

Swedish Wind Energy Association's view on
Health and Safety issues when

Working in cold climate

Winterwind 2016

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Swedish Wind Energy Association

The organisation of Swedish wind business for promotion of wind energy through

- ❖ Political lobbying
- ❖ Opinion advocacy
- ❖ Information distribution
- ❖ Seminars
- ❖ Annual conference

150 member companies and central office in Stockholm

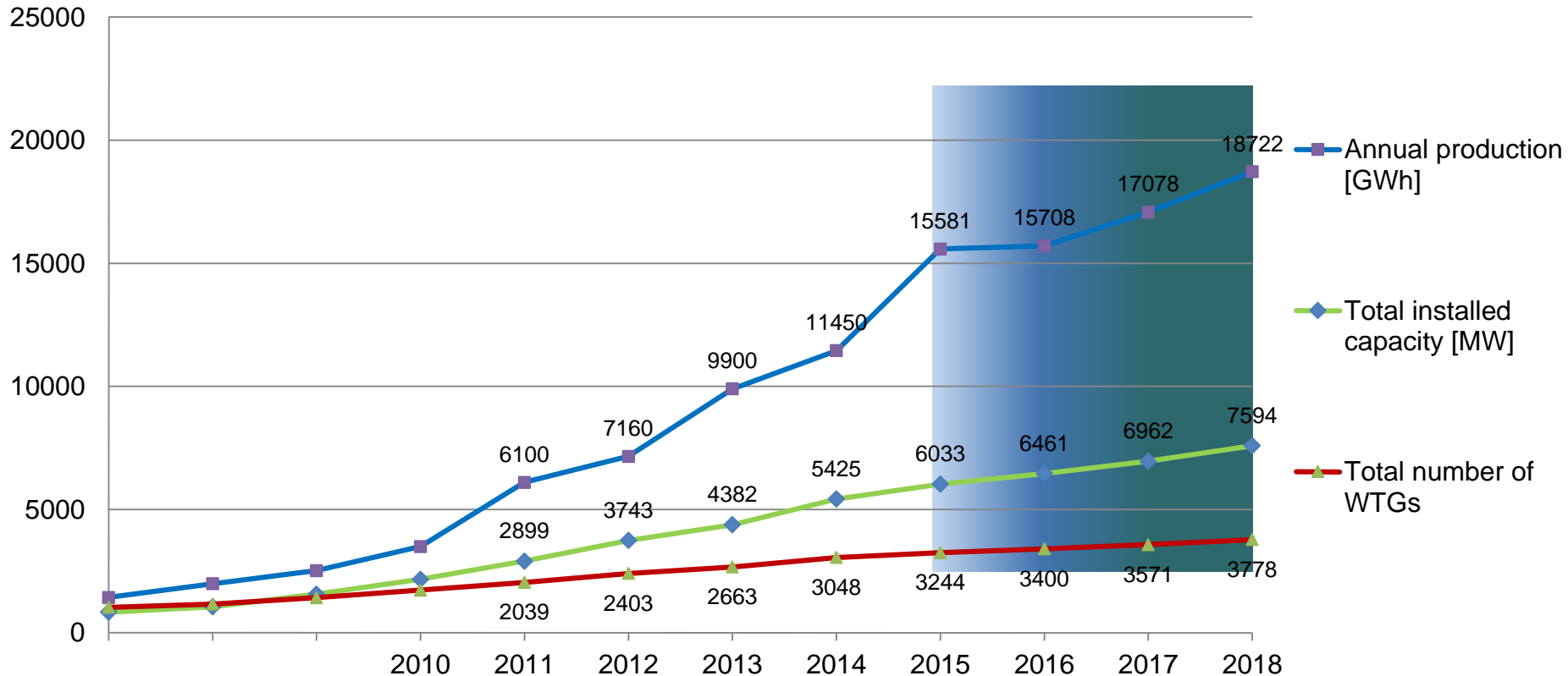
Priority areas

- ❖ Infrastructure
- ❖ Support scheme
- ❖ Permission
- ❖ Health and Safety

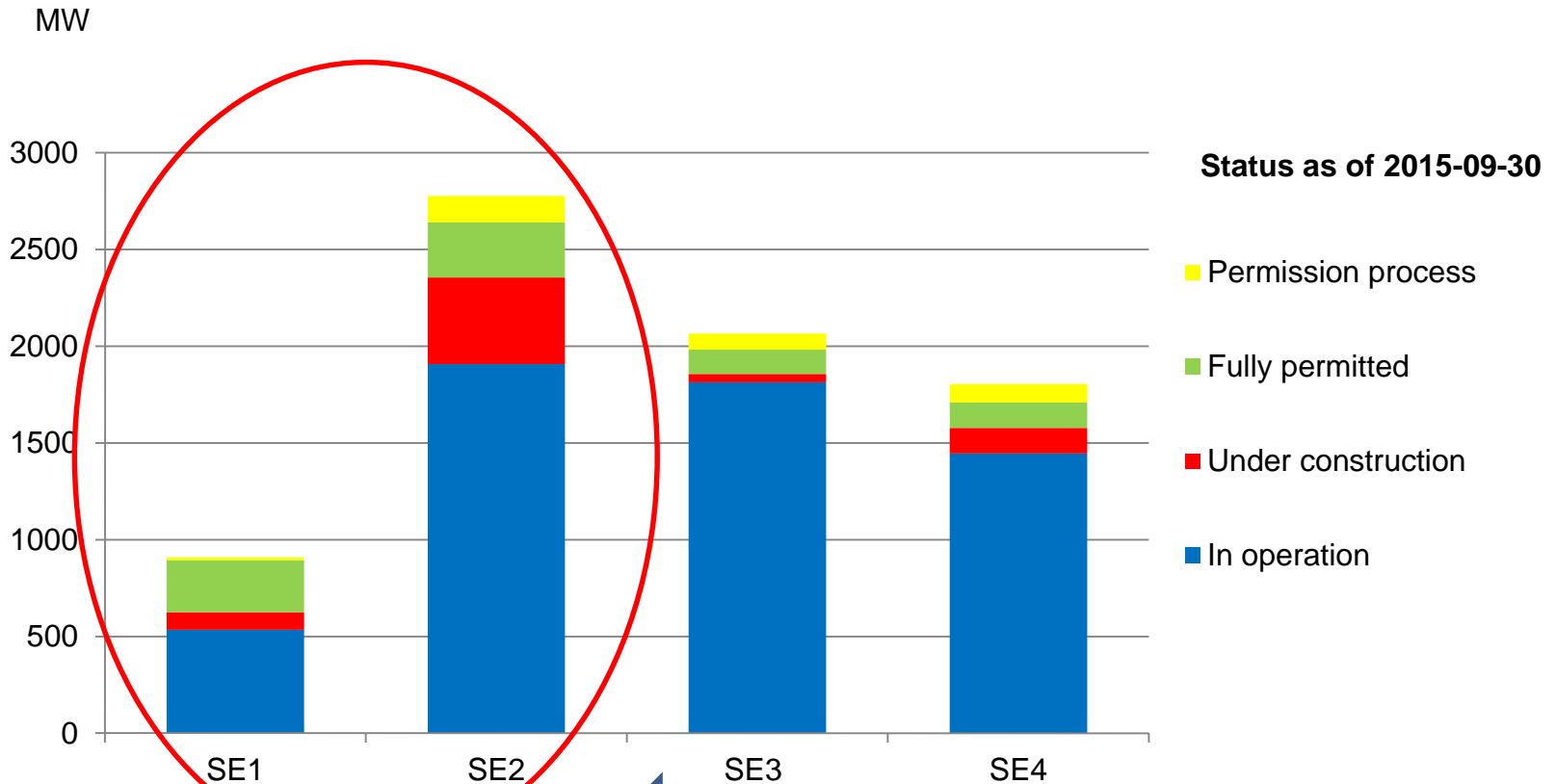
Eight member councils

Wind power development

Actual (White) and forecast (blue)



Expected capacity per price area december 2018



Shift towards northern Sweden

Our work with health and safety issues

- A council with 25 members
- Three working groups
 - Cold climate
 - Fire and emergency
 - Demands on suppliers
- Implementation of a common industry incident database (ENIA)

Guidelines for cold climate work

Four objectives:

- Internal & external communication
- Turbin specific ice-mapping
- Turbine technical measures
- Operational strategy



1. Internal & external communication

Management's
commitment to the
special H&S challenges for
windpower in cold climate

Communication & dialog
with nearby residents and
other stakeholders



Internal communication

Ice statement

Safety is one of our core values and in our H&S policy we state our commitment to prevent all incident and control safety risk arising from our activities.

Under certain cold climate weather conditions, ice can form on wind turbine structures and rotor blades in a variety of ways.

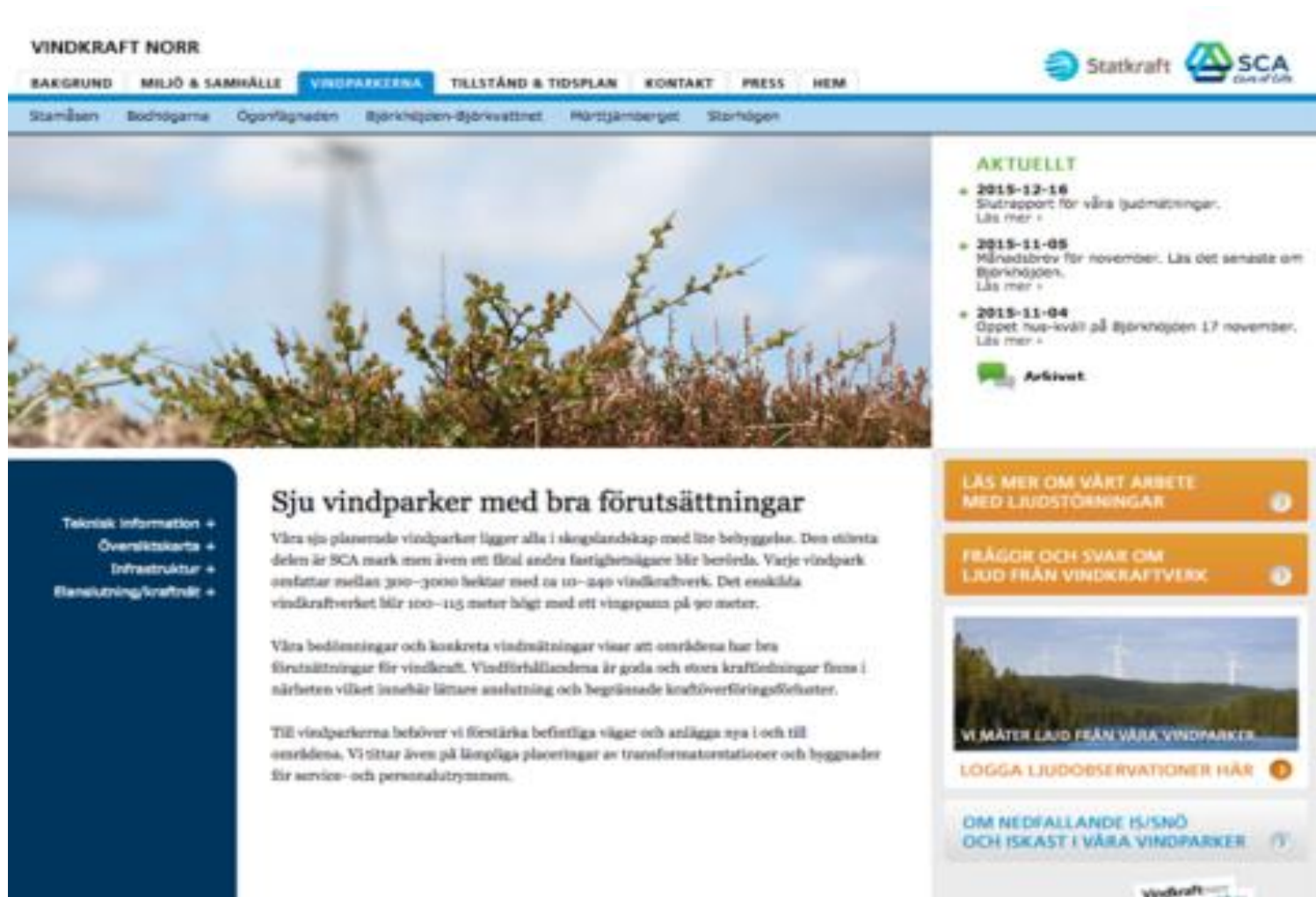
This ice can effect production and also be a safety hazard.

The purpose of this statement is to state the management's commitment to ensure safe and sound cold climate operations on our plants.

We believe:

- Ice build-up on turbines is inevitable during cold climate conditions
- Any unsafe condition due to ice formation on turbines must be controlled. Concessions to this will not be made in favour of business result.
- At the design stage of developments projects in cold climate areas, risk from falling ice must be assessed and mitigated. This might be means of, but not necessary limited to, state of the art ice prevention or de-icing technology.
- For all operational sites, residual risk must be identified, assessed and controlled by site specific procedures supported by local management approval.
- Rules stipulated by legislation or enforcement bodies must always be followed.

External communication




VINDKRAFT NORR

BAKGRUND MILJÖ & SAMHÄLLE **VINDPARKERNA** TILLSTÅND & TIDSPLAN KONTAKT PRESS HEM

Stamåsen Bodsjögarna Ögonflagnaden Björnkjöpen-Björkvattnet Håstjärnberget Storhögen

AKTUELLT

- **2015-12-16**
Slutrapport för våra ljudmätningar.
[Läs mer >](#)
- **2015-11-05**
Månadsbrev för november. Läs det senaste om Björnkjöpen.
[Läs mer >](#)
- **2015-11-04**
Öppet hus-kväll på Björnkjöpen 17 november.
[Läs mer >](#)

 **Arkivet**

Sju vindparker med bra förutsättningar

Våra sju planerade vindparker ligger alla i skogslandskap med lite bebyggelse. Den största delen är SCA mark men även ett flertal andra fastighetsägare blir berörda. Varje vindpark omfattar mellan 300–3000 hektar med ca 10–240 vindkraftverk. Det enskilda vindkraftverket blir 100–115 meter högt med ett vingspann på 90 meter.

Våra bedömningar och konkreta vindmätningar visar att områdena har bra förutsättningar för vindkraft. Vindförhållandena är goda och stora kraftledningar finns i närheten vilket innebär lämnat anslutning och begränsade kraftöverföringsförluster.

Till vindparkerna behöver vi förstärka befintliga vägar och anlägga nya i och till områdena. Vi tittar även på lämpliga placeringar av transformatorstationer och byggnader för service- och personalutrymmen.

LÄS MER OM VÅRT ARBETE MED LJUDSTÖRNINGAR

FRÅGOR OCH SVAR OM LJUD FRÅN VINDKRAFTVERK

VI MÄTER LJUD FRÅN VÅRA VINDPARKER

LOGGA LJUDOBSERVATIONER HÄR

OM NEDFALLANDE IS/SNÖ OCH ISKAST I VÅRA VINDPARKER

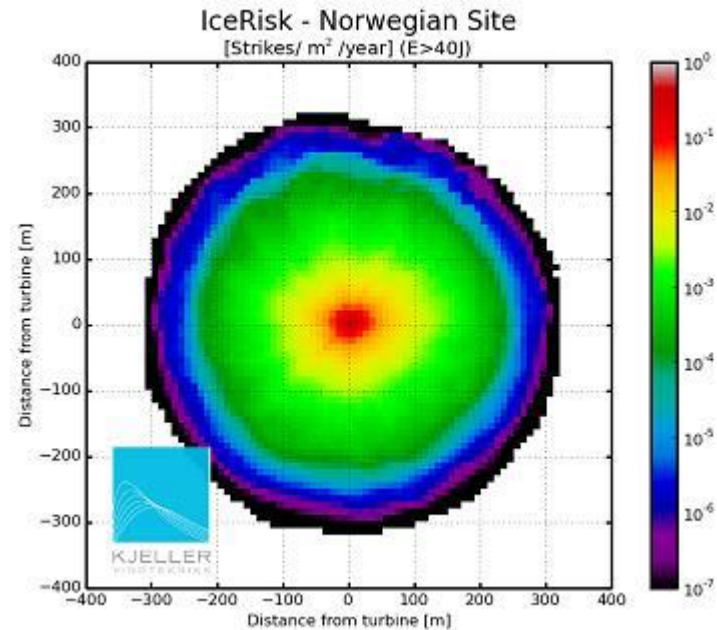
Teknisk information +
Översiktskarta +
Infrastruktur +
Elanslutning/kraftnät +

Statkraft **SCA**
Care of Life

vindkraft

2. Turbine specific ice-mapping

- Mapping of the likelihood of ice or snow build up for the area
- Mapping of ice-trajectory
- Critical mass based on an impact energy $> 40\text{J}$
- Move away from risk area based on $(H+D)\times 1,5$
- New risk area based on the prevailing wind direction during ice build up and melting
- Risk analysis and acceptance criteria



3. Turbine technical measures

- Ice detection instruments
- Vibration detection
- Power curve deviation
- De-icing systems
- Anti-icing systems
- Barriers at entrance.
- Ice camera



4. Operational strategy

- Warning signs
- Warning lights & horn
- Road gates & barriers
- Meteorological forecasts
- Understanding the location-specific weather phenomena
- Register ice-throws
- Demand of weather-specific routines



4. Operational strategy (cont)

- Visual observation of ice on blades, procedures for manual or remote stop of turbines
- Safe start-up after ice events, visual check that the blades are free of ice
- Minimize staff exposure inside- or transport through the risk area
- Safe transport vehicles
- Yaw turbine to minimize risk for ice throw/ falling ice hitting sensitive areas.



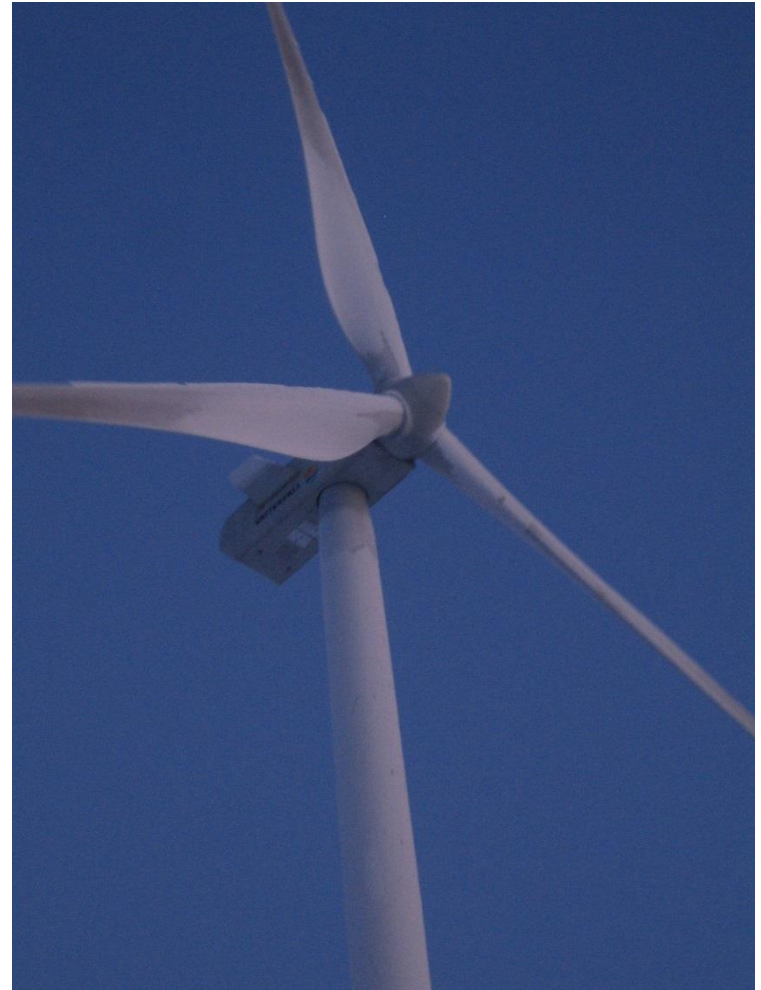
4. Operational strategy (cont)

- Larger risk acceptance for employees than third parties where knowledge and routines are in place to manage the risk
- Ad-hoc information to local stakeholders such as reindeer herders, local tourist associations, snowmobile organizations, snow clearance companies, skiers, hunters, etc.



4. Operational strategy (cont)

- Stop turbines before ice-event which is expected to be followed by a longer period of high air pressure and low temperatures.
- De-icing with helicopter or MEWP
- Technical upgrading
 - De-icing
 - Deflect heat to the blades
 - Hydrofobic coating
 - Protective sleeve during periods of active icing



Thank you

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