

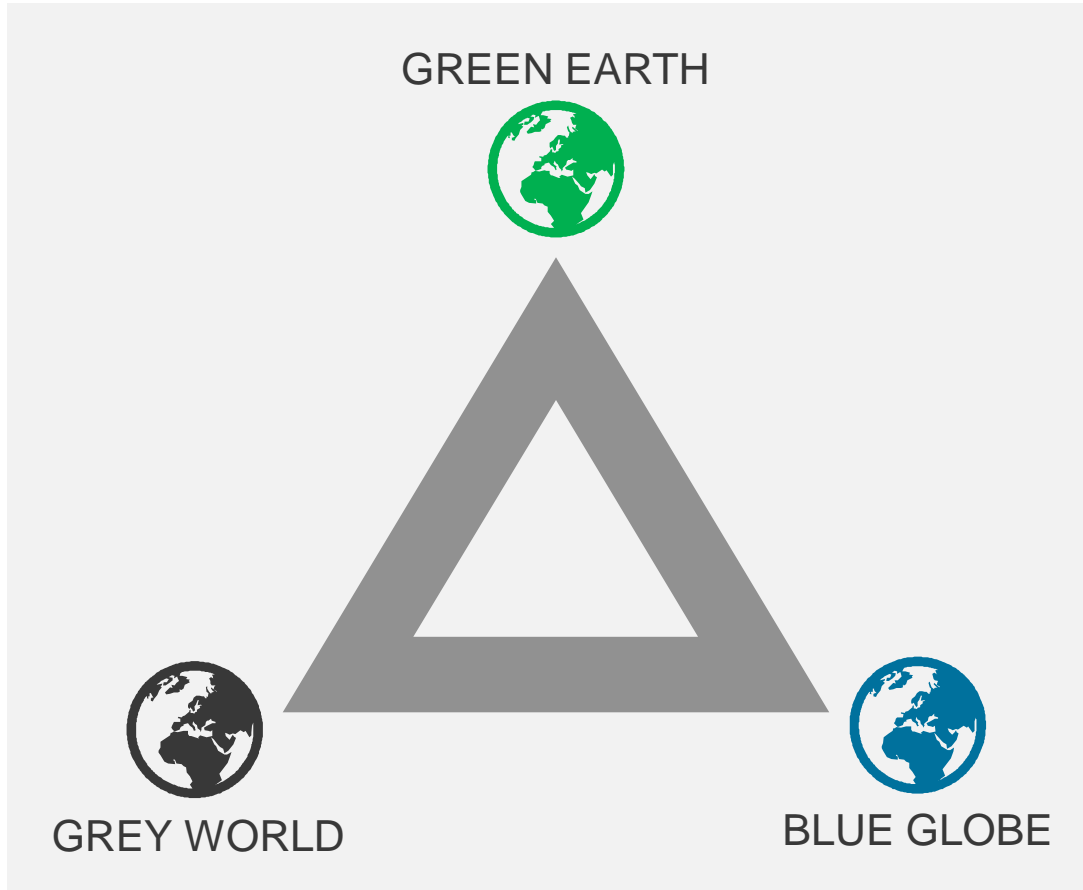


POWER PLANTS: POSITIONING IN THE FAST CHANGING ENERGY WORLD

15 CAPITAL
MARKETS
DAY HELSINKI
FINLAND

Rakesh Sarin, President, Power Plants &
Executive Vice President





The world wants

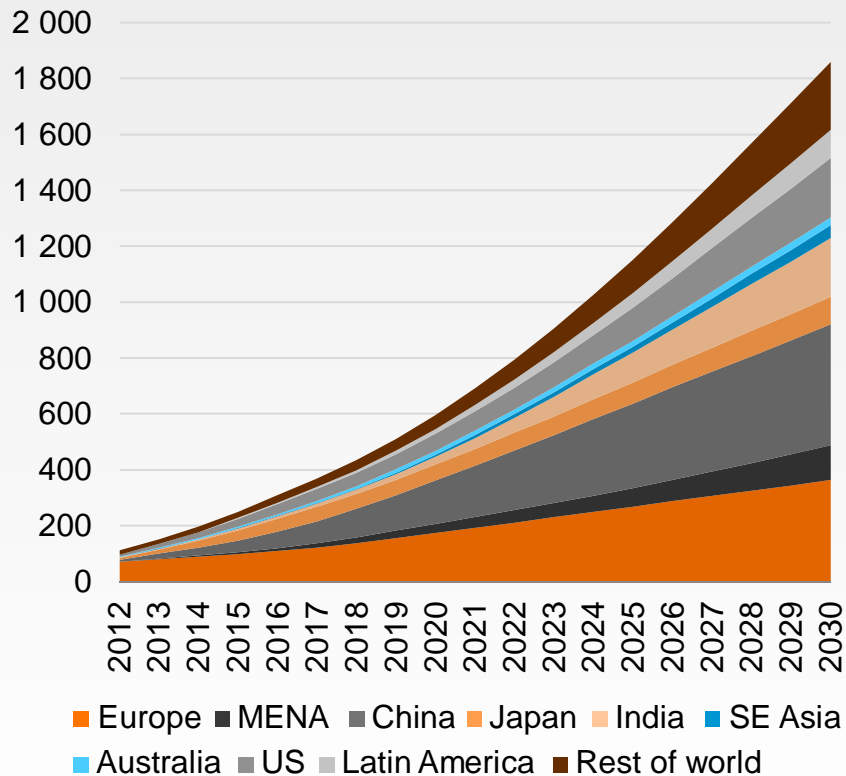
- More energy but less emissions
- Higher reliability with intermittent renewables
- Enhanced energy security with challenging geopolitics

Intermittent renewables are penetrating in different forms

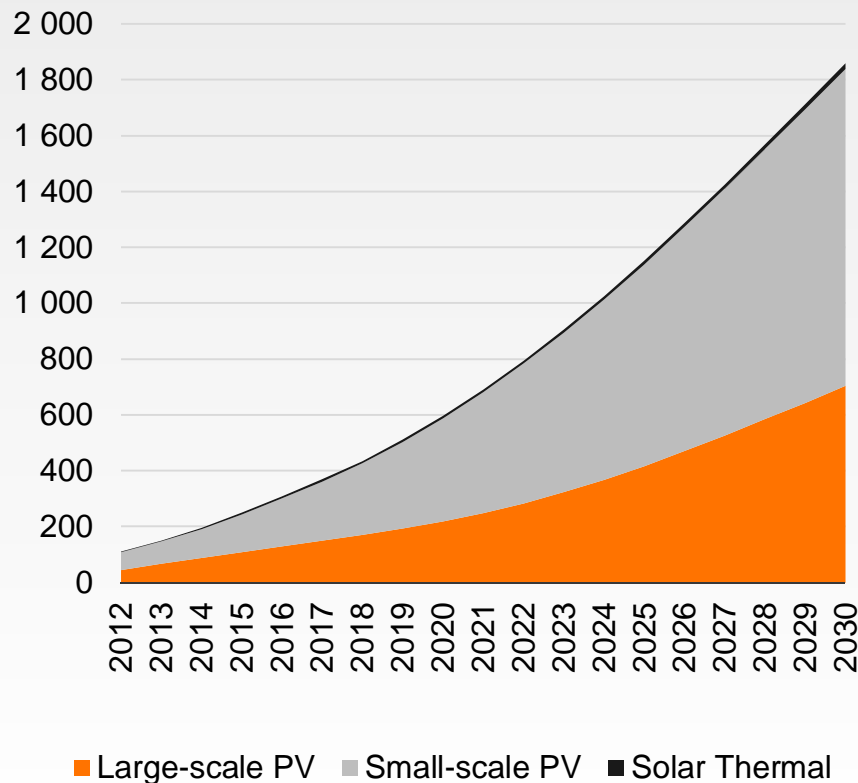


Rapid development of solar PV expected

Solar cumulative installed capacity (GW) by region / country



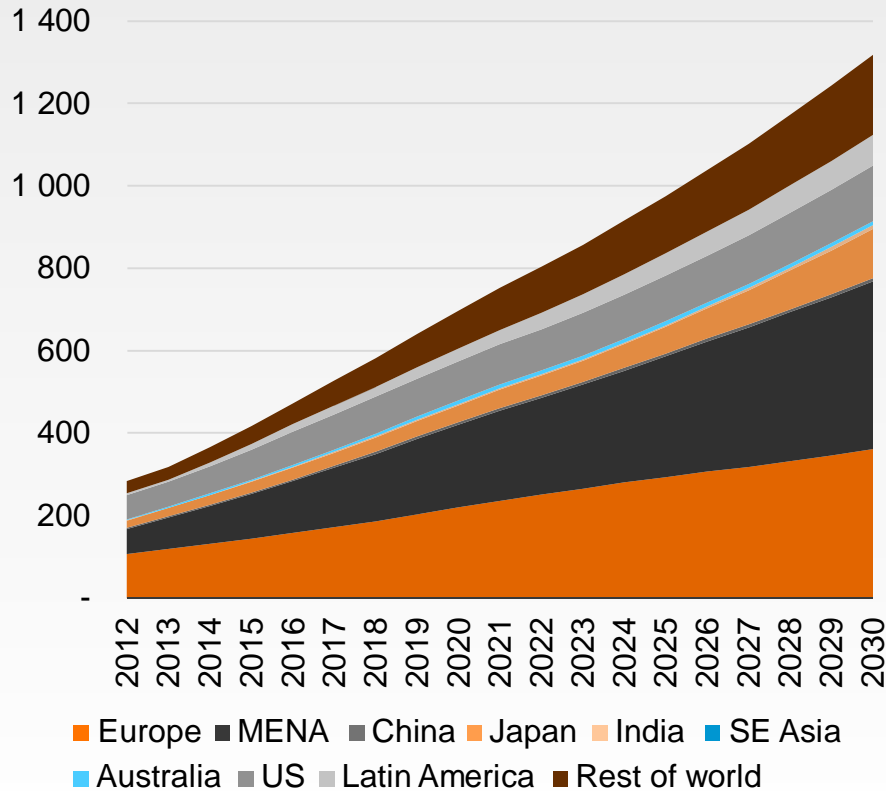
Solar cumulative installed capacity (GW) by technology



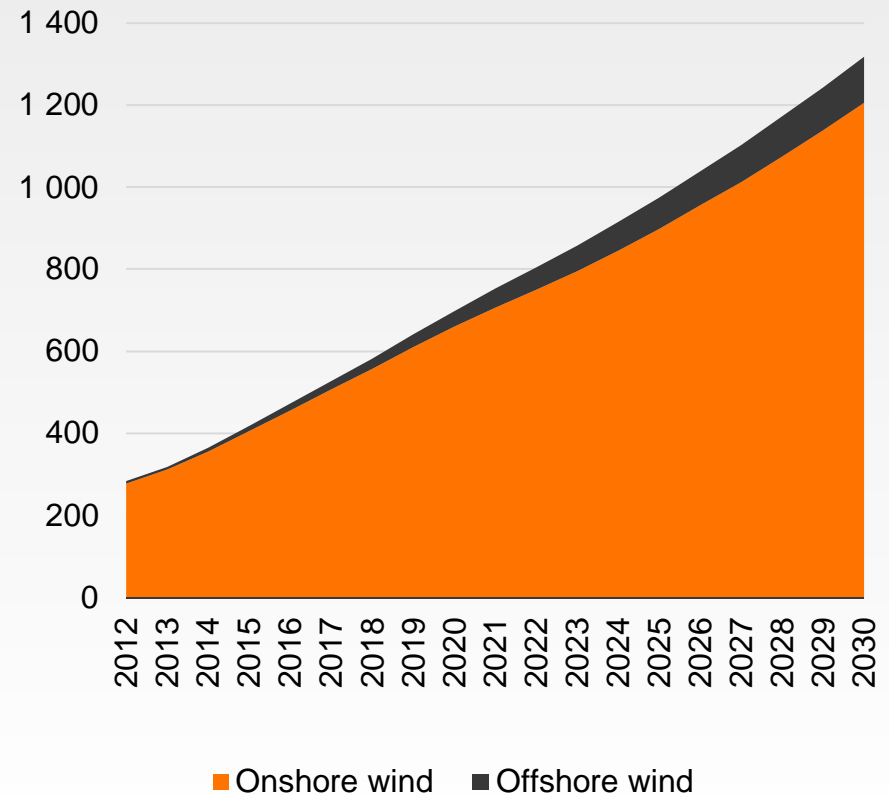
Source: Bloomberg New Energy Finance

Steady growth for wind capacity expected

Wind cumulative installed capacity (GW) by region / country



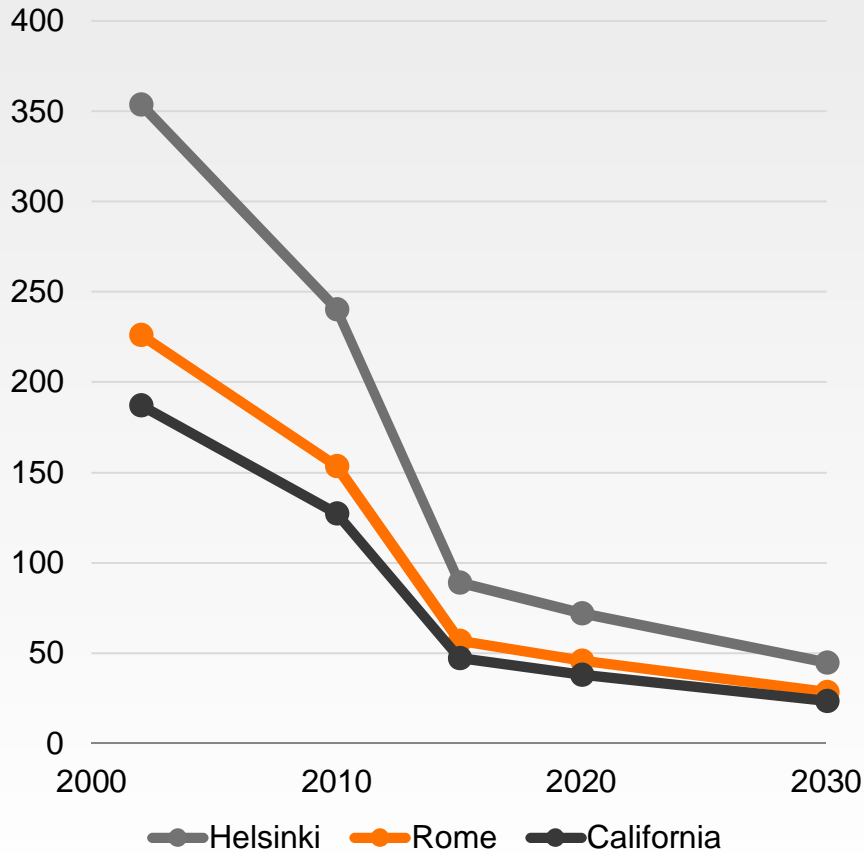
Wind cumulative installed capacity (GW) by technology



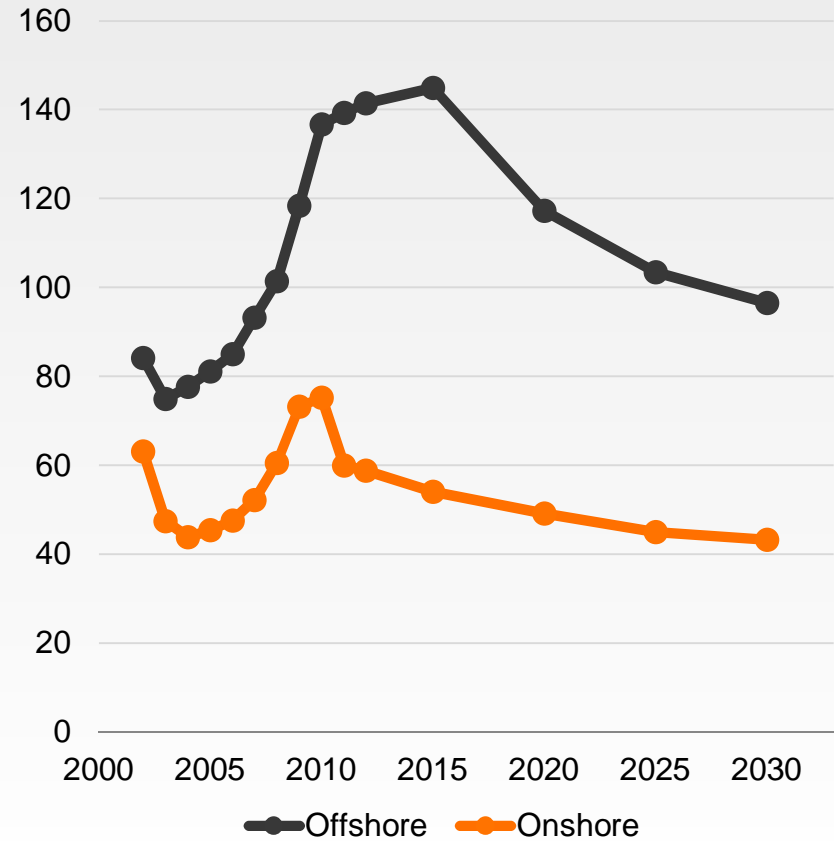
Source: Bloomberg New Energy Finance

Panel prices down >80% in the last 5 years

Solar PV LCOE €/MWh



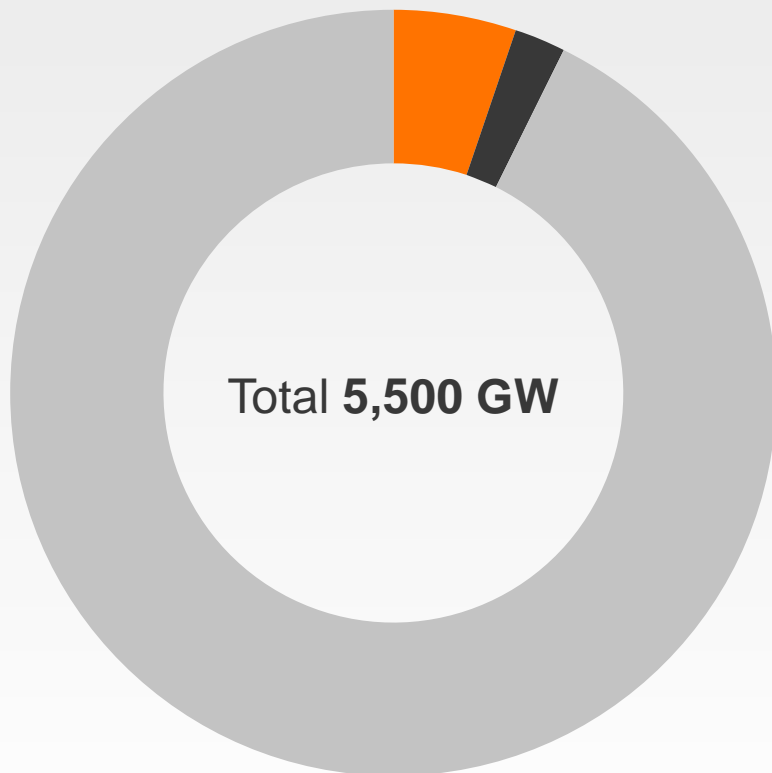
Wind power LCOE €/MWh



Source: Gaia Consulting

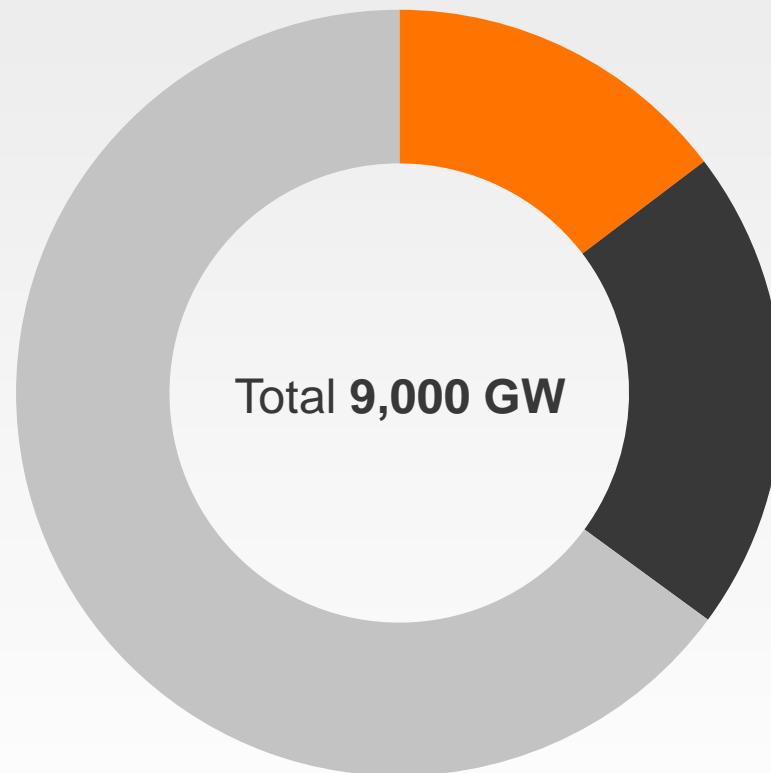
Share of wind and solar capacity grows dramatically

Installed capacity (GW) 2012



■ Wind ■ Solar ■ Conventional

Installed capacity (GW) 2030

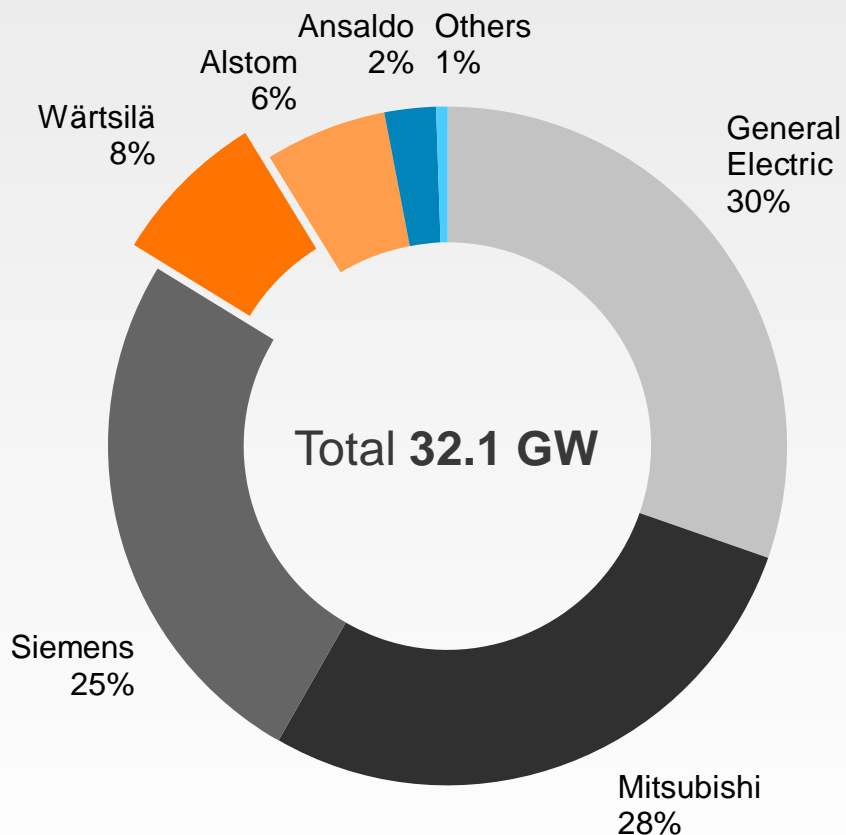


■ Wind ■ Solar ■ Conventional

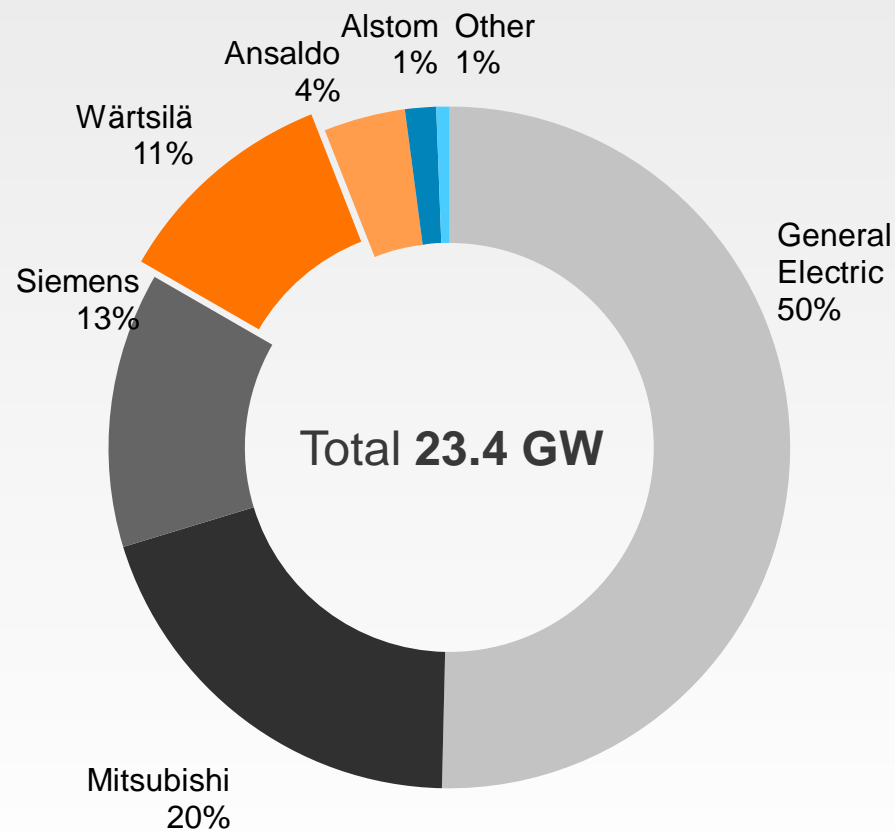
Source: Bloomberg New Energy Finance, International Energy Agency (IEA), GlobalData, Wärtsilä

Market share, <500 MW market

2013



2014



<500MW market down -27% y-o-y

Total market down -21% y-o-y to 47.8 GW

Power Plants orders 2014: top 10 countries





Focus on changing market dynamics & customer value

POWER PLANTS MISSION

We provide superior value to our customers with our distributed, flexible, efficient and environmentally advanced energy solutions, which enable a global transition to a more sustainable and modern energy infrastructure

Focus on markets and solutions where we can deliver best value for customers

HFO & DF

Maintain our leading position in HFO & dual-fuel power plant markets by enhancing our value proposition

UTILITY GAS

Grow strongly in large utility gas power plant markets by capturing market share from gas turbines

LNG

Small and medium scale LNG terminal EPC

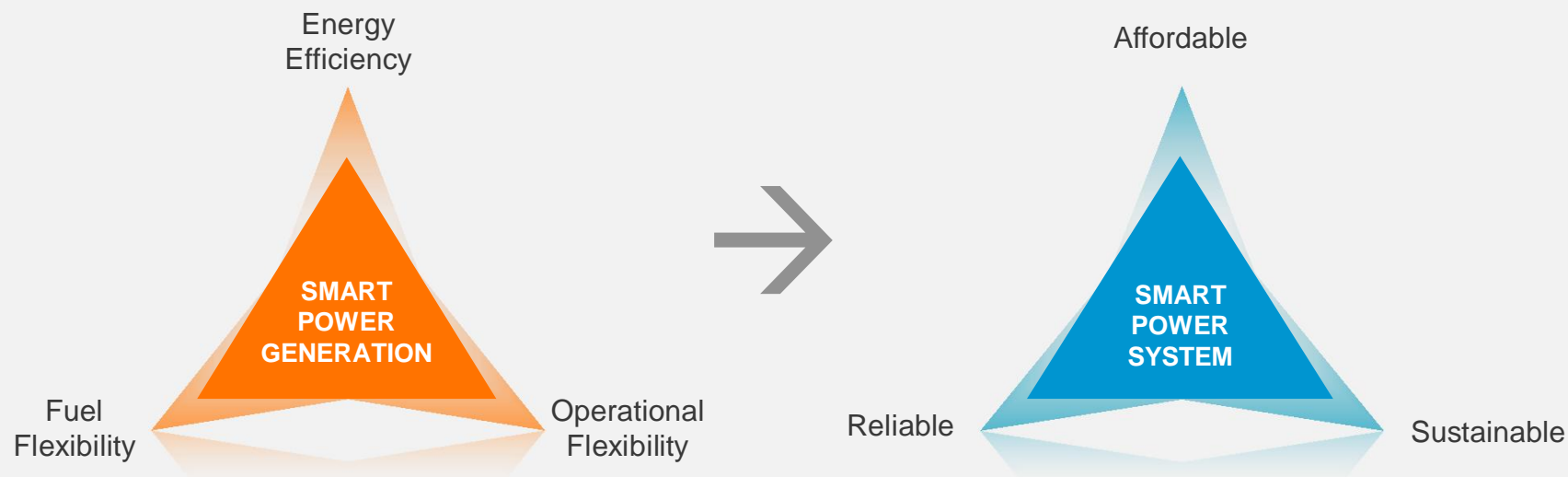
SPECIAL APPLICATIONS

Grow in:

- Nuclear emergency power
- CHP
- Oil & Gas
- Biofuels

through value approach to selected customer segments

Smart Power Generation for the changing market dynamics



Smart Power Generation enables an existing power system to operate at its maximum efficiency by most effectively absorbing current and future system load variations, hence providing dramatic savings

Grow by enabling the usage of side-streams* as fuel in the O&G industry

Main focus segments

- Power generation for up-stream oil and gas field operations
- Power generation for down-stream process industry

Strong value proposition for customer operations

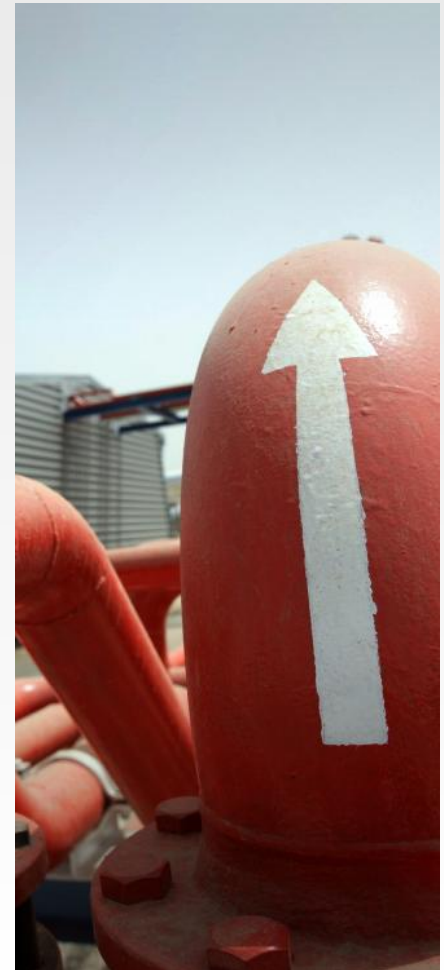
- Increase customers' net sales by using side-streams as fuel
- Increase revenues by converting side-streams to electricity sales (IPP projects)
- Increase fuel efficiency and lower CO₂ footprint of the operations
- Lower side-stream handling cost



* Side-stream is a general term in the Oil and Gas industry, both in up-stream and down-stream sectors, for various types of hydrocarbon flows, which come out of a certain process in addition to the actual main product.

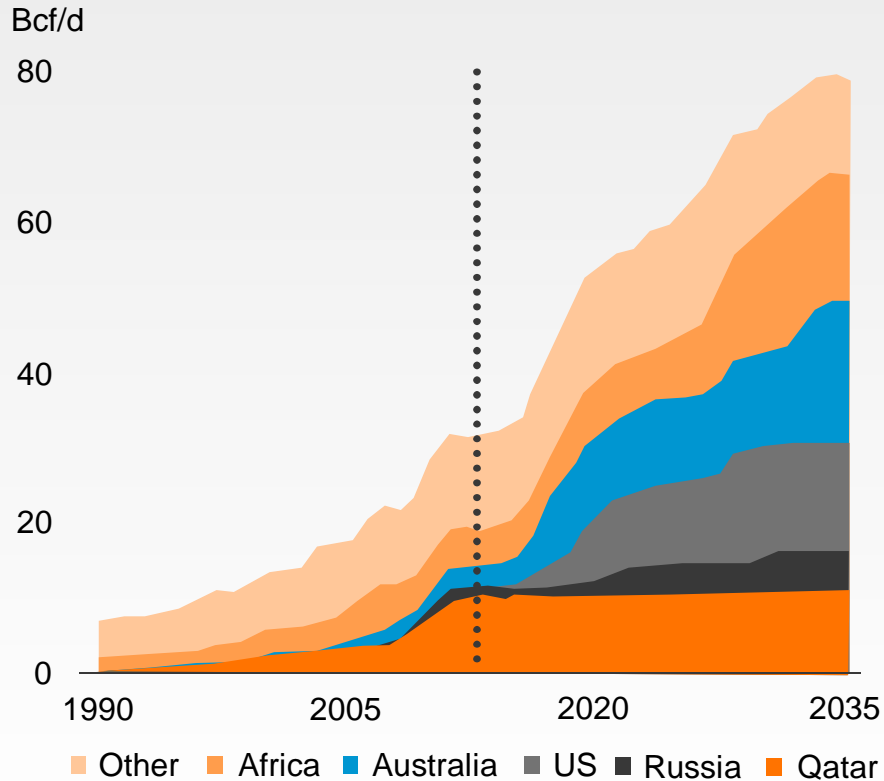
- Introduce Oil & Gas value proposition focusing on selected geographical regions: Middle-East, Africa, Russia, North and South America
- Adapt the chosen value propositions for regional markets
- Develop engine technology to cover all typical side-streams
- Maximise sales by:
 - Optimising solutions for customer needs
 - Maximising the scope of supply, aiming for EPC delivery
- Incremental power need ~7 to 10 GWs per annum of new capacity*

Develop Oil & Gas customer segment to a long-term strategic corner stone



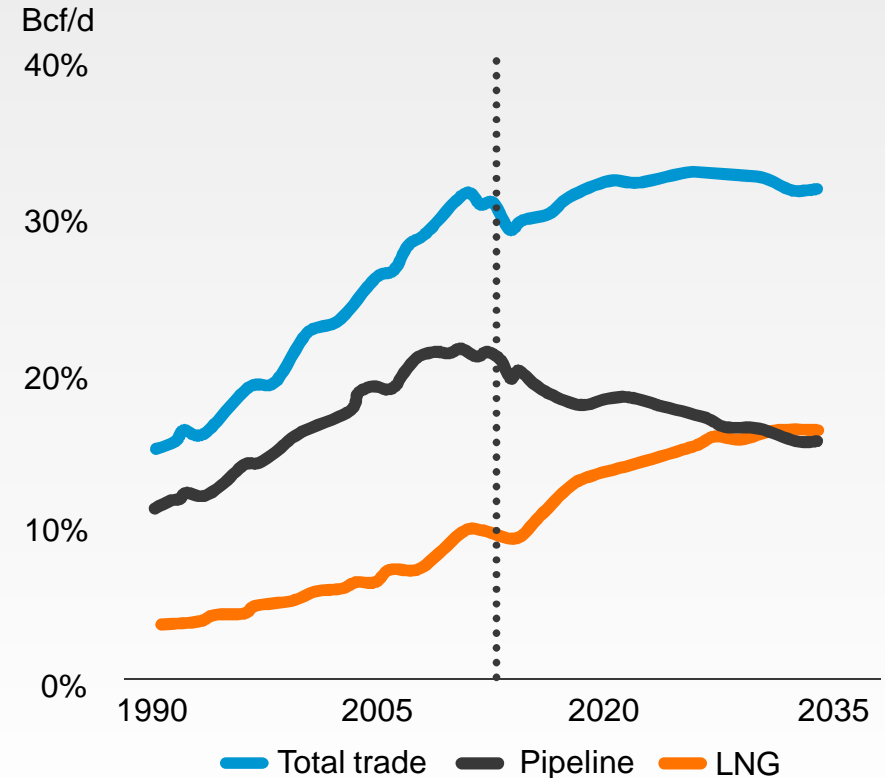
*Source: IHS

Growth of LNG LNG supply



BP Energy outlook 2035

Shares of global gas consumption



Power Plants provides EPC solutions for small to medium scale LNG projects

- Small to medium scale LNG terminal market expected to grow at a rapid pace
- Increasing demand for decentralised power plants, energy intensive industries in remote areas & local gas grids
- LNG has huge potential as fuel for ships and heavy vehicles when environmental legislation is tightening

Regional gas availability enables:

- Decentralised Smart Power Generation
- Flexible gas power plants on islands supporting renewable energy
- HFO power plant gas conversions
- Gas and dual-fuel ships
- Need for new small size LNG carriers



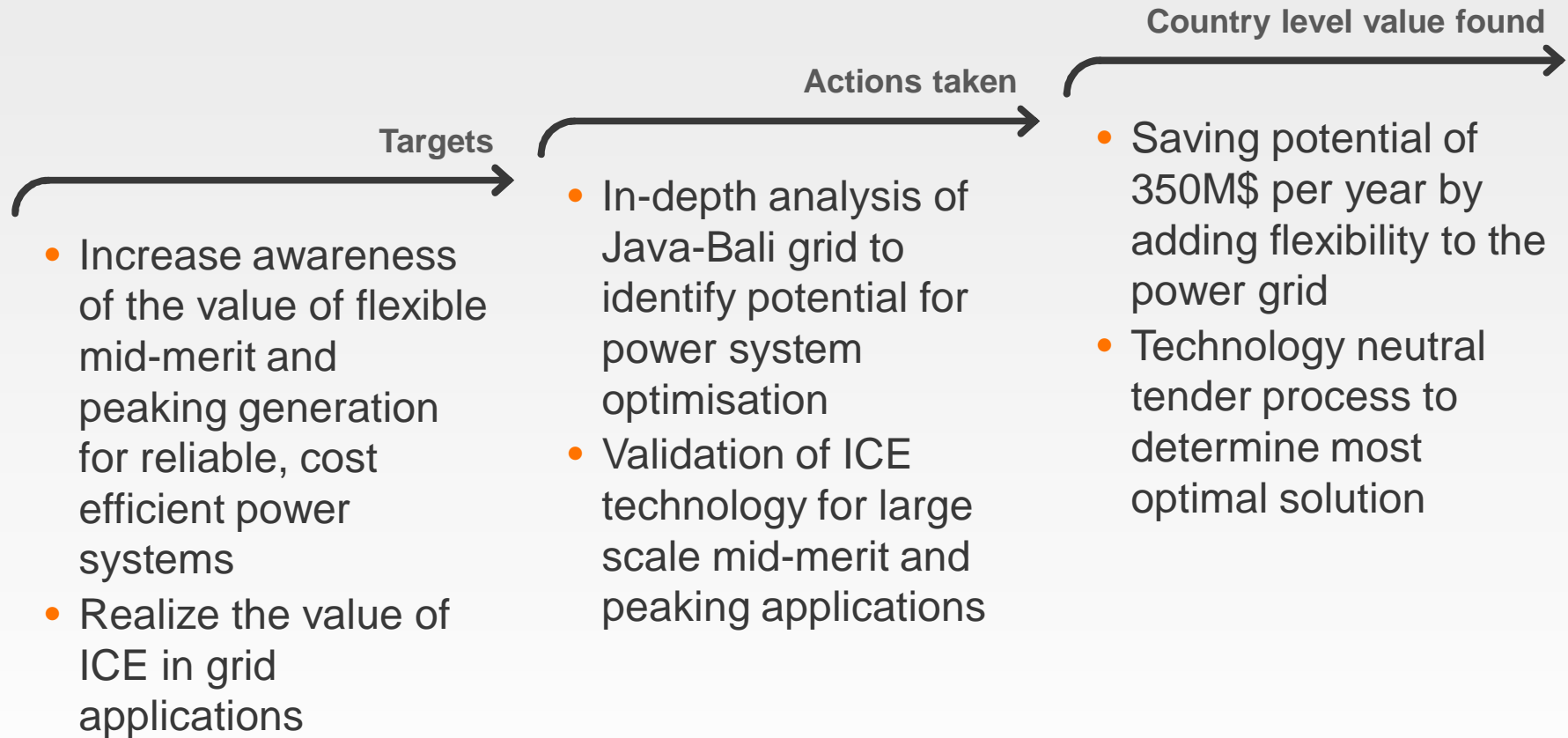
Strategy to action

1st LNG terminal contract signed in 2014 - Tornio



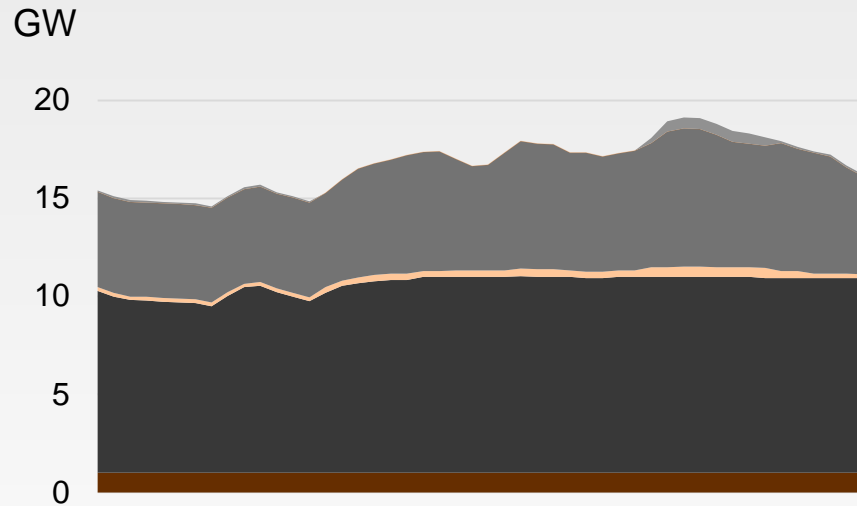
Case Indonesia

Opening the market for large internal combustion engine power plants

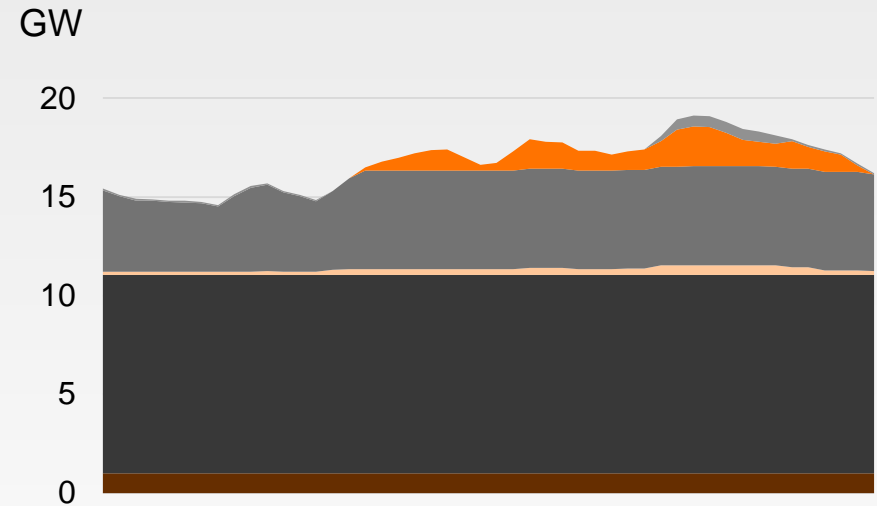


ICE: Internal Combustion Engines

Actual daily load profile – over 24 hours



Optimized daily load profile – 24 hours

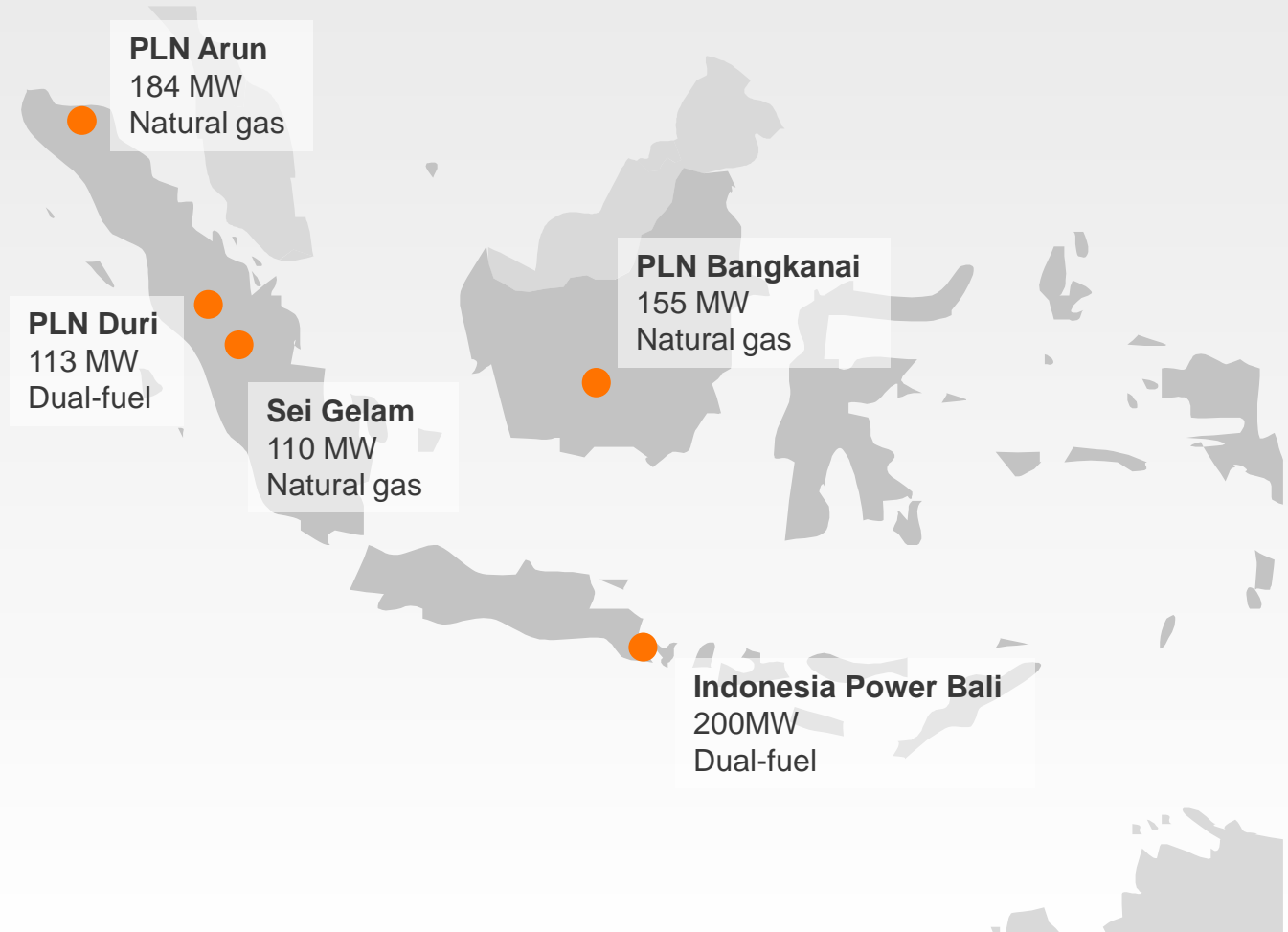


■ Geothermal ■ Coal ■ Hydro ROR ■ Thermal ■ Flexible power ■ Hydro peak

1. Lack of flexibility in power system; all coal and thermal power plants follow the load (ramp-down at nights)
2. Sub-optimal efficiency, including high use of expensive natural gas

1. With flexible power plants in the system, low-cost base load generation can be released from load following duty
2. Optimised fuel use yields cost savings of **350M\$ / year**

Wärtsilä's power projects with PLN since 2012

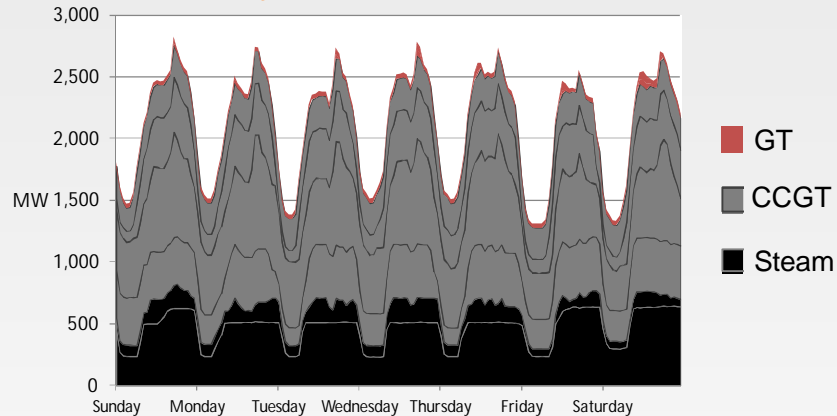




Case Jordan

Optimising system efficiency

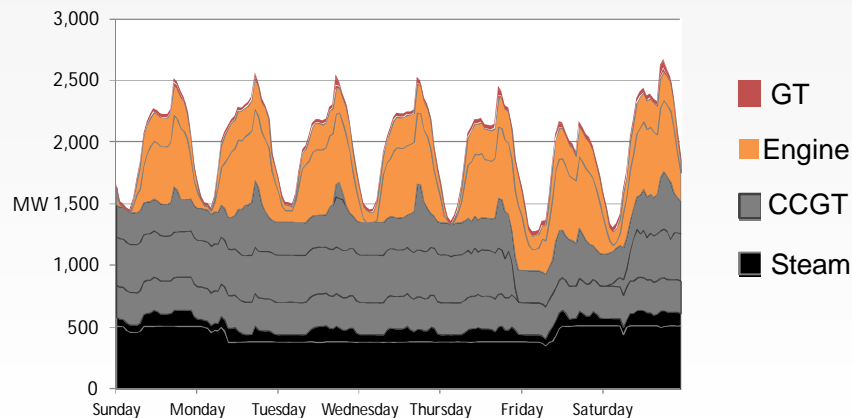
5-11 January, 2014



Before engine plants installed

- All plants are cycling with low efficiency (sub-optimal)

2-8 November, 2014



After 850 MW engine plants installed

- Steam plants and CCGT plants provide stable base load with optimised efficiency
- Engine plants provide load following capacity with high efficiency



“As the leading global supplier of flexible and efficient power plant solutions, Wärtsilä suggested this efficient multi-fuel combustion engine technology solution to meet the requirements of the proposal, which was the critical success factor in the bid.”



“We trust Wärtsilä to professionally and competently lead the EPC consortium for the successful completion of this major and important project.”

CEO of Amman Asia Electric Power Company



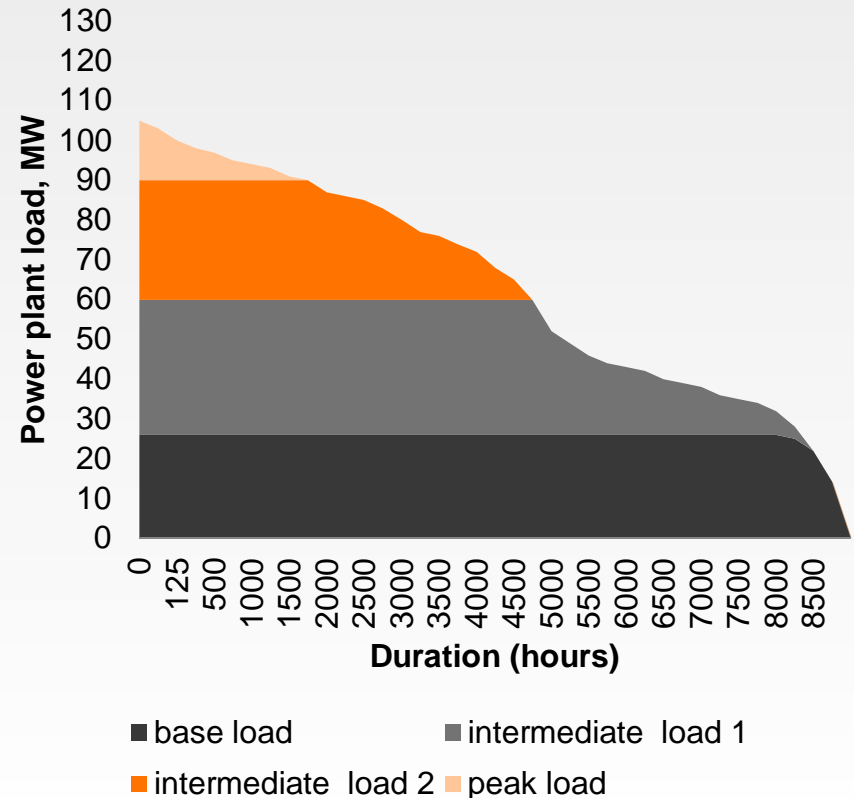
Case Oman

Breaking into the gas turbine market

- Continuous base load : 26 MW
- Intermediate load 1 : app 60 MW
- Intermediate load 2 : app 90 MW
- Peak load : app 105 MW
- Expected annual capacity factor =40-50%
- Low load factor plant
- Huge variation between maximum and minimum load
- Number of starts/stops
- Load profile needed operational flexibility
- Power plant needed high part load efficiency

→ Smart Power Generation needed for Musandam

Expected load duration curve:
Musandam power plant



Wärtsilä signed
EPC and LTSA for
120 MWe
Musandam
power plant in
November 2014

“We have selected
an optimal ICE
configuration for
this project, to
deliver flexible and
sustainable energy
to the Musandam
Governorate.”
Chairman of the Board

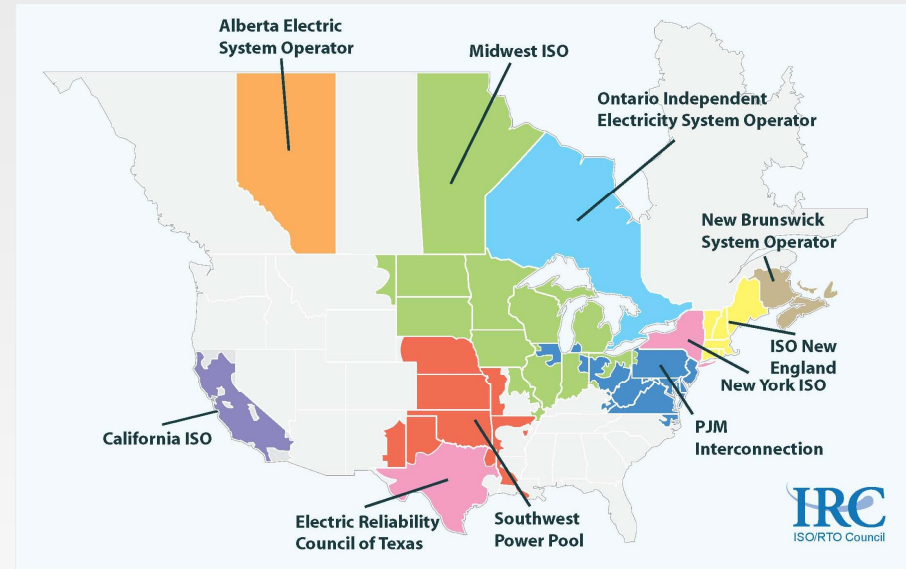




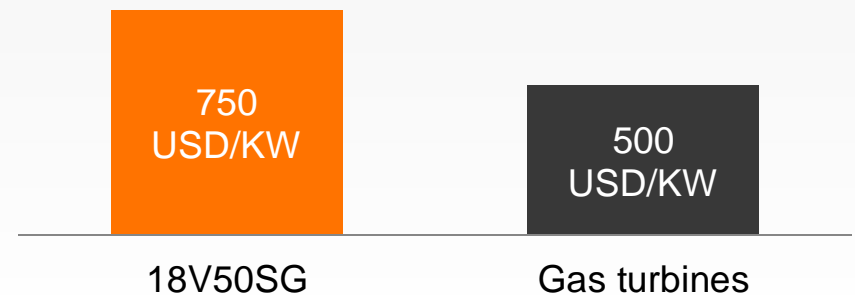
Case USA

Breaking into the gas turbine market

- The organised electricity markets in the USA favour investments in simple cycle gas turbines with lower efficiency and less flexibility than Wärtsilä
 - Capacity requirements / physical hedges
 - Low capital cost
- Around **20 GW** of announced or planned OCGT projects in ERCOT, SPP, and Alberta



CAPEX (overnight EPC cost)



USA electricity market components:

Day-ahead market:

Hourly market where **efficiency** is the key driver

Real-time market:

5 minute market for system balancing where **flexibility** matters

Ancillary service market:

Various products valued based on capability to **ramp-up and ramp-down**

- In the past, the traditional utility investment planning took into account only the day-ahead market income
- Increasing renewable penetration and recent market changes have created attractive price patterns in the real-time markets and ancillary service markets
- Wärtsilä's existing plants in Texas are already today exploiting the real-time and ancillary service market opportunities

“The fact that Wärtsilä engines can go to full power in less than 10 minutes makes us much **more competitive.**”

Coffeyville Municipal Light and Power,
Director Gene Ratzlaff

"The power plant will help to meet the **increasing peak load requirements** of our customers, as well as **supporting a reliable supply** of electricity to the region."

Montana-Dakota Utilities,
Director of Generation Alan Welte

“This flexibility allows us to adjust quickly when **wind and solar energy** rise and fall with natural variability.”

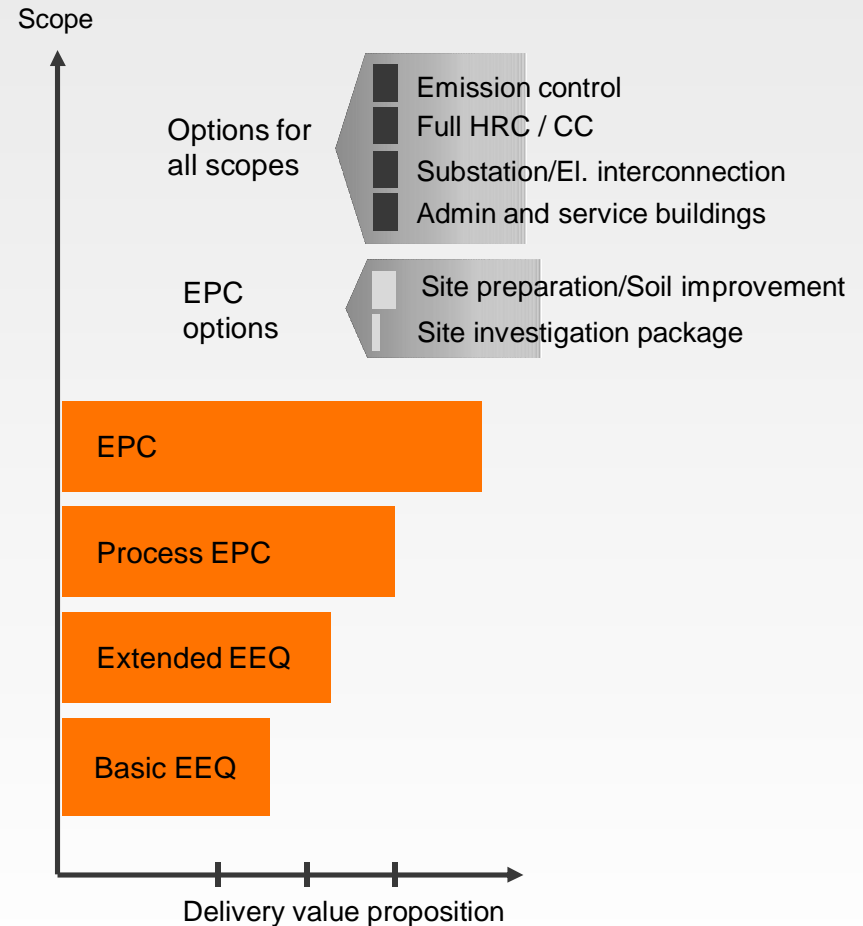
Portland General Electric,
Project Manager Rick Tetzloff

"These units were included as part of our generation resource planning process and were **selected due to size and cost.** Other factors were the **emissions profile, efficiency, anticipated maintenance profile and ease of construction.**"

Montana-Dakota Utilities,
Vice President of Electric Supply Jay Skabo

We have delivered power plants to 169 countries around the world

- Wärtsilä Power Plants has extensive experience in turnkey power solutions since early 90's
- Approximately 25% of the projects are executed on an EPC basis
- The turnkey supplier role provides visibility on the overall economics of investments and the potential challenges that our customers have



Thank you!



WÄRTSILÄ

www.wartsila.com