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INTERNATIONAL WIND FARM MANAGEMENT

FROM PITEÅ TO TAICHUNG

CONTENT

WINDMANAGER WORLDWIDE 2023

Facts & Figures

520 WINDMANAGER

WORLDWIDE FROM PITEÅ TO TAICHUNG

16 Offices

Six+

Gigawatts

TAIWAN — Around **80%** Humidity — Down to **-50°** Celsius — FINLAND

WEATHER EXTREMES

OUR EXPERTISE:
Over 80 different turbine types in our portfolio

80+

DISTANCE FROM BREMEN TO ALL OFFICES

138.874 *kilometres*

Operating in **twelve** countries

Top Rating:

9/10

9 out of 10 customers recommend our services

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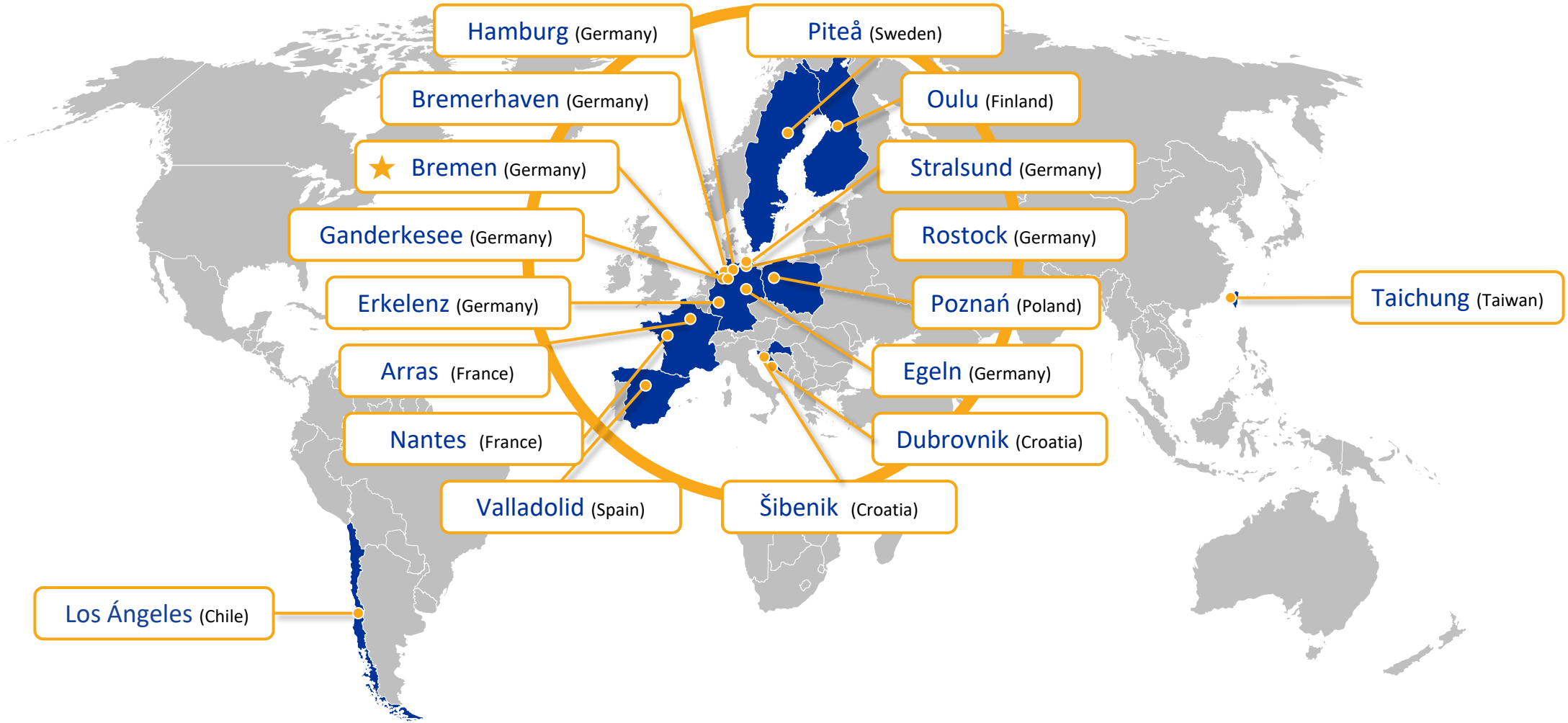
COMPANY LOCATIONS



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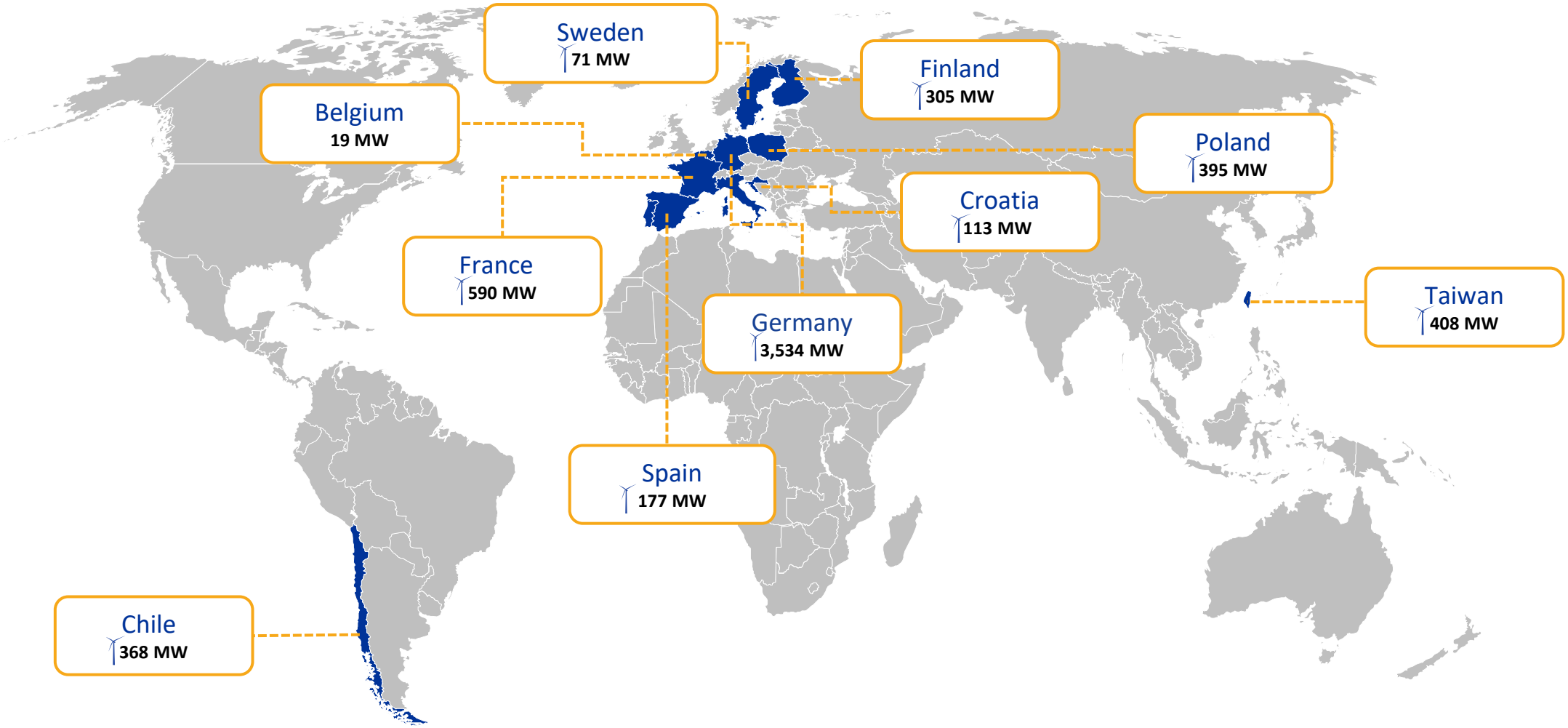
WIND FARMS 2023



DISTANCES & TIME ZONES

13:00

LOS ÁNGELES

12,719 km

17:00

BREMEN

HEADQUARTER

24:00

TAICHUNG

9,223 km

TCMA

then

now

Management contract 2002

- A total of 4 pages
- Technical services:
  - 10 subpoints

VS

Management contract 2023

- Terms & Conditions:
  - 13 pages
- Technical & commercial services:
  - 10 pages

Increasing requirements for operational management

New generation of turbines

Projects: Achim Bollen, Aldermyrberget, Chuangwei, Ehra Lessin, Kemnitz Repowering, Kuuronkallio, Wilstedt etc.

Capacity: 4.2 – 5.7 MW **Hub height:** +160 m

GLOBAL vs. LOCAL

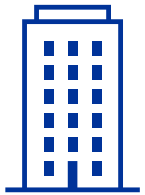
knowledge transfer

International Management

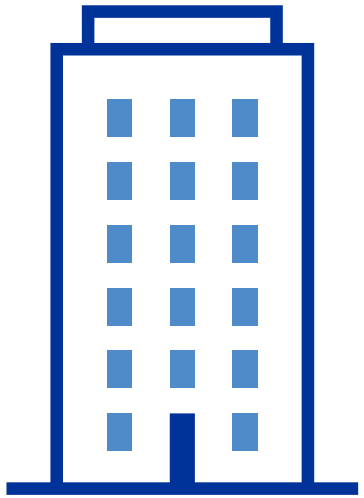
technical expertise

Managing Director
Country

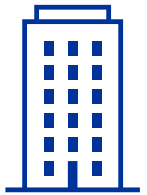
Managing Director
Country



commercial experience



market know how



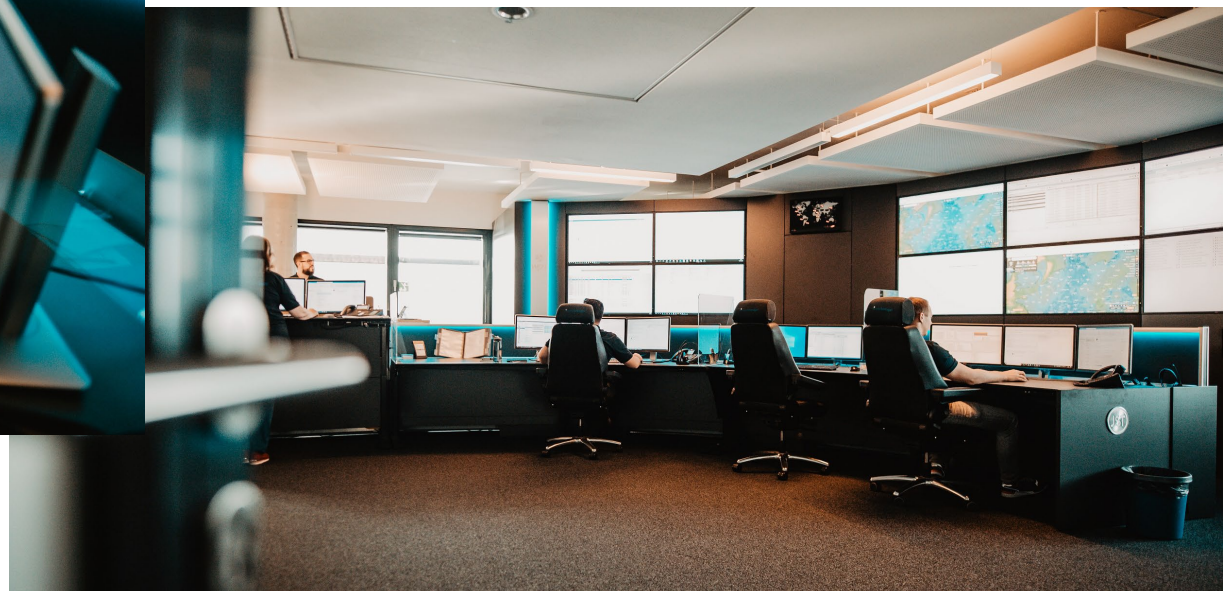
Local Management

Bremen
HEADQUARTER

Local Management

24/7 MONITORING

Local & global: Our control room. Located in our headquarter in Bremen. Monitoring of all our wind farms in the various markets in Europe, South America and Asia.



OUR CONTROL ROOM

AROUND 2,800 TURBINES WORLDWIDE

INTERNATIONAL COOPERATION

CROSS-SITE KNOW-HOW TRANSFER

NEW UPCOMING CHALLENGES *in Market A*

EXISTING KNOW HOW *in Market B*

KNOWLEDGE TRANSFER BETWEEN *Markets*

WHAT'S COMING NEXT? *New requests*

New upcoming challenges could be: new regulations, new site, new turbine types, new requirements by investor etc.

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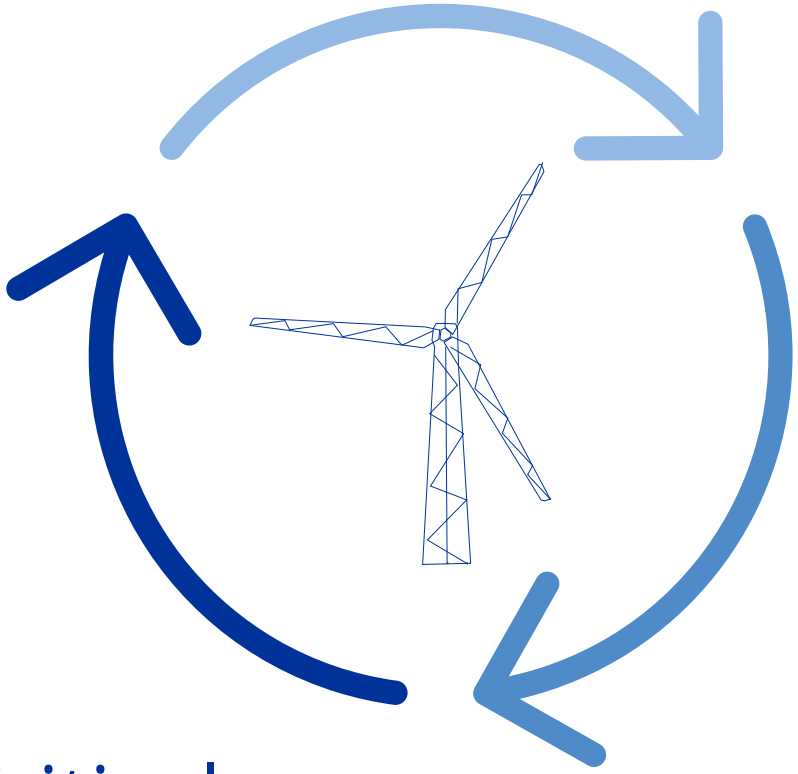
STROMPREISBREMSEGESETZ

GERMAN WIND FARM MANAGEMENT



Critical Infrastructures

KRITIS

Mandatory IT security measures

Particularly concerns our control room

German requirement, but due to our worldwide operation applies to all turbines

Different dimensions of security

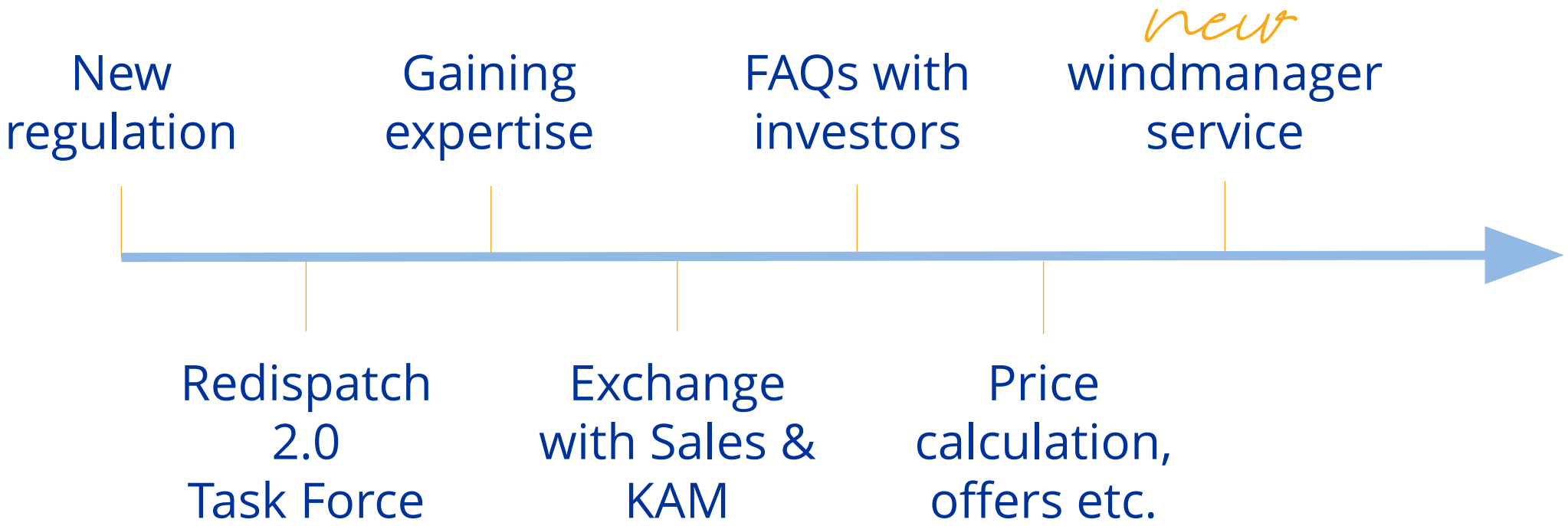
BEDARFSGESTEUERTE NACHTKENNZEICHNUNG

RETROFITTING OF AROUND 1,500 WTGS IN GERMANY

NEWLY DEVELOPED SERVICE

Demand-controlled night marking.
Coordination with all stakeholders incl. investors, hardware manufacturers, other operators, authorities, politicians etc.

Redispatch 2.0



STROMPREISBREMSEGESETZ

NEW REQUIREMENTS FOR OPERATION

ERLÖSABSCHÖPFUNG

REVENUE SKIMMING

to compensate
high energy prices

BUREAUCRACY MONSTER

NEW SUCCESFUL SERVICE?

COMPENSATORY & SUBSTITUTE *Measures*

1. **CHECK THE ENVIRONMENTAL REQUIREMENTS OF THE WIND FARM**
2. **CONTROL THE STATUS QUO OF THE MEASURES ON SITE**
3. **REVIEW OF THE MEASURES**
4. **ADJUSTMENTS TO THE MEASURES**

NEW TOPIC 2024

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PORONKUSEMA

FINNISH WIND FARM MANAGEMENT

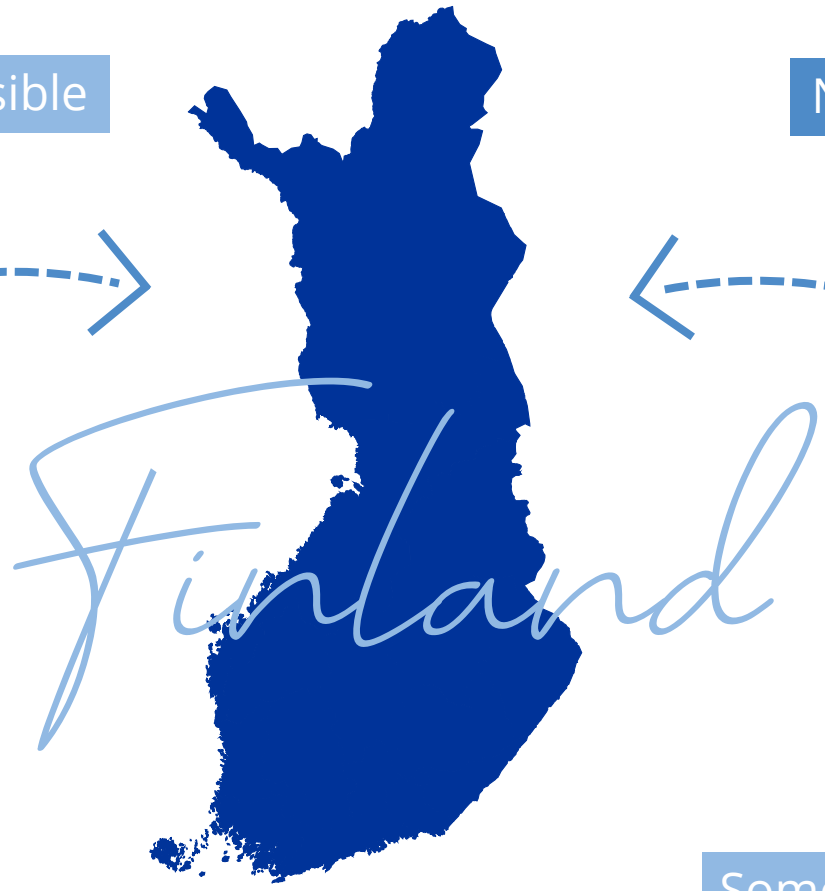
SUOMI GEOGRAPHY

SOS

Rescue by helicopter not possible

No mountain ranges in Finland

Wind farms often located in remote areas with long distances to hospitals



High snow removal costs up north: roads must be kept open

Access to wind farms is usually not limited

Sometimes snowmobiles need to be used to access wind turbines or power lines.

Location effects

Differences within our wind farms

Risk of **falling ice** to be considered when approaching turbines during winter. Service companies follow their internal safety regulation and/or site safety rules.

Some wind farms are located in areas where **access is restricted**. Service / visits need to be planned beforehand.

Location of wind farm to be considered when planning works. For example, areas with **high risk or fire** etc.

ENVIRONMENTAL MONITORING

Not many dangerous or poisonous animals in Finland. In other countries, these may require special arrangements.

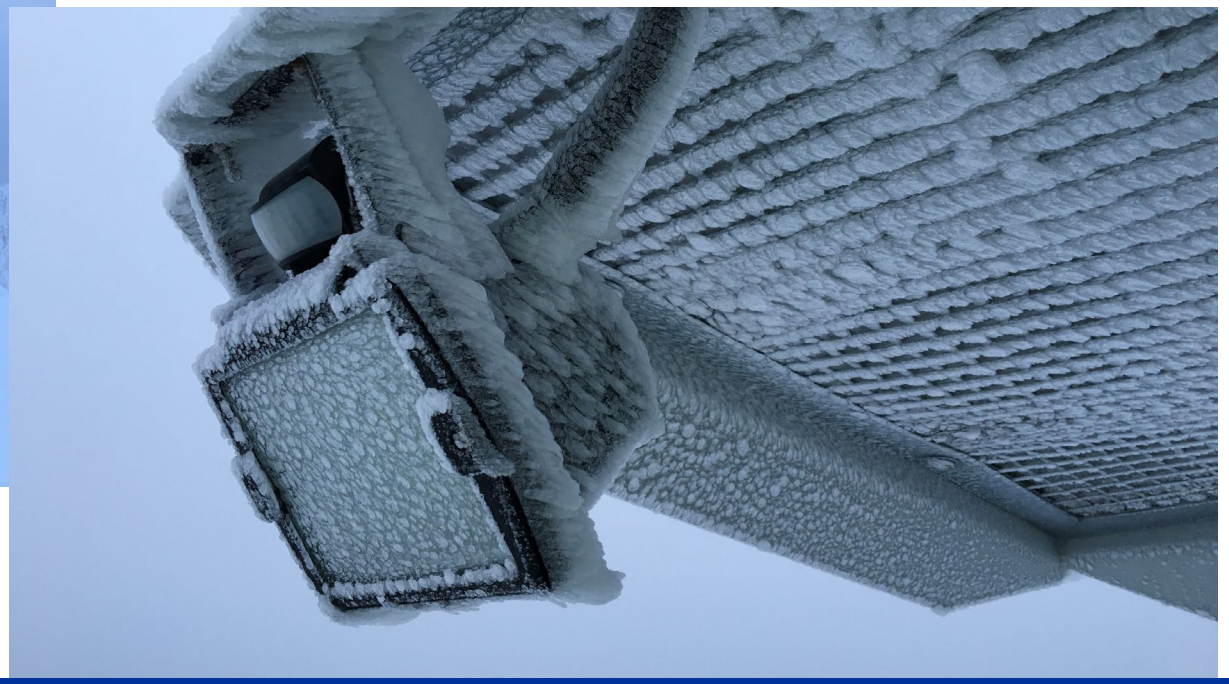
In Finland, reindeer and elk are most important animals to watch out for. Vipers and ticks do not pose immediate threat to life.

In other markets turbines can be required to be shut down at certain times, for example due to bats, birds or shadow flicker.

Environmental monitoring: especially migratory birds and reindeers. Monitoring of bird collisions by our field crew on site.

Down to
-50°
Celsius

Focus of ice detection and blade heating systems in FIN: keep turbines in operation during winter. In other countries, aim is to protect people, property and assets.



Lubricants and other materials need to be suitable for extreme weather conditions.

COLD CLIMATE CONDITIONS

Differences within our wind farms

COMMERCIAL MANAGEMENT

1

The size of a wind farm company imposes certain requirements: Statutory audit if certain limits are met. Loan agreements usually require audit irrespectively of the company size.

2

Property tax: Municipalities can choose the rate of property tax between 0.93–3.10 %. Property tax income could be significant source of income to some small municipalities.

REPORTING

Financial Statements

... and Corporate Income Tax Returns

- Differences between countries
  - Timing, deadlines
  - Documentation requirements
  - Filing practices
- Accountants prepare financial statements and tax returns in Finland. There is no special tax accountant system in place.

Invoicing

Many parties calculate and charge interest immediately when a payment is overdue.

We always try to approve and pay invoices on the due date at the latest.

IMPORTANCE OF DUE DATES

E-INVOICING

- ☒ No paper invoices
- ☑ A special Finnish e-invoice system
- ☑ Invoices are processed and approved electronically

Publicity & *Freedom* of information

The trade register is public in Finland. Public documents are for example:

Basic trade register information

Financial statements

Profit & tax data for corporations & joint ventures

including

- Name, municipality of residence, company identification number
- Taxable profit
- Total amount of tax due and total amount of advances
- Amount of taxes to be paid or refunded

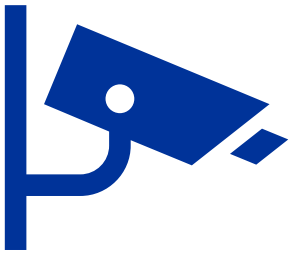
FINLAND *vs.* OTHER MARKETS

During winter, special *instructions* apply for access to power plants (darkness, icy conditions etc).

Some countries have several different certificates. In Finland, only *guarantees* of origin are traded.

In some wind farms in addition to substations, there are also *maintenance* buildings that need to be looked after.

Authorities in Finland *do not* require regular inspections of power plant structures, e.g. every four years.



Security & mischief: There is only little crime in Finland.

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DREAL OR NO DREAL?

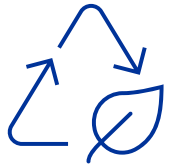
FRENCH WIND FARM MANAGEMENT

ICPE

Installation Classified for the Protection of the Environment

HEALTH & SAFETY

EMERGENCY MANAGEMENT



ENVIRONMENTAL MONITORING

DREAL

Regional Department for the Environment, Planning and Housing

Control of sites that are classified as ICPE

Non compliances are penalized

Can delay restart of whole wind farm

DREAL check anytime: scheduled, unannounced, remotely or on site

Severe damage: stop of whole windfarm and DREAL checks full ICPE compliance

2022: environmental topics
2023: public health and safety

Frequency of checks increases & focus may change

Health & Safety

One document called Plan de Prévention for each wind farm

Signed by parties involved and includes a. o. :

- Who is who
- Detailed risk analysis & risk mitigation plan

Only personal identified in PDP can intervene

Personal Protective Equipment (PPE) available

On every turbine and access point: Safety pictogrammes, security notices, first aid, emergency numbers

Personal is trained

According to ICPE

EMERGENCY MANAGEMENT

EMERGENCY PLAN

ACCORDING TO ICPE

- Emergency stop procedures
- Safety procedures & restrictions
- Contact details (fire department, ambulance, etc.)
- Actions for safe operation (e.g., overspeed, storms, fire, ...)
- ...

ICPE inspector will check e.g.:

- How is overspeed, fire and loss of wind turbine's integrity escalated to the duty service
- If operator can notify emergency services within 15 minutes of any abnormal wind turbines behavior

ENVIRONMENTAL MONITORING

At least *once* during the first 12 months after commissioning.

12

After initial monitoring, *monitoring* must be conducted once every 10 years

10

Objective: Determining the mortality of *avifauna* and bats.

Monitoring must be in *accordance* with the ICPE protocol issued by DREAL.

During the first 12 months of operation, a noise *measurement* must be carried out

ELECTRICAL RESPONSIBILITY

NF C-18-510 as implementation of the European directive EN 50110-1 (D: DIN VDE 0105-100)

...lies with the head of the operator (SPV)

PREVENTION OF ELECTRICAL RISK

SHARING OF NECESSARY INFORMATION & DOCUMENTS

DEVELOP SAFETY INSTRUCTIONS

MAINTANANCE OF ELECTRICAL INSTALLATIONS

UPDATING OF ELECTRICAL INSTALLATION PLANS

Head of SPV can entrust its duties to outside company (e.g. TCMA contractor) who can entrust to a physical person within its organization.

Important to have a delegation document (“DREI”) established between SPV, TCMA contractor & physical person within TCMA organization.

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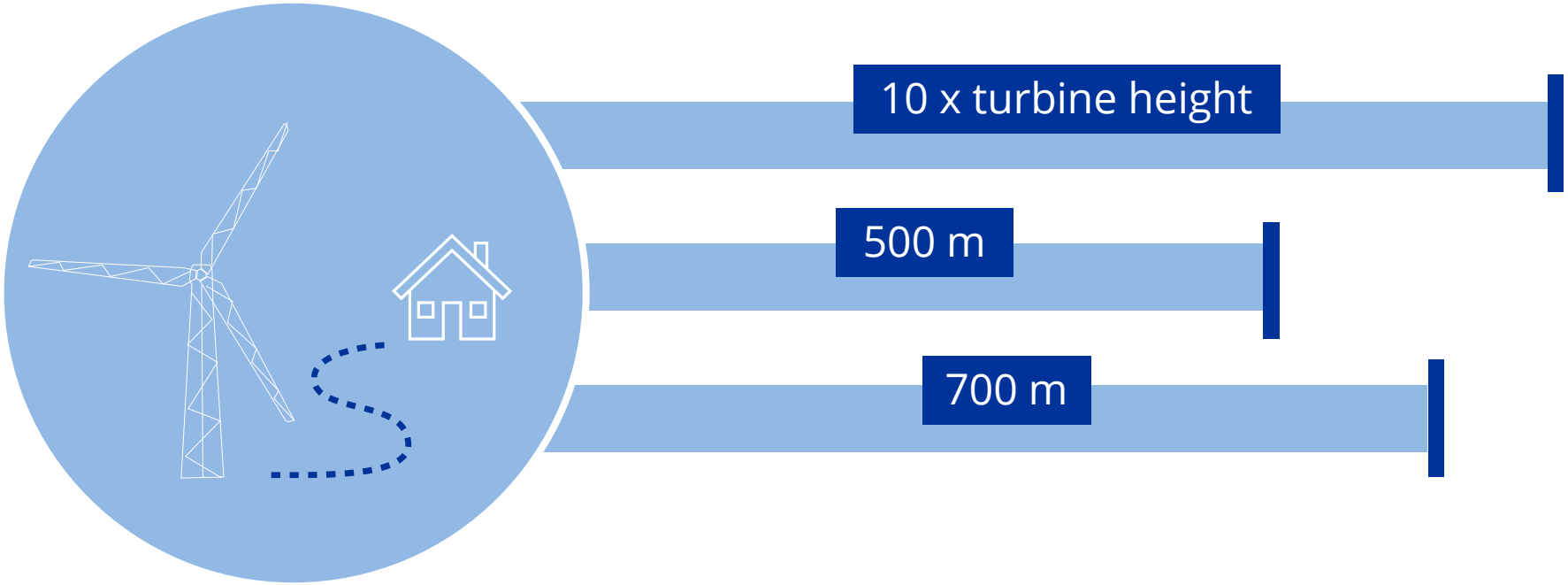
Dziesięciokrotność

POLISH WIND FARM MANAGEMENT

10H *rule*



GROWING WIND ENERGY MARKET

coming to

Poland

Our customers:
Worldwide operating investors

expecting

Very important part of our technical management. Constantly evolving. Through trainings and new challenges.

ON-SITE SERVICE

PRIME PRESIDENT IN KOZMIN

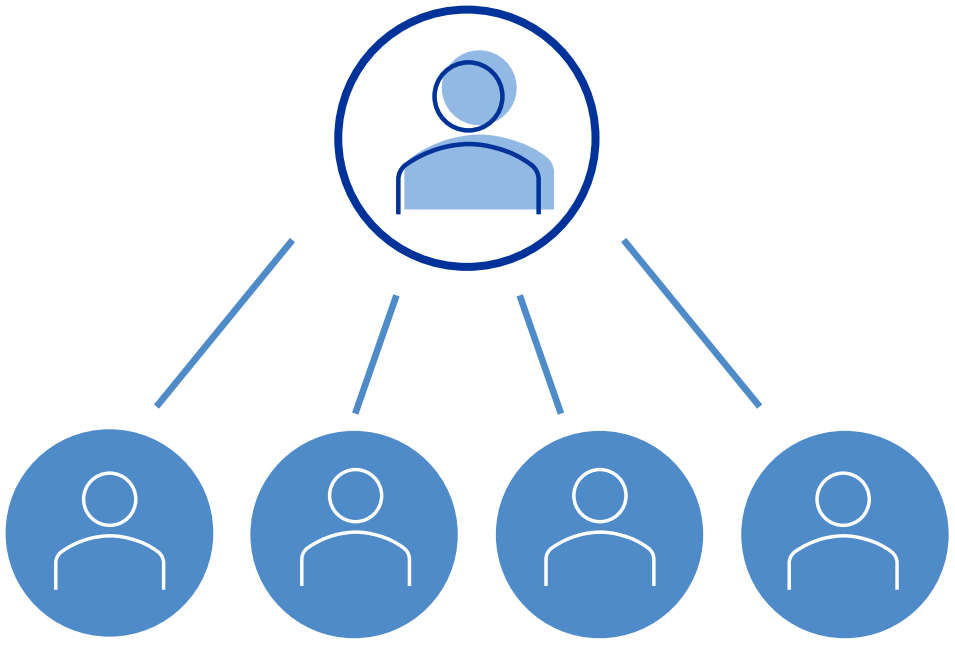
TRAINING WITH FIREFIGHTER

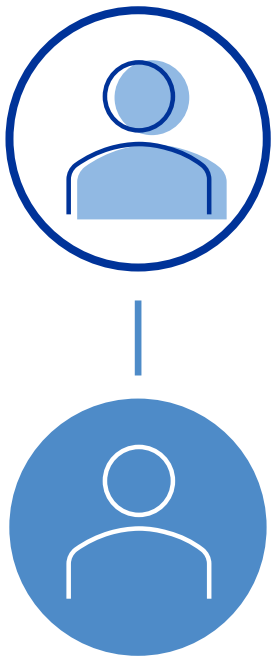
SETTING HSE STANDARDS IN POLAND

ELECTRICAL RESPONSIBILITY

DIFFERENT APPROACHES

Poland *vs.* *Germany*





COMMERCIAL *Specifics*

RES Auctions / CFD
(Contract for Difference)
Current system

Green Certificates
Old system, but still in use

Windfall tax
Different to European Law

Guarantees of Origin

ACCEPTANCE ISSUES

Politcs

Polish lobbyism fueled a narrative discouraging cooperation with wind industry. Poland's economic situation fluctuated a lot. GDP growing by average of 4% per year over past 30 years.

Landowner

In operational management we often deal with strongly unsatisfied landowners trying to terminate the provisions of the contracts, calling us with complaints, blocking work on the farm etc.

Local activities

It is important for us to counter these sentiments and to proactively nurture relations with the local community through various CSR activities. Such as organizing events for the local community.

Upcoming ? challenges

CABLE POOLING

- Preparation
- Close cooperation with developers
- Operation of hybrid systems with e.g. pv, storage, etc.

REDISPATCH

- European grid code is valid in Poland
- Polish grid operators are implementing solutions already implemented in Germany.

OTHER SERVICES?

- Tendency: Working solutions of German market come to Poland. With delay of a couple of years.
- What‘s next? Demand-controlled night marking?

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Thank you