



*Windenergietage in
Linstow
8-10 November 2022*

COTES

THE RIGHT WAY TO DRY

**Präsentation von Henrik Toft
Kromann**



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: 15 mEUR

Employees: +80

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

TAKE ACTION AGAINST HUMIDITY



DO NOTHING

Live with the problem and hope for the issue will just go away by itself. (IT DOES NOT)



DO SOMETHING

Try silica dry bags, condensation dehumidifier or turn up the heat and ventilation or open a window. None of which are long-term solutions or effective in dealing with the issues.



DO THE RIGHT THING

Choose Cotes dry-air solutions that use adsorption dehumidification, clever design and enhance functionality – the right way to dry.

POSITIVE AND SUSTAINABLE IMPACT



WIND
INDUSTRY



LI-ION BATTERY
MANUFACTURING



OTHER
INDUSTRY
APPLICATION



WIND ONSHORE, NEARSHORE AND OFFSHORE INDUSTRY

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](#).

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



PROTECT WIND TURBINES ASSETS

Integrated design



Transition Piece and Foundation



Substation



Transportation and Storage



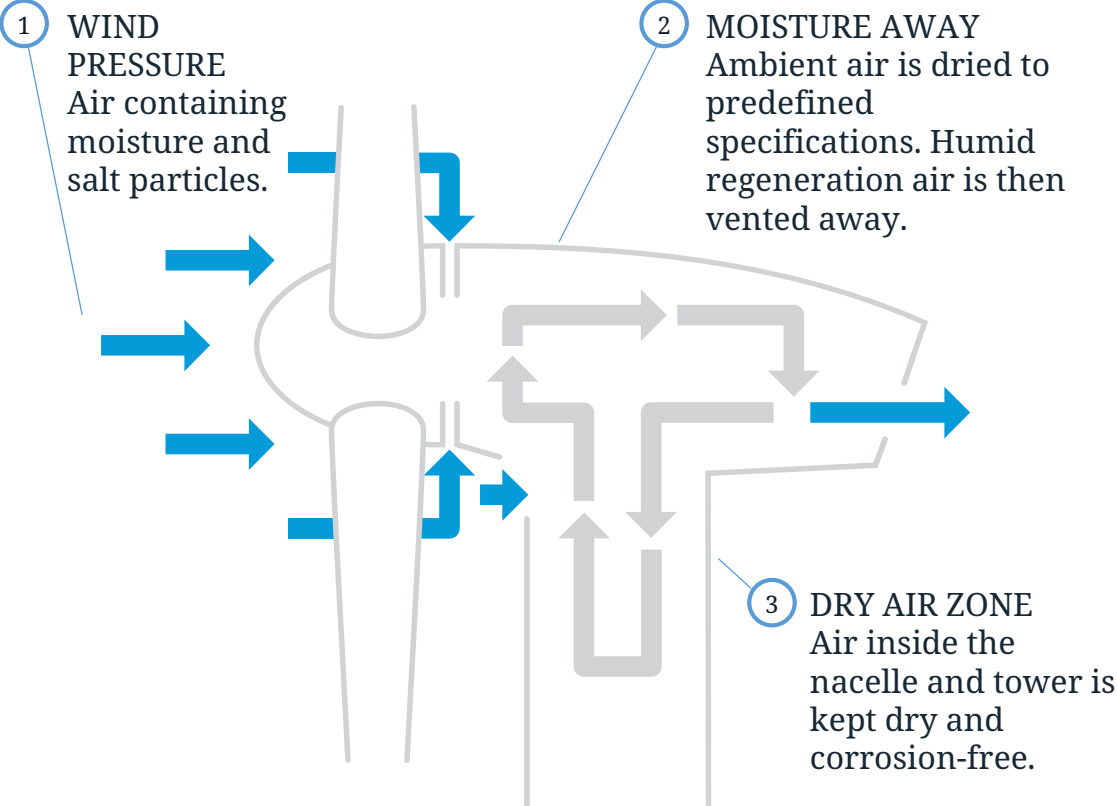
Retrofit

INTEGRATED DESIGN AND RETROFIT

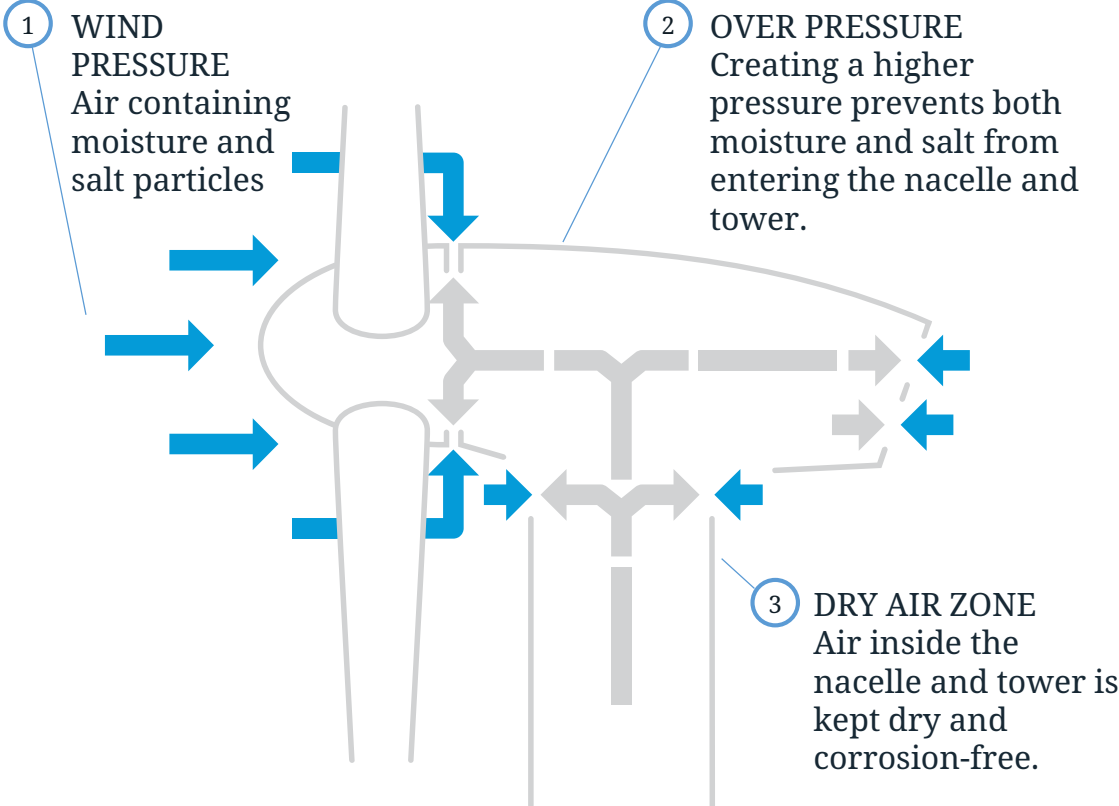
IN THE TURBINE...



TWO PRINCIPLES TO KEEP TURBINES DRY



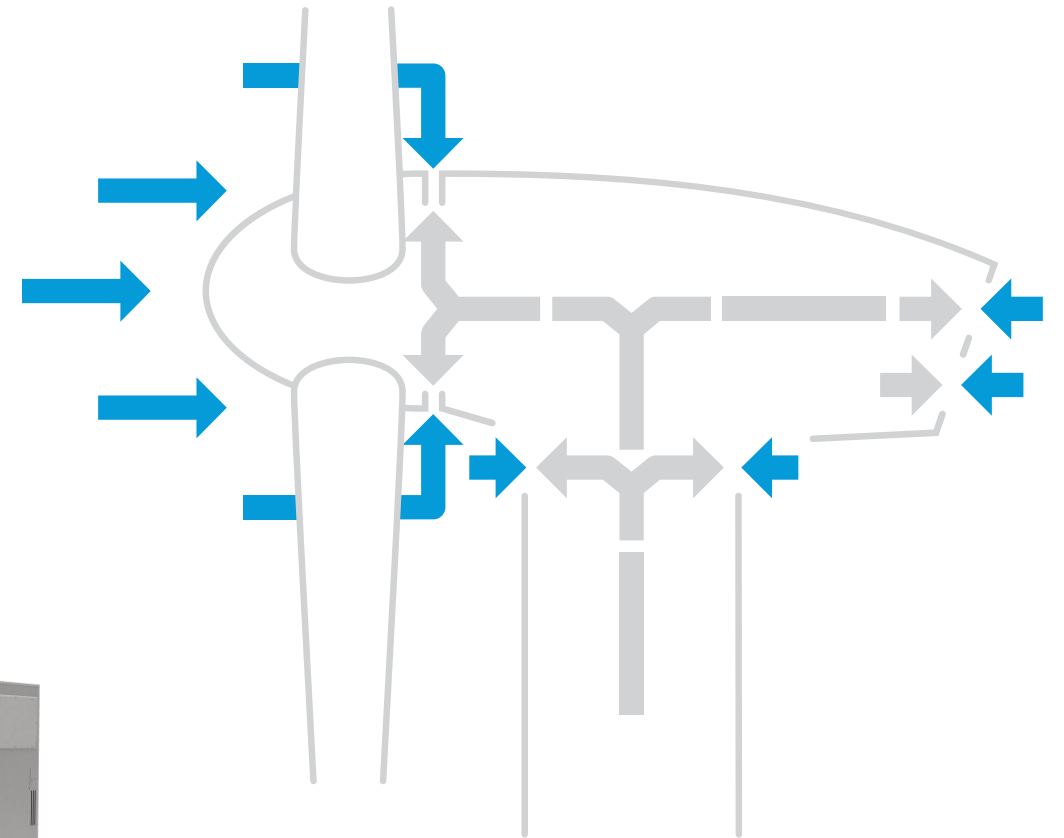
PRINCIPLE A: **NEGATIVE PRESSURE**



PRINCIPLE B: **OVER PRESSURE**

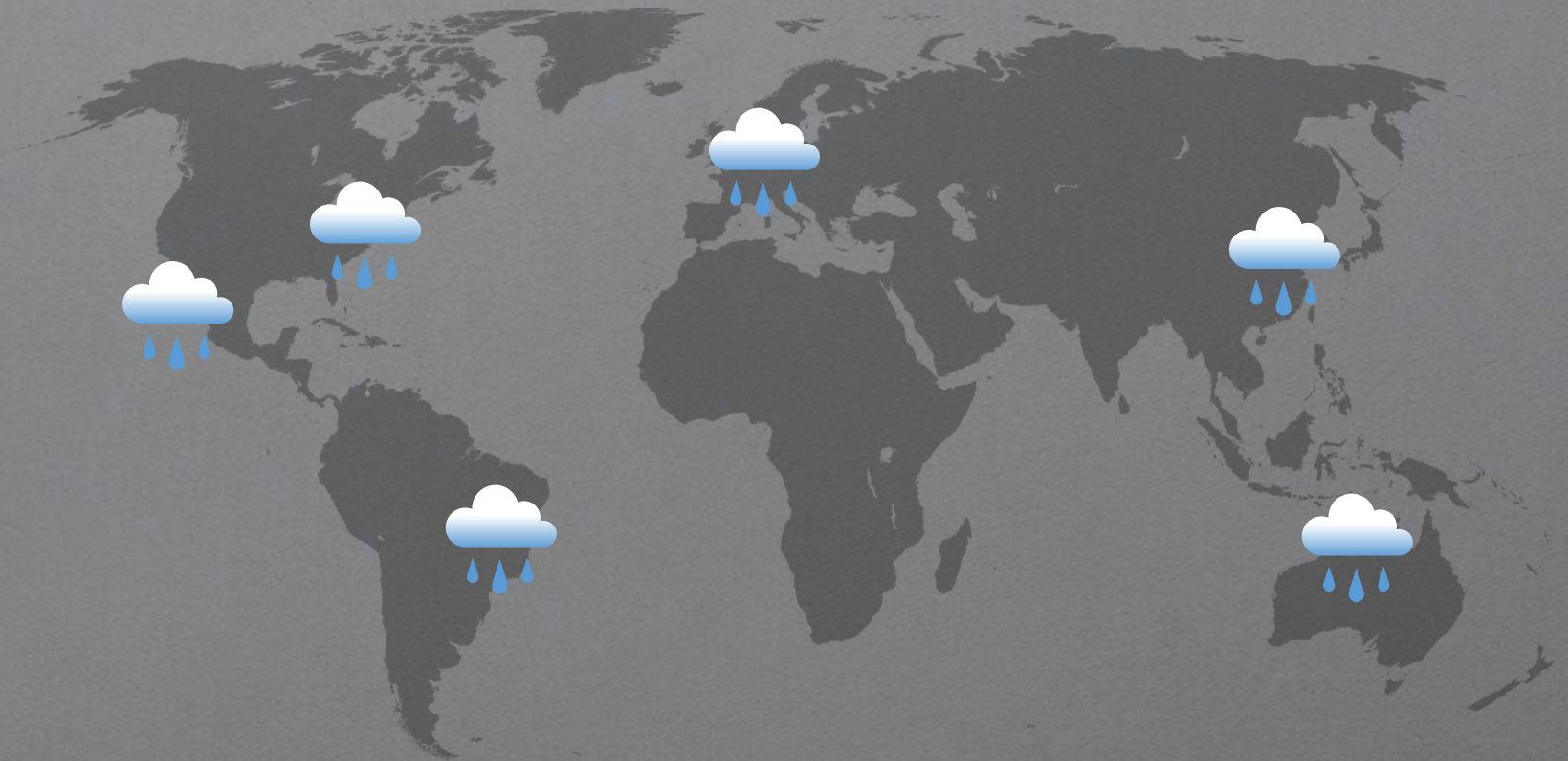
UNIQUE **PATENTED** OVERPRESSURE SYSTEM IN COMBINED DESALTER AND DEHUMIDIFIER

- 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

HUMIDITY
HOTSPOTS
=
MAJOR
WIND
MARKETS



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
Total cost per failure	45,287 EUR	20,344 EUR

COTES

DEALING WITH HUMIDITY AND SALT





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

Vielen Dank für Ihre Aufmerksamkeit



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