ETN's 20th Annual General Meeting & Workshop

"Accelerating turbomachinery pathways to net-zero"

19-21 March 2024, Leiden, the Netherlands

Event sponsors

Host

nem Energy Group

Exhibitors

Thomassen Energy a Hanwha company
Solar Turbines A Caterpillar Company
MD&A
CHROMALLOY
PROENERGY
DEKOMTE Expansion Joint Technology
CO2OLHEAT
ASTERIX CAESAR
FLEX4H2
flexconfu
HyPowerGT
Robinson
MEGAwatt

Welcome speech

Alexander Wisse, CEO, NEM Energy

NEM Energy Group

Heat transfer as enabler for the gas turbine future

20.03.2024

Welcome at NEM Energy

Heat Recovery Solutions

Exhaust & Diverter Solutions

Heat Exchanger Solutions

Aftermarket Services

Let’s talk about NEM Energy

Heat transfer as enabler for the gas turbine future

1 Who is NEM Energy?

Heat transfer technology provider for Power and Heat Generation, O&G, Nuclear, Geothermal and many more markets.

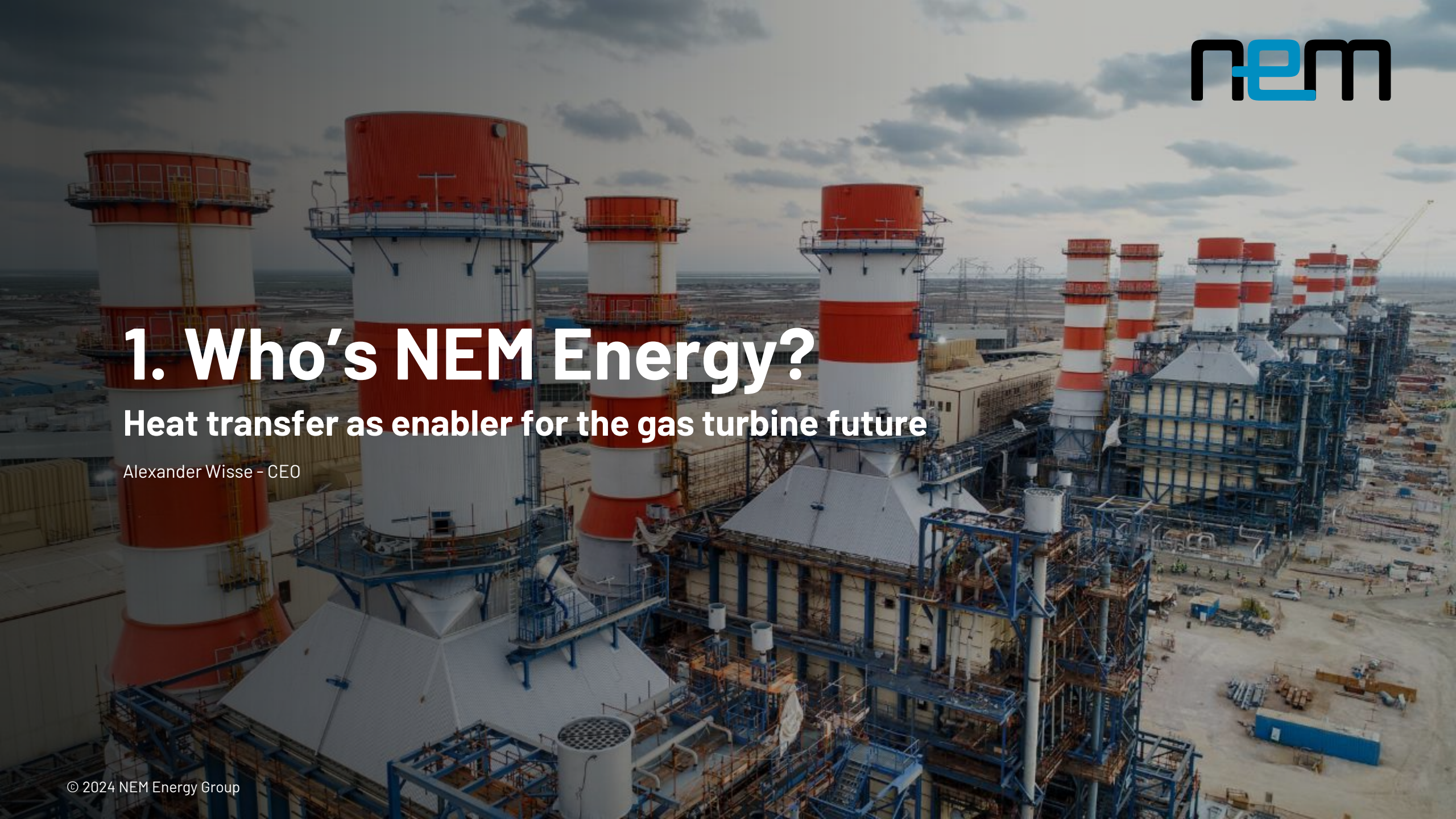
2 Energy trends defining demand

Heat transfer technologies are key in supporting a better climate and achieving CO2 goals.

3 Walk the talk

State of the art technology, providing heat transfer technology in gas turbine projects around the globe.

NEM Energy is a globally leading provider of Heat Transfer Technology



1. Who’s NEM Energy?

Heat transfer as enabler for the gas turbine future

Alexander Wisse - CEO

NEM Energy from 1929 to 2024 in a nutshell

Established
in **1929,** Leiden
The Netherlands

2011 Siemens
Acquires NEM
(name change in
2018)

SIEMENS

2022 Acquired by Mutares.
Back as **NEM** Energy
and **independent**

2023
NEM acquires
Balcke-Dürr

BALCKE DÜRR

2024

Number one In heat recovery behind GTs (McCoy Power reports)

Energy Group

*Number 1 statement based on number of units sold – Source: McCoy Power Reports 1980-2023

2. Energy trends defining demand

Heat transfer as enabler for the gas turbine future

Alexander Wisse - CEO

Market challenges of today define demand for new solutions

Climate

Following Paris agreement: keeping the world within the 2°C scenario; lowering our global emissions footprint

CO2 price

Lower GHG

Producing power with lower emissions

Air quality

United Nations: " Europe and North America are on course for sustained damage from air pollution to health, ecosystems, food production.."

NOx + PM regulations

Emission-free

Cleaning exhaust gases from Nitrogen Oxide pollutants

Efficiency

International Energy Agency: "Efficiency and renewables key to global climate change mitigation"

Fuel price

Lower LCoE

Providing affordable electricity with high efficiency

Reliability and flexibility

Grid stability issues in many countries; renewables determining the new normal for conventional power plants

Grid/ renewables

Reliable power

Allowing growth of renewables through a reliable power backbone

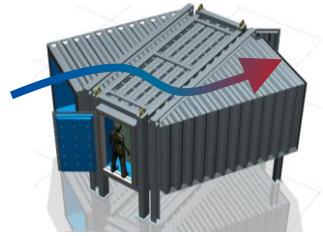
Addressing today's market challenges with real solutions

Market challenges

- Climate and GHG emissions
- Air quality
- Efficiency
- Reliability & Flexibility

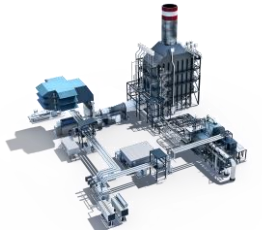
NEM Energy response

Producing renewable heat through our E-heater



Providing power with minimum NOx Emissions through our T-SCR

Generating electricity with high efficiency through our large gas turbine HRSG solutions



Offering flexible operations with DrumPlus™, proven Exhaust Diverters and H_2-Ready concepts

Our contribution to the energy transition

Heat exchangers
Geothermal applications for renewable power

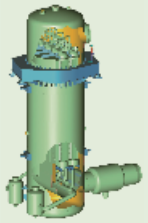
DrumPlus™
Allowing fast start-up and flexible operation

H2 readiness
First H2 certified HRSG company in the world

Alternative Cycles
WHRU for ORC, sCO2, and other fluids/gasses

Ultra-Light Bottoming Cycle
Reducing off-shore CO2 emissions

Electrification of heat
E-heaters and electrical hybrids



SMR & Thorium Reactors
Small Modular Reactors for power generation and thermal storage

HRSGs since 1960s Highly Efficient reducing CO2

Vertical Once-Through
Highly efficient & quick installation

Energy Storage
OTSG in thermal storage application

T-SCR
SCR for single cycle operation
Reducing emissions and supporting the grid stability

Molten salt storage
Adding a molten salt thermal storage application

Ammonia cracker
Releasing Hydrogen from transport ammonia

Reliability & Flexibility | Efficiency | Air quality | Climate

Addressing various market segments

Each segment is experiencing its own challenges and needs a dedicated (design) approach

Power & Heat Generation

- Lower overall emissions
- Operational flexibility
  Great part load performance
- Lifetime extensions

Onshore O&G

- Superb availability
- Fuel flexibility
- Reliable Power & heat supply

Offshore Power and O&G

- GTs number 1 source responsible for CO2
- New units and retrofits
- Compact, light and modular design approach

$ Cost competitiveness essential in obtaining financial investment decisions $

3. Walk the talk – providing real solutions globally

Heat transfer as enabler for the gas turbine future

Alexander Wisse - CEO

Typical delivered projects behind industrial GTs

Karish FPSO, Mediterranean sea

3 x 12 MWe gas turbines

- Vertical Once-Through WHRU
- **Internal by-pass channel**
- Modularized on GT+OTSG skid for offshore

Pipestone compressor station, Canada

1 x 37 MWe gas turbine (MD)

- Vertical WHRU
- Including external bypass
- Fast construction concept
- **Glycol/water mixture**

Mega project, Bolivia

22 x 50 MWe Gas turbine

- Once-Through type HRSG
- **Modular design and fast construction concept**
- Conversion of OCGTs to CC

Small and medium gas turbines for a multitude of applications

Typical delivered projects behind large GTs

Zarqa, Jordania

3 x 120 MWe gas turbines

- Vertical HRSGs
- **Oil firing capability**
- Including bypass systems

Lordstown, Ohio USA

2 x 310 MWe gas turbines

- Horizontal 3 pressure + RH
- **DrumPlus™ Fast start & Cycling capability**
- "Top Plant" by Power Mag.

Keadby II, United Kingdom

1 x 590 MWe gas turbine

- Vertical Once-Through HRSG
- **Highly efficient steam cycle** (approx. 63% CC efficiency)
- World's first 50hz 9000HL in CC

Large gas turbines focus on flexibility and efficiency

Summarizing and setting the scene

Heat transfer as enabler for the gas turbine future

1

Heat transfer an essential enabler

Heat transfer is an essential enabler for gas turbines in Power and Heat generation throughout the energy landscape for emissions reduction

2

An integral approach

Gas turbines solutions require an integral approach to tackle the market requirements of today

3

No one can do it alone…

The energy transition ahead of us needs companies to collaborate on new projects and new technologies

NEM Energy is a globally leading provider of Heat Transfer Technology

Wishing you a successful event

Heat Recovery Solutions

Exhaust & Diverter Solutions

Heat Exchanger Solutions

Aftermarket Services