

**SPECIALIST IN HEAVY DUTY ELECTRICAL AND HYBRID ELECTRICAL DRIVE TRAINS**



**DAMEN**  
*Artist impression*  
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## **New business opportunities for agile forerunners**

Markku Hokkanen, Director, Sales, Visedo Oy

**VISEDO**

# Visedo, Technology

## Products

- Visedo develops and manufactures robust, efficient, compact equipment for demanding operating conditions.
- Visedo in-house products:
  - Permanent magnet generators and motors
  - Inverters for generators and motors
  - DC/DC converters
  - Supercapacitors
- Visedo products are water cooled and come with a high IP class.

## Systems

- Power plant & propulsion systems
  - Delivered as one functional entity Visedo DC-grid is an efficient, simple and reliable system covering power production, propulsion and specified consumers.

Typical vessels: Workboats, Yachts, Ferries etc. vessels with a power up to 1MW per shaft.



# Building blocks of a system for harsh environments

**Designed on terms of being a part of a system** instead of applying standard industrial components which are modified to be acceptable for being part of a system.

**Designed from a basis of mobility**

- Space
- Weight
- Ambient conditions
  - Temperature
  - IP-class
  - Vibration



**Marine components optimized for harsh operating conditions** instead of standard industrial components which are modified to pass the requirements of the marine applications.

# Indirect space savings

Field equipment, water cooling



Dedicated electrical space, air cooling, requirements for the ambient conditions



## Where the incentives for electric propulsion are in place

- Varying operation profile / lots of operation at partial load
  - Multipurpose vessels
- Big working process or high power consumers onboard the vessel
- Special requirement for zero emission / silent / comfortable operation

## State of the art in inland waterway and coastal traffic

- Inland waterway traffic and coastal shipping is by number of units a big market, predominantly operated with not that sophisticated fleet of vessels.
- The portion of diesel electric / hybrid / electric vessels is small.
- The incentives for applying electric propulsion haven't been there until now.
- The available technology and services have not met the marine requirements in terms of size, weight and cost.
- The solutions are often tailored individuals lacking consistency in technical solutions and makers.

## Trends and motivation for electrification in water transport

- **Regulation and promotion for environmentally cleaner and more sustainable transportation.**

More stringent environmental rules drive for less polluting solutions. EU, governments and cities are pushing strongly programmes to develop and enhance the use of internal waterways, coastal shipping and public transportation. The use of renewable energy in transportation is supported. In general the waterway traffic close to inhabited areas is driven to grow and get greener.

- **Competitiveness requires efficiency improvements**

The significance of the efficiency is getting more and more widely recognized

- **New vessel types - often multipurpose - are needed to support new areas of industries.**

The emerge and growth of new industries e.g. fish farming and offshore wind power industry need new types of services & service vessels to support their businesses while building the infrastructure as well as during the operation.

## Development needs for electrification in water transport

- **Technical development has made electric propulsion a competitive alternative.**

Products developed for mobile applications are being introduced. The market with demand is no longer hindered to grow because of lack of supply. Power train building blocks for mobile machinery and marine applications are available. Vessel concepts need to be further developed.

- **The technology for the shore power solutions and the infrastructure to support it is at their early stage of development.**
- **Need for industrial players**

As the market of electric propulsion will grow and the vessels are being built in greater numbers and in series the yards and the ship owners will require their counterpart on the system supplier side to be a credible industrial player with systematic working practices, comprehensive offering and vision & commitment to serve the market with consistency.



## Future electrification scenarios and steps to be taken to fulfil and benefit the desired scenario

### Gas electric and full electric vessels

- Technology and availability of fuel supply
- Technology and availability of shore power
- Distribution and production of shore power
  - Load profile
  - Cost
- Intelligence
  - to provide information for a user about the efficiency
  - to optimize the the distribution and the production > consumption (charging batteries) of the energy

The logistic chain as a whole including the infrastructure has to work together

# My Vision 2025

- Infrastructure for electricified water transport has been set up driven by proactive measures of biggest European cities
  - electricification as a goal, not just a point where we ended up because of the tightened environmental regulation
  - tied together with the development of public transport in general
- A new area of industry, developing and maintaining the logistic chain and functions needed to support it has emerged – dominated by new players.
- Majority of inland waterway and coastal vessel new buildings are electricified to some degree, hybrid, diesel / gas electric, full electric

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