Glosten

WSF MEDIUM VOLTAGE SHORE POWER

FEASIBILITY STUDY

PREPARED FOR

WASHINGTON STATE FERRIES
SEATTLE, WASHINGTON

8 February 2018
FILE NO. 17122.01
REV. –

PREPARED

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Timetables

monday–friday
EFFECTIVE 31.10.2017–31.12.2017

Pargas / Pargas

00:00	01:00	02:00	03:00	04:00
04:50	05:20	06:00	06:40	07:00
07:15	07:30	07:45	08:00	08:15 (1
08:30	08:45	09:00	09:15	09:30
09:45	10:00	10:15	10:30	10:45
11:00	11:15	11:30	11:45	12:15
12:45	13:05	13:15	13:30	14:00
14:15	14:30	14:45	15:00	15:15
15:30	15:45	16:00	16:15	16:30
16:45	17:00	17:15	17:30	17:45
18:15	18:45	19:15	19:45	20:15
20:45	21:15	22:10	22:40	23:10

Nauvo / Nagu

00:15	01:15	02:15	03:15	04:15
05:05	05:45	06:25	07:00	07:15
07:30	07:45	08:00	08:15	08:30
08:45	09:00	09:15	09:30	09:45
10:00	10:15	10:30	10:45	11:00
11:15	11:30	11:40	12:00	12:30
13:00	13:15	13:45	14:00	14:15
14:30	14:45	15:00 (1	15:15	15:30
15:45	16:00	16:15	16:30	16:45
17:00	17:15	17:30	17:45	18:00
18:30	19:00	19:30	20:00	20:30
21:00	21:55	22:25	22:57	23:37

1) Tämä vuoro on varattu vaarallisten aineiden kuljetukseen / This trip is reserved for the transport of dangerous substances / This run is reserved for the carriage of dangerous goods.

Lisävuorot perjantaisin maalis, huhti-ja marraskuussa. / Additional tours on Fridays March, April and November / Extra departures during Fridays in March, April and November .:

Pargas / Nauvo / Nagu
18:00 18:15
18:30 18:45
19:30 19:45
20:00 20:15

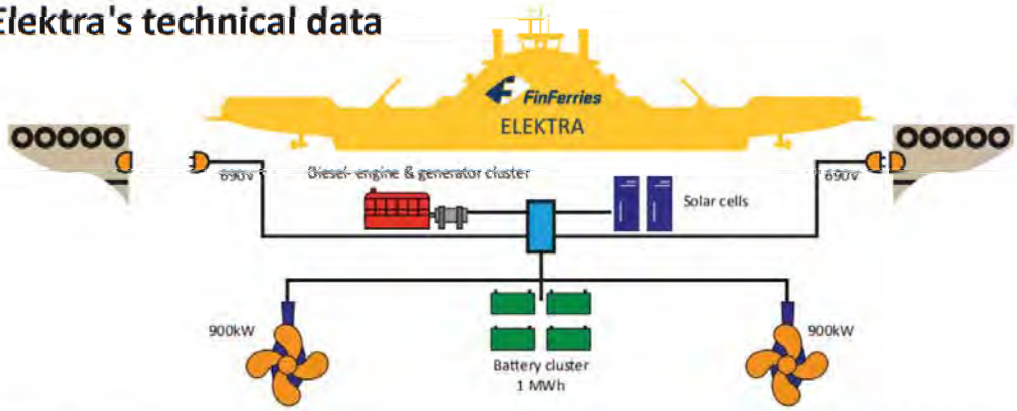
Figure 35 Elektra time schedule (Reference 3)

Electrifying Finnish ferry service

Finferries' newbuilding Elektra is Finland's first hybrid ferry, which represents a milestone on the path towards clean shipping. Battery packs will be charged directly from the grid and diesel electricity generators used alongside them as a backup will serve as the energy source for the new vessel. The energy storage system will be charged at each side of the crossing, using a shore-based connection to the local grid. Because of the harsh winter conditions in Finland, the ferry will be able to use diesel engines to support the onboard batteries, which will serve as an extra boost travelling through ice.

The environmentally friendly ferry will improve the transport options between Nauvo and Parainen in the Turku Archipelago. Elektra will begin operating on the 1.6 km-long route in the summer of 2017.

Elektra's technical data



Length over all	97,92 m	DWT	525 t
Breadth moulded	15,20 m	Cars	90
Draught	3,55 m	Propulsion power	2 x 900 kW
5 lanes, length of lanes	450 m	Batteries all together	1 MWh
Passenger + crew	375 persons	Diesel generators	3 x 420 kWe

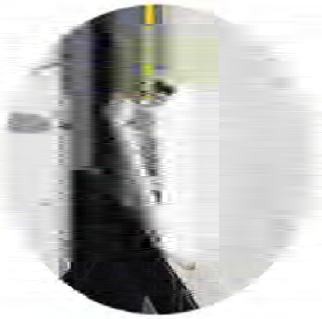
Figure 36 Elektra technical data (Reference 4)

APS in ship applications

APS is also revolutionizing the maritime industry for electrical and battery powered ships with the automatic connection to the grid. APS's automated connection of ships to electrical power ensures optimal recharging times, thereby maximising operational efficiency and minimising emissions.

Benefits

- Quick and reliable connection.
- Longer charging time at berth optimising the battery pack design and cost.
- Safe operations with no human access to the connection point.
- Combination with MoorMaster™ system ensures automated mooring and charging.



Tower

The tower is a vertical steel structure, (composed of pre-assembled blocks), placed on the quay which permits the lowering of the plug inside the ship receptacle.

The primary parts of the tower are the electro winch which allows the up and down movement of the plug; and the top arm which permits the extension of the plug to the ship.

The tower is also fitted with an inspection door and a protective roof that covers the entire outreach of the top arm.

Ship receptacle

The ship receptacle is designed as an integrated part of the fast opening pivoting hatch on board the ship. The female connectors matching the ones of the ship plug are housed in the ship receptacle.

Special covers fitted to the connectors guarantee the IP degree, even during connection operations, enabling safe and reliable power transmission.

Plug unit

The shore side connection plug is a unique feature of APS for ships. It consists of a special body where males connectors are embedded.

The number and size of connectors can be adapted to match the required voltage and amperage up to 7.2kV and 2000A.

The shape and weight of the plug body permits the ship plug to be placed in the ship receptacle even if slightly misaligned, and to maintain the required power connection even in demanding sea states and weather conditions.

Figure 37 Cavotec APS brochure (Reference 5)