



Right in time

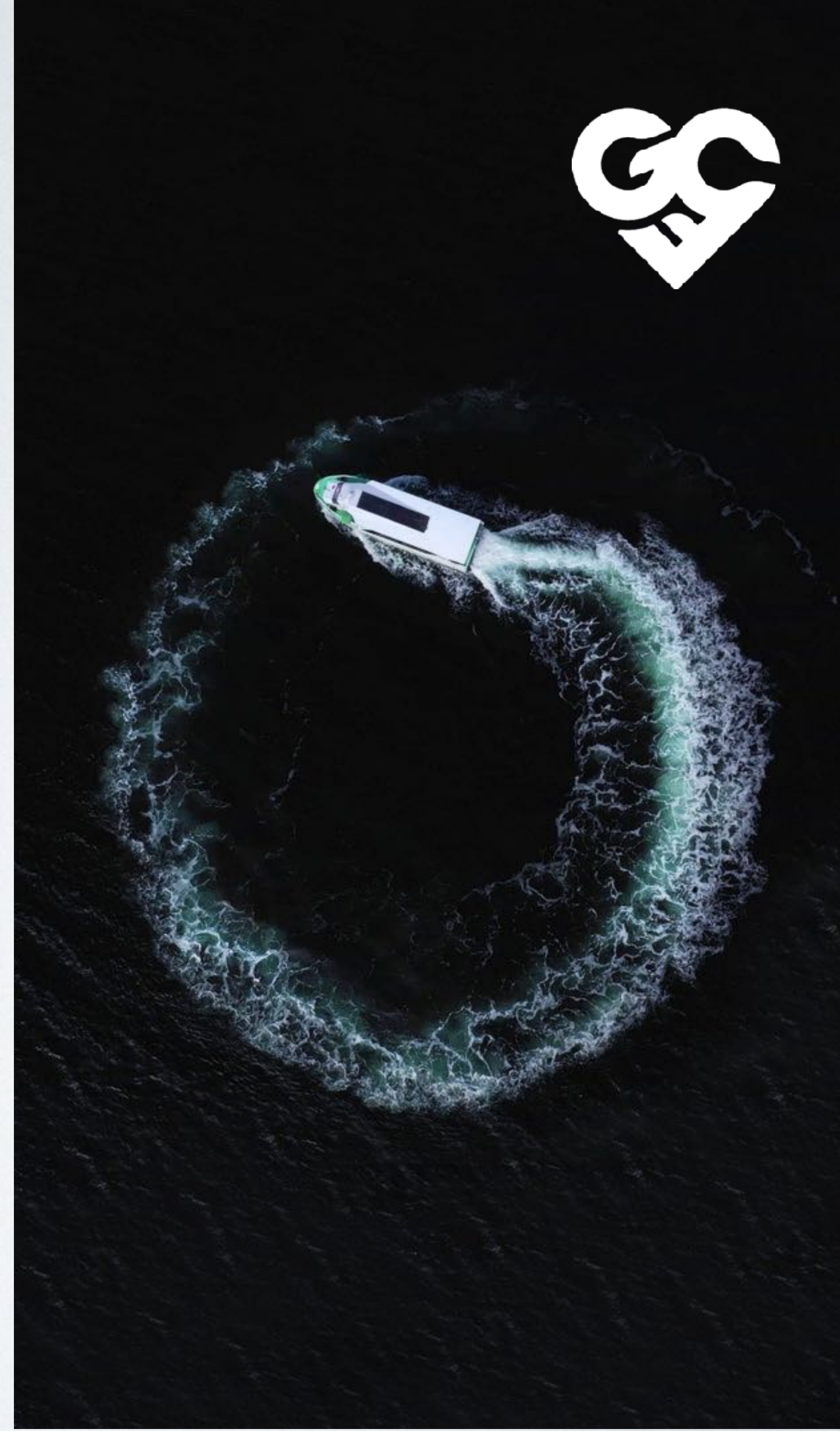


- Climate emergency. Need for many solutions. We have one.
- Cities are growing and so is traffic congestion
- Introduce or expand waterborne public transportations.
- GCF is the first mover for emission-free fast ferry solutions in large scale.

Our Solution is a Game changer

System integrator for sustainable mobility on water

Emission free
@ higher speed
& lower cost





History and foundations

2013

Powertrain



It all started with the drive to build the powertrain for the world's first supercharged electric ferry.

2014

Supercharging



E/S Movitz, the world's first supercharged passenger ferry operates for an hour and recharges in 10 minutes.

2016

Electric prototype

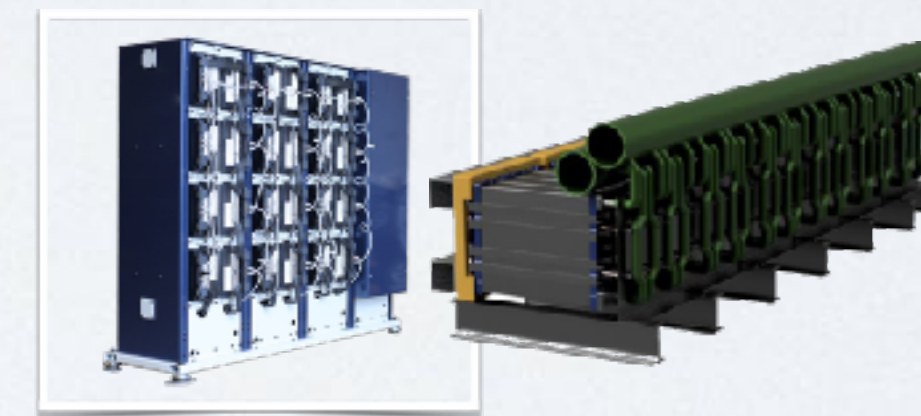


BB Green, the world's fastest supercharged passenger ferry operates at 30 knots only on batteries. (EU-funded)

Split GCF &
Echandia

2020

LTO and HyCmax1



The technology behind the power of the BB Green is coming from our sister company Echandia. The LTO batteries are now certified DNV-GL.

2021

New BB Green 24



BB Green 24, An electric or hydrogen FSV vessel for 147 passengers plus 26 bikes, service speed of 30 knots with ultra-low wakes of 26cm

A systems integrator with **world class partners**



We provide Ferries, Fuels and Financing based on existing technology



FERRIES

Hulls



Carbon fiber hulls uses 20 % less energy than aluminum hulls



Energy efficient hulls - 150 pax



Catamaran

45 kWh/NM



ASV-hull

Air-supported

30 kWh/NM



FSV-hull

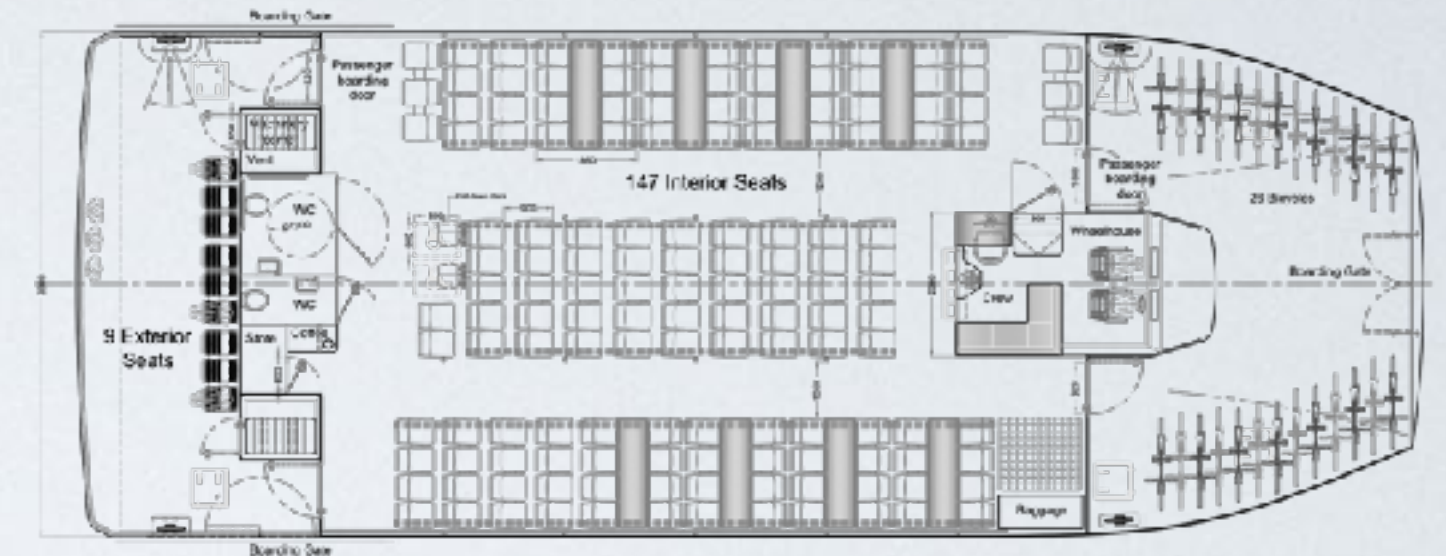
Foil-supported

30 kWh/NM



Hydrofoil

15 kWh/NM



Beluga 24

Reduces energy consumption by 50 % compared to conventional catamarans



FUELS



EVALUATION OF FUELS

	Density kWh/kg	Efficiency	Price	Cost* € per kWh	Future cost € per kWh
Diesel	14	33%	70 cents/liter	0,21	0,42**
Batteries (LTO)	0,06	90%	7 cents/kWh	0,08	0,05
Hydrogen	33	50%	5 euro/kg	0,30	0,15
*) Cost per kWh used for propulsion		**) Using Biodiesel (HVO)			



COMPARISON IN 25 KNOTS

	Conventional biodiesel cat	Battery FSV cat
Operating hours	2000 h	2000 h
Energy consumption	340 l/h	1000 kW
Fuel price	€ 1,4	€ 0,07
Annual cost	€ 950 000	€ 140 000



CHARGING

Batteries



Powerful grid

- 10 foot container
- 1500 kW charging power
- 1500 kW feeding power
-



Limited grid

- 20 foot container
- 1500 kW charging power
- 400 kWh buffer battery
- 300 kW feeding power
-

Hydrogen



Electrolyzer

- 20 foot container
- 24 h production 200 kg
- One day's consumption
- Add water + electricity (400 kW)



Truck delivery

- 20 foot trailer
- 2 week's consumption



FINANCING



HEAVY INVESTMENTS

- The transition to emission-free transport means heavy investments in
 - New high-speed vessels
 - Retrofit of slower vessels
 - Charging infrastructure
- New ways of financing can keep costs down



A FERRY IS NOT A BUS

- Traditionally, in many countries the operator is expected also to provide the vessel
- Buses have a lifetime in the same range as the contract - e.g. 8 years
- Ferries have 3-4 times longer lifetime but are depreciated over same period - 8 years
- Operators will probably not have the financial power to make the investment



SEPARATE OWNERSHIP FROM OPERATIONS

- In the hotel business, real estate ownership is separated from management
- Long term financing of ferries reduces the capital costs - 25 years
- Batteries and fuel-cells last 10 years
- Short term contracts opens up also for small operators



ECONOMY



ECONOMY - 5 FACTORS THAT REDUCES COSTS



Speed

Fast ferries do more transport work per hour



Serial production

Standardized ferries produced in automated serial production will have lower cost per unit



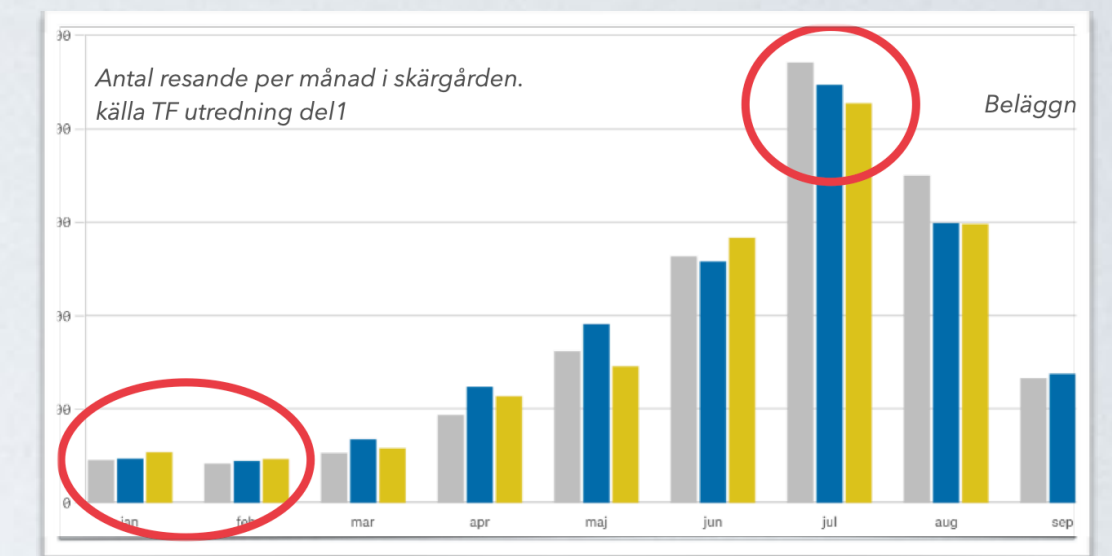
Financing

Long term financing reduces capital costs



Energy efficiency

Batteries as energy source are extremely cheap and hydrogen is today close to diesel



Cabin factor

Today, the cabin factor is 25 % in high season. Smaller ferries in combination with Peak-shaving vessels reduces cost per passenger

Boatplan Stockholm 2025

- 40.000 ton of yearly GHG emissions
- 150 M€ by pension funds
- Erasing all GHG emissions
- 0 € investment for the region





BOATPLAN: ANALYSIS OF THE STOCKHOLM FLEET



- 62 ferries, 100 - 500 pax
- 10 - 25 knots
- Average age 40 years
- Emissions from 15 million liter diesel
- 40 000 tons of CO₂



THE TRANSITION TO ZERO EMISSION

Boatplan Stockholm offers emission-free waterborne traffic at lower cost and better service

23 New fast and
emission-free ferries



€ 100 M

11 retrofitted hydrogen ferries
with reduced speed



€ 20 M

14 new or retrofitted
slow ferries



€ 20 M

12 charging stations
with pontoons



€ 10 M

Estimated investment: € 150 M
During 5 years with 5 new and 5 retrofitted ferries per year



THE TRANSITION
TO ZERO-EMISSION
WATERBORNE TRAFFIC
CAN BE MADE AT NO
EXTRA COST