
plug
SHORE POWER

Developing infrastructure for greener shipping - Plug's approach to shore power

Maria Bos
CEO
Plug


Supply
Cruise
Coastal voyage
Cargo
Leisure
Shore power & charging for all types of vessels
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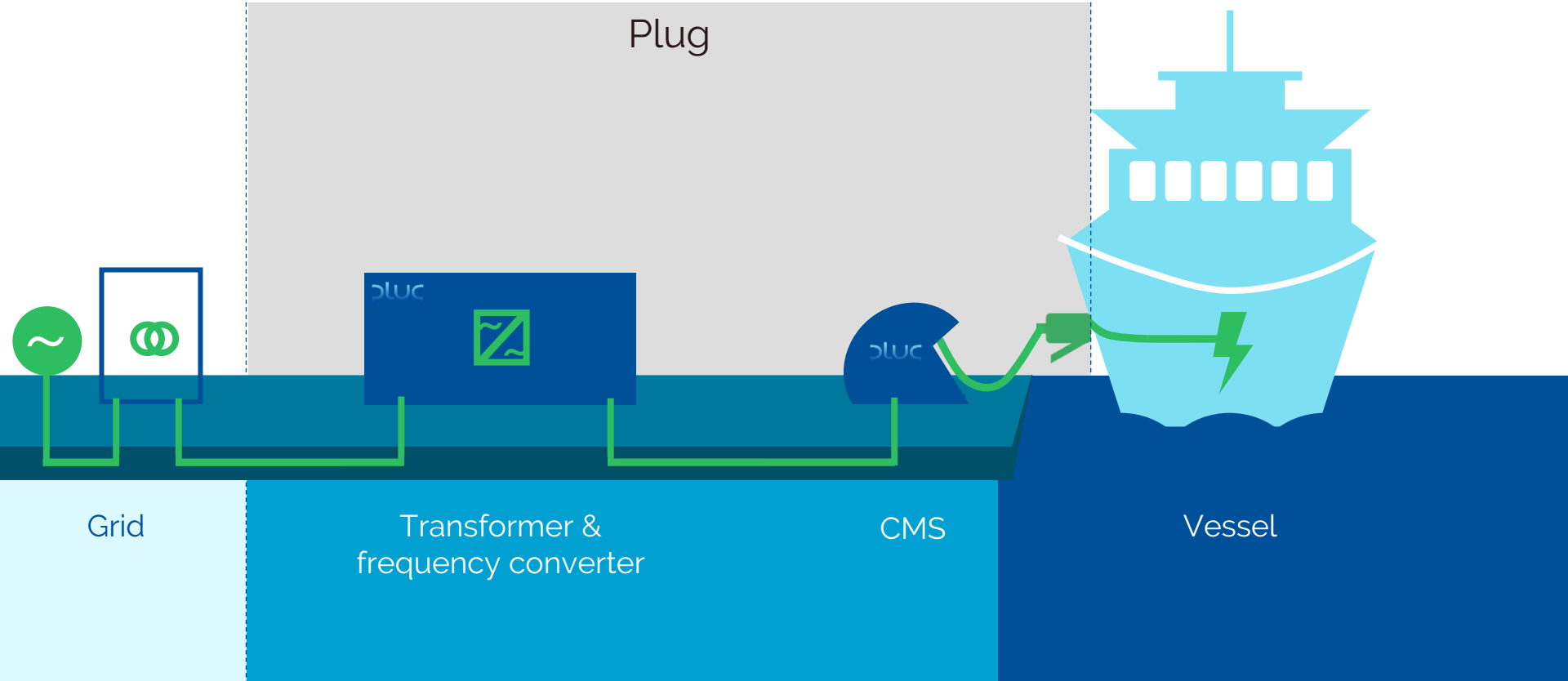
What is shore power?



Different ports – different vessels – different needs

							
	OSV	**Coastal Express**	**Cruise**	**Bulk**	**Container**	**Ferries**	**Leisure/ workboats**
Connection	IEC 80005-3	NG3-plug	IEC 80005-1	IEC 80005-3 / IEC 80005-1	IEC 80005-3 / IEC 80005-1	All kinds	CCS
Voltage	Low	Low	High	Low/high	Low/high	Low/high	Low
Power need	200-600 kW	800-1200 kW + charging	2000-12000 kW (+ charging)	50-2000 kW	200-4000 kW	500-9000 kW charging	0-350 kW
Frequency	60 Hz (50 Hz)	50 Hz	60 Hz (50 Hz)	50 Hz (60 Hz)	60 Hz (50 Hz)	DC/induction (50 Hz)	DC

Many things to consider…

Grid capacity?

Tariff structure?

Duration?

Energy price?

Fuel price?

Berthing position?

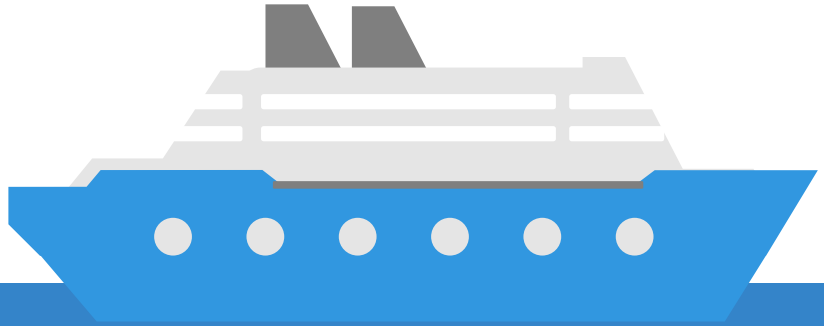
Consumption?

ships?

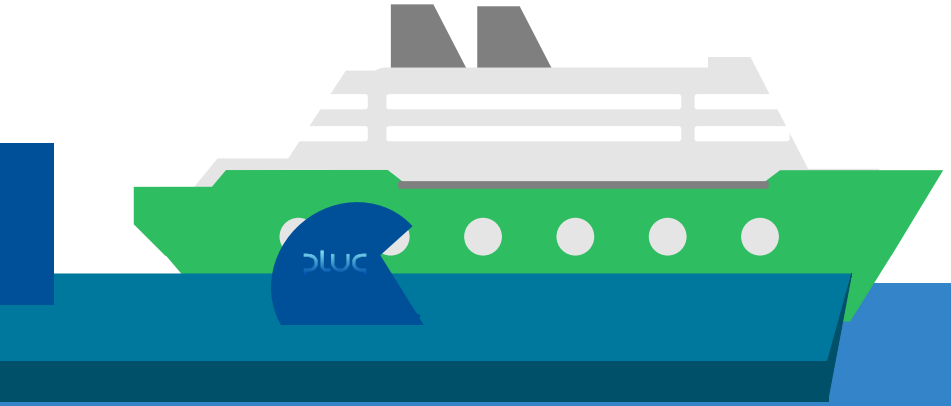
quays?

Placement of hatch?

Simultaneous connections?



...before the vessels can connect to shore power

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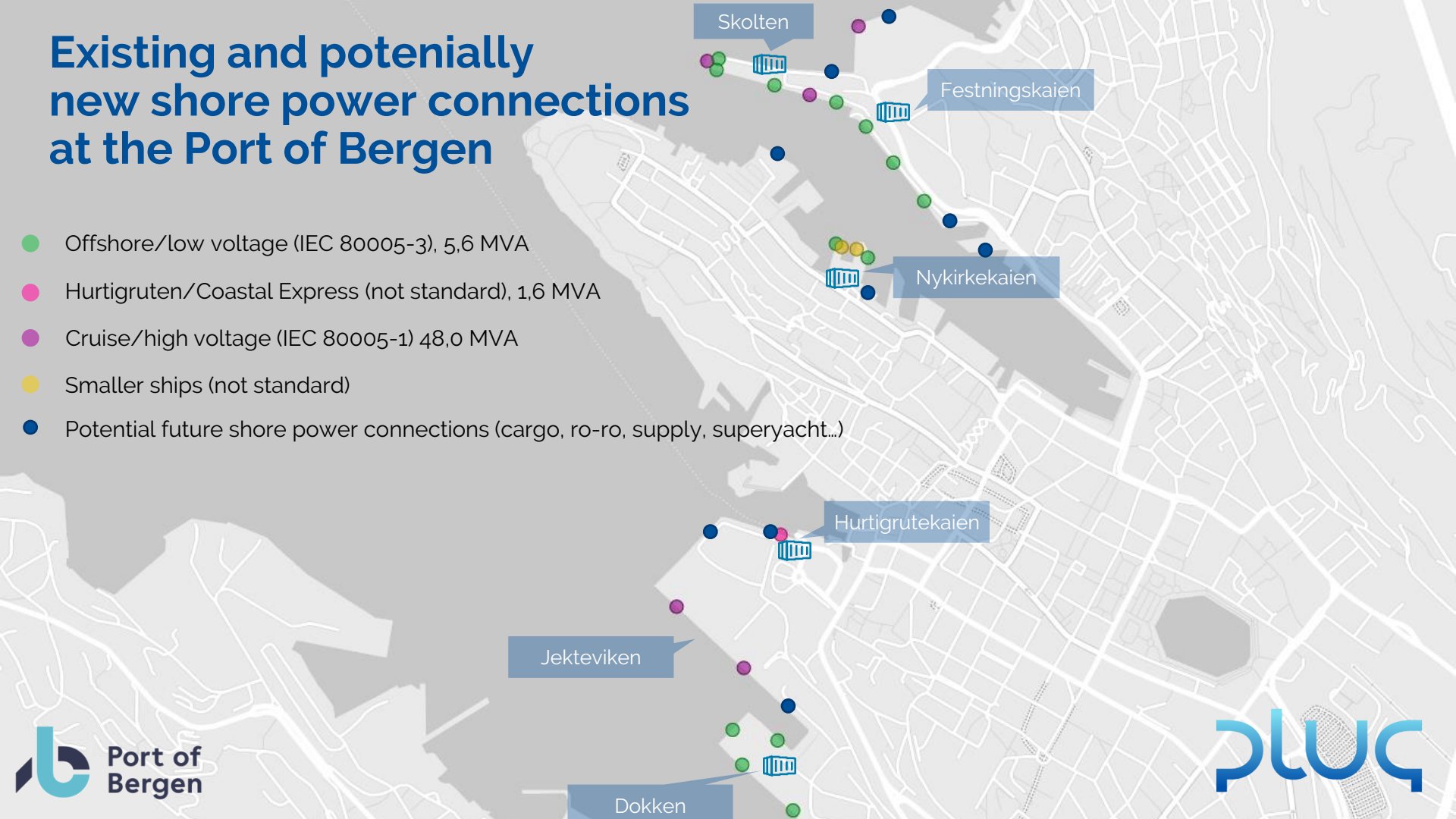
GAC Shipping
KERSTASJON

Existing and potenially new shore power connections at the Port of Bergen

- Offshore/low voltage (IEC 80005-3), 5,6 MVA
- Hurtigruten/Coastal Express (not standard), 1,6 MVA
- Cruise/high voltage (IEC 80005-1) 48,0 MVA
- Smaller ships (not standard)
- Potential future shore power connections (cargo, ro-ro, supply, superyacht…)



Port of Bergen

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Record demand in Bergen

Highlights of 2021

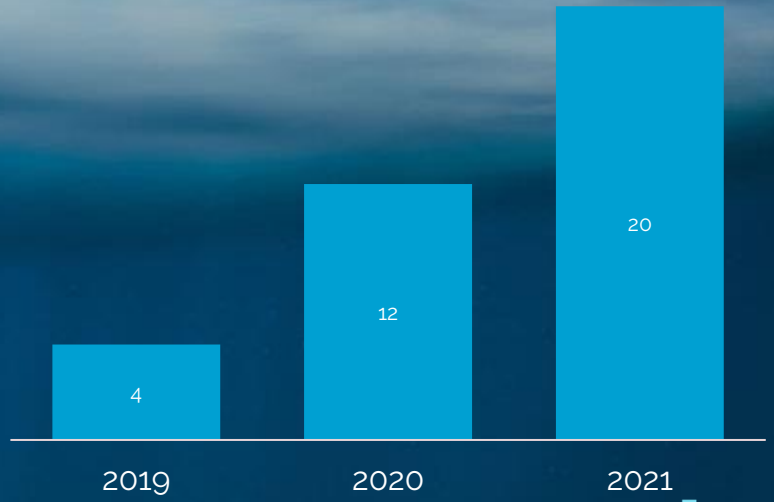
70 %
økning i energi levert

16 000
tonn CO_2 spart

60 %
økning i antall skip

50
unike skip koblet på landstrøm

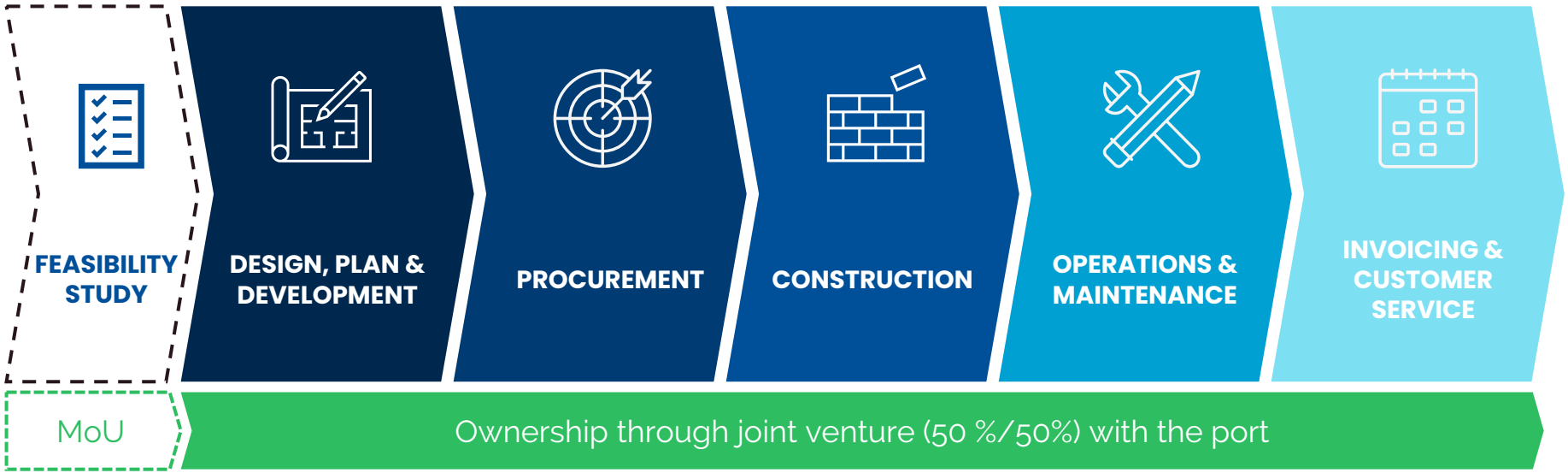
Energy sold to ships 2019 - 2021
GWh

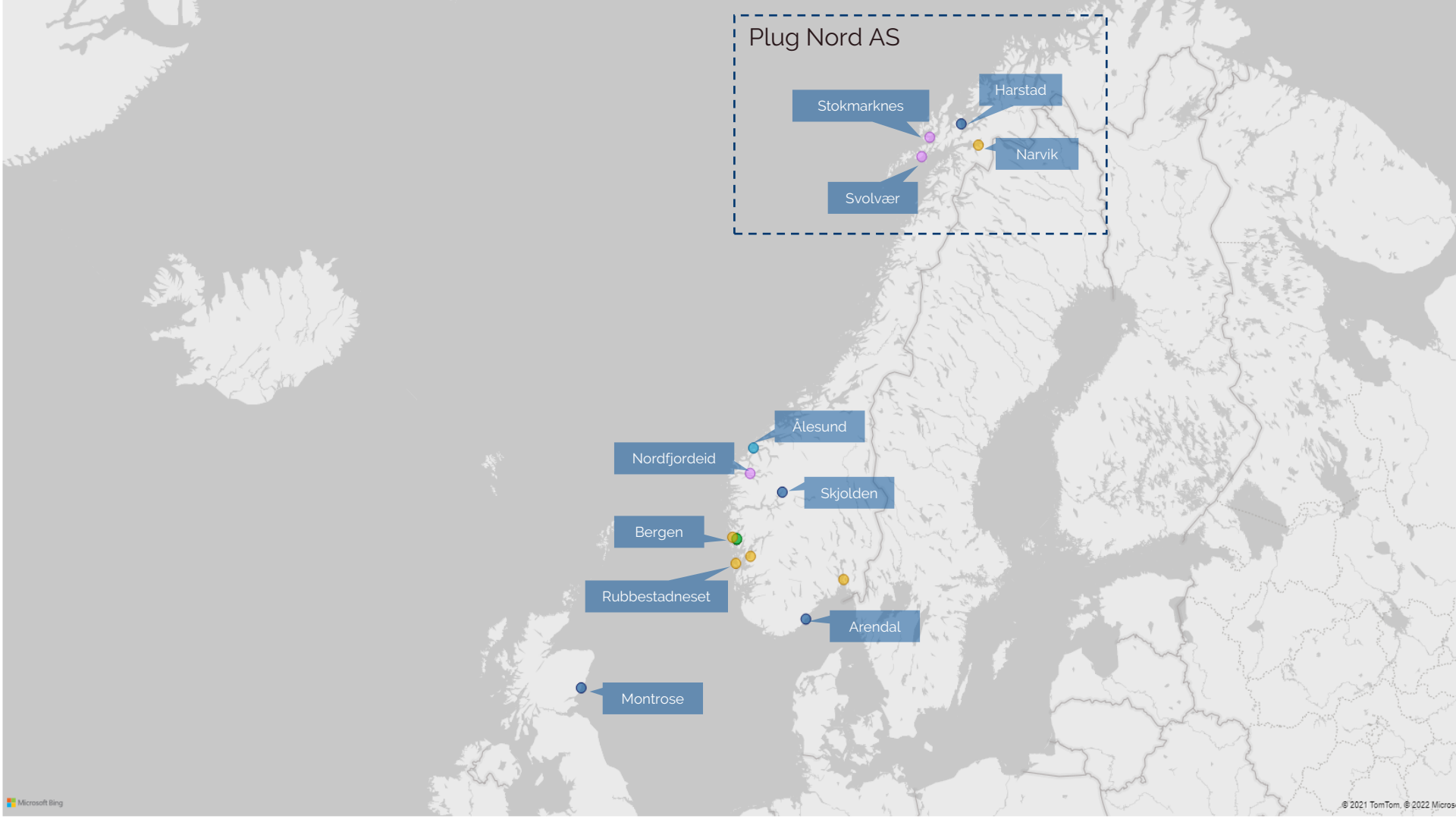



ÅLESUND
LANDSTRØM

Plug's business model

- sharing the investment, the risk and the future profit

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More sustainable shipping
Shore power is part of the solution
Plug is ready to collaborate to make it happen
17 PARTNERSHIPS FOR THE GOALS
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Clean power.
Clean port
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SHORE POWER
Clean air.

Clean port. Clean air. Clean coast.