



Future of Cold Chain Technology

Protect your valuable cargo – food & pharma

Peter Ø Hansen

Sr. Product Manager
Thermo King
Marine, Bus & Rail



**Cold Chain
Importance to
World trade**

Technology to

**Reduce
Food loss &
Food waste**

**Ensure optimal
cargo conditions
Un-disturbed logistics**

**Impact our
Globe / environment
as less as possible**

Healthier & Wealthier population of the World



TRANE

TECHNOLOGIES

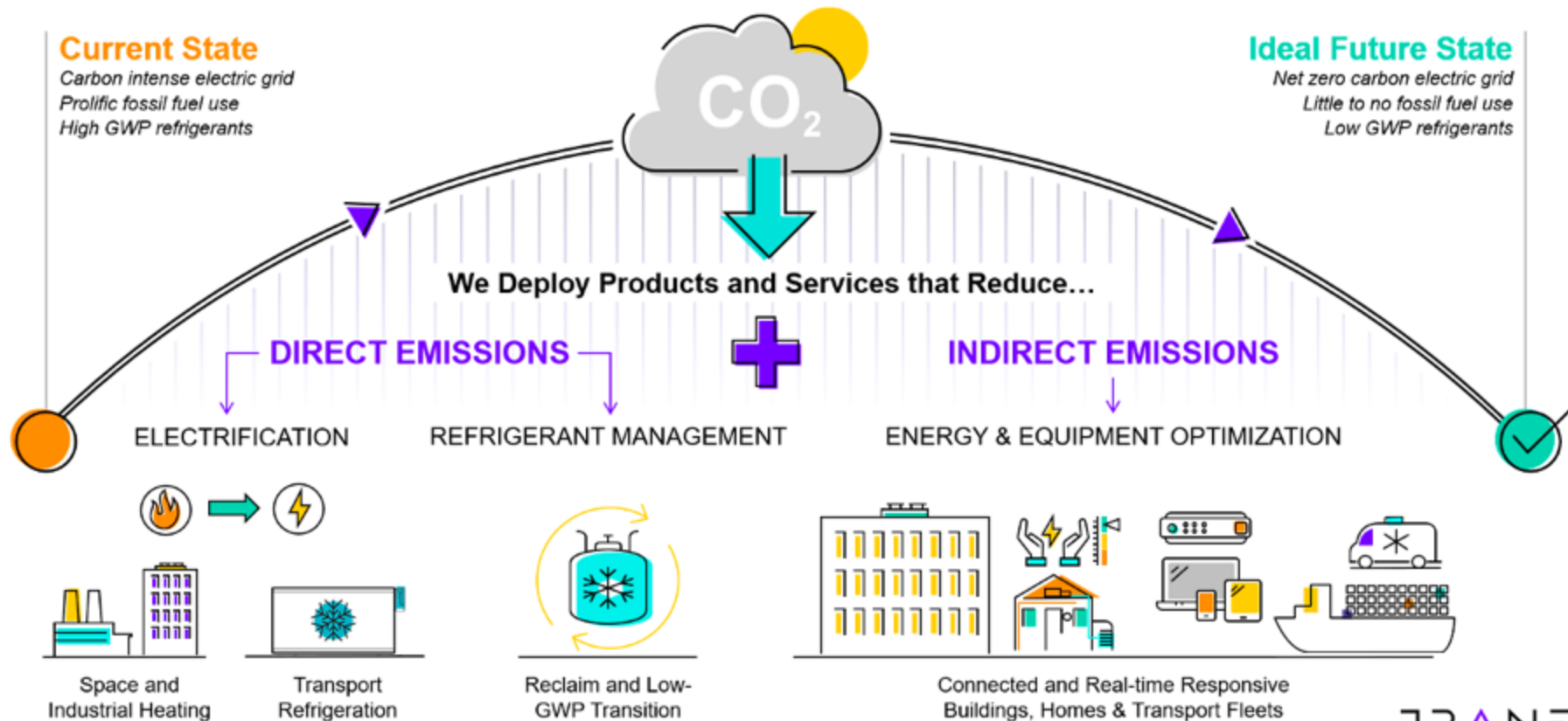
**We believe visionary leadership
empowers positive change**

Trane Technologies (NYSE:TT) is a global climate innovator. Through our strategic brands Trane and Thermo King, and our portfolio of environmental products and services, we bring sustainable, efficient climate solutions to buildings, homes, and refrigerated transport.

39	42,000+	\$17.7B
Manufacturing Locations Worldwide	Employees	Total Sales

AN ENTERPRISE THAT DELIVERS DECARBONIZATION

ENABLING THE TRANSITION TO A NET ZERO CARBON ECONOMY



END-TO-END TEMPERATURE-CONTROLLED TRANSPORT AND STORAGE SOLUTIONS ACROSS THE COLD CHAIN



AIR



OCEAN



ROAD



STORAGE



INTERMODAL

UNITED NATIONS SUSTAINABLE DEVELOPMENT GOALS



THERMO KING ADDRESSING SUSTAINABLE DEVELOPMENT GOALS

U.N. GOALS APPLICABLE TO OUR INDUSTRY



OUR RESPONSE

Temperature
Control solutions

Sustainable
Energy Sources

Efficiency
Lower GWP refrigerants
Recycling



CO-EXISTENCE OF FOOD LOSS AND HUNGER

1.3 BILLION



people experience
food insecurity

OVER
30%

12%



of food produced
each year is lost
or wasted

Is due to lack of refrigeration



Global warming impacts
harvest output



THERMO KING SOLUTIONS TO REDUCE FOOD LOSS AND WASTE



Onsite post-harvest



Blockchain for
temperature monitoring



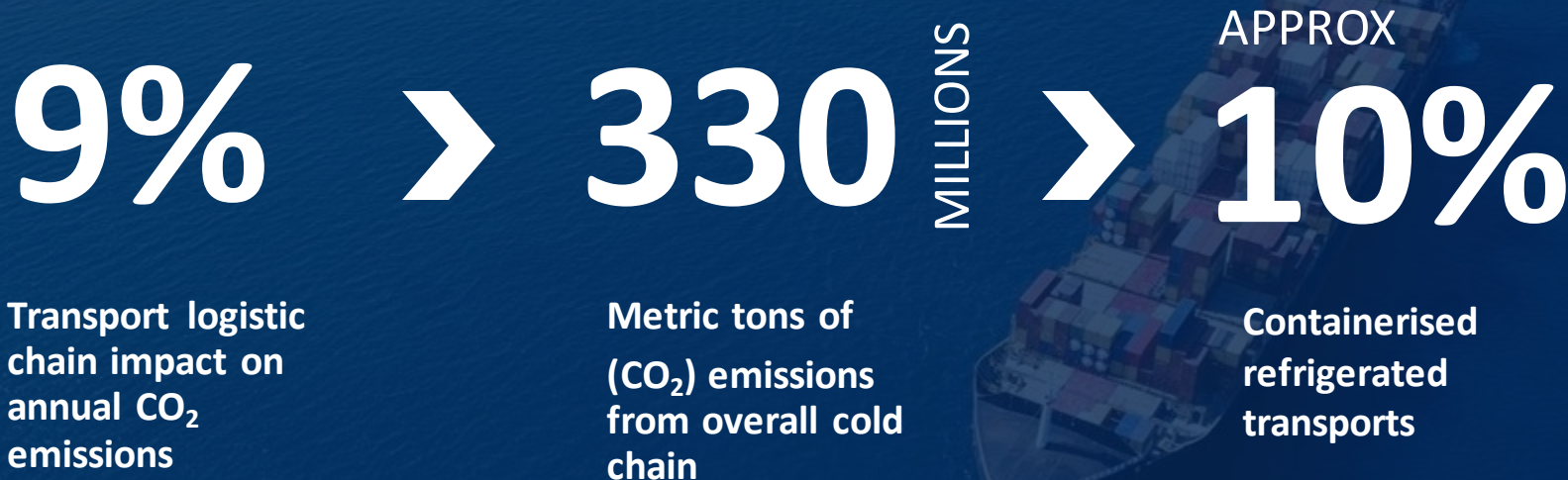
Transport
multimodality



Innovative materials



COLD CHAIN TRANSPORT EMISSIONS





THERMO KING SOLUTIONS USING CLEAN ENERGY



Full Electrification
Battery technology



Kinetic energy recovery
AXLE POWER



Power agnostic
products



Vessels and Genset
alternative fuels



CLIMATE IMPACT OF REEFER CONTAINERS

TOTAL EQUIVALENT WARMING IMPACT (TEWI) OF REEFER CONTAINER

90%

ENERGY



10%

REFRIGERANT





THERMO KING SOLUTIONS TO REDUCE CLIMATE IMPACT



EFFICIENCY

Improved design to reduce energy consumption

Components, sub-systems and controls

Two Energy modes: Optimized & Non-Optimized – Protect cargo + globe

Frozen -15C vs -18C -> 10% reduction in power consumption

Container insulation -> Super Insulated like the CIMC SuperFreezer box



RECYCLING

Unit designed for durability

Recyclable materials and components - aluminium, copper, plastics, etc ...



REFRIGERANT

Introduction of refrigerants with low global warming potential (GWP)

Cost-effective, technically feasible (safe), energy efficient and reliable

OUR RECENT SUSTAINABLE INNOVATIONS



POWER SOLUTIONS

RENEWABLE
TECHNOLOGY



GENERATOR SETS

ECO-FRIENDLY
& ELECTRIC



CFF REEFER

BEST-IN-CLASS
PERFORMANCE

OUR RECENT SUSTAINABLE INNOVATIONS

**RENEWABLE
TECHNOLOGY**

Advancer AxlePower
Energy recuperated from the vehicles' axle

OUR RECENT SUSTAINABLE INNOVATIONS

**RENEWABLE
TECHNOLOGY**

E-Coolpac
Full electric generator set

OUR RECENT SUSTAINABLE INNOVATIONS

SUSTAINABLE GENERATOR SETS

- Lowest emissions covering all regulations
- SG-5000 CARB compliant
- Lower than CARB regulation for PM, NMHC, Nox
- GB4, NRMM
- All gensets fueled up to 20% biodiesel or w/HVO

OUR RECENT SUSTAINABLE INNOVATIONS

ENERGY EFFICIENT CFF REEFER

- Best performance & temperature control
- Energy logging
- Smart PTI
- TK Fresh Plus

OUR VISION: TO BE A SUSTAINABLE INNOVATOR

SUSTAINABILITY
AT THE CORE

ENERGY EFFICIENCY
LEADERSHIP

DIGITALIZATION





THANK YOU

VISIT US AT
STAND
H20

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