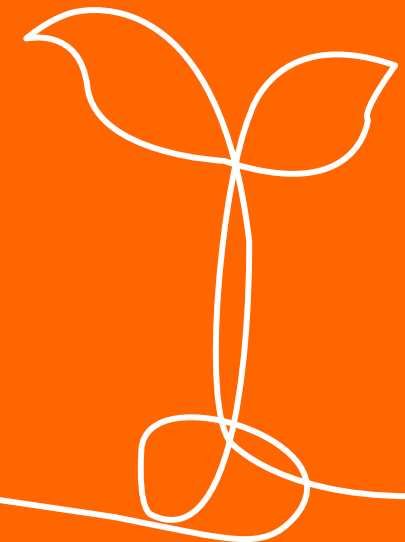


Creating a Low-Carbon Energy Future Together

Tan Cheng Guan
Head, Renewables & Environment
Sembcorp Industries



**Sembcorp's journey towards a
low- carbon future started 25
years ago..**



SINGAPORE

Sembcorp Utilities and Terminals @ Sakra



1997

- SG's 1st Multi-utilities facility on Jurong Island
- Centralised and highly efficient steam generation with recovery of heat from steam condensate which reduces carbon emissions

SINGAPORE

1st Sembcorp Cogen & Sembcorp Gas @ Sakra



2001

- SG's 1st IPP with cogeneration
- 1st commercial supplier of pipeline gas from West Natuna, Indonesia enabling gas fired combined cycle power plants to be built in SG

UK

Sembcorp GT1 in Wilton, Teesside



2004

- Efficient Gas Fired Cogeneration (CHP) to reduce steam production from coal fired boilers

UK

Sembcorp Biomass Power Station Wilton 10 Teesside



2007

- 35MW Biomass Power & Steam plant from sustainably sourced wood using CFB Technology

CHINA

Sembcorp Wind Assets In Inner Mongolia & Hebei



2012

- Enters renewable energy market in China with 248MW wind assets

SINGAPORE

Sembcorp Woodchip Boiler Plant



2012

- 40tph steam from waste wood supplied by Sembcorp's Waste Collection business

UK

Wilton Power Station



2014

- Decommissioning of coal boilers

SINGAPORE

Sembcorp Cogen @ Banyan



2014

- Second cogeneration plant on Jurong Island

Carbon Milestones in our 25-year journey

INDIA

Sembcorp wind and solar assets in India



2015

- Acquires majority stake in a leading renewable energy company in India

UK

Sembcorp EfW Plant, Wilton 11



2016

- Steam & Power generation from 470,000 tph of Municipal Solid Waste from Merseyside, Liverpool

SINGAPORE

Sembcorp Solar



2016

- Enters SG's solar energy sector with a total capacity of more than 240MWp to date

SINGAPORE

Sembcorp EfW Plant Jurong Island



2018

- 160tph steam generation from Industrial and Commercial waste supplied by Sembcorp's Waste Collection business

UK

UKPR



2018

- Enters UK power grid frequency & ancillary support svcs through portfolio of fast ramping gas GE sets & BESS enabling higher adoption of intermittent renewable energy

SINGAPORE

Singapore



2018

- 1st SG energy company to launch a Climate Change Strategy

VIETNAM

Sembcorp's Industrial Cities

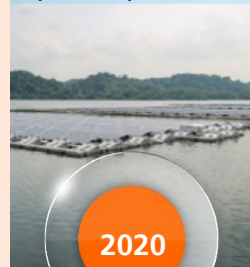


2019

- Entered the rooftop solar and smart solutions space in our Vietnam Industrial Cities

SINGAPORE

Sembcorp's floating solar PV systems @ Tengeh In partnership with PUB

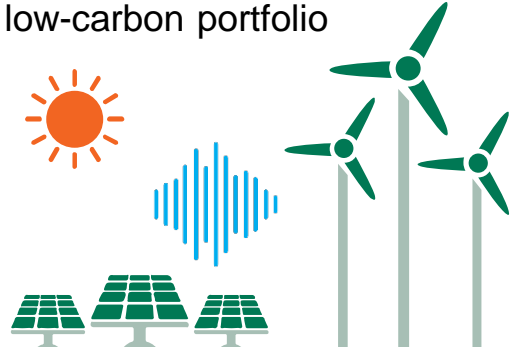


2020

- Partnering PUB to develop SG's largest floating solar platform at Tengeh Water Reservoir

Our Strategies in Creating a Low Carbon Energy Future

Move towards a low-carbon portfolio



Leverage technology for better performance



Create novel sustainable solutions for end-users

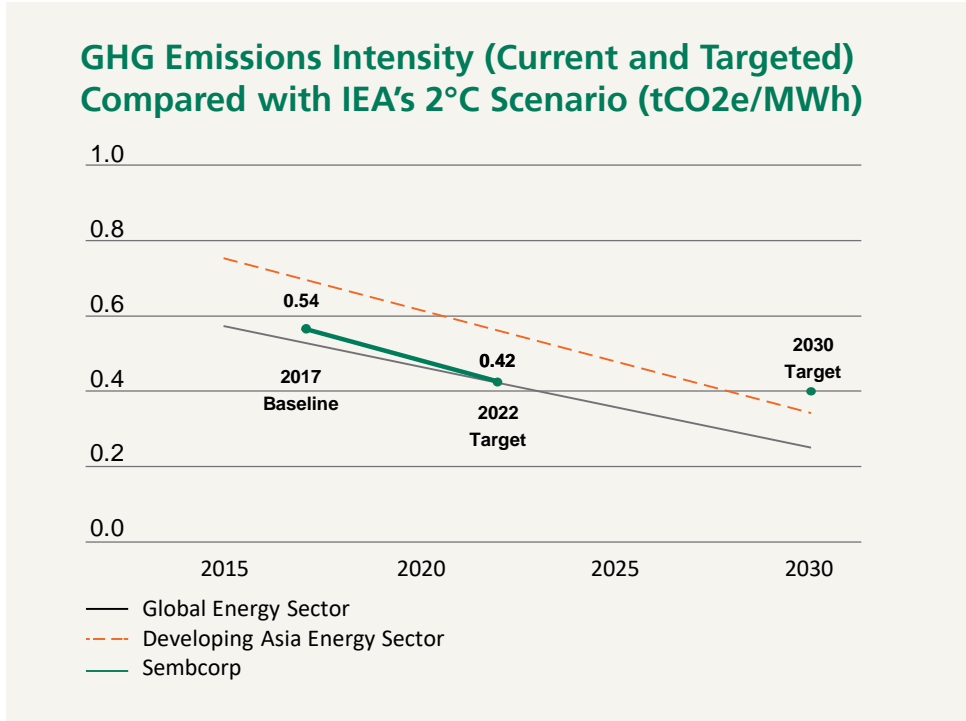


Collaboration with partners and stakeholders



Sembcorp's Carbon Targets

Sembcorp has set aggressive targets to reduce GHG emissions intensity in line with a 2 degree celsius scenario



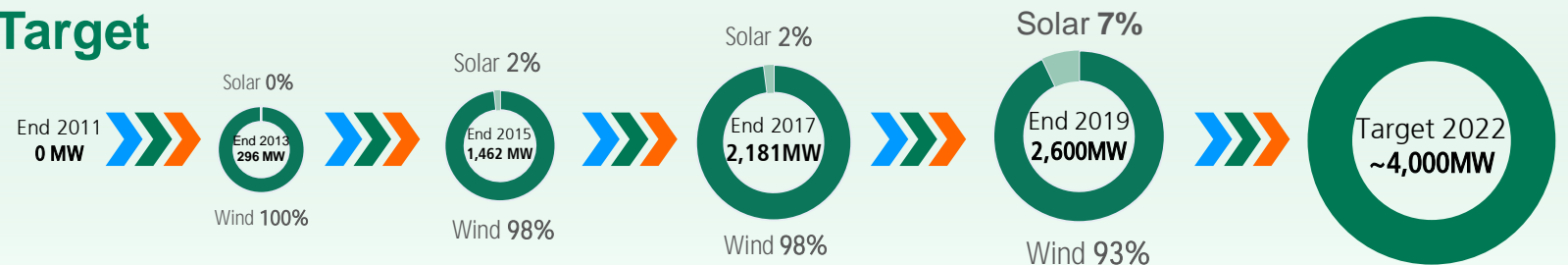
OUR CARBON INTENSITY TARGETS

By 2022
22% reduction
 to **0.42 tCO₂e/MWh**
 from 2017 baseline

By 2030
>26% reduction
 to **<0.40 tCO₂e/MWh**
 from 2017 baseline

Our Renewables Capacity Target

>4000MW by 2022
To be one of the region's leading independent renewables energy player



Leveraging Technology



Sembcorp's Wind Performance Monitoring Centre in Gurgaon, India

- Digitisation of assets enabling the deployment of data analytics and smart algorithms to:
 - Improve Energy Based Availability
 - Better energy generation forecasting
 - Optimise energy generation through corrections on Yaw and Pitch misalignment
 - Predictive maintenance to maximise turbine availability



Sembcorp's Solar Performance Monitoring Centre in Singapore

- Use of advanced and intelligent systems via autonomous drones to:
 - Optimise O&M cost
 - Remote monitoring of panel performance and degradation
 - Remote monitoring of performance of inverters
 - Preventive maintenance of critical equipment such as inverters and sensors



Centralised Utilities – Example of Sustainable Solutions for Industries on Jurong Island



One-stop centralised utilities solution to customers in Jurong Island



About 415,000 metric tonnes of CO₂e avoided annually through efficiency and recycling & reuse of waste energy



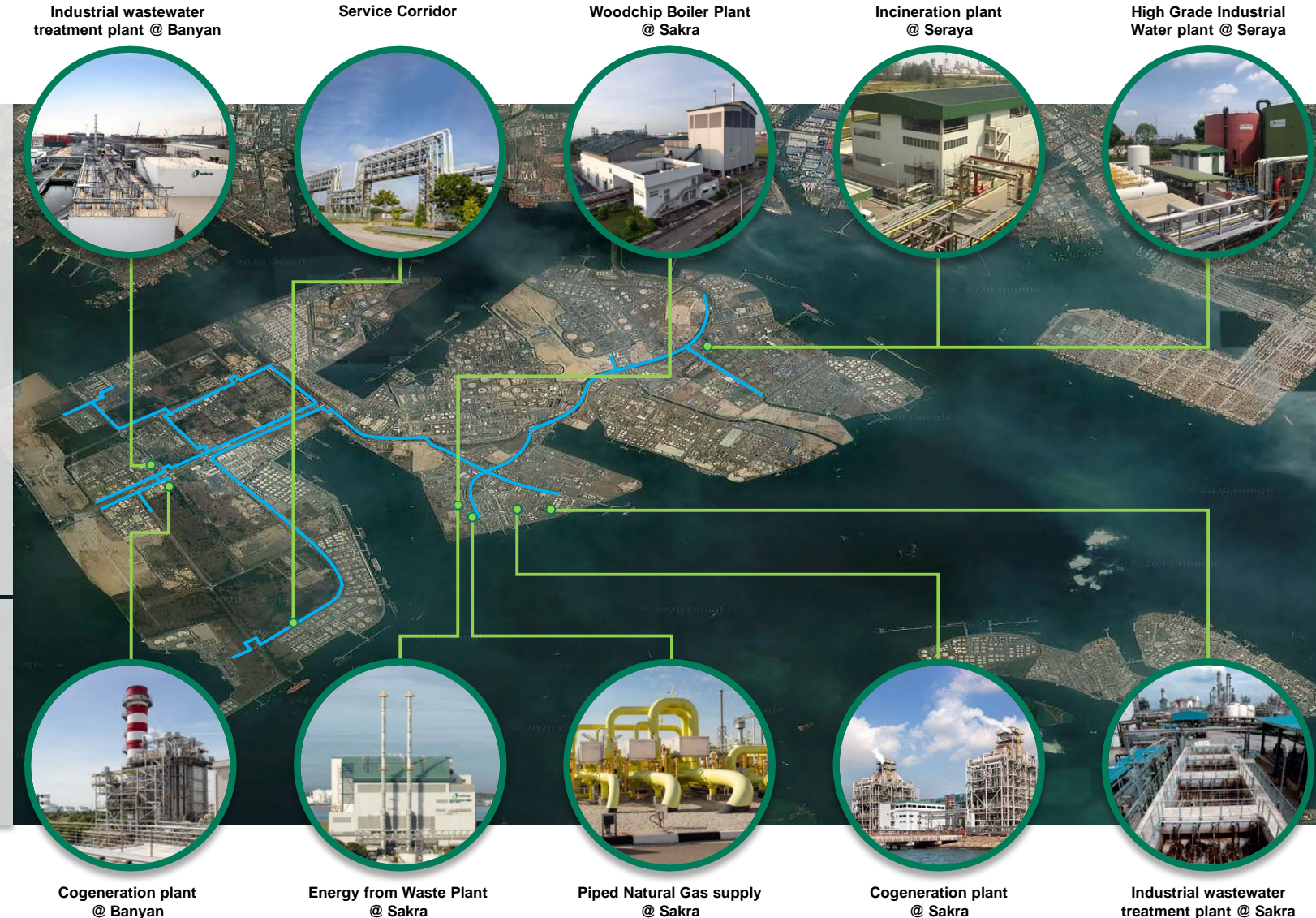
Over 30,000 cubic metres of water recycled for industrial use



Energy recovered from >300,000 tonnes of municipal solid waste annually

Sustainability benefits

- Lower carbon footprint for Utilities supply
- Scale and multi-utilities created opportunities for recycling economically
- Efficient use of land leading to higher unit investment per sqm of land in Jurong Island



Partnerships for Sustainability



Sustainability Solutions



Green energy and energy efficiency management, microgrids, BESS



Wastewater treatment, reuse & energy recovery

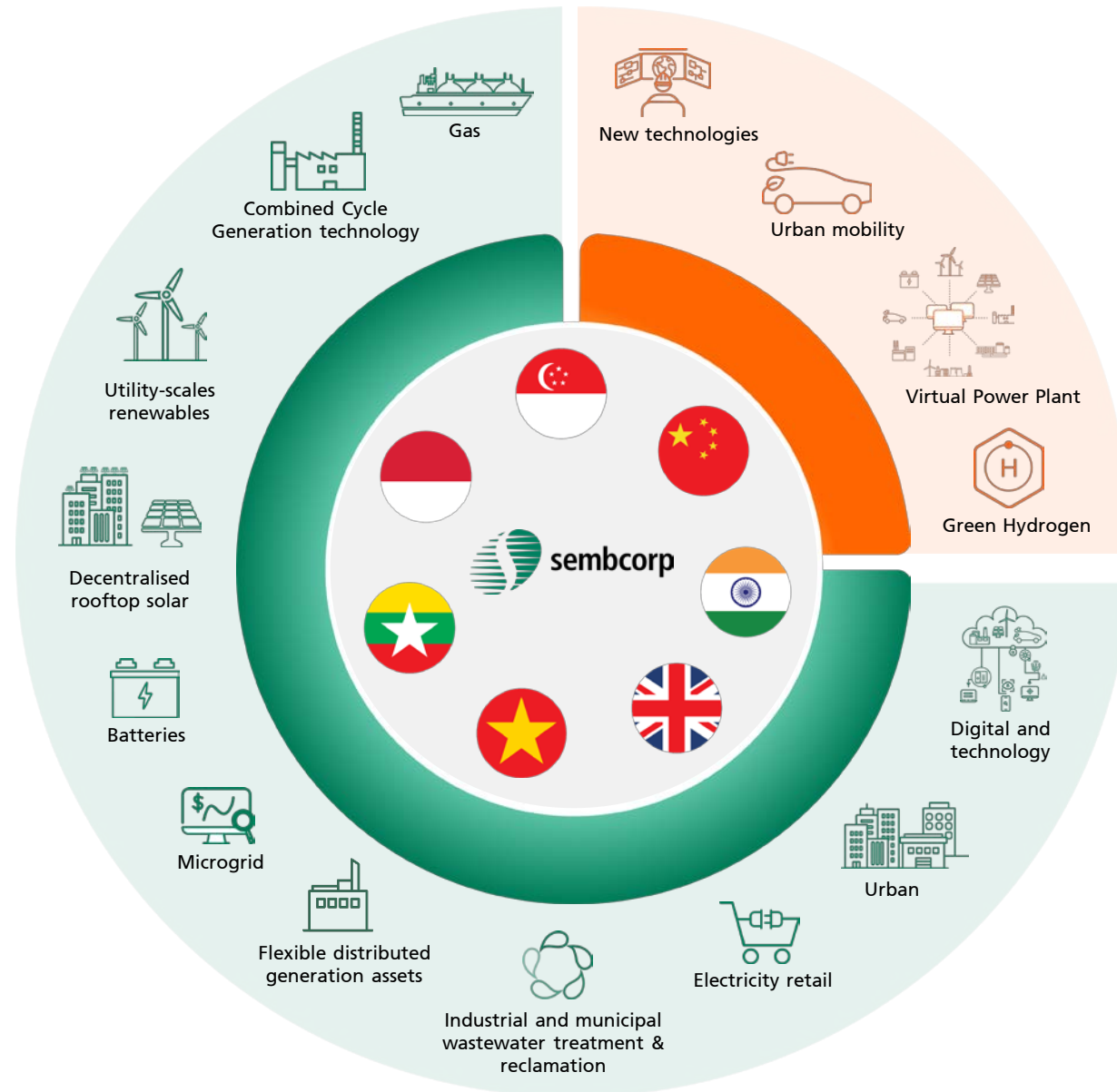


Waste to energy & recycling

Partners & Customers

ST Engineering
Agility
Tiger
YCH
HEATAT
Containers Printers Pte Ltd
APB SINGAPORE
Micron
facebook
UBS
BERTSCHI
CACHE LOGISTICS TRUST
Stolthaven
3M Science. Applied to Life.
Oiltanking
SINGAPORE AIRLINES
KIM SOON LEE ONE-STOP Transportation & Moving Specialist
experia events that influence
ascendas Reit
HALLIBURTON
WINSTON ENGINEERING
CHANGI EXHIBITION CENTRE
sats
SSMC
VF
WOH HUP BUILDING WITH INTEGRITY
STAMFORD Tynes
jtc Breaking New Ground
EDB singapore
PUB SINGAPORE'S NATIONAL WATER AGENCY
HOUSING & DEVELOPMENT BOARD
Amicus

A strong foundation for a sustainable future



CURRENT CAPABILITIES

NEW CAPABILITIES UNDER DEVELOPMENT

Thank you

