



*Windenergietage in Potsdam*



*Präsentation von Henrik Toft Kromann*

*8-10 November 2023*



COTES

## THIS IS US

Cotes is an independent and privately owned company.

Founded in 1986 with a focus on sustainability, quality and positive impact.

Cotes designs and manufactures adsorption dehumidifiers for a range of industries.

Delivered +100.000 dehumidifiers.

Invests +7% of revenue on R&D. Holder of multiple international patents and awards.

HQ in Denmark, production in Poland and Denmark, and a Global Partner Network.

Revenue: 20 mEUR

Employees: +100

# BECAUSE UNCONTROLLED HUMIDITY CAUSES PROBLEMS

## UNCONTROLLED HUMIDITY LEADS TO:

- Condensation
- Corrosion
- Mould, fungi and bacterial growth
- Ice formation
- Electrical faults
- Clumping and blockages
- Seasonal fluctuations



INDUSTRY FOCUS

# POSITIVE AND SUSTAINABLE IMPACT



**WIND  
INDUSTRY**



**LI-ION BATTERY  
MANUFACTURING**



**OTHER INDUSTRY  
APPLICATION**



# WIND INDUSTRY

**ONSHORE, NEARSHORE AND OFFSHORE**

# TRUSTED BY:



## STUDIES:

**RWE**

RWE INVESTS IN THE FUTURE OF PAPALOTE CREEK WIND FARM  
BY VANQUISHING HUMIDITY

 **Fraunhofer**

Humidity-related electrical failures occur in wind turbines if they are not protected. This has been documented several times, most recently in a study by [Fraunhofer](#).

INTEGRATED DESIGN

# PROTECT WIND TURBINES ASSETS

Integrated design



Transition Piece and Foundation



Substation



Transportation and Storage



Retrofit



ONSHORE, OFFSHORE AND NEARSHORE

# PROTECTS YOUR WIND ASSETS FROM MOULD, CORROSION AND ELECTRICAL FAULTS

Wind turbines are exposed 24/7, 365 days a year

- Proven over-pressure dry-air solution that protects the inside of wind turbines.
- Drying and desalting the air and keeping moist air out.
- Ensure to avoid electrical faults, mould and corrosion.
- Key effects for customer are higher production uptime, lower maintenance costs, extended lifetime on equipment and strong ROI.

Global Leader in Offshore Wind



ONSHORE, OFFSHORE AND NEARSHORE

## CR240 LIGHT WEIGHT

### Transportation, storage, temporary usage

- From 19 kg to 11 kg - complying with HSE
- Recycled plastic for the main structure
- Easy to disassemble, maintain and service
- Hygrostat is optimal

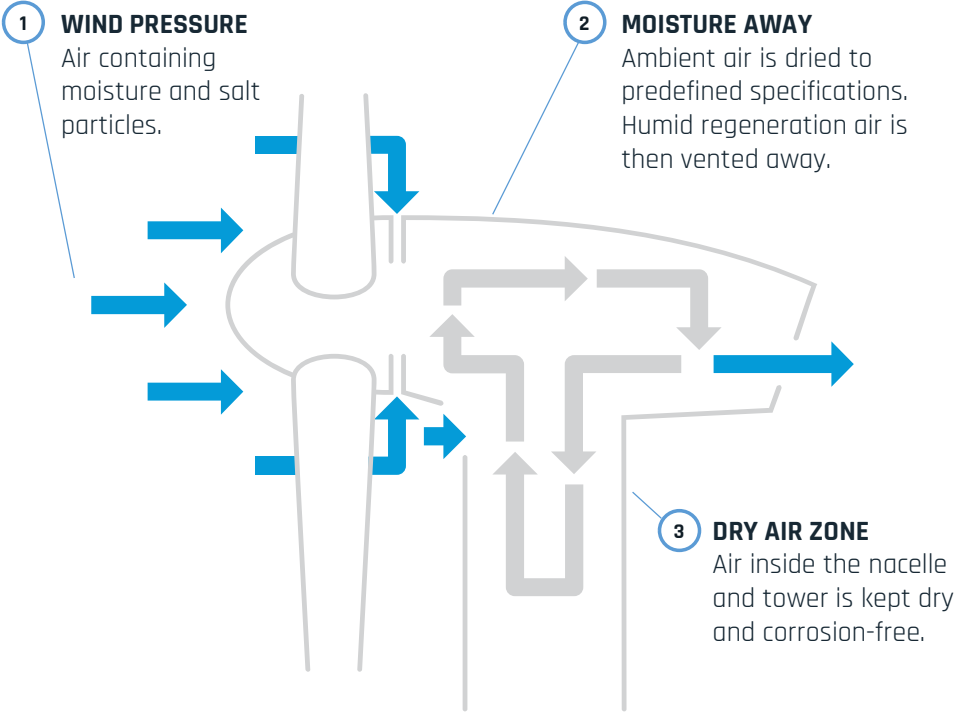


ADSORPTION DEHUMIDIFICATION

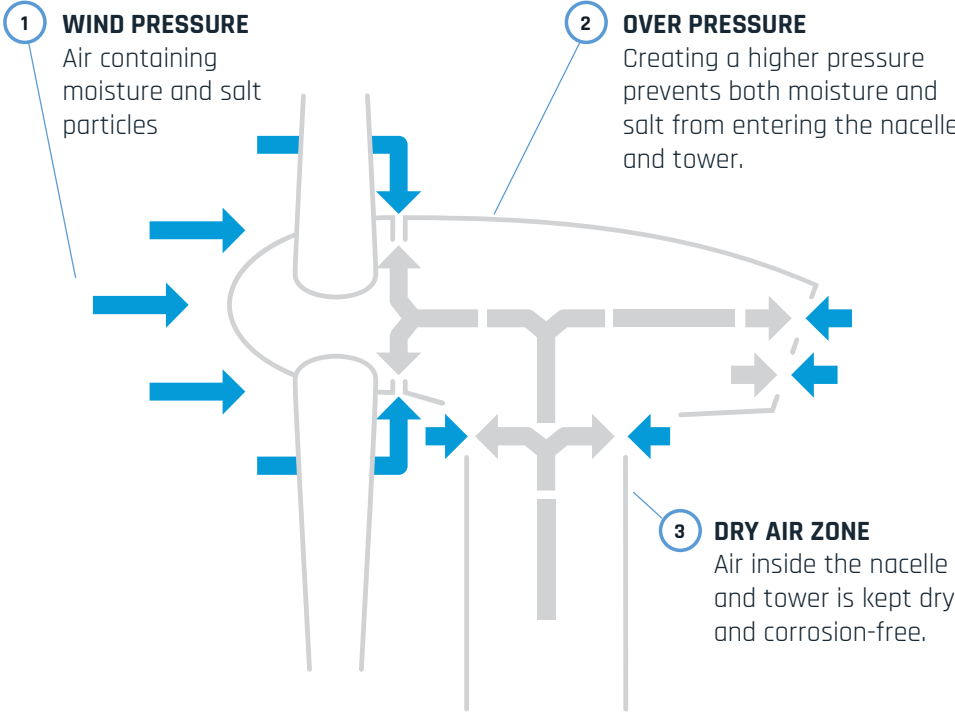
# THE PRINCIPLE



# TWO PRINCIPLES TO KEEP TURBINES DRY



PRINCIPLE A: **NEGATIVE PRESSURE**



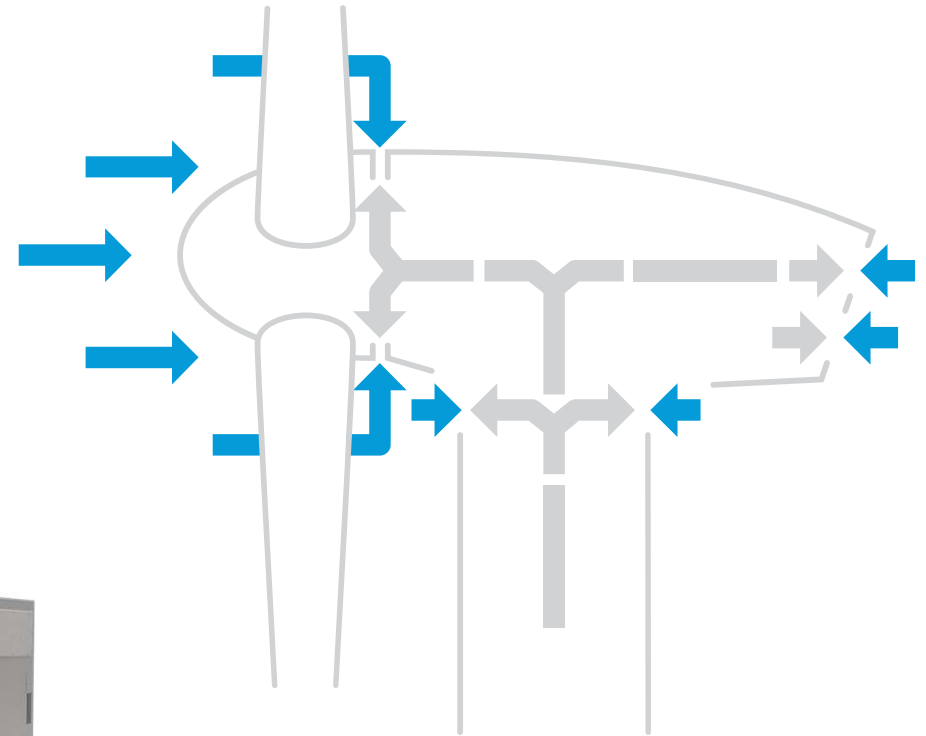
PRINCIPLE B: **OVER PRESSURE**



ONSHORE, OFFSHORE AND NEARSHORE

# UNIQUE **PATENTED** OVERPRESSURE SYSTEM IN COMBINED DESALTER AND DEHUMIDIFIER

- 100% efficient salt filtration via crystallization/salt filter
- Overpressure reduces ingress of moisture and salts
- No major ducting required
- Remote monitoring via SCADA and other systems
- Can be adjusted to fit custom-made requirements



PRINCIPLE OF **OVER PRESSURE**

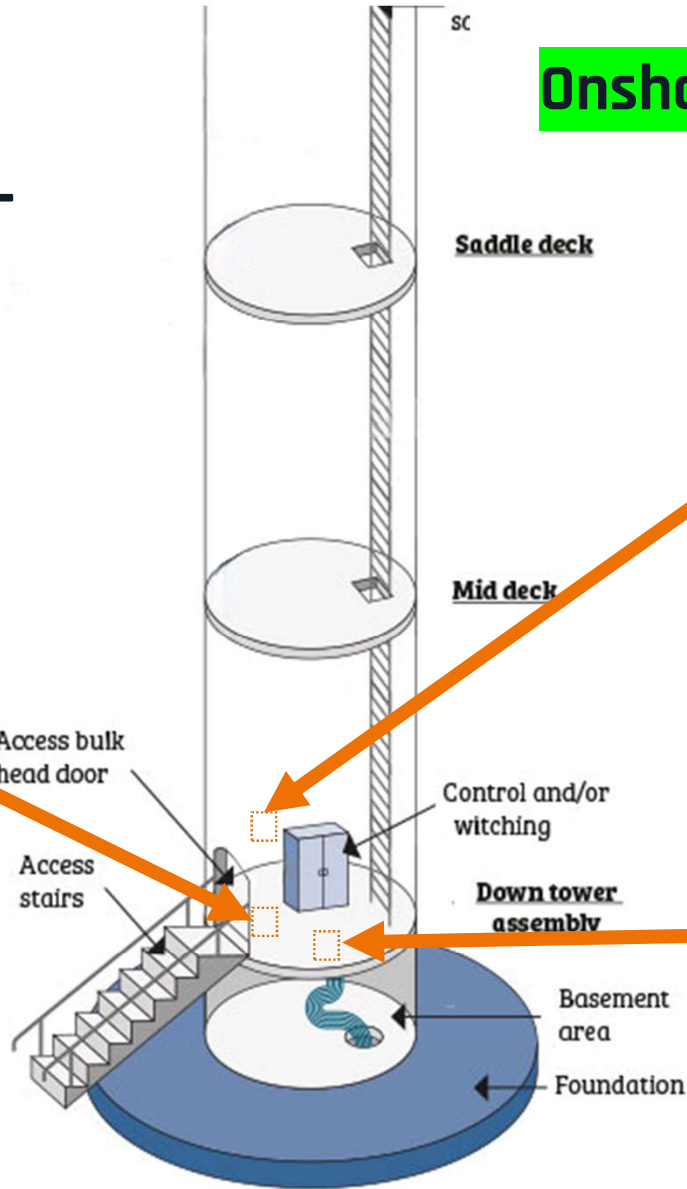
THE RIGHT WAY TO DRY

# TOWER INSTALLATION - KEEP THE TOWER DRY

**Onshore - retrofit**



**Magnetic wall mounted**



**Wall mounted with ventilation**

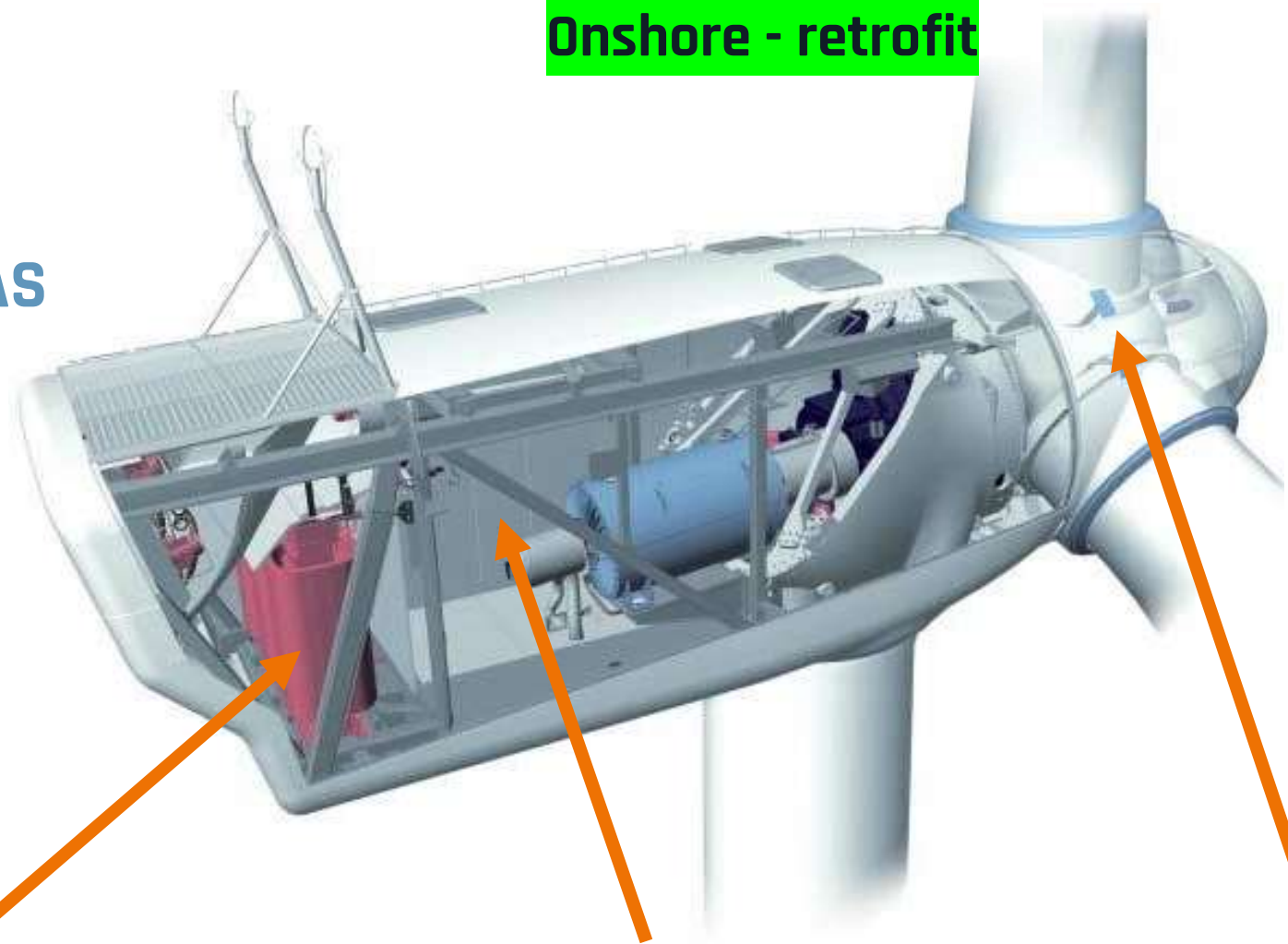


**Floor placement**

THE RIGHT WAY TO DRY

# NACELLE INSTALLATION KEEP SELECTED AREAS DRY

Onshore - retrofit



BLOW DRY AIR INTO THE CONVERTER  
CABINET

BLOW DRY AIR INTO THE  
ELECTRICAL CABINET

BLOW DRY AIR INTO T

# HIGH HUMIDITY WILL CAUSE PROBLEMS

- Converter failures
- Rain ingress
- Salt crystals in nacelle
- Water condensation
- Increased O&M costs
- Lost production time/availability
- Long start up/warm up processes





# PREVENTION IS CHEAPER THAN CURE

- According to market research conducted by Cotes, just one onshore failure can easily cost 20.000 EUR.
- Offshore is more than twice as expensive when you include lost production and component replacement.
- Over the lifetime of a project, just one annual electrical failure could cost more than 400.000 euros, if you sum it all up.

**If you avoid just one humidity related production stop over 25-30 years in your turbine, your investment in a dehumidification solution has already paid for itself.**

Cost per failure per turbine	10 MW offshore	5 MW onshore
Minimum lost production time	48 hours	24 hours
Lost production costs	8,767 EUR	4,384 EUR
Component replacement	10,000 EUR	10,000 EUR
Installation/transport vessel	15,000 EUR	5,000 EUR
Time to change/repair	48 hours	6 hours
Hourly rate technician	110 EUR	80 EUR
<b>Total cost per failure</b>	<b>45,287 EUR</b>	<b>20,344 EUR</b>



## IT'S SCIENCE - NOT MAGIC

**COTES INVESTS +7% OF ITS ANNUAL REVENUE ON R&D TO CONTINUE DEVELOPING:**

- Specialist knowhow
- Data driven approach
- Technology driven position
- Sustainable and environmentally focused



*Windenergietage in Potsdam*



**Vielen Dank für Ihre Aufmerksamkeit**