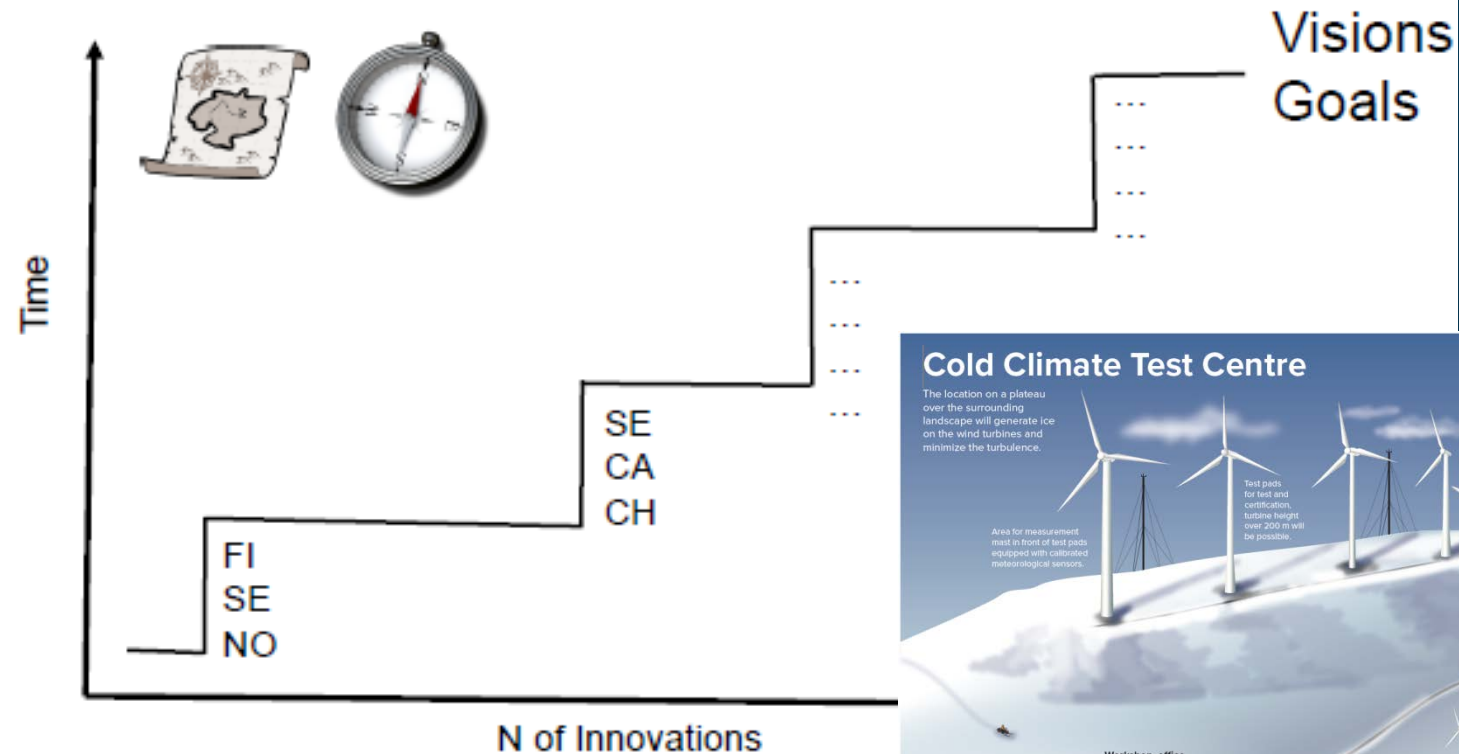
Why industry needs the full-scale test site?

- Facilities and workshop customized for R&D
- Detailed metrological data for a test turbine at a test site
- Secure good HSE conditions and procedures for R&D activities
- Repeatability of tests, procedures and test conditions as parameters can be better controlled
- The independent centre allows cost splitting for i.e.
 - joint product validations
 - benchmark test
 - ...
- Do joint R&D projects

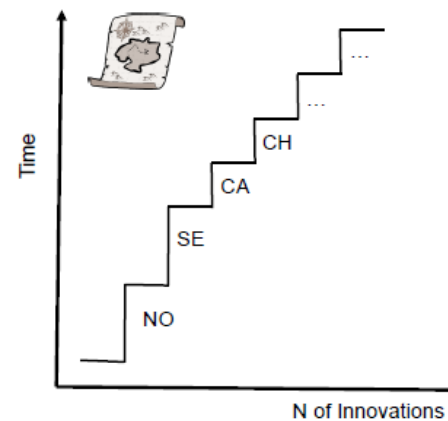


Why does the research community need full-scale test site?

The walk to goals TOMORROW



The walk to goals NOW



Cold Climate Test Centre

The location on a plateau over the surrounding landscape will generate ice on the wind turbines and minimize the turbulence.

Area for measurement mast in front of test pads equipped with calibrated meteorological sensors.

Test pads for test and certification, turbine height over 200 m will be possible.

Middle crane access for high availability, trouble free installation and easy maintenance.

Workshop, office and testing facilities
Local staff:
• Electrician
• IT support
• Test facility support

Accommodation and airport at a convenient distance.

Access to power networks with high capacity.

Fiber optic data connection to each test bed with 24/7 support. Facility for local data storage will be available.

Possibility to establish a separate wind farm with smaller research wind turbines.

Meteorological data	
Temperature:	
Average per year	690 h
-10°C and colder	30 h
-20°C and colder	30 h
Wind speed:	
Average	8.6 m/s at 80 m
>20 m/s	120 h/year
Ice conditions:	
10g/m	
Minimum year	350 h
Average year	800 h

Sweden
Europe

Photographic: Mikko Kim, Maria Olsson

Picture by Ville Lehtomäki (VTT)

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