Port of Tallinn - converting ambitions into action

PORT OF TALLINN

The Port of Good News

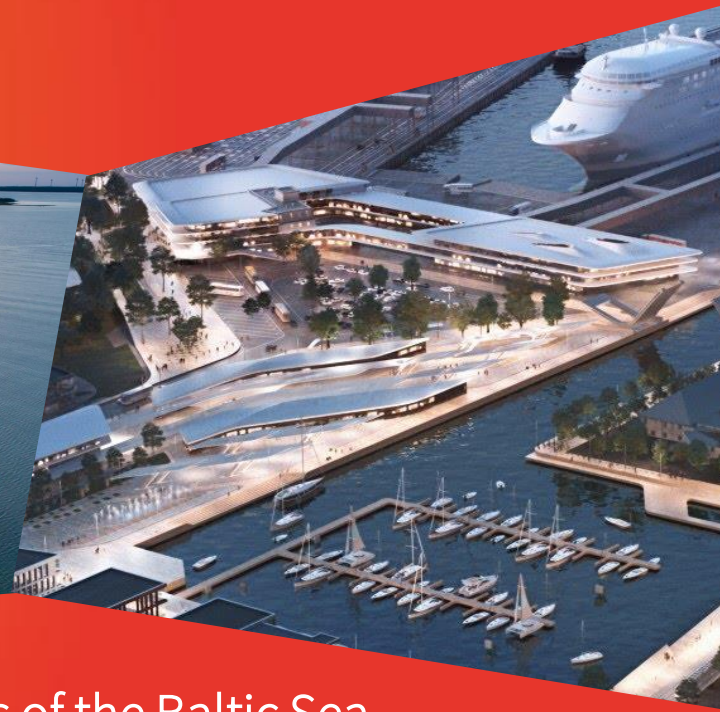
Port of Tallinn reaches Sea and Land

We greet
passengers arriving to Estonian harbours, organize a warm welcome for them.

We service
cargo ships – create an opportunity for goods to move to their destination.

We connect
Estonian biggest islands with the mainland with our five ferries and keep Estonian seaways free from ice.

We develop
attractive real estate and industrial parks in our harbour areas.



Port of Tallinn aims to become the **most innovative port on the shores of the Baltic Sea** by offering its customers the best **environment** and **development** opportunities.

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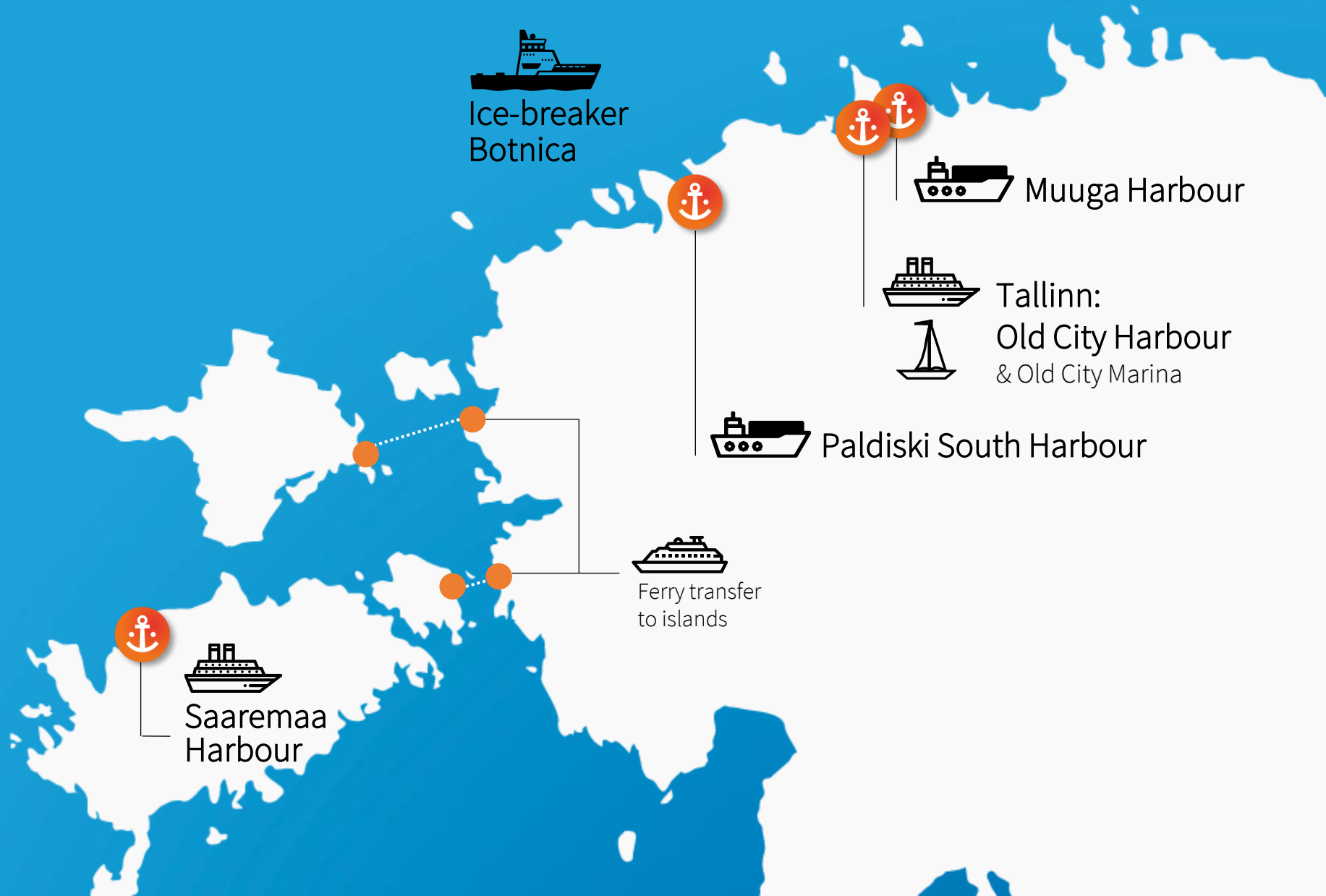
Where we operate

from harbours to vessel operations

Port of Tallinn doesn't by far mean ports in the city limits of Tallinn.

Port of Tallinn is a port complex with harbours located all over Estonia.



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2 of our harbours service passengers: Old City Harbour and Saaremaa Harbour

Regular passenger lines from Tallinn's Old City Harbour:

Tallinn – Helsinki – Tallinn
Tallinn – Mariehamn – Stockholm – Mariehamn – Tallinn
St. Petersburg – Helsinki – Stockholm – Tallinn– St. Petersburg

TALLINK

ECKERÖ LINE

VIKING LINE

MOBY · SPL

Regular Cargo Lines

Ro-Ro

Containers

Port of Tallinn's subsidiary
TS Laevad:

Domestic Connections

Operating **ferry traffic** between Estonia's major **islands** Saaremaa (Muhu) and Hiiumaa and the mainland (contract with the state).

5 ferries

Over 2 million passengers
and 1 million vehicles a year

TS LAEVAD

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Port of Tallinn's Subsidiaries

TS LAEVAD

TS Laevad OÜ

Operating **ferry traffic** between Estonia's major island and the mainland.

TS Shipping

TS Shipping OÜ

Providing **icebreaking** and other maritime support/offshore services with the multifunctional icebreaker **MPSV Botnica**, being contracted by state of Estonia for winter periods. It also provides full management services for vessels, including **commercial, technical and crewing.**

Green Marine
Your Partner on the Green Planet

Green Marine AS

Providing and coordinating **waste management services** to ships within the ports of Port of Tallinn, focuses also on sea pollution prevention, localization and removal issues.

Hydrogen Strategy

Grey hydrogen in EU

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Table 1: Hydrogen use in EU and some MS (2015 figures)

Area	Hydrogen use		Total final energy use	
	TWh, total	MWh/capital	TWh	H_2 share
EU28	325	0.633	14 100	2.3%
Germany	55	0.656	2 475	2.2%
Netherlands	32.5	1.897	571	5.7%
Norway	7.5	1.383	217	3.4%
Finland	5	0.902	281	1.8%

National Hydrogen Roadmap for Finland 2020

Estonian Final Energy Consumption in 2018

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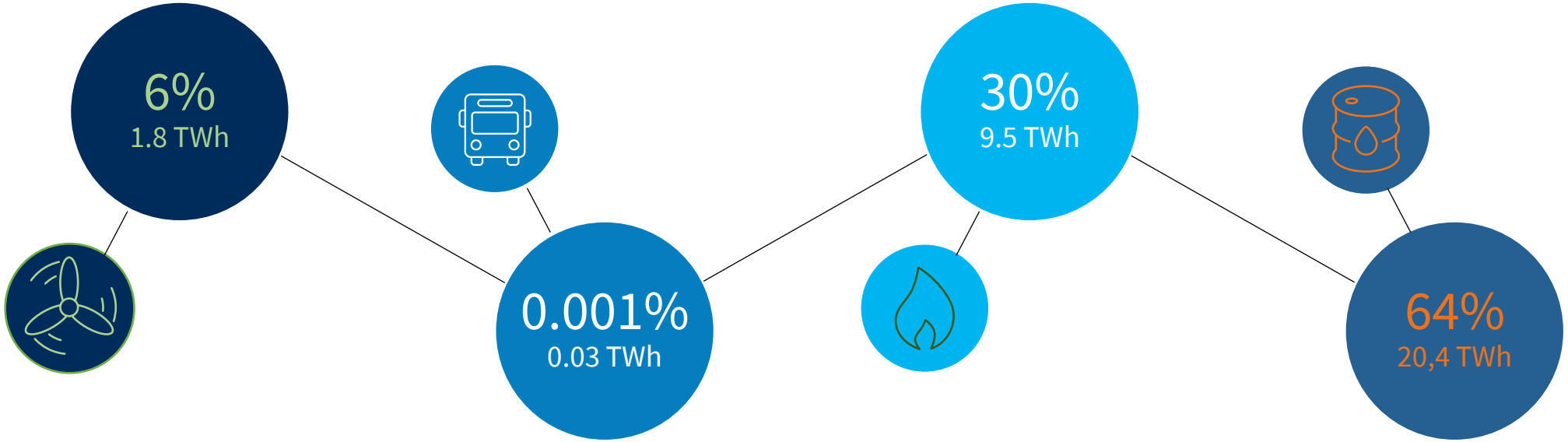

National Energy and Climate Plan (NECP 2030)

Potential Use Cases

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Transportation

H_2 can be used as a direct energy carrier or as a component of advanced fuels.

Industry

As the marginal price of natural gas is still low, hydrogen as a feedstock for Estonian Industry is a pathway for the future.

Energy Storage

Using hydrogen as a buffer for the electricity grid might become a realistic option in the future.

Heating for buildings

When green hydrogen is available in abundance, this becomes a viable option.

Export

Estonia, when using its full potential for green energy production, might become an important player in the new H_2 economy.

Long-term Renewable Energy Potential in Estonia

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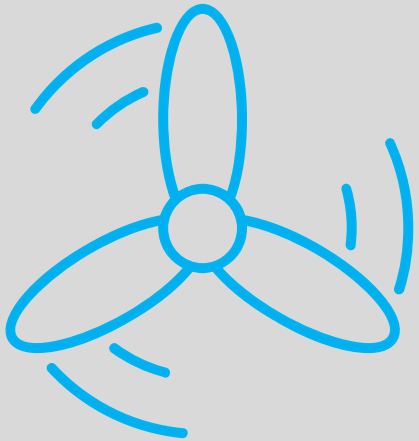
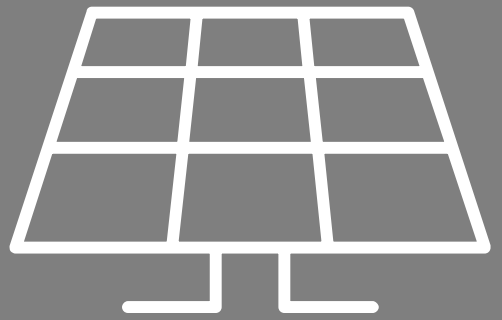


Primary:

Offshore Wind Energy Potential

Approximately 28 TWh per year in 2050 (NECP)

Part of this renewable energy to be used for green H_2 production. Disclaimer: in the short term (2021-2030),) PV is the primary source and wind is secondary, as Estonia currently has 320MW of wind and 500MW+ of PV.



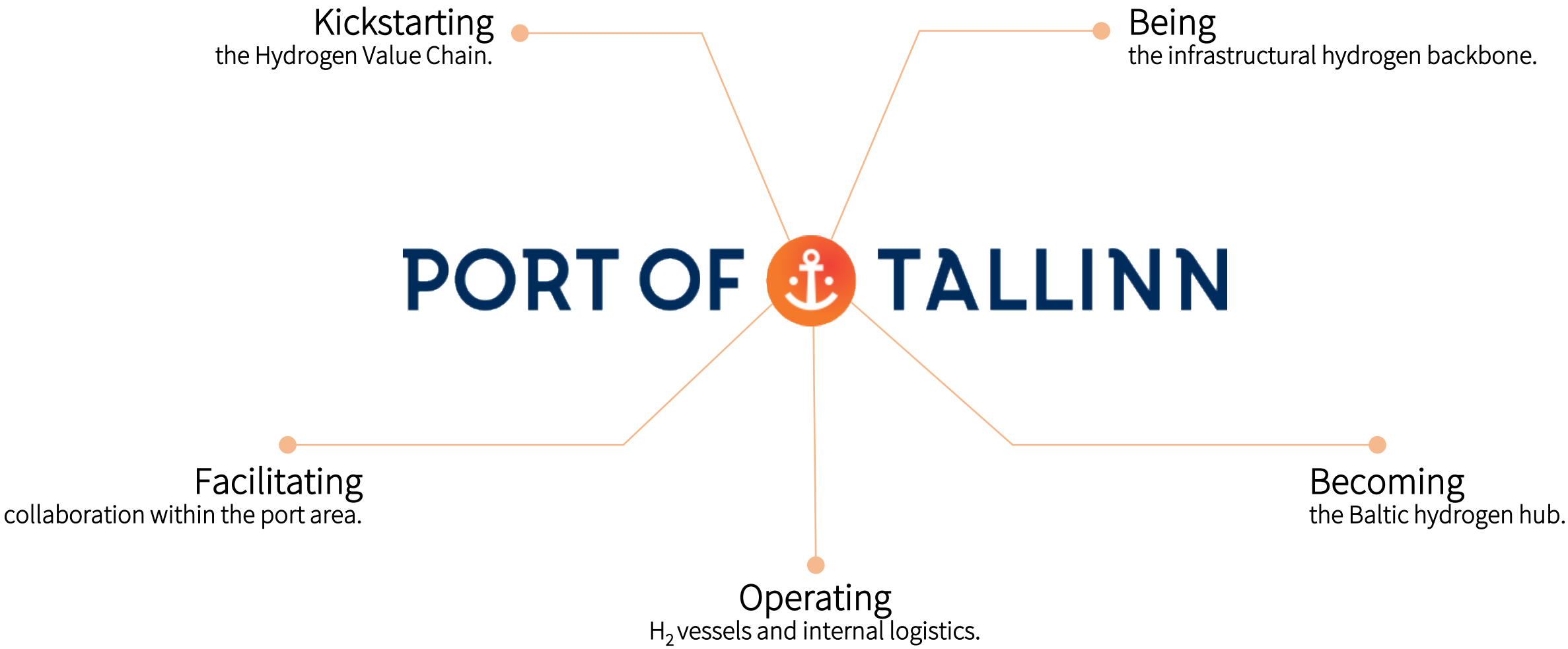
Secondary:

PV Solar Energy

Onshore wind

Biomass

Role of Port of Tallinn



Central Node in Hydrogen Ecosystem

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Legislative

- Ministry of Environment
- Ministry of Economic Affairs
- Municipalities
- Cities

Technology Provider

- Linde Gas
- Elcogen
- PowerUp Fuel Cells

Knowledge Institutions

- University of Tarty, Institute of Chemistry
- Tallinn University of Technology
- SEI Tallinn
- Estonian Hydrogen Association

International market

- Technological/commercial partners
- Advisors/investors
- Other EU ports

Logistics

- Alexela Logistics
- Liwathon E.O.S.
- Elering

Energy Producer

- Enefit Green
- Estiko Energia
- Fortum

Off-taker

- Operail
- HHLA TK Estonia AS
- Tallink Grupp
- TS Laevad/TS Shipping

Tallinn's Old City Harbour OPS

- OPS for 2-5 cruise ships with max 16 MW each
- Additional grid connection and 110 kV substation
- Hydrogen as energy storage:

16 h → H_2

8 h H_2 →

OPS – Onshore Power Supply

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TS Laevad & H_2

- Planned newbuild LMG 110-DEH2 will operate purely on batteries charged from the electric grid on shore and has readiness for H_2
- Possible retrofit the presently operating LMG 150-DE ferries (mf Leiger and mf Tiiu) to battery/hydrogen hybrid operation
- Total estimated reduction of CO_2 emission is 55%

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H_2 terminal in Estonia

- Paldiski or/and Muuga
- Co-operation with partner port (Hamburg, Roenne)
- Size small-medium-big hub

Paldiski South Harbour

Muuga Harbour

How do we get there?

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1. Internal Logistics

- Internal logistics (trucks, heavy lifting) on hydrogen by 2023
- Including planned project:
  - On-Shore power supply for cruise vessels

2. Public Transport and Ferries

- Providing hydrogen for freight and public transport (busses and trains) by 2023 - 2024
- Domestic ferry industry by 2023 - 2025
- Providing hydrogen for international ferry industry by 2025 – 2027

3. Shipping and Export

- Providing hydrogen for shipping and export by > 2030

H_2 Production Capacity Scale-Up

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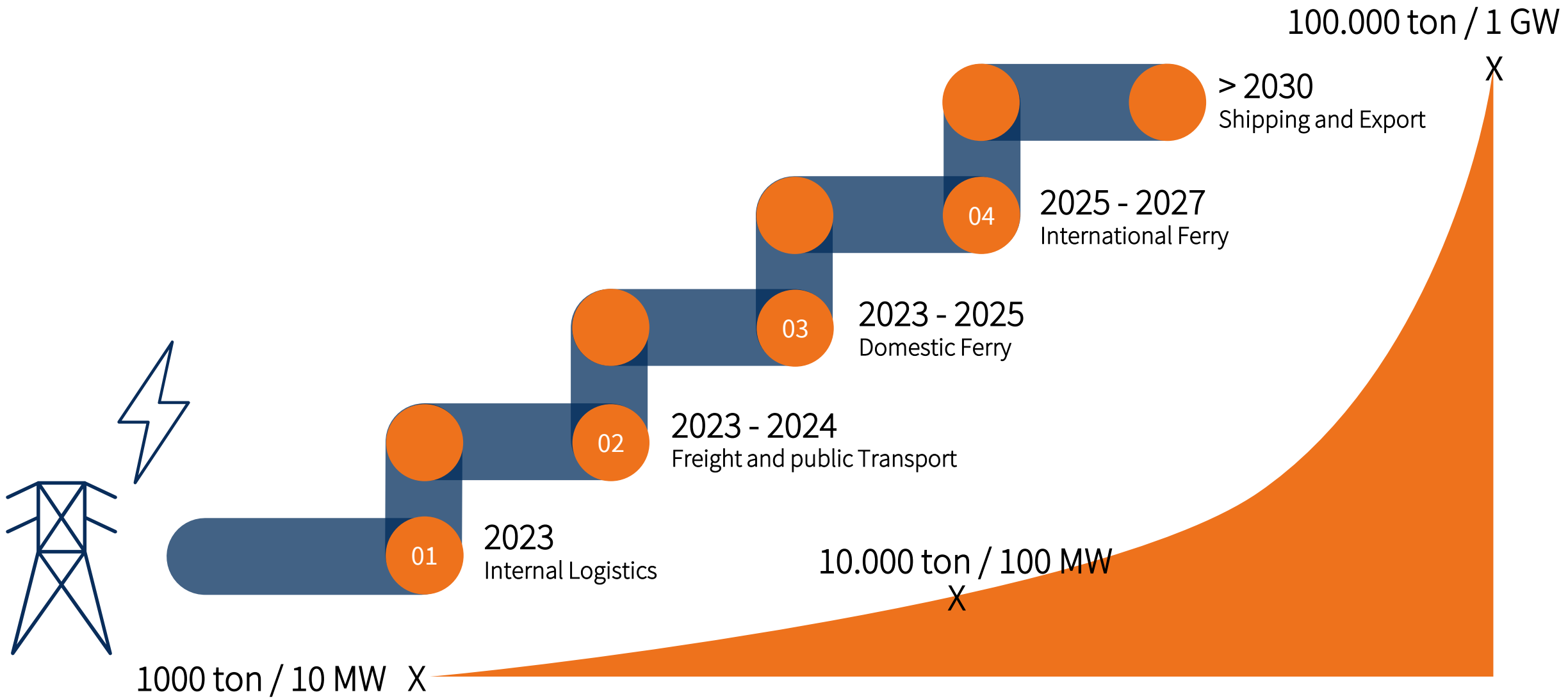

Challenges to address

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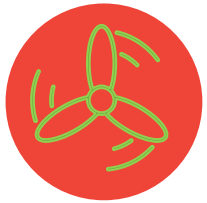
Efficient energy use

When converting electricity to hydrogen there is a loss of approximately 30%. This is the same when turning it back to electricity.



Green energy production

Unfortunately, the bulk of planned energy production in Estonia will be realized earliest after 2030. There is lack of the legislation, safety rules, permits, competency in responsible authorities and clear general state hydrogen-strategy.

Lowering CAPEX cost with subsidies

Investing in hydrogen infrastructure requires high initial capital investments (CAPEX). Great influence on the price of hydrogen, while the operating costs are of less influence. Therefore, available subsidies have big importance in starting up the hydrogen value chain.

International collaboration

The biggest European ports already have hydrogen strategies in place, these will be the first movers. By working together closely with these frontrunners, Estonia can ensure a place in the hydrogen market and good offset opportunities. It can also learn from the best practices in realizing a hydrogen economy.

Potential partners (until now)

LIWATHON E.O.S.

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HHLA TK Estonia

TS LAEVAD

ALEXELA

Port of Hamburg

SKYCORP

Estonian Association of Hydrogen Technologies

Thank You!

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