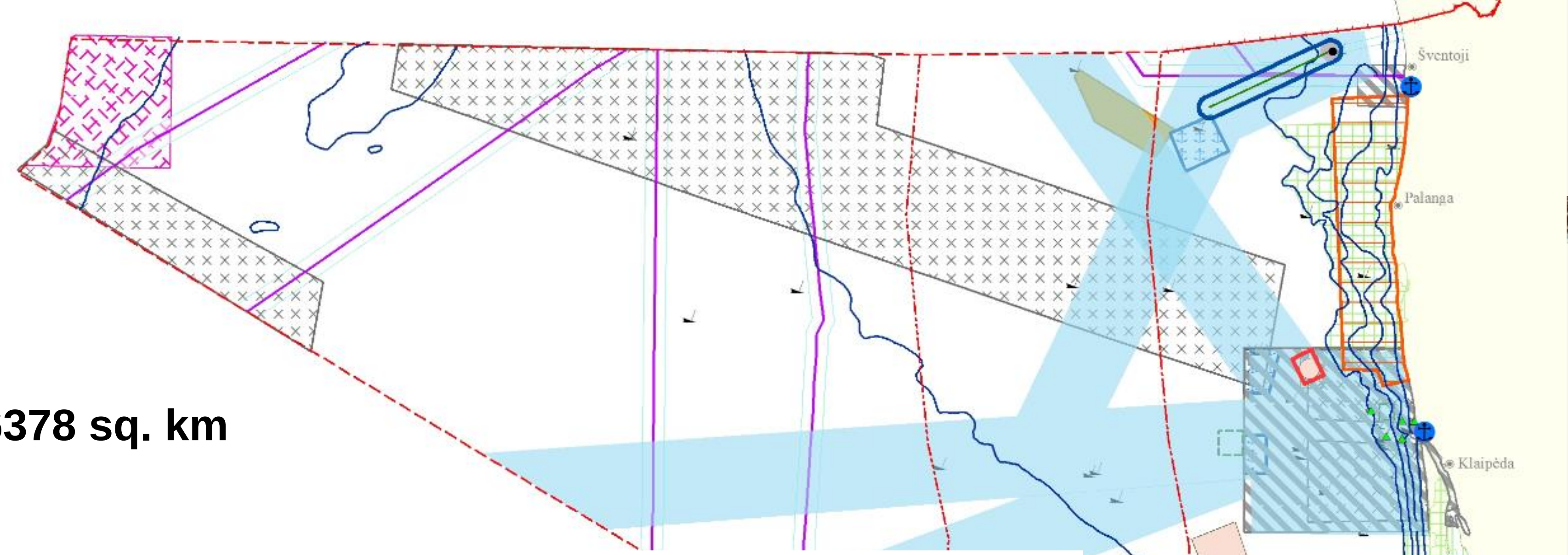
MULTI-LEVEL GOVERNANCE
IN MARITIME SPATIAL PLANNING
THROUGHOUT THE BALTIC SEA REGION
PartiSEApate

Towards offshore energy market development in Lithuania: planning principles and state of the art

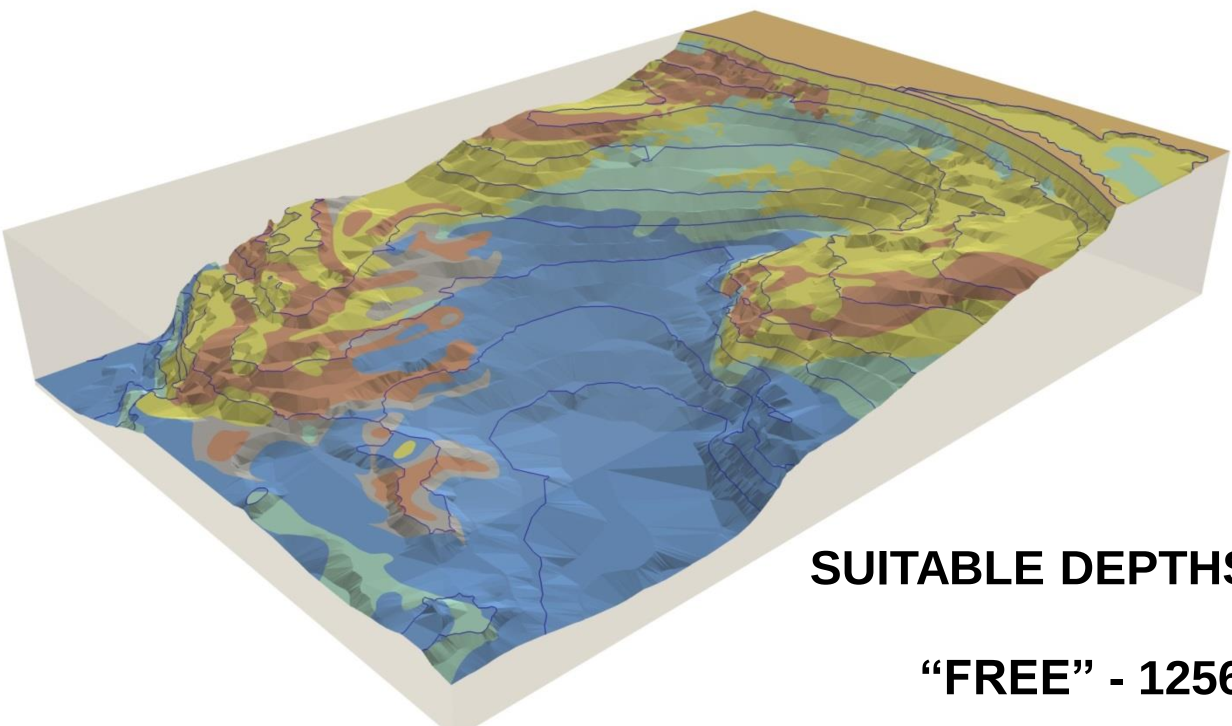
N.Blažauskas, KU

Klaipeda, 2017

Baltic Sea Region
Programme 2007–2013
Part-financed by the European Union
(European Regional Development Fund)



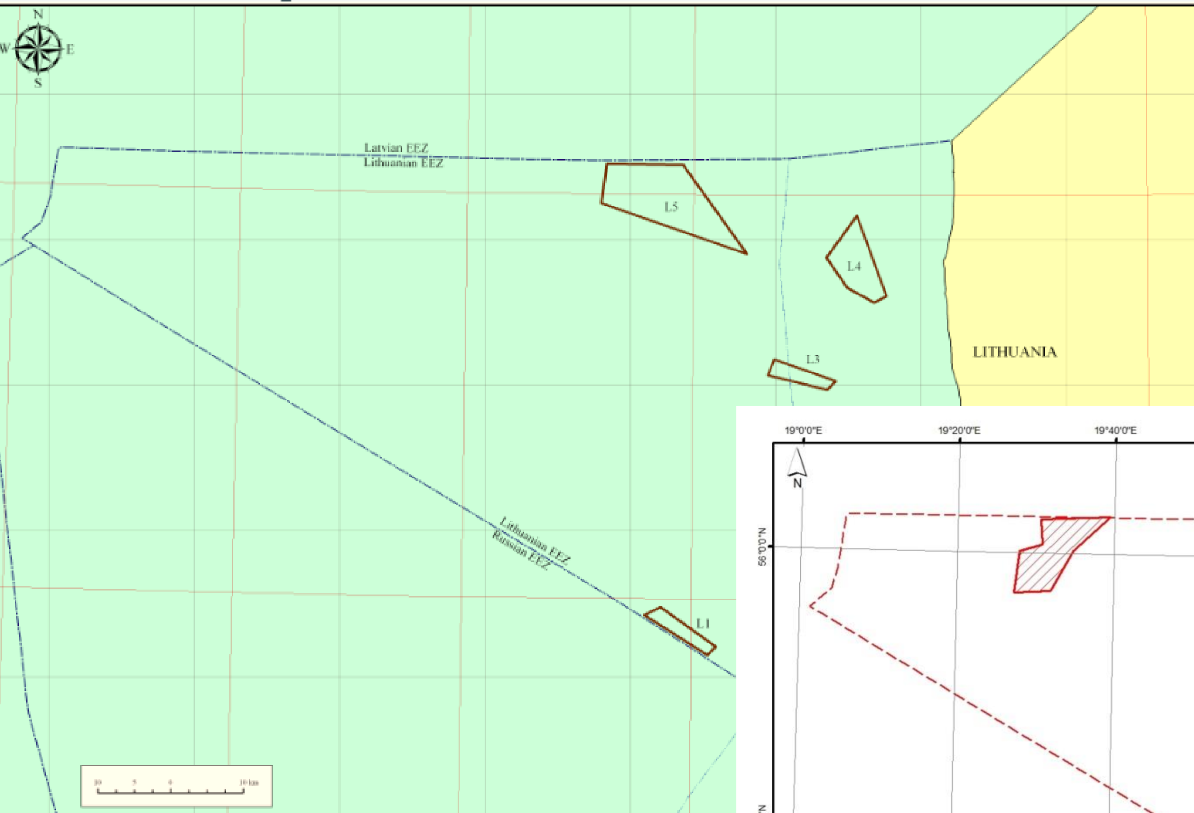
AREA - 6378 sq. km



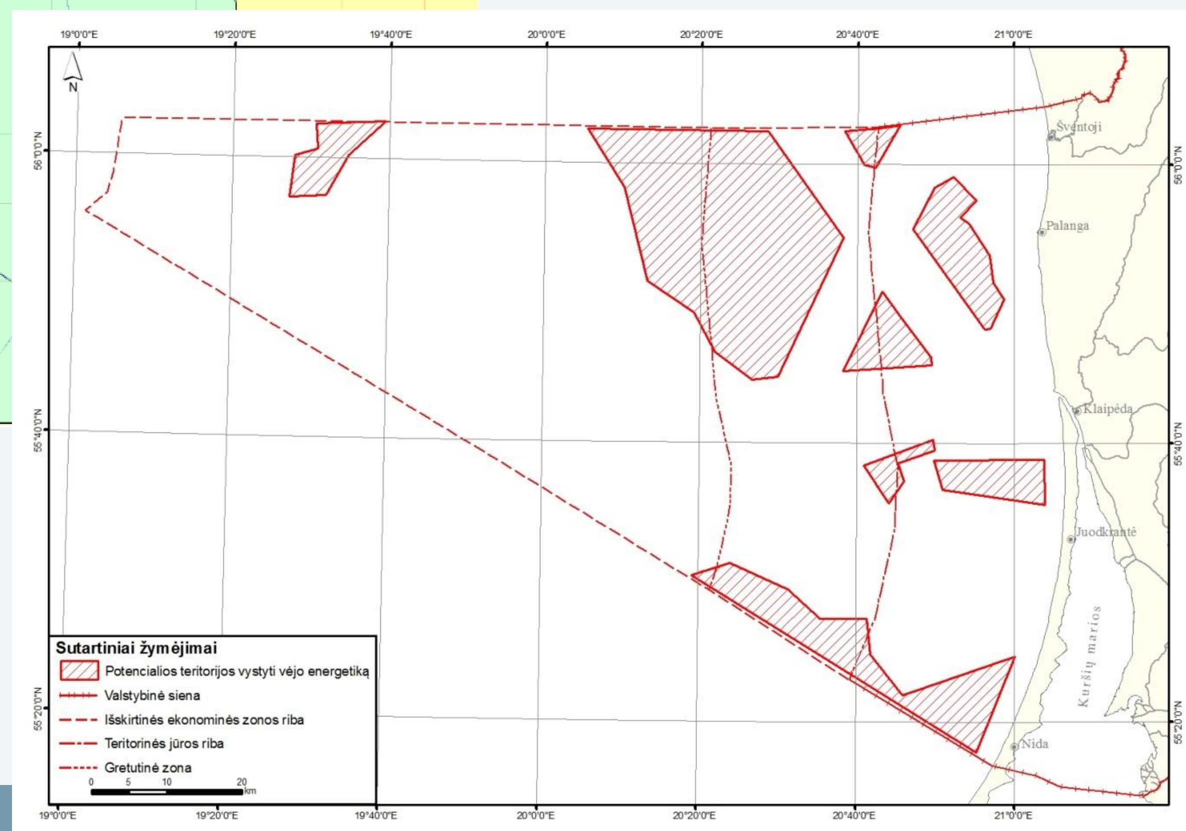
SUITABLE DEPTHS 20-50 m - 2737 sq. km

“FREE” - 1256 sq. km

TWO FEASIBILITY STUDIES:



5 zones
TOTAL AREA: 237 sq.km
Potential Capacity: 766 MW



6 zones
TOTAL AREA: 1210 sq. km
Potential Capacity: 5436 MW

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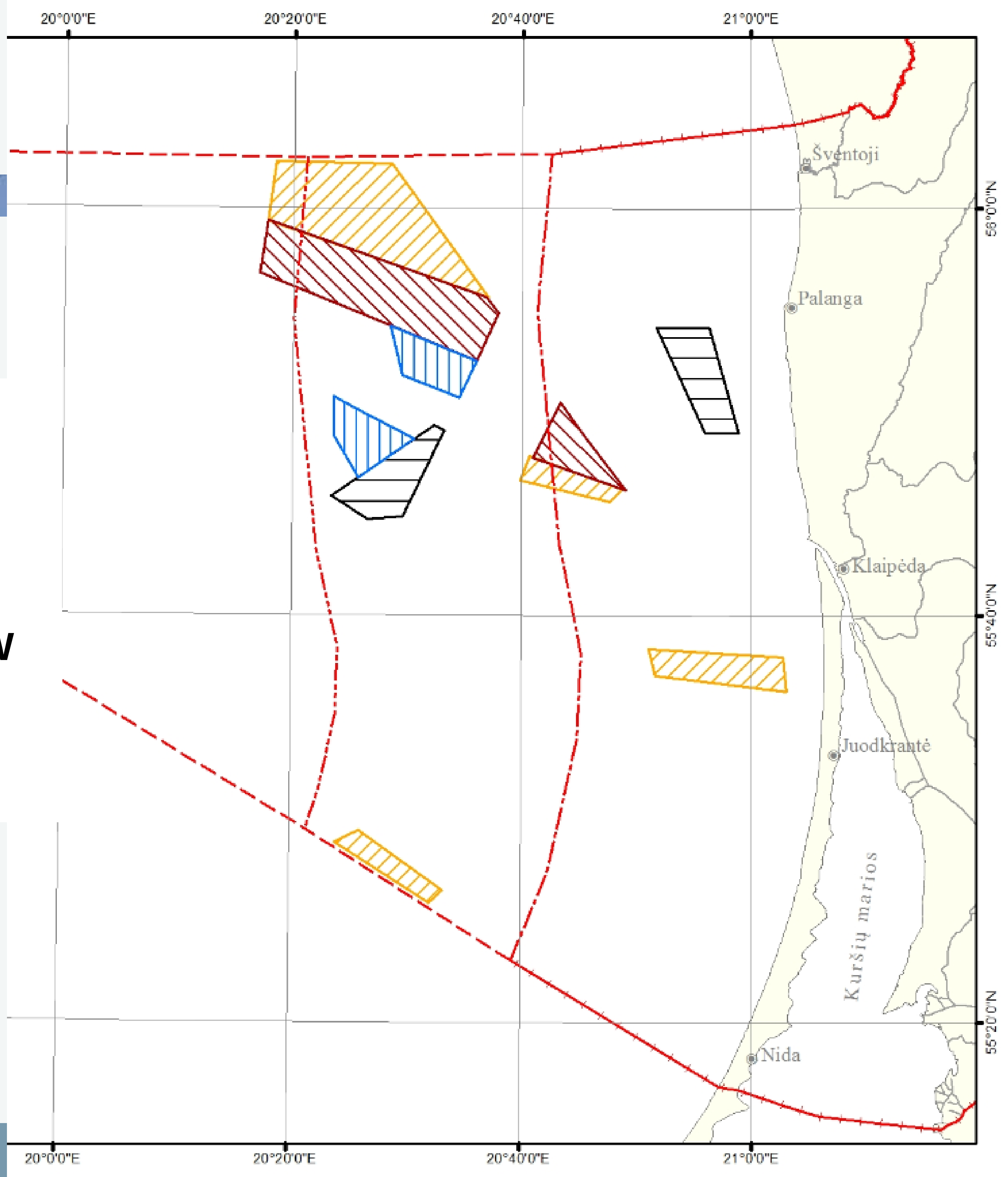
ONGOING PROJECTS:

ONGOING PROJECTS:

4 EIA studies
10 zones

Capacity concerned: 2640 MW



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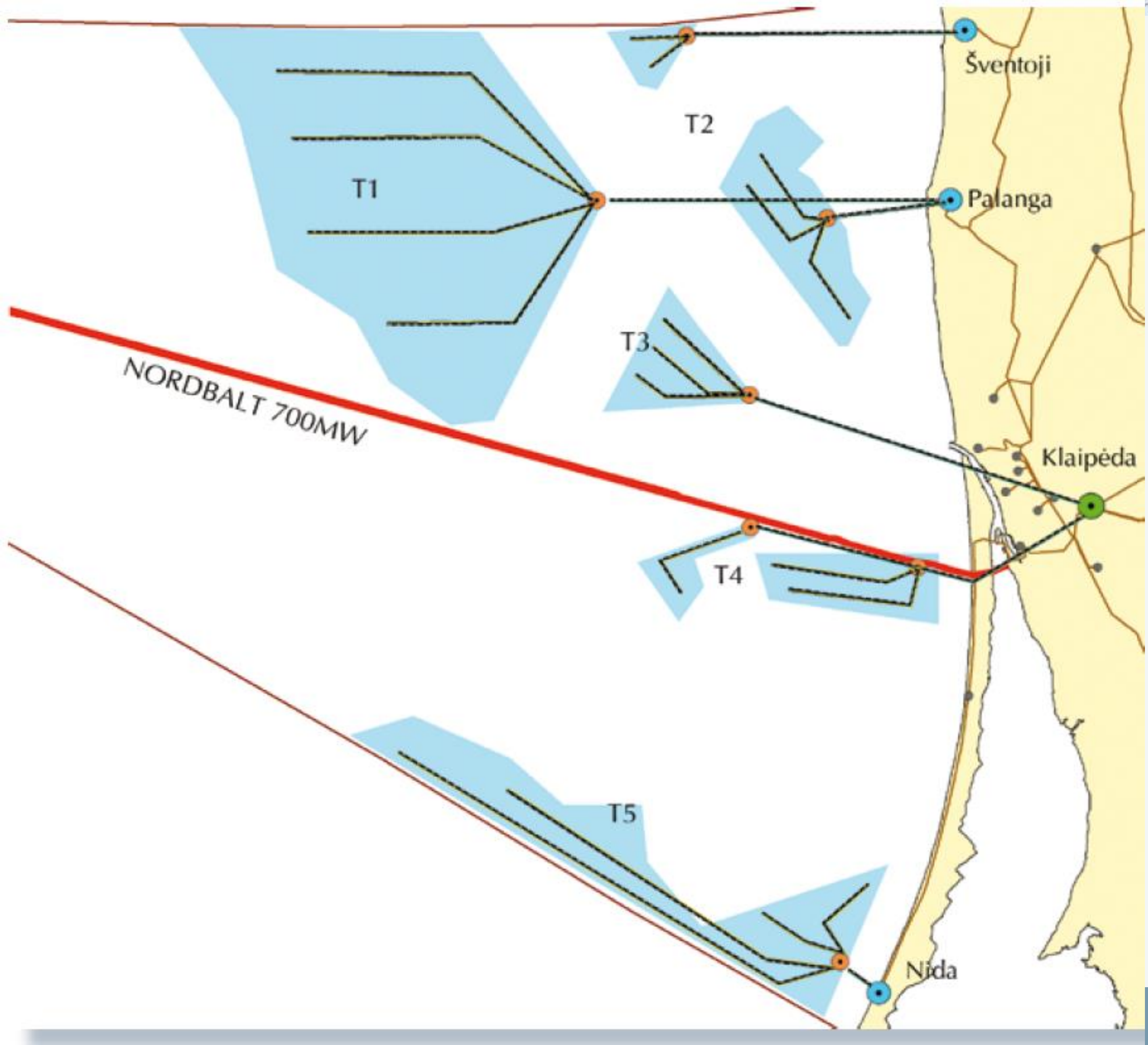
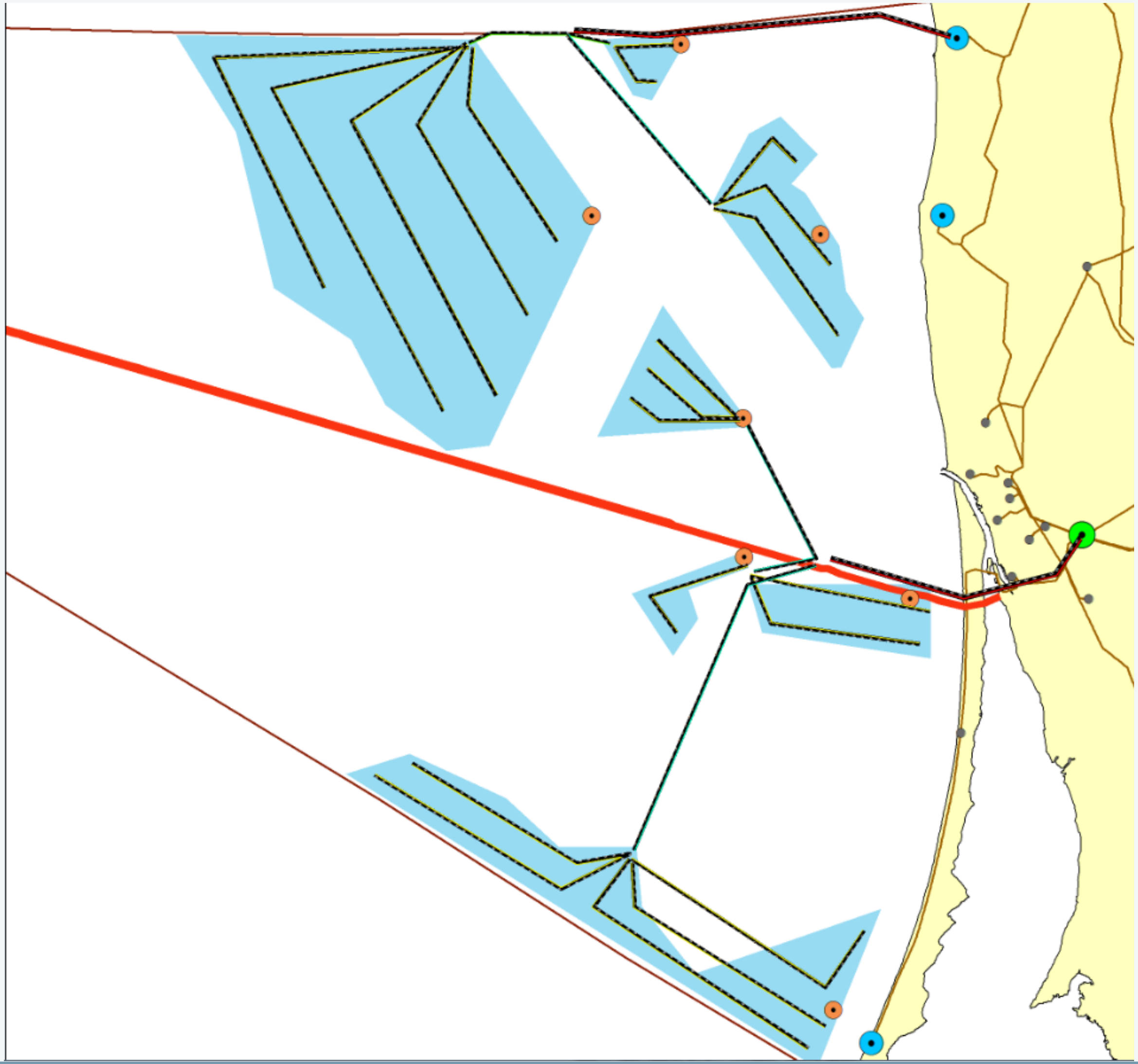
CONNECTION - Disintegrated



CONNECTION - Integrated



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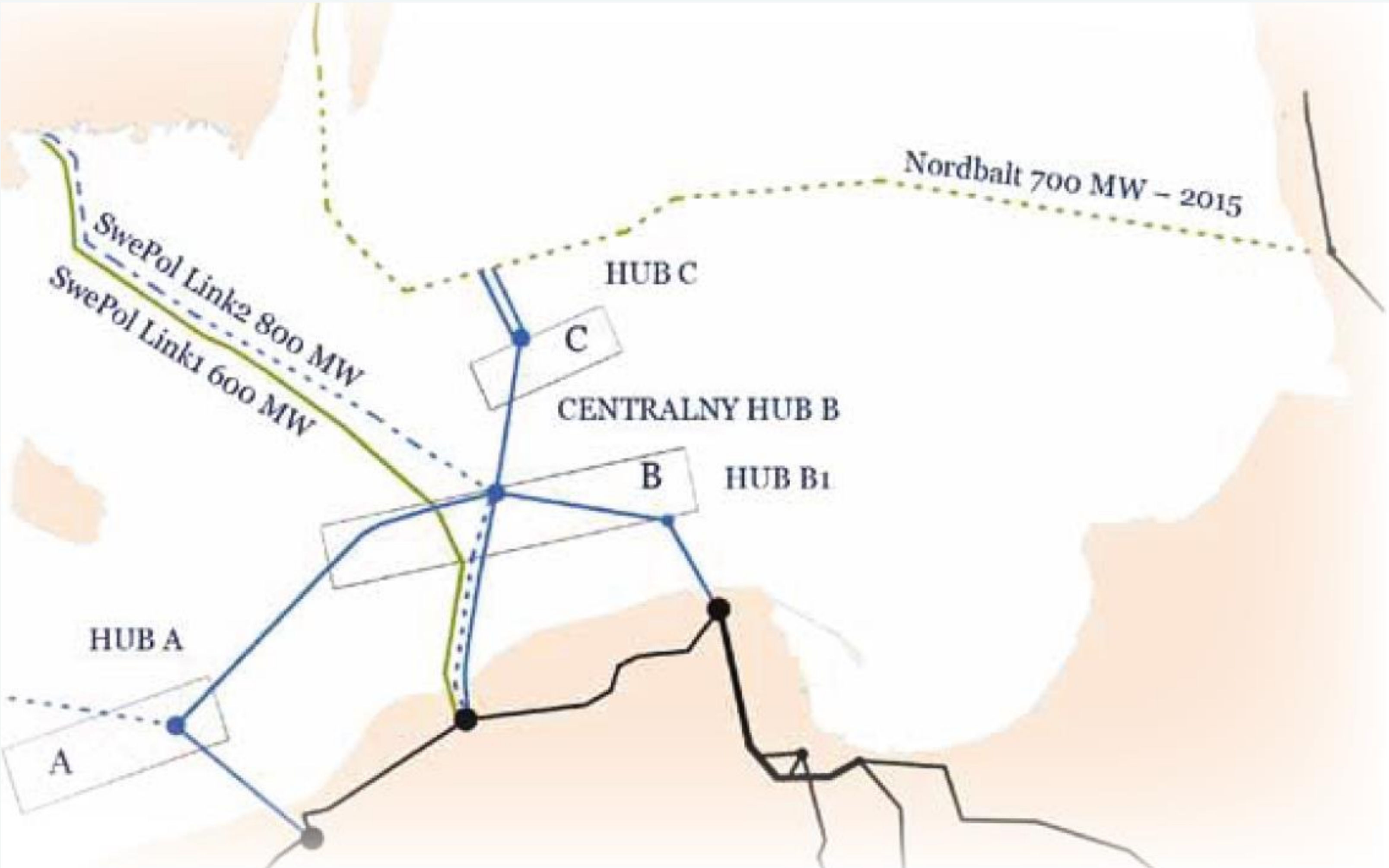
INTEGRATION INTO EXISTING OWE NETWORK



Concept of the Polish Offshore Grid by 2030.

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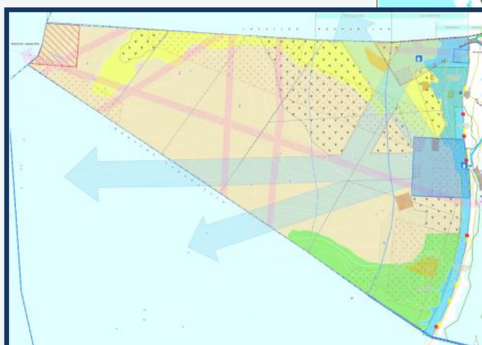
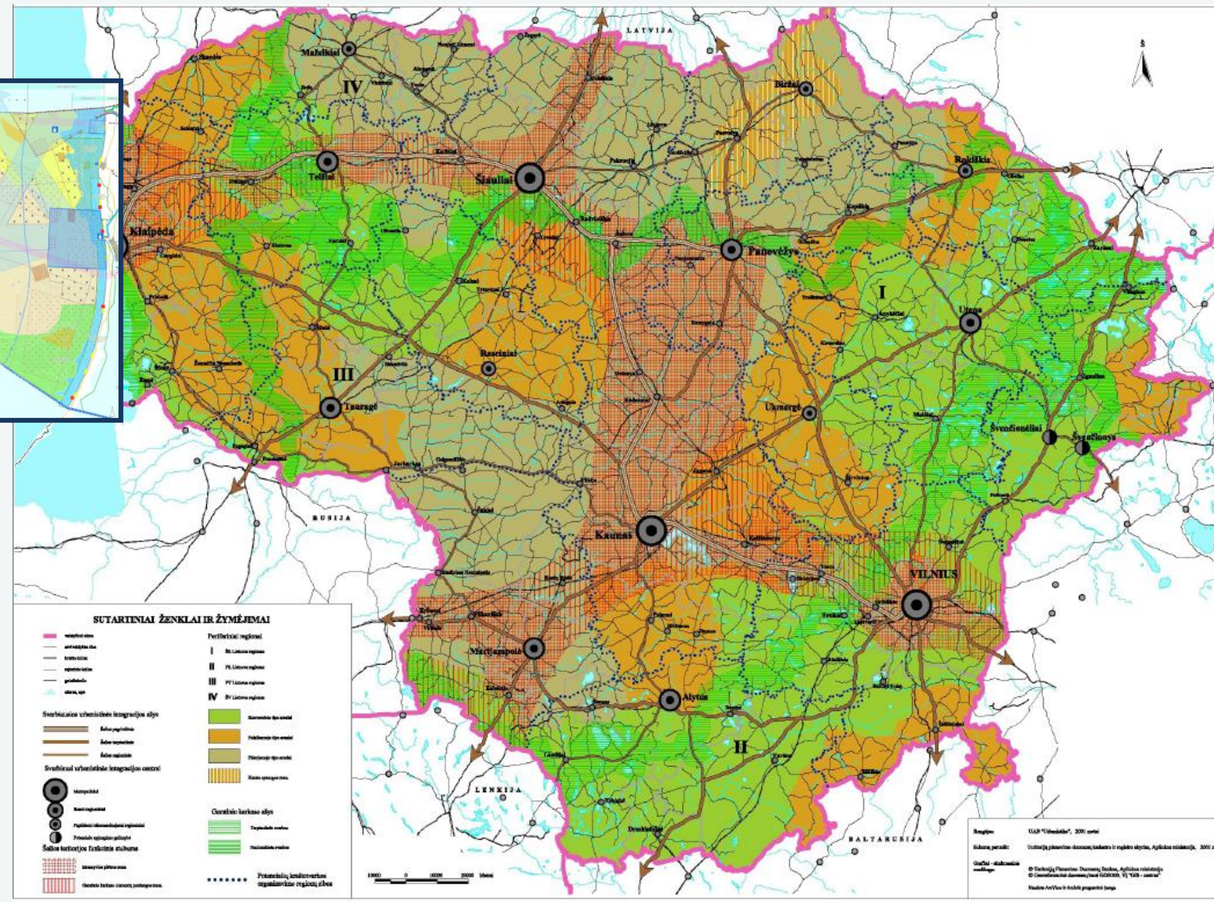
AIM:

To foster the development of the maritime space of Republic of Lithuania





+ ~10% of the area

Territorial (TW) and
exclusive economic zone (EEZ)

OBJECTIVE:

To extend the existing General Plan of Lithuania with marine solutions

TASKS:

Stocktake the existing natural resources and current use and protection

Set the strategic priorities for future use

TOOLS:

Applying MSP principles

Integrating Land and Sea

DRIVING FORCES

Offshore wind
Energy transfer infrastructure
Mineral resources
Port development
Nature/cultural heritage protection
Fishery and recreation
New/emerging uses

MSP principles

Sustainability.
Spatial planning addresses economic prosperity, social well-being and environmental targets at the same time and balances their respective needs.

Pan-Baltic thinking.
Considering the whole Baltic Sea ecosystem and the whole Baltic Sea as a planning space.

Pan-Baltic priorities.
The following cannot be achieved at a national or sub-national level alone:

- a healthy marine environment
- a coherent pan-Baltic energy policy
- safe, clean and efficient maritime transport
- sustainable fisheries

Spatial efficiency:
Uses are concentrated as much as possible to keep other areas free, and co-uses, synergies and multiple spatial use are promoted.

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SCOPE & PROCESS

- **Stocktaking of existing uses and strategic priorities**
- **Mapping of natural/cultural assets & natural resources**
- **Identification of future trends and demand for marine space**
- **Preparation of the Concept for spatial distribution of maritime activities**
- **Creating the conditions for Ecological Balance**
- **Reserve areas for strategic national needs**
- **Prioritizing and Regulation of use and developments at the sea**

CONSULTATION

PARTICIPATION

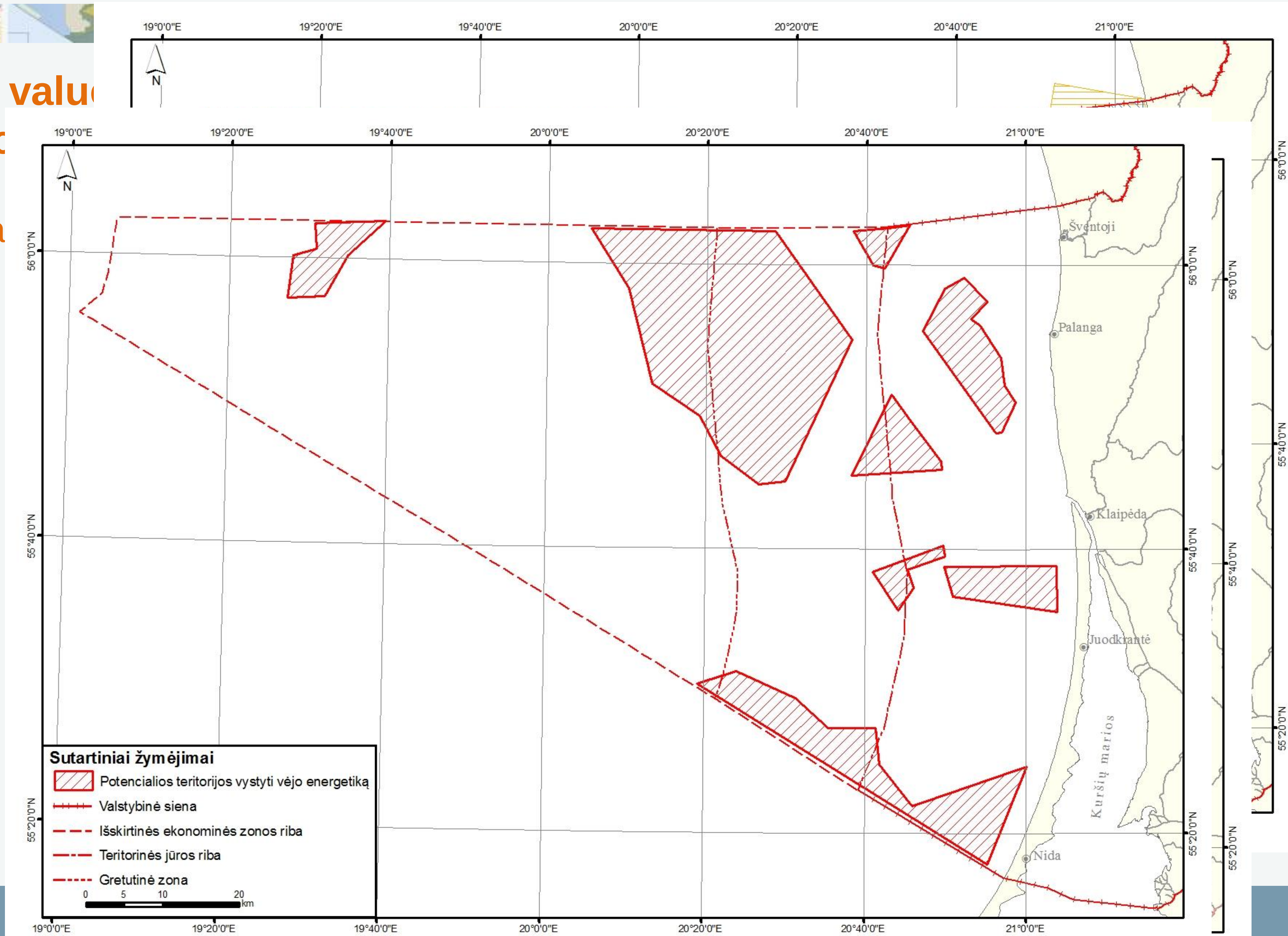
STOCKTAKING PRINCIPLES

Natural valu
identific

Biologica

Mineral

Energy



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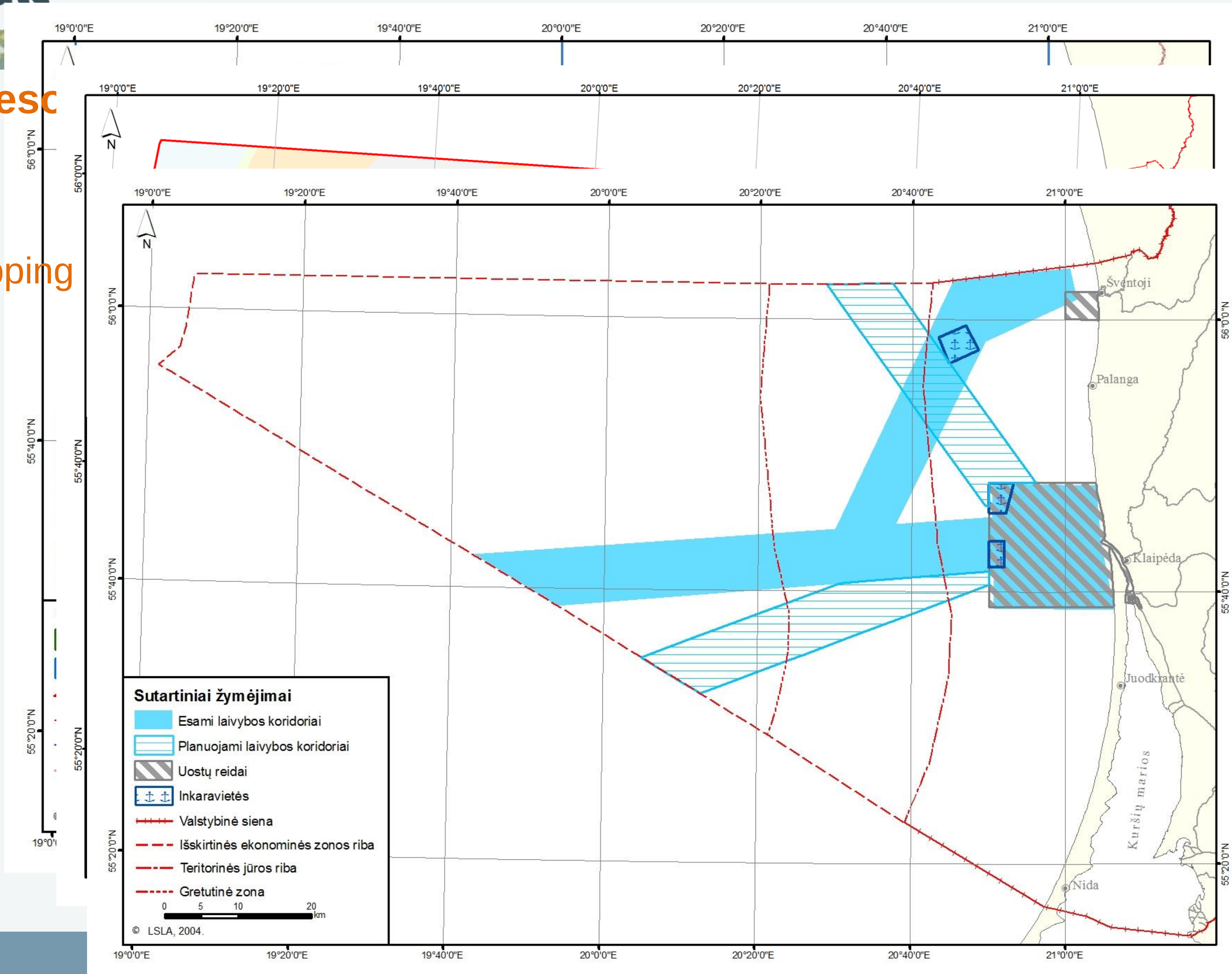
STOCKTAKING PRINCIPLES

Use of the reso

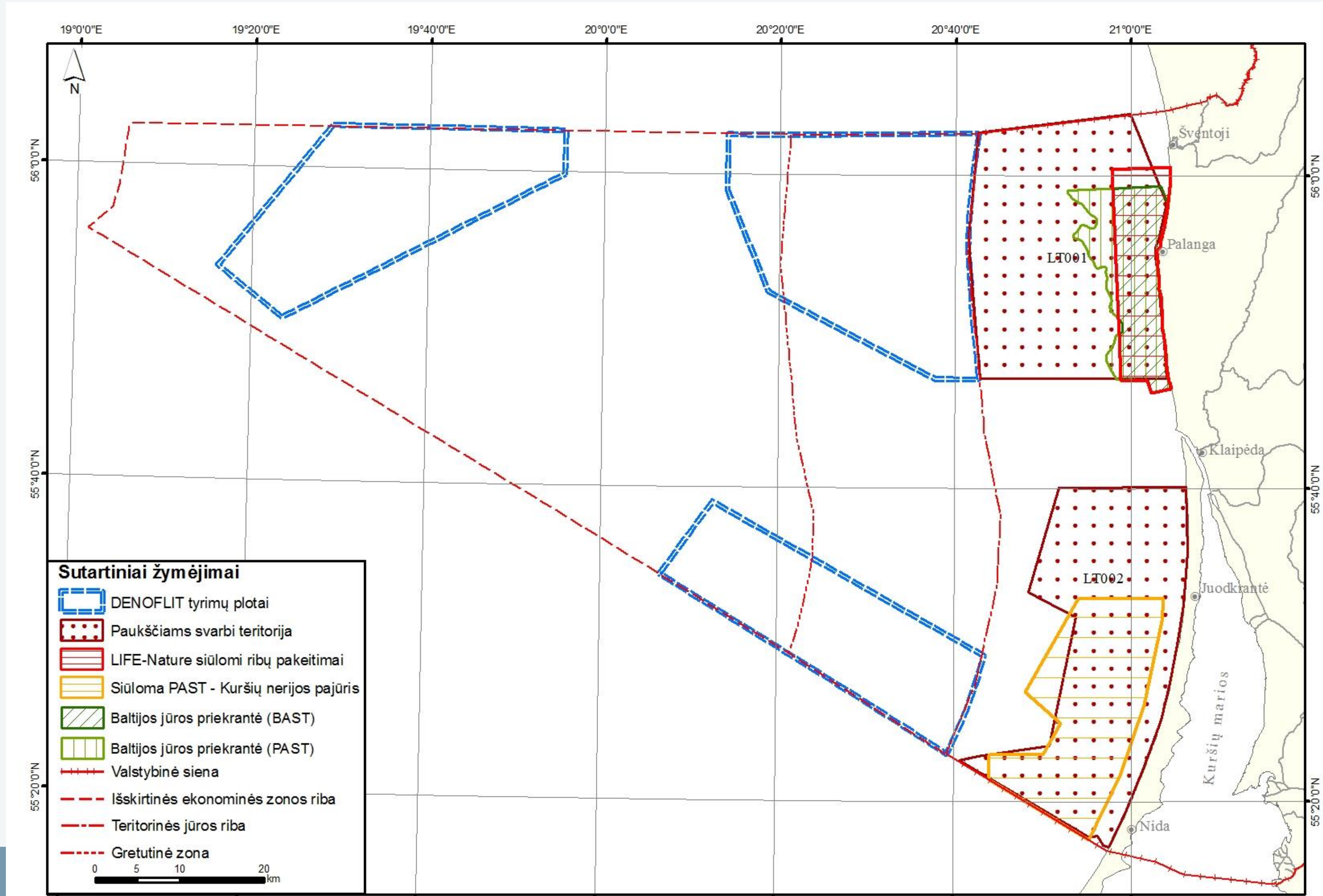
Fishing

Ports and shipping

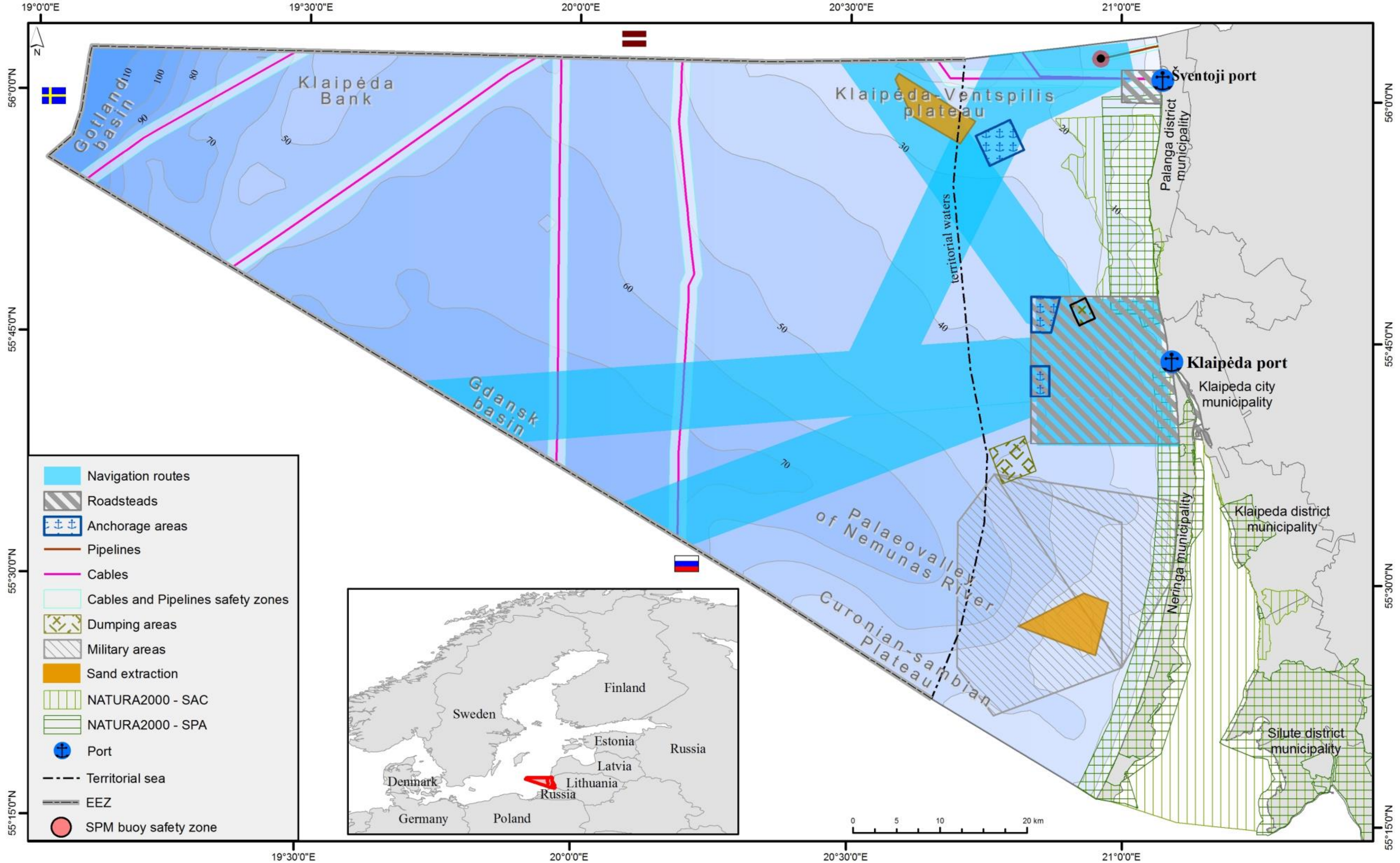


STOCKTAKING PRINCIPLES

Protection and research:



Stocktaking:



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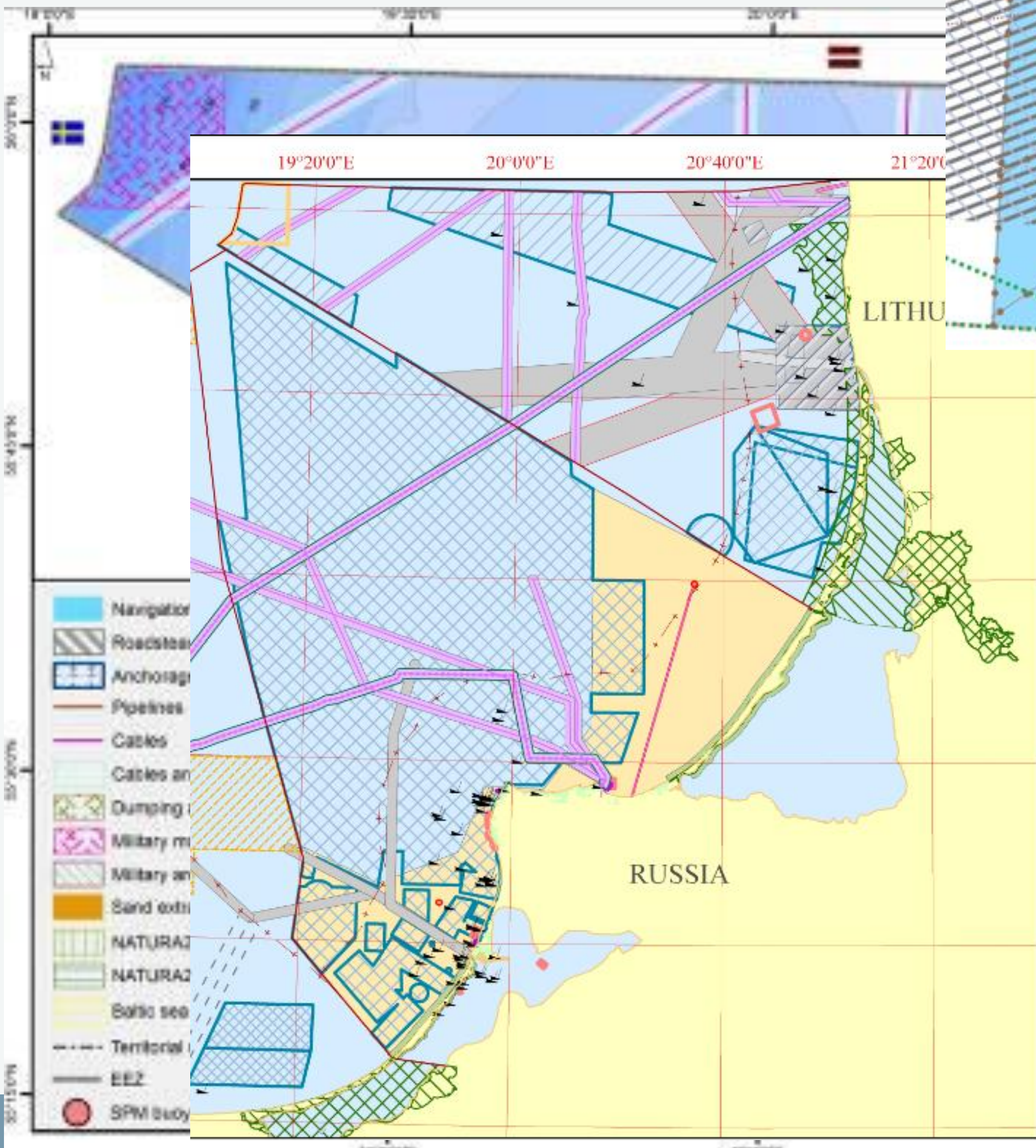
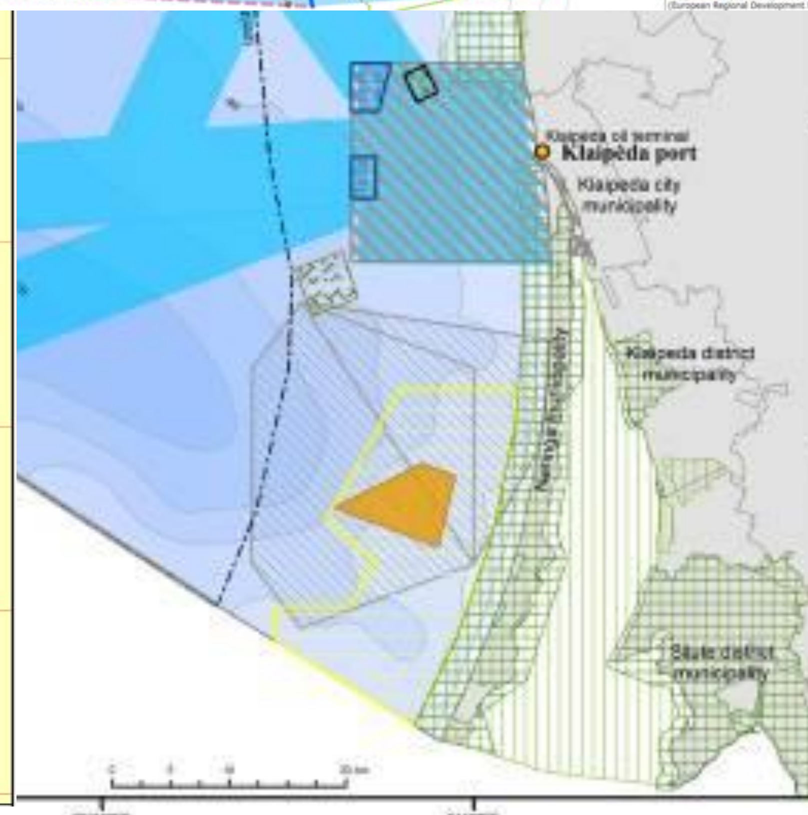
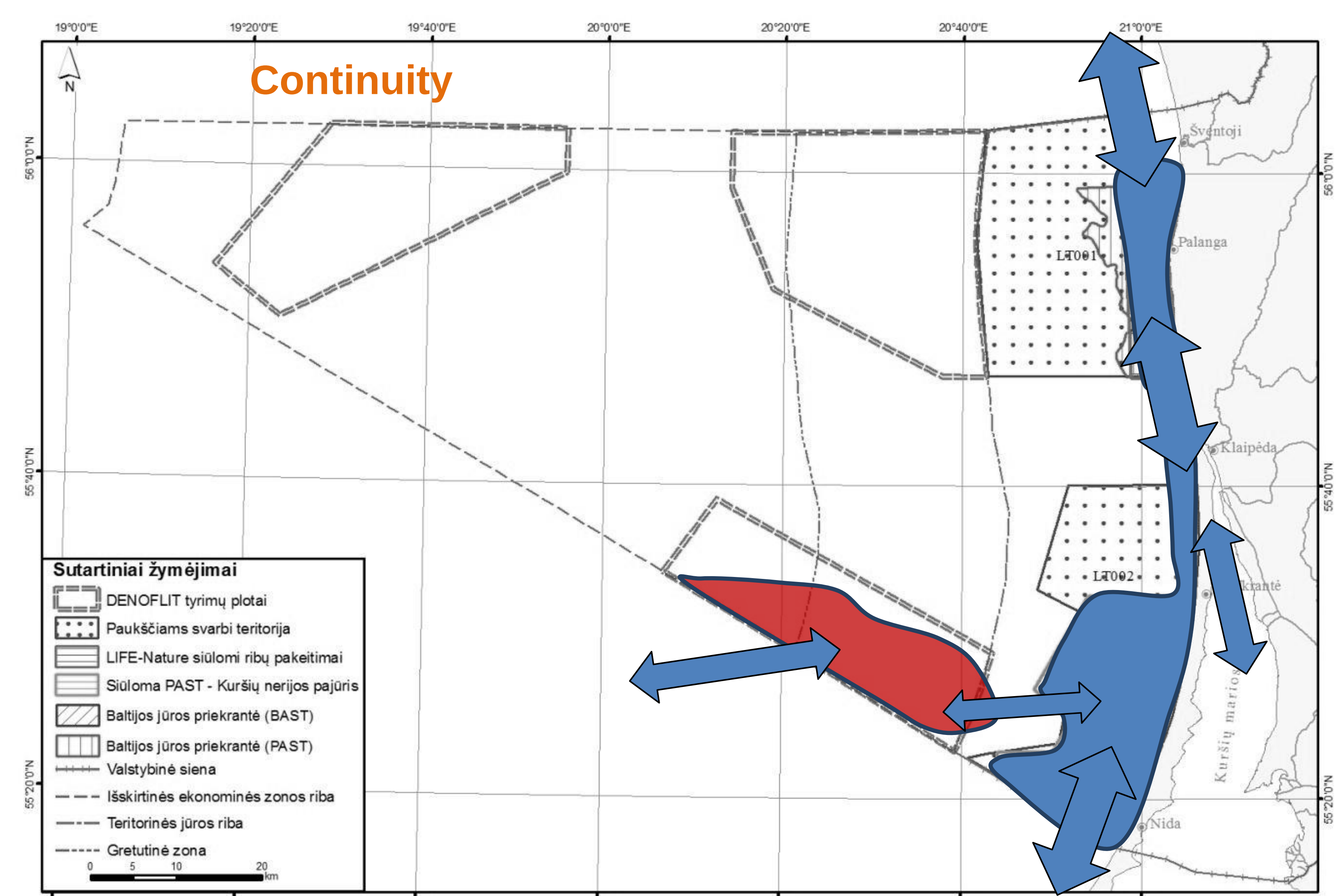


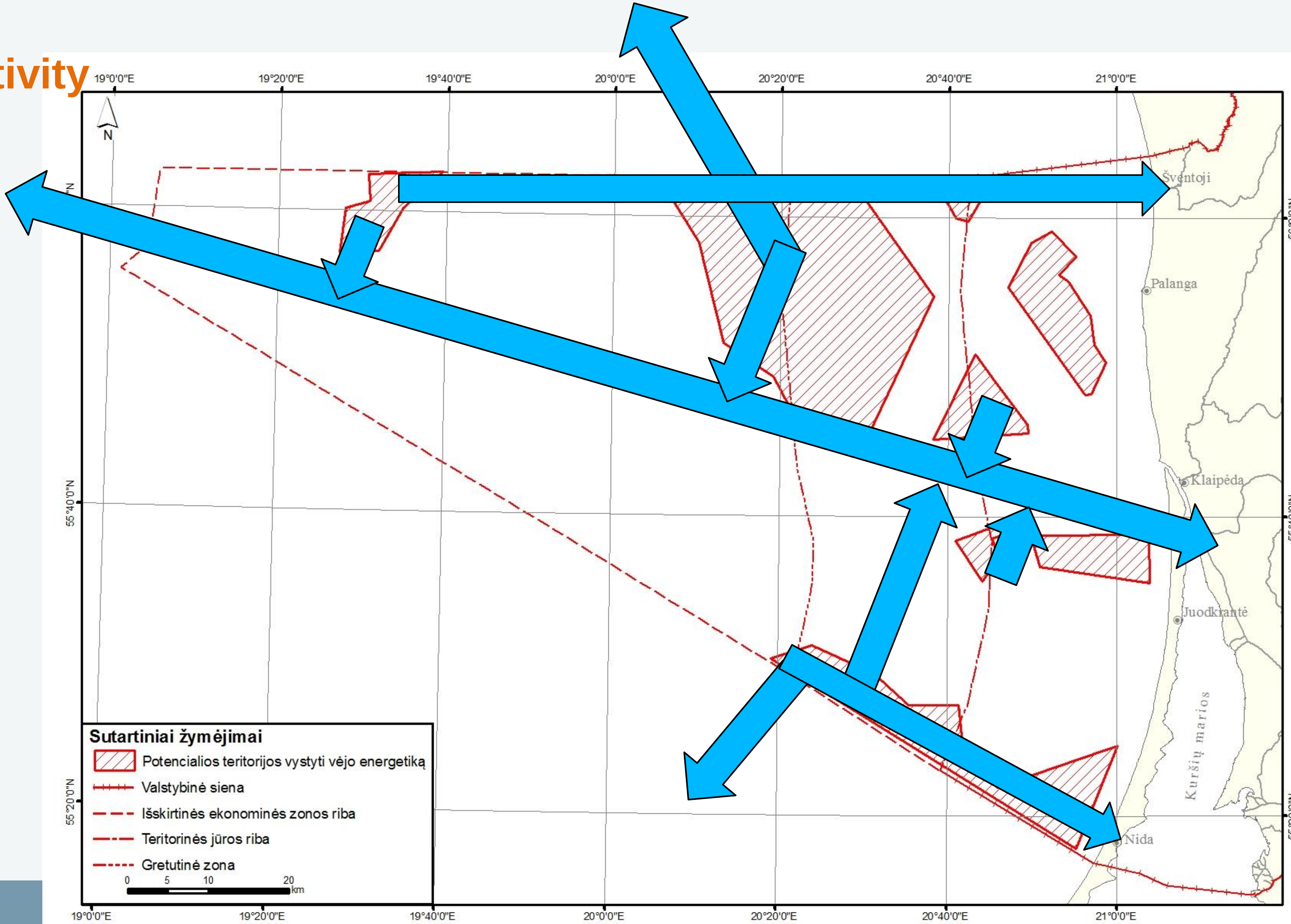


PLANNING PRINCIPLES



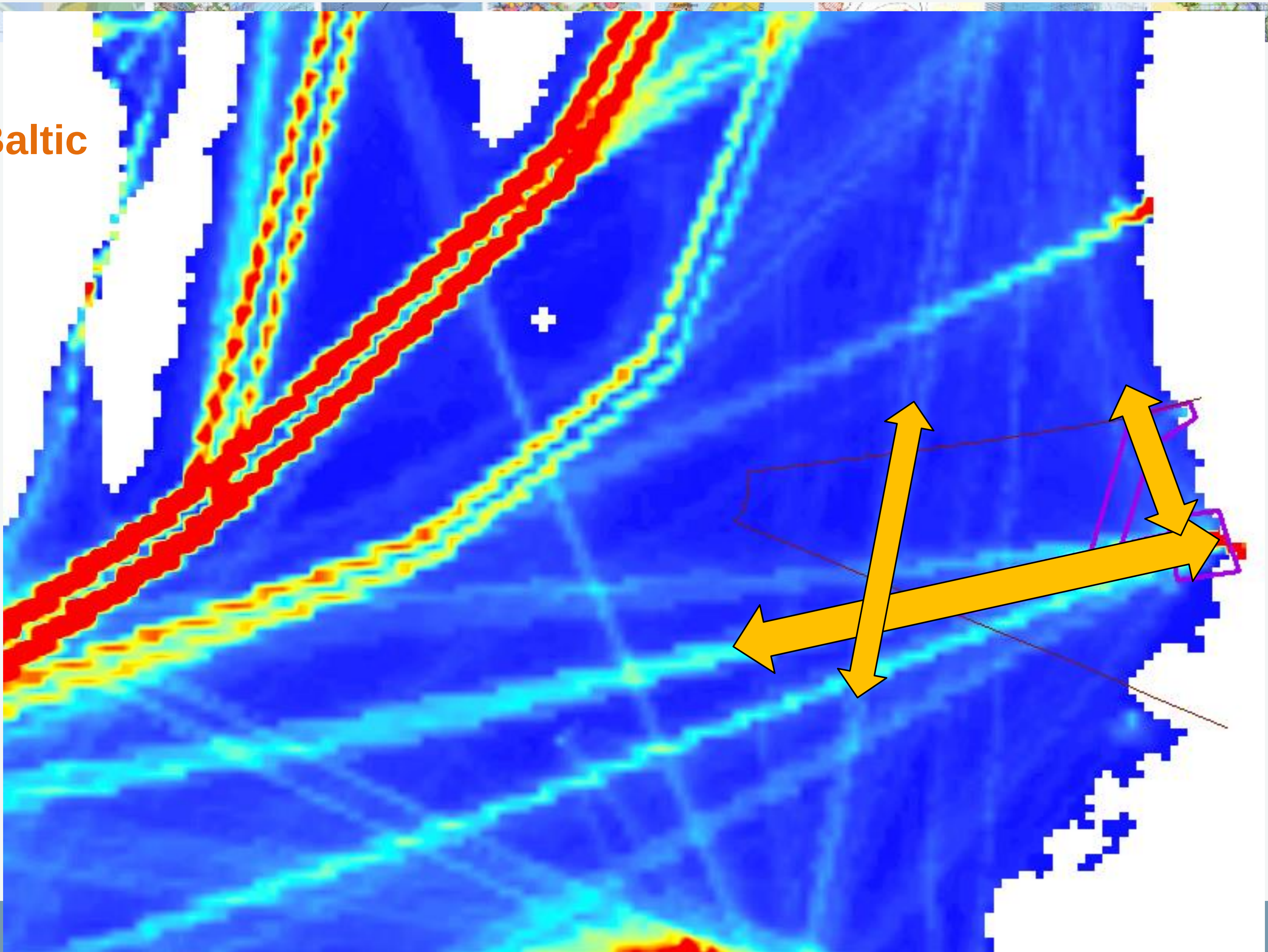
PLANNING PRINCIPLES

Connectivity



PLANNING PRINCIPLES

TransBaltic



Stocktaking:


BaltSeaPlan

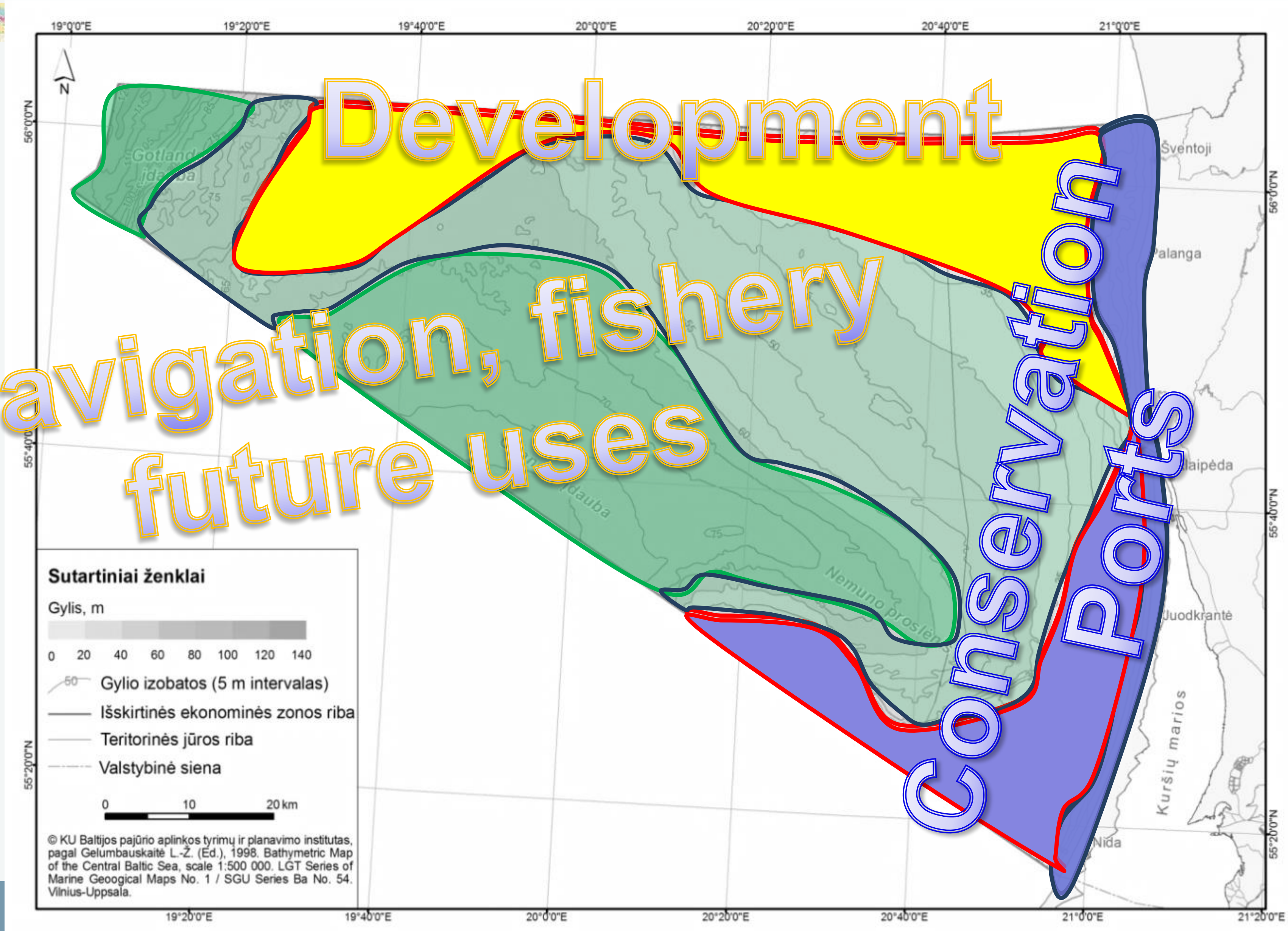
BaltSeaPlan Report 4

National and regional strategies with relevance for Lithuanian maritime space

Authors: Nerijus Blažauskas[1], Sergej Suzdalev[1] and Saulius Gulbinskas[1]

[1] Klaipėda University Coastal Research and Planning Institute (CORPI), Lithuania

Concept:


Development
Navigation, fishery
future uses
Conservation
Ports
N
Šventoji
Palanga
Klaipėda
Juodkrantė
Nida
Kuršių marios
Nemuno proslėn
Sutartiniai ženklai
Gylis, m
0 20 40 60 80 100 120 140
Gylio izobatos (5 m intervalas)
Išskirtinės ekonominės zonos riba
Teritorinės jūros riba
Valstybinė siena
0 10 20 km
© KU Baltijos pajūrio aplinkos tyrimų ir planavimo institutas, pagal Gelumbauskaitė L.-Ž. (Ed.), 1998. Bathymetric Map of the Central Baltic Sea, scale 1:500 000. LGT Series of Marine Geoogical Maps No. 1 / SGU Series Ba No. 54. Vilnius-Uppsala.
19°0'0"E
19°20'0"E
19°40'0"E
20°0'0"E
20°20'0"E
20°40'0"E
21°0'0"E
21°20'0"E
56°0'0"N
55°40'0"N
55°20'0"N

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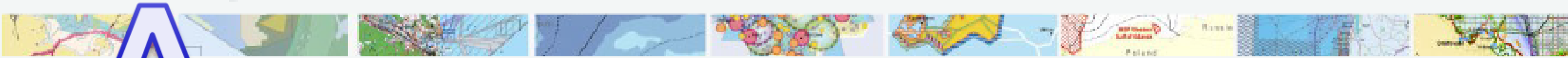
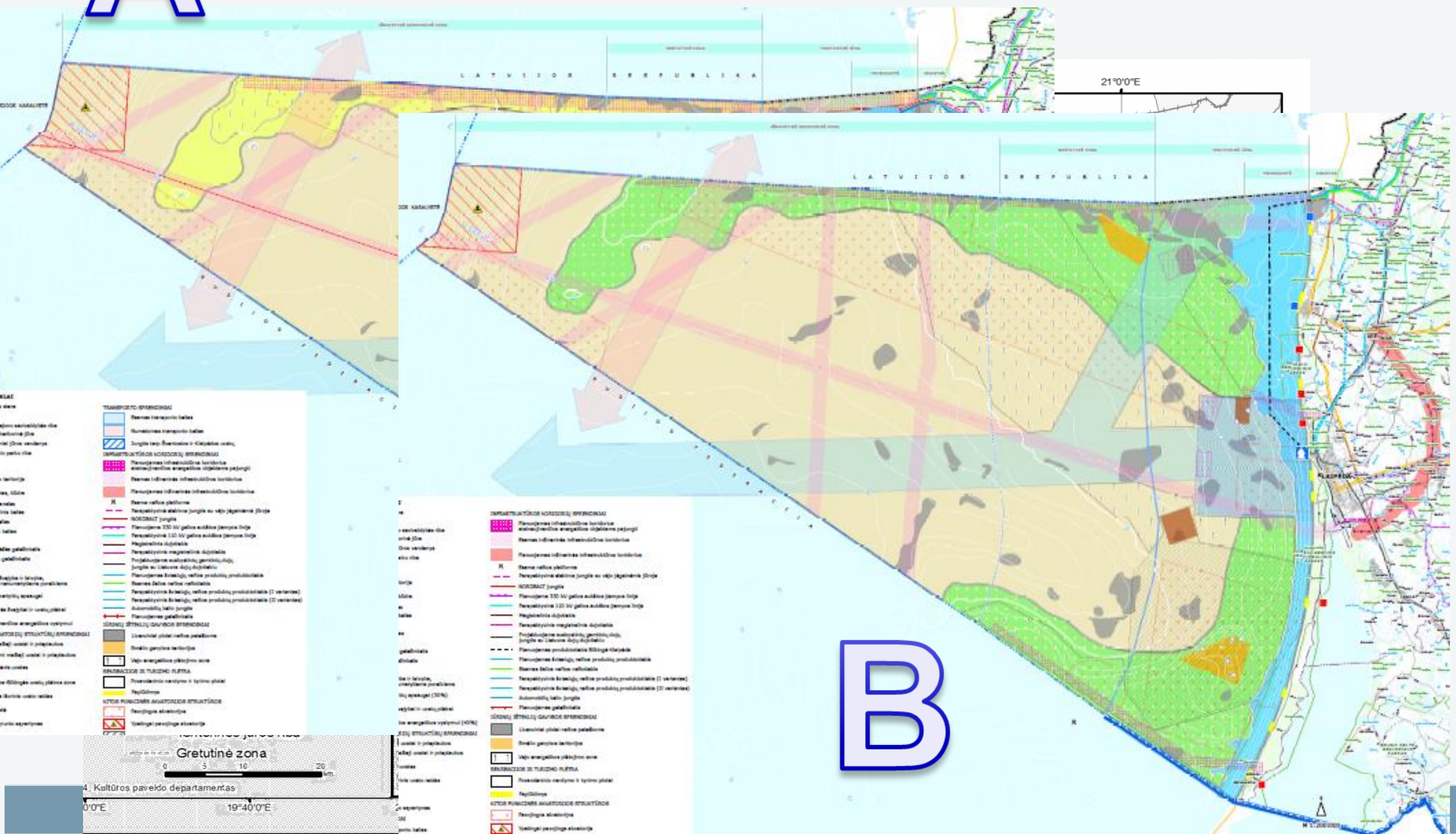
Concept: versions A and B





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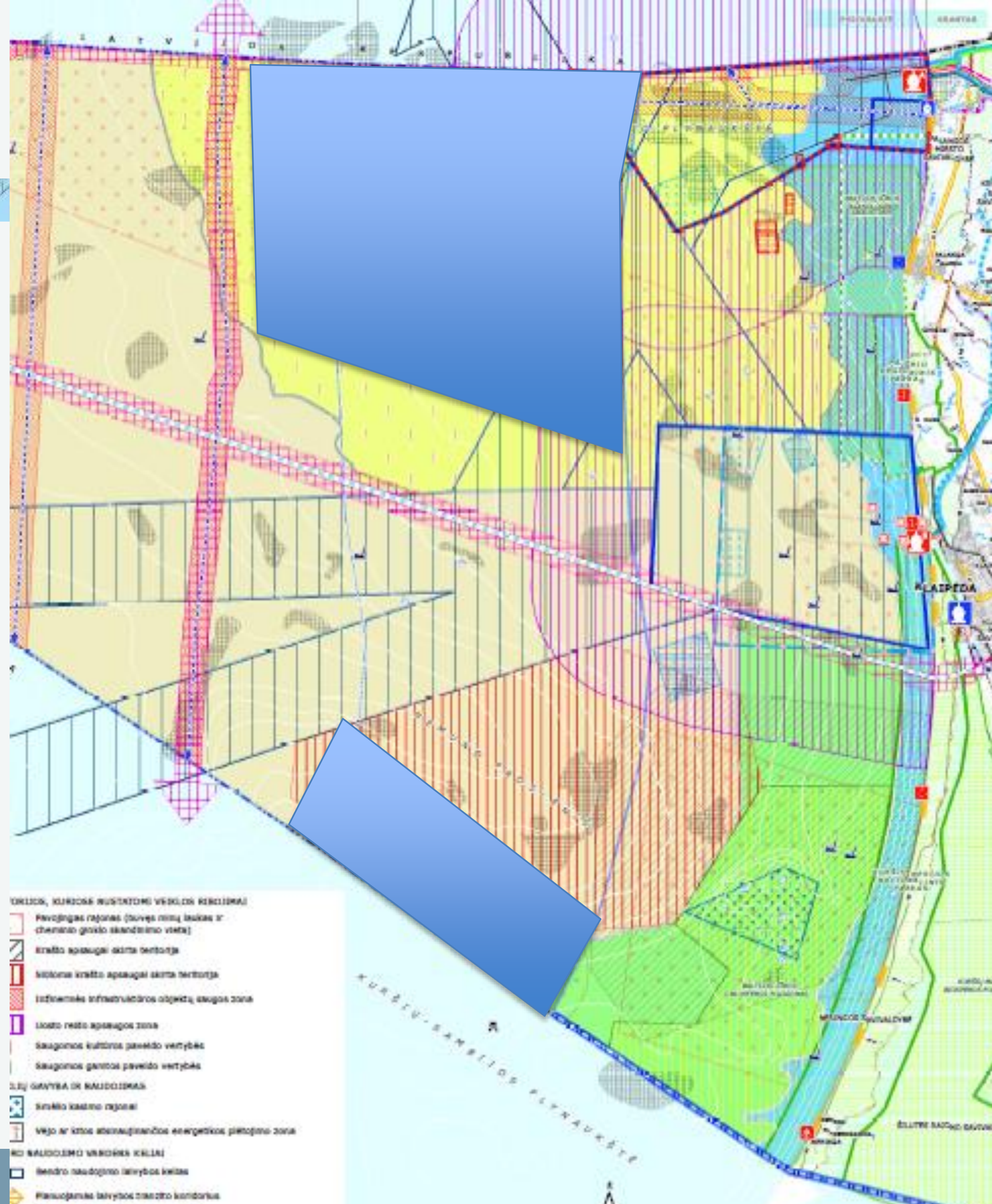
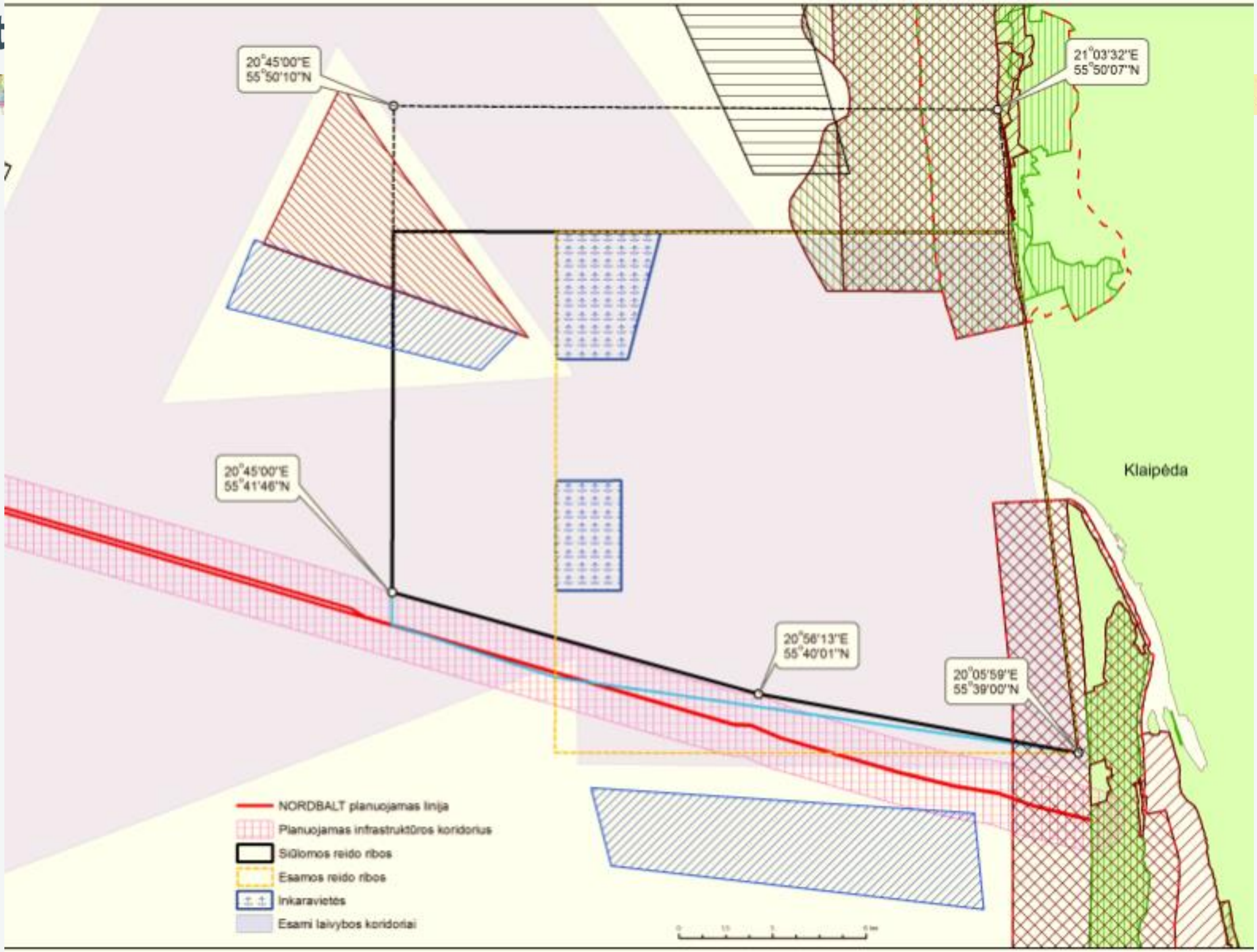

KLAIPĖDA


20°45'00"E
55°50'10"N
21°03'32"E
55°50'07"N
20°45'00"E
55°41'46"N
20°56'13"E
55°40'01"N
20°05'59"E
55°39'00"N
Klaipėda
NORDBALT planuojamas linija
Planuojamas infrastruktūros koridorius
Siūlomos reido ribos
Esamos reido ribos
Inkaravietės
Esami laivybos koridoriai

Concept SEA:

COCEPT solution		Assessment of the alternative	Proposed corrections after SEA
Alternative A	Alternative B		
Infrastructure development			
To use existing infrastructure lines as corridors for other cables and power lines development in future.		Use of existing corridors allows to minimize the impact and limitations for other activities. Development of OWE in Baltic sea region requires the common integrated grid development in order to connect the parks..	To use existing/known cable lines as corridors for other/future/planned cables and power lines development. Foresee corridors for integrated Baltic Sea Region electricity grid.
Exploration and exploitation of natural resources			
Marine area of EEZ and TW is divided into zones for oil exploration and exploitation after the all necessary procedures for deposit exploration, resource evaluation and EIA are in place. Other mineral resources, including sand and gravel, needed for port and other developments can be used when all necessary procedures for deposit exploration, resource evaluation and EIA are in place. Mineral resource exploitation is not allowed in the nearshore.		There is no economic evaluation of the potential oil resource. Exploitation would have an impact to all environmental components and is subject of EIA study. Exploration of the resource is important strategically	Oil exploration, oil and other mineral resource exploitation is allowed in EEZ and TW except nearshore zone after the all necessary procedures for deposit exploration, resource evaluation and EIA are in place.
Energy generated from renewable sources transmission is carried out through established infrastructure corridors.		The connection of the OWE parks through established infrastructure corridors minimizes the impact but need to be adopted to the needs of each particular park.	Energy generated from renewable sources transmission should be preferably carried out through established infrastructure corridors. Other cabling lines can be developed taking into account marine use and nature protection requirements.
Sand form existing marine sources can be used for the coastal protection purposes only.		Marine sand is the only suitable resource for beach replenishment and is important for good status of the coast.	Sand form existing marine sources can be used for the coastal protection purposes only.
OWE priority zone is Klaipeda Ventspils plateau and Klaipeda Bank at the depths of 20-50 m. Except nature protection, navigation corridors, roadsteads, dumping and sand extraction zones. Developments should follow the EIA procedure.	OWE developments are allowed in depths of 20-50 m. Except nature protection, navigation corridors, roadsteads, dumping and sand extraction zones. Developments should follow the EIA procedure.	The main possible impact is to the biodiversity, landscape, cultural heritage. OWE developments in southern part of EEZ could have the impact on Curronian spit.	OWE priority zone is north part – Klaipeda-Ventspils plateau and Klaipeda Bank at the water depths of 20-50 m..

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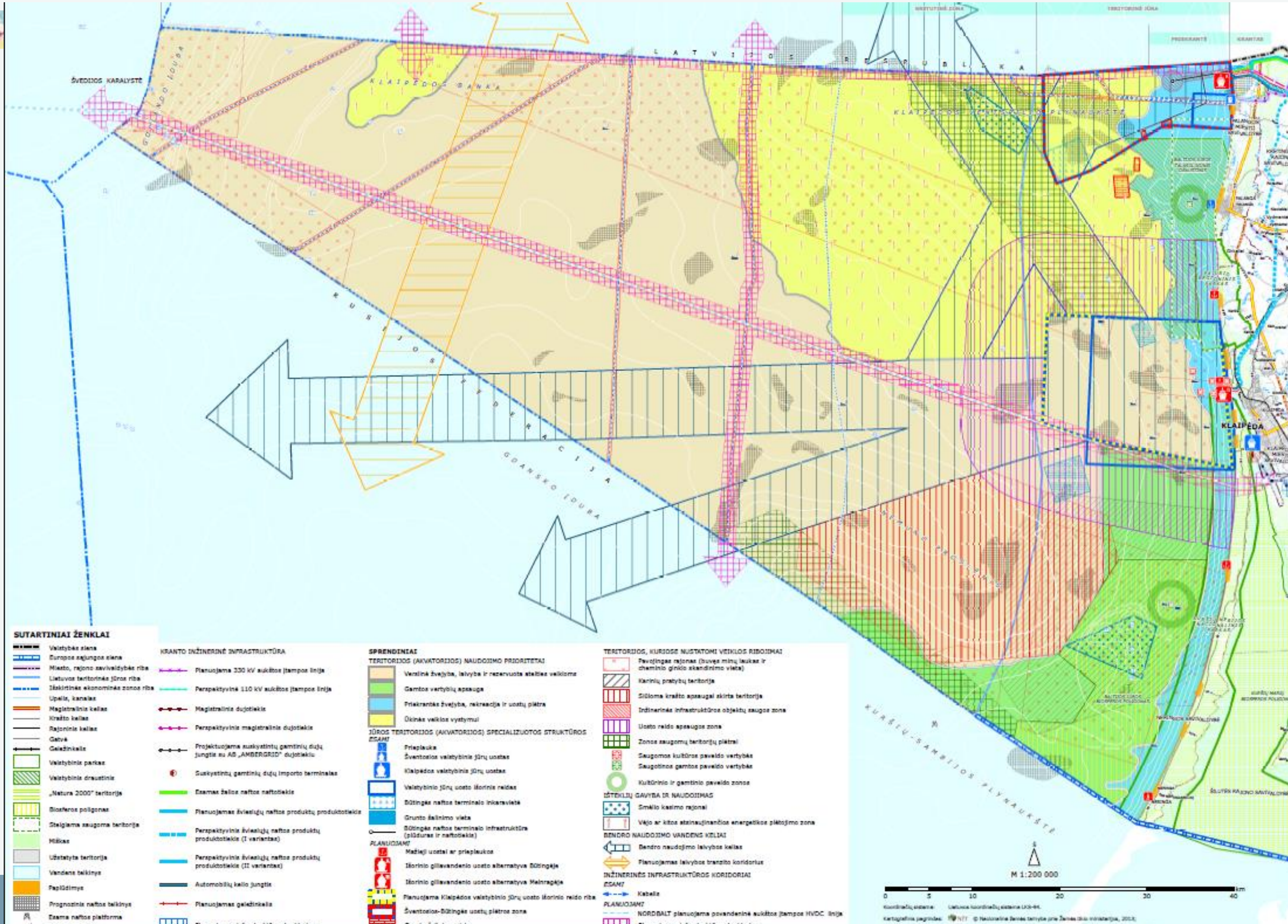
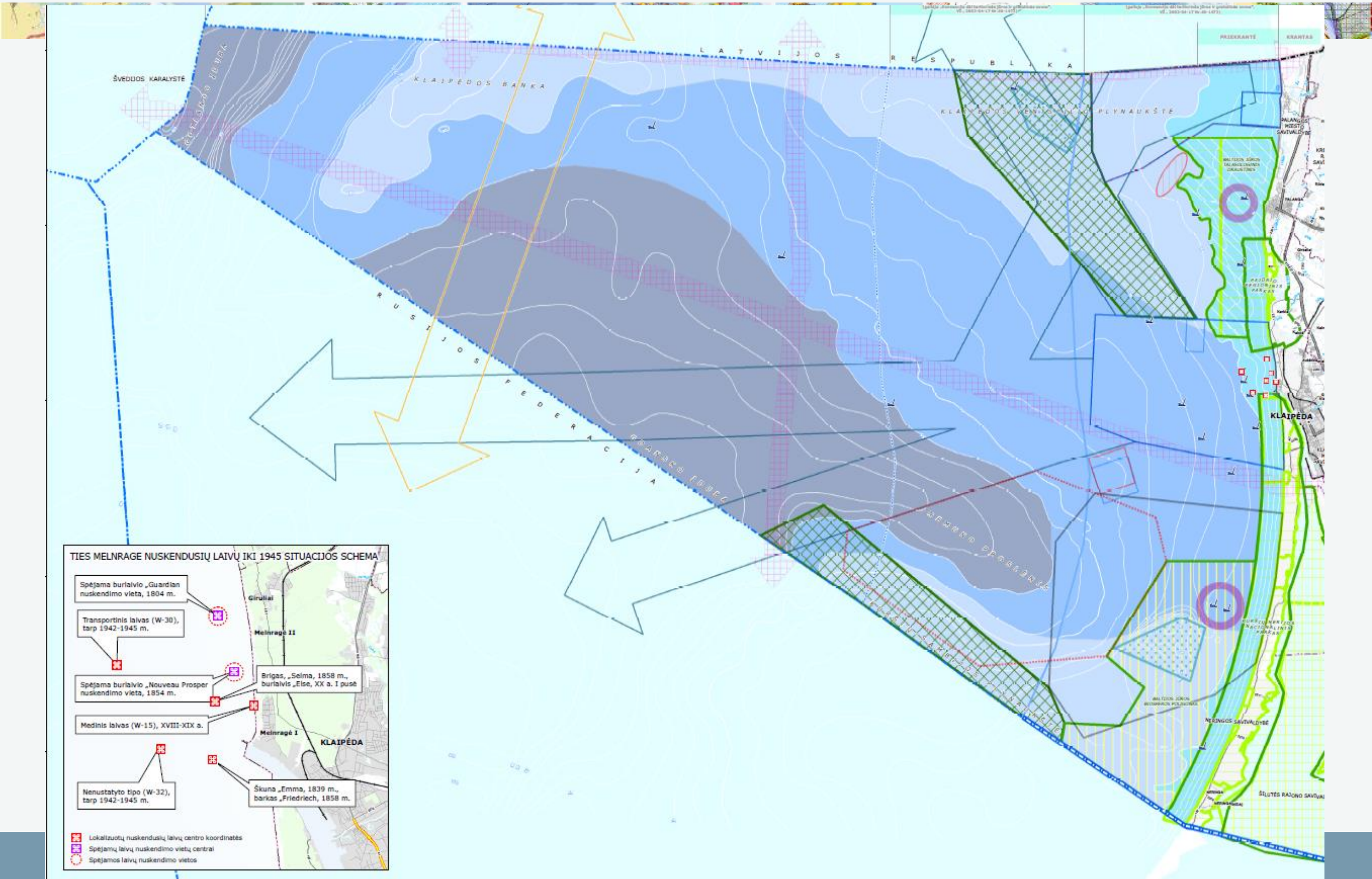
Common Spatial Concept:



Ecological balance:



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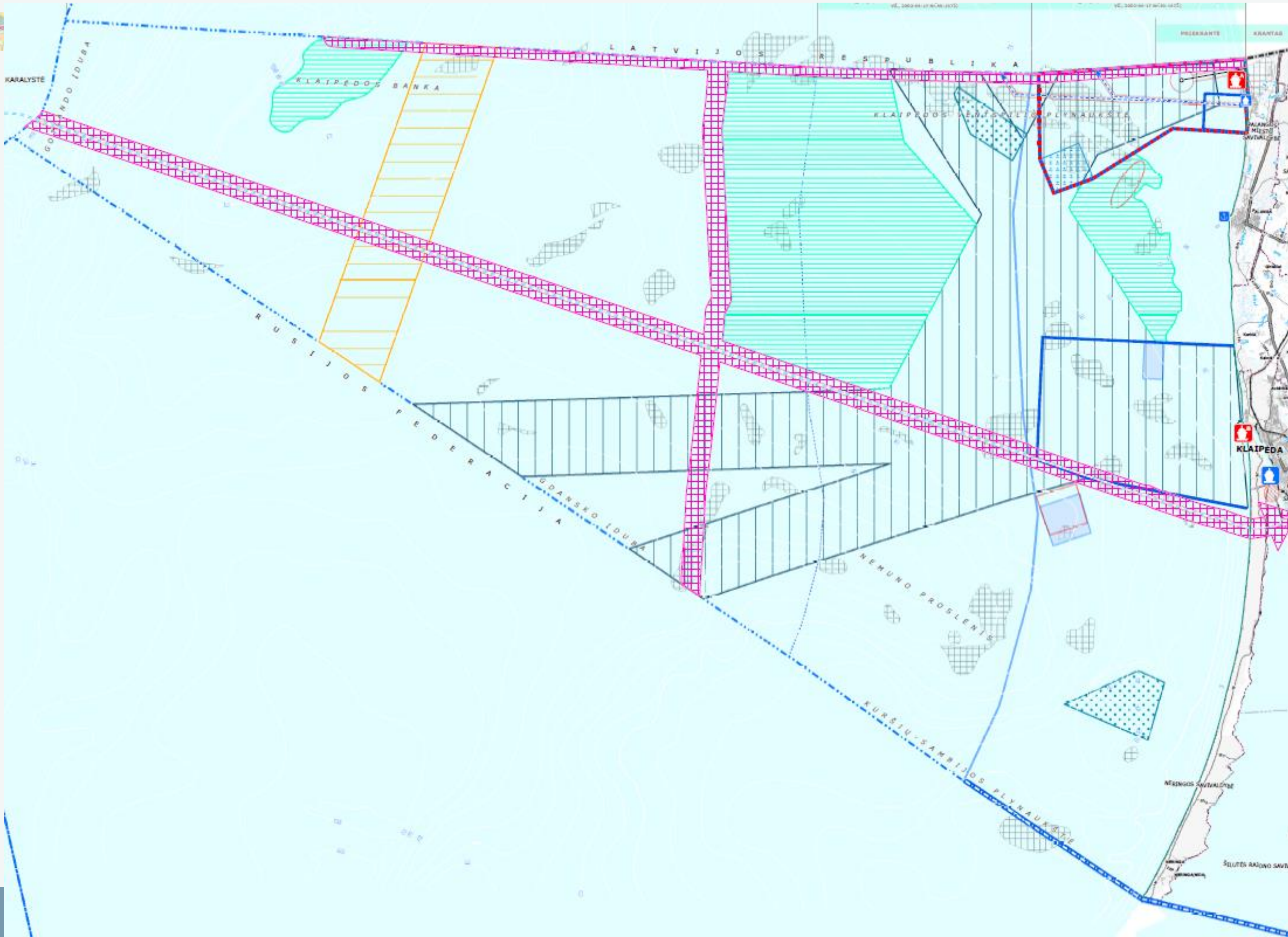
Reservation:



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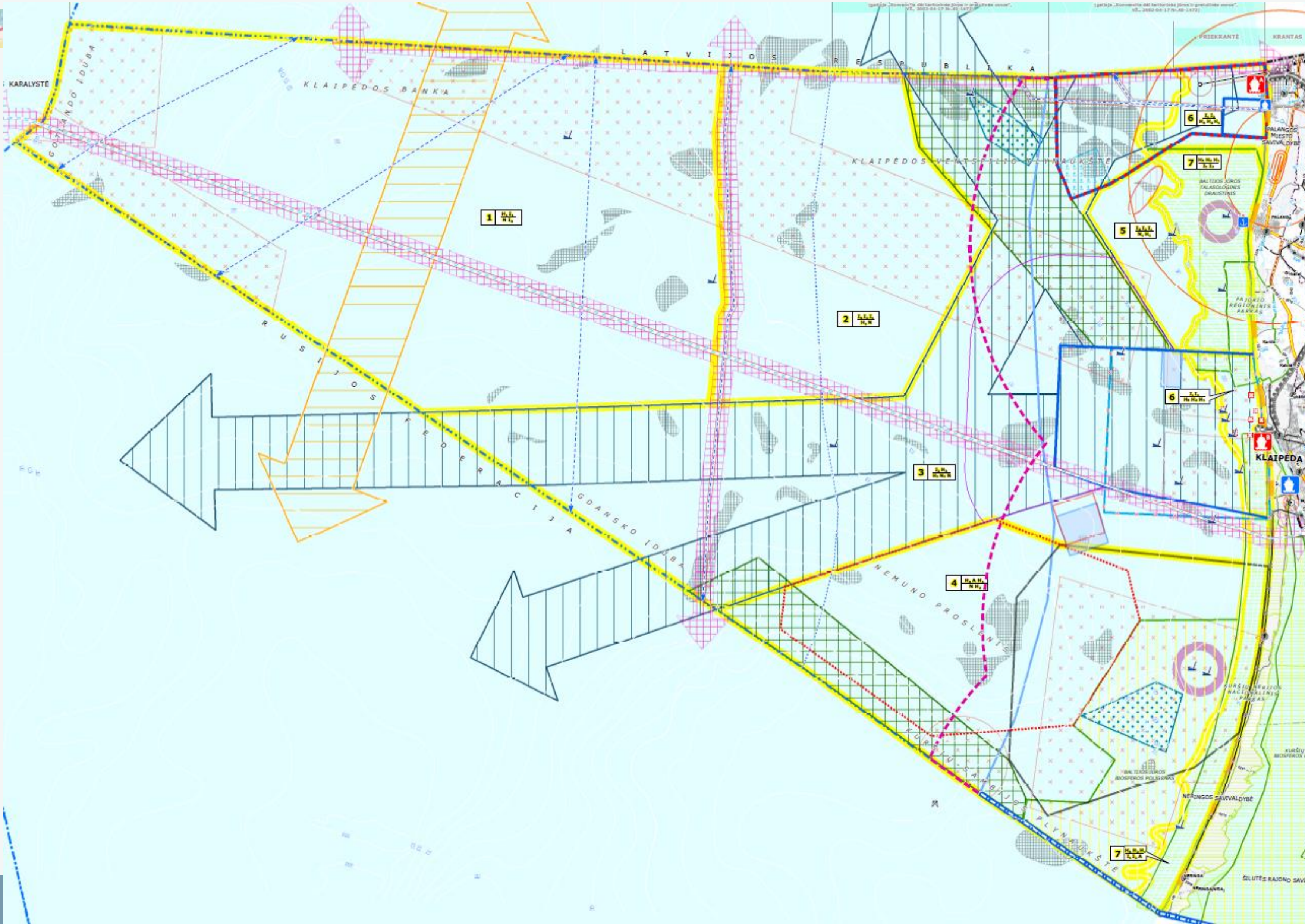
Developments:



PRIORITIES FOR AREA USE

Limit of the priority area

1	A / B

Index for regulations of use

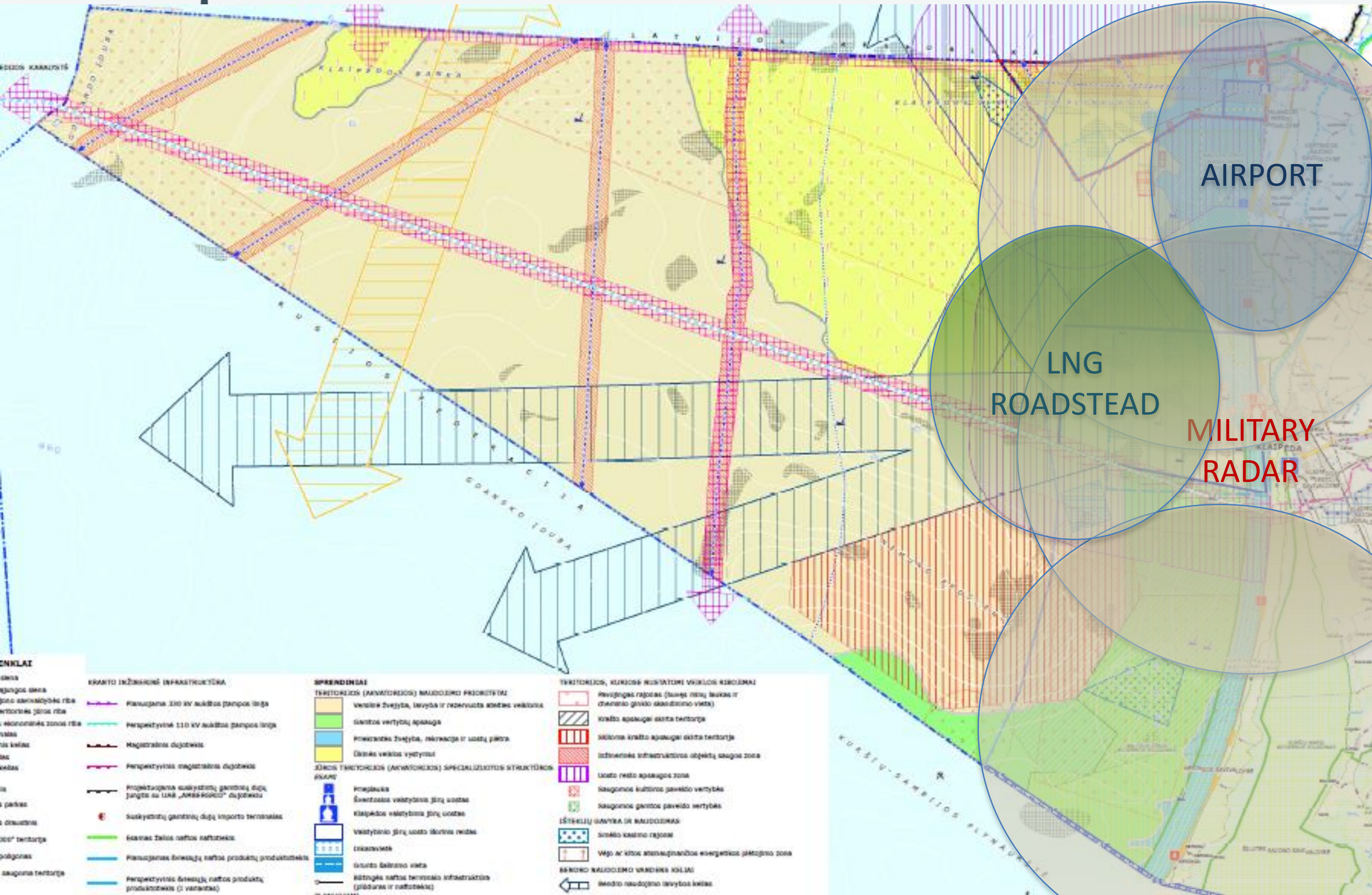
Number of zone	**First priority group** / **Second priority group**

Areas for water economy
H_1 – economics
H_2 – recreation
H_3 – ecosystem conservations

Other activities
I_1 – exploitation and development of communication and infrastructure objects
I_2 – communication and infrastructure corridors
I_3 – use of renewable energy resource
N – exploration of mineral resources
N_1 – dumping
A – national defence

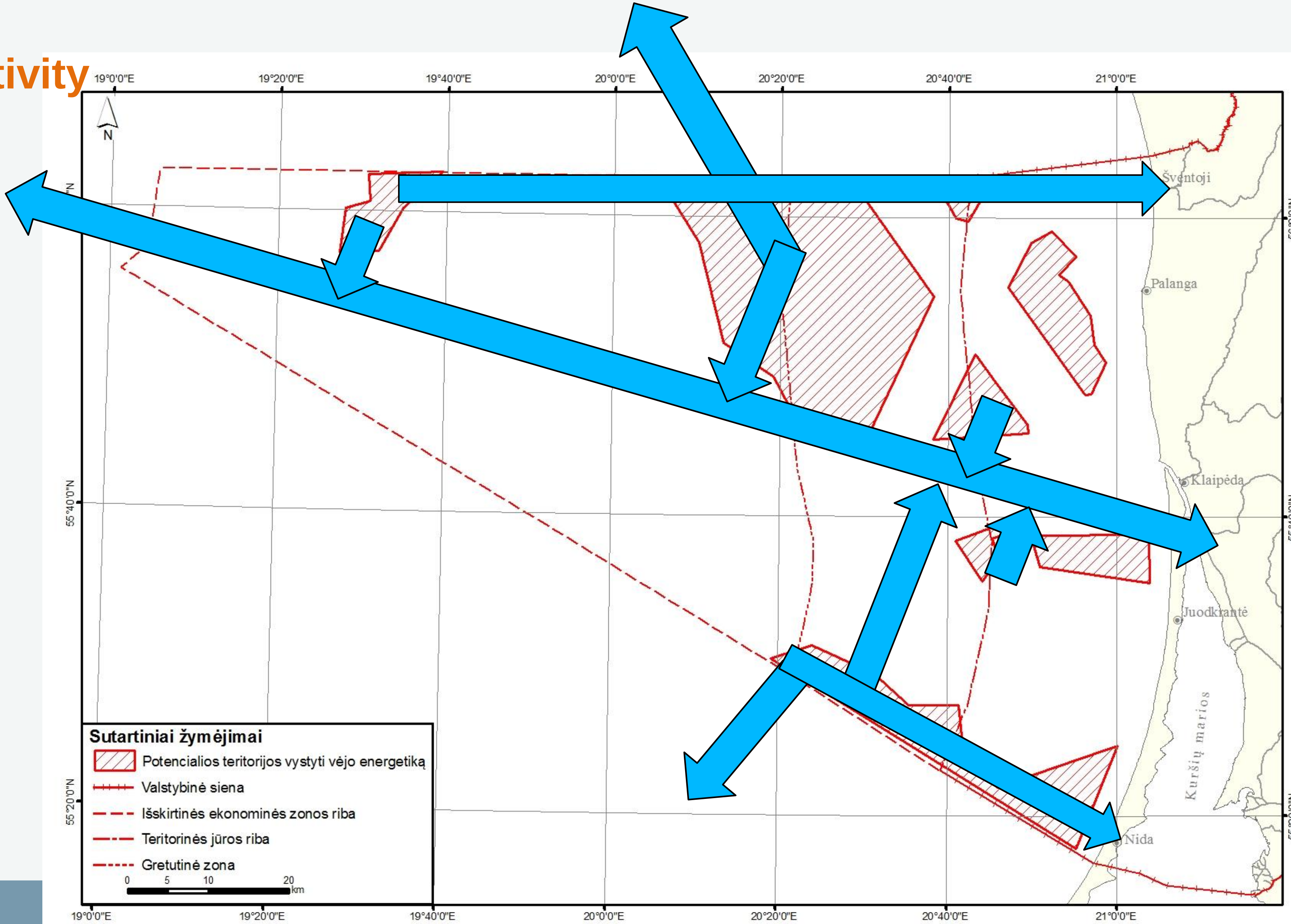
Functional regions
1 – decentralized development
2 – use of renewable energy resource
3 – shipping
4 – military training & ecosystem conservation
5 – mixed purpose
6 – port development
7 – protection of coastal ecosystem

LIMITATIONS



PLANNING PRINCIPLES

Connectivity



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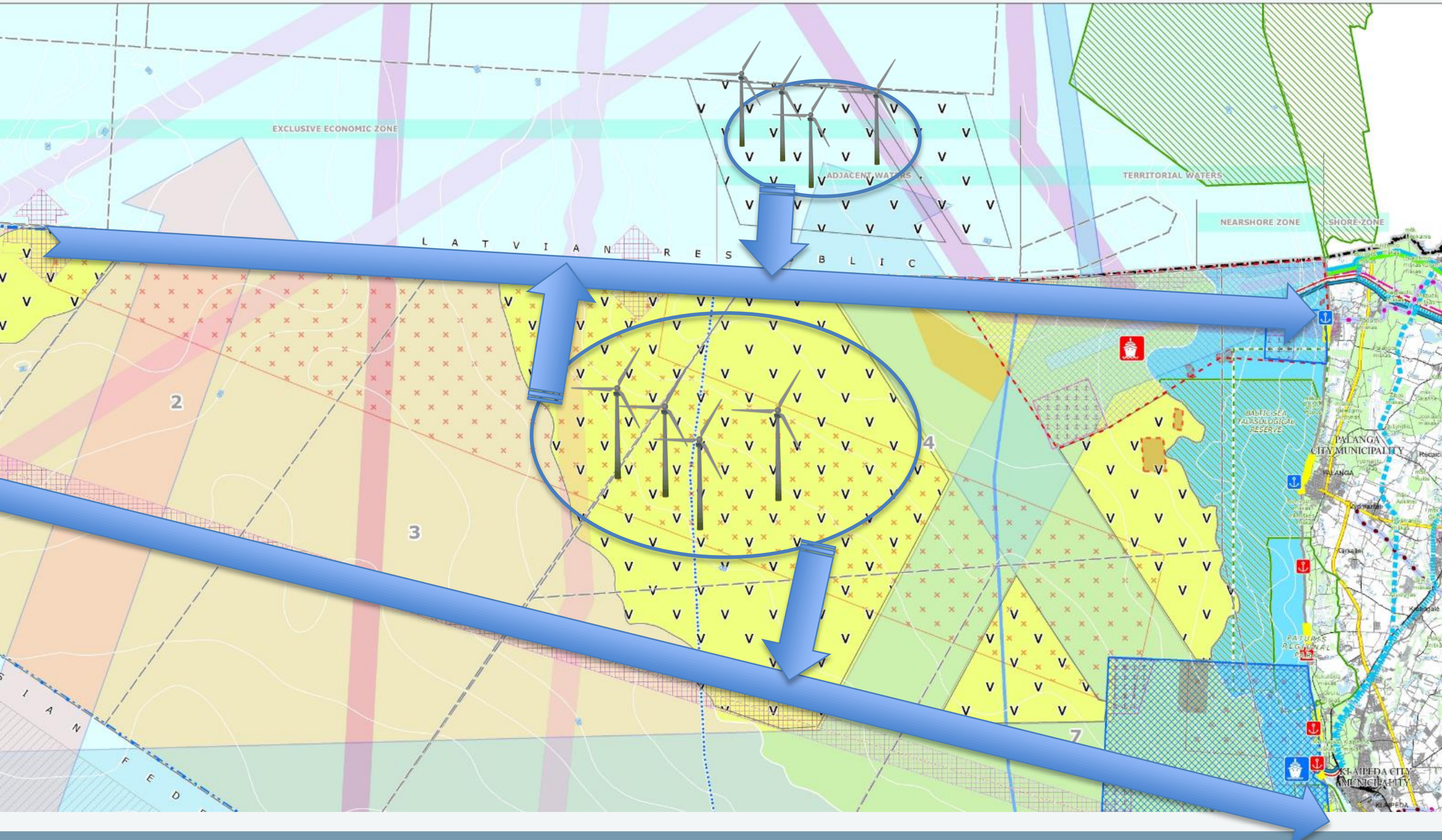
OPPORTUNITIES



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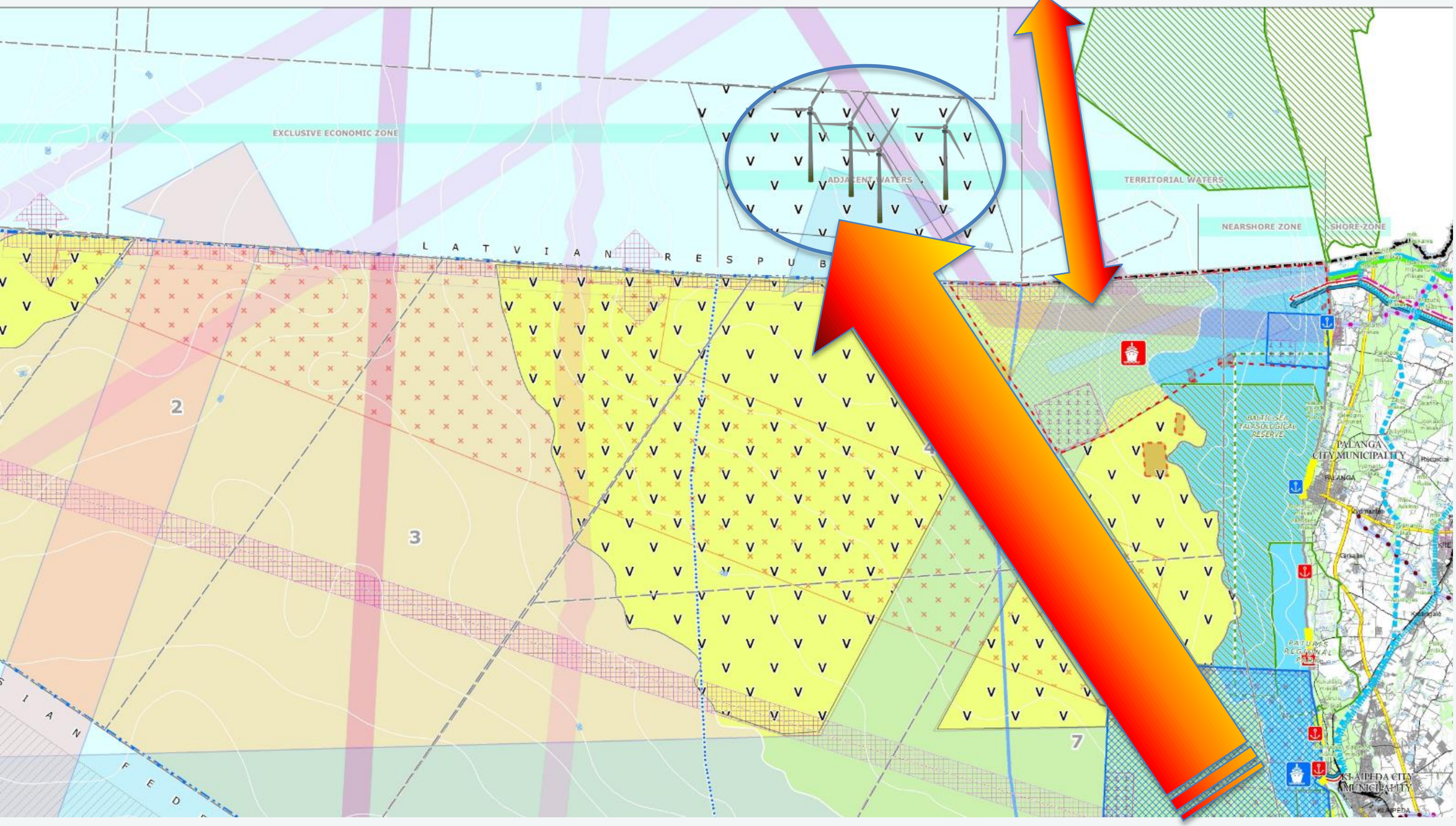
CONFLICTS



Wave energy in the Baltic Sea: innovative small-scale technology development

N.Blažauskas,

Technology developed by:

A.Pašilis

Assisted by:

A.Knolis

Main drivers:

- Demand for renewable and safe energy
- Environmental targets
- Technology development

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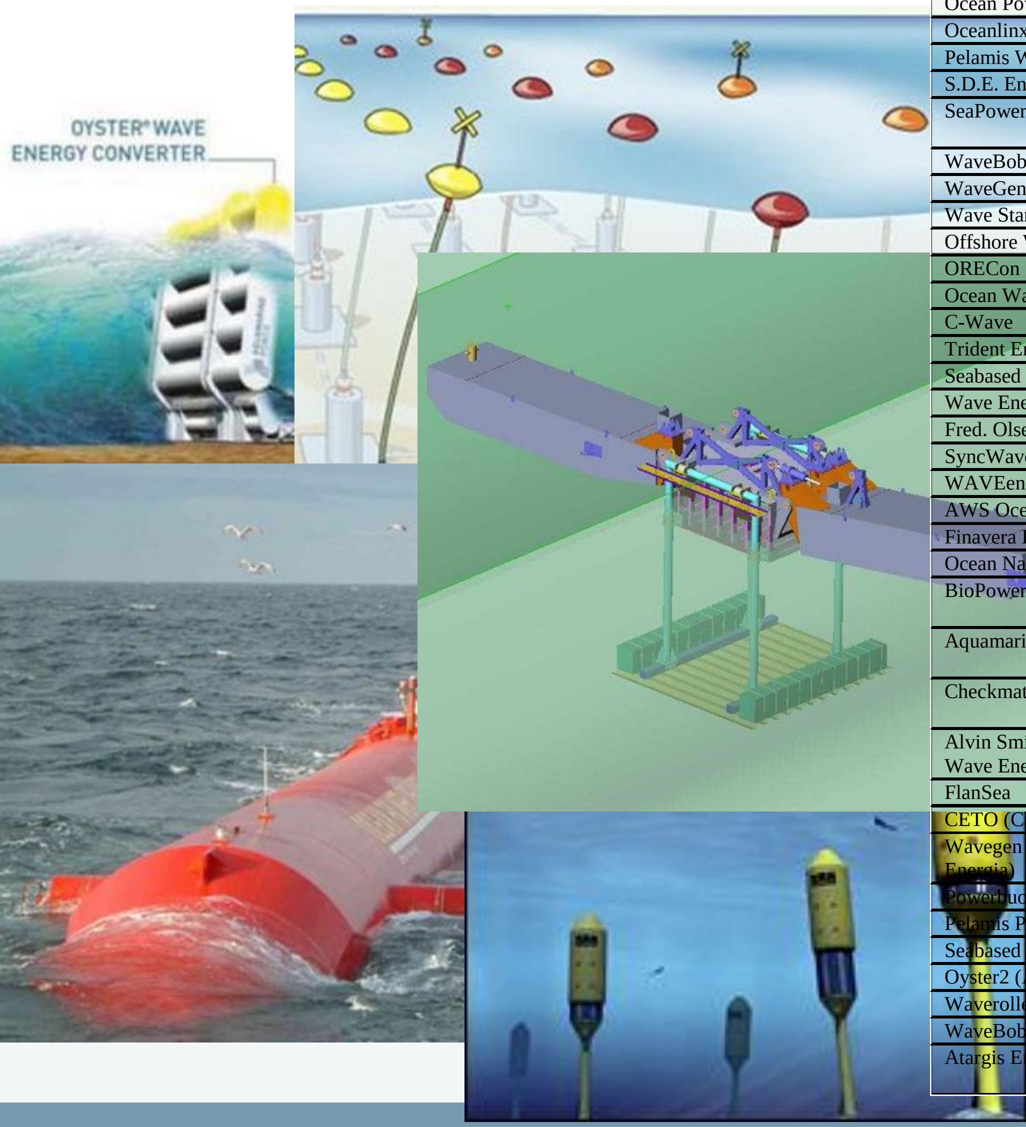
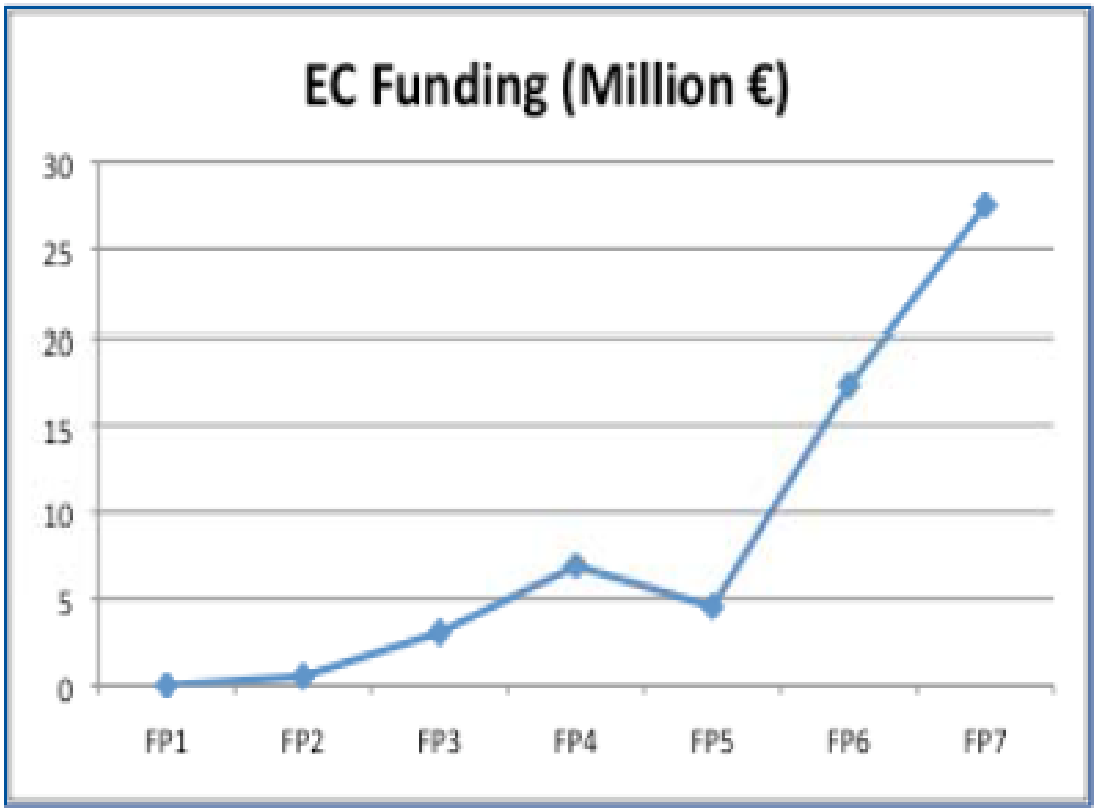
Techniques available



Operator/Device	Technology	Country	Year Started	Stage
Wave Dragon	Overtopper	Denmark	1987	Commercial
Ocean Power Technologies	Point Absorber	U.S	1994	Commercial
Oceanlinx	Oscillating Water Column	Australia	1997	Commercial
Pelamis Wave Power	Attenuator	U.K.	1998	Commercial
S.D.E. Energy	Terminator	Israel	1998	Commercial
SeaPower Pacific	Oscillating Wave Surge Converter	Australia	1999	Pilot
WaveBob	Point Absorber	Ireland	1999	Pre-commercial
WaveGen	Oscillating Water Column	U.K.	1990	Commercial
Wave Star Energy	Attenuator	Denmark	2000	Pilot
Offshore Wave Energy	Oscillating Water Column	U.K.	2001	Prototype
ORECon	Oscillating Water Column	U.K.	2002	Prototype
Ocean Wave Master	Attenuator	U.K.	2002	Prototype
C-Wave	Attenuator	U.K.	2002	Prototype
Trident Energy	Point Absorber	U.K.	2003	Prototype
Seabased	Point Absorber	Sweden	2003	Pilot
Wave Energy Technologies	Point Absorber	Canada	2004	Pilot
Fred. Olsen	Point Absorber	Norway	2004	Pre-commercial
SyncWave Energy	Point Absorber	Canada	2004	Prototype
WAVEenergy	Overtopper	Norway	2004	Pilot
AWS Ocean Energy	Point Absorber	U.K.	2004	Pre-commercial
Finavera Renewables	Point Absorber	Canada	2006	Pre-commercial
Ocean Navitas	Point Absorber	U.K.	2006	Prototype
BioPower Systems	Oscillating Wave Surge Converter	Australia	2006	Pre-pilot
Aquamarine Power	Oscillating Wave Surge Converter	U.K.	2007	Prototype
Checkmate SeaEnergy	Anaconda Wave Energy Converter	UK	2008	Prototype
Alvin Smith (Dartmouth Wave Energy)	Hydraulic ram, Boy	UK	2008	Pilot
FlanSea	Point absorber buoy	Belgium	2010	Commercial
CETO (Carnegie Corp.)	Point Absorbers array	Australia	2010	Commercial
Wavegen (Ente Vasco de la Energia)	Wavepump	Spain	2010	Prototype
Powerbuoy (OPT)	Point absorber	Scotland	2010	Commercial
Pelamis P2 (E.oN)	Attenuator	Scotland	2010	Under test
Seabased	Point absorber	Sweden	2010-2011	Pilot
Oyster2 (Aquamarine)	Oscillating surge converter	Scotland	2011	Pilot
Waveroller (AW energy)	Oscillating surge converter	Portugal	2011	Prototype
WaveBob	Point Absorber	Portugal	2011	Pre-commercial
Atargis Energy Inc.	Cycloidal Wave Energy Converter	US	2011	Pilot

R&D opportunities



More than 55 Million EUR has been spent so far to support research and advance knowledge in marine power production testing and optimization

Scottish Ministers' Wave and Tidal Energy Support Scheme has total funding of **£13 million**

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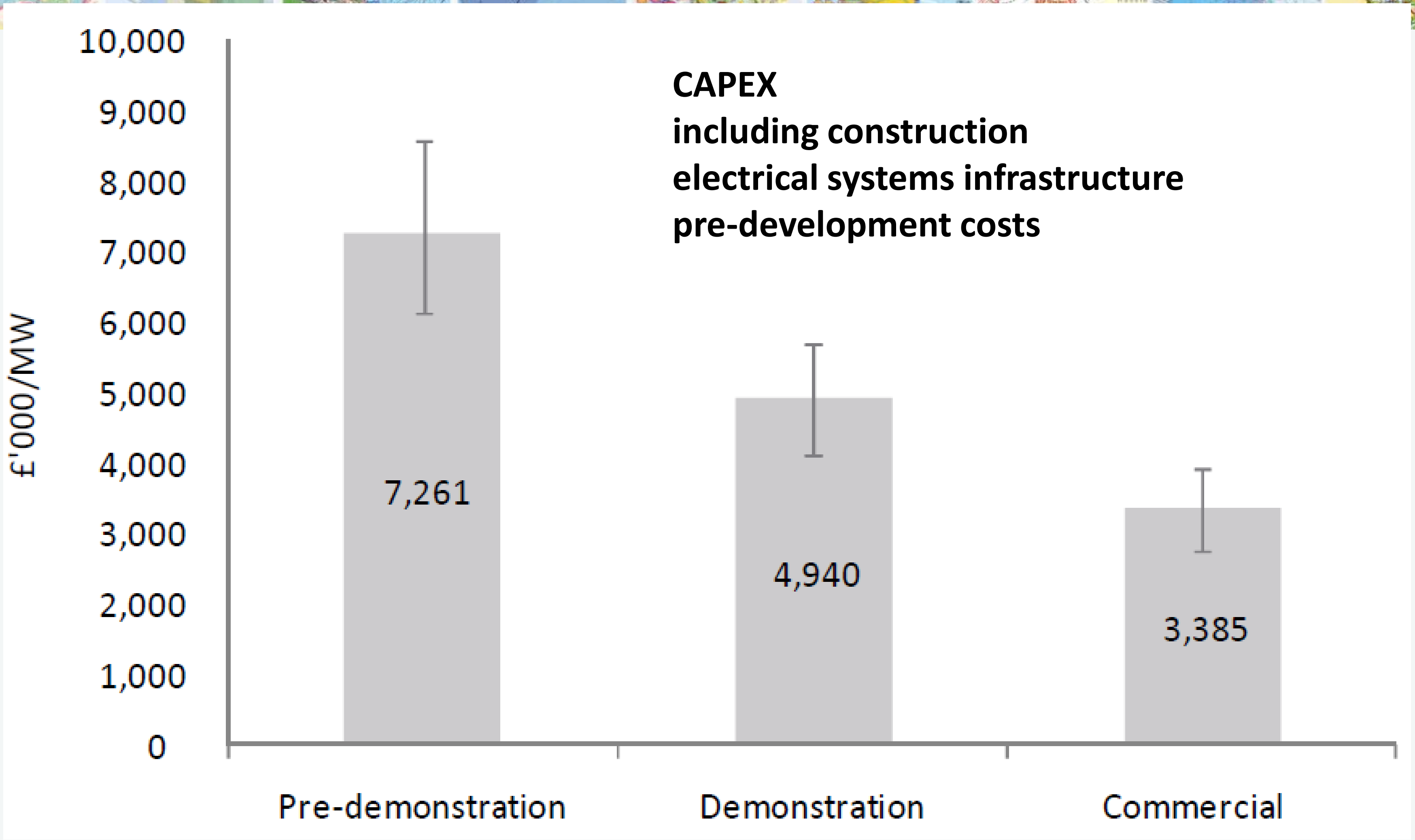

Estimated by Young and Ernst, 2010

Some facts:

One of the first shore-based, grid-connected wave power unit to be installed was an **oscillating water column system** built in Scotland in 2000.

In 2003, Wave Dragon installed the world's **first floating grid-connected wave power unit**. Experimental data from more than 20,000 hours of operation has been collected.

In July 2004, Pelamis was the **first company to deploy a full-scale grid-connected wave power unit**
Pelamis announced the **first commercial sale**

Deployed off the coast of Portugal in 2008 but is **no longer operating**

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The key issues affecting wave power devices are:

- survivability in violent storms
- vulnerability of moving and electric parts to sea water
- fouling, corrosion
- capital cost of construction
- costs of connection to the electricity grid
- operational costs of maintenance and repair..

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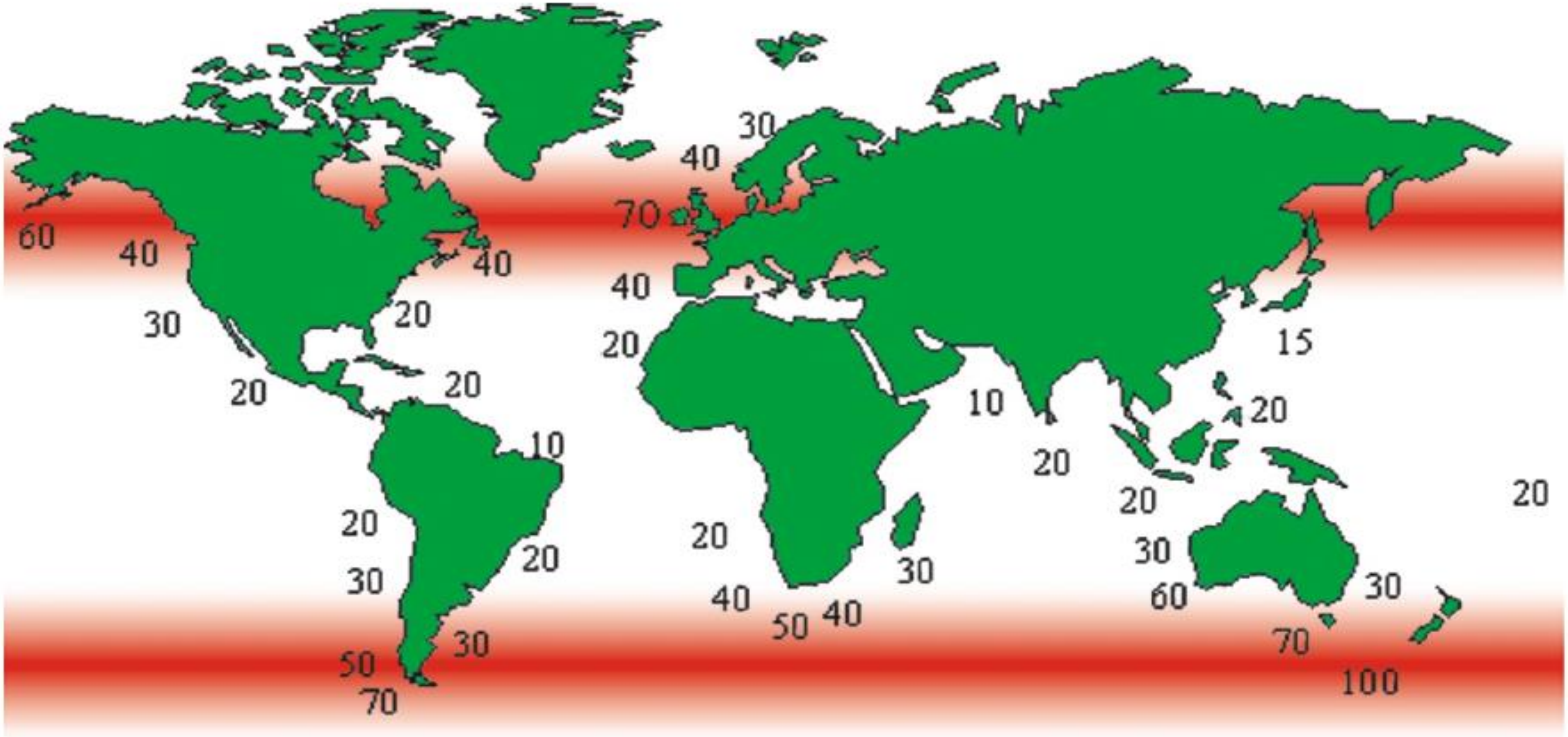
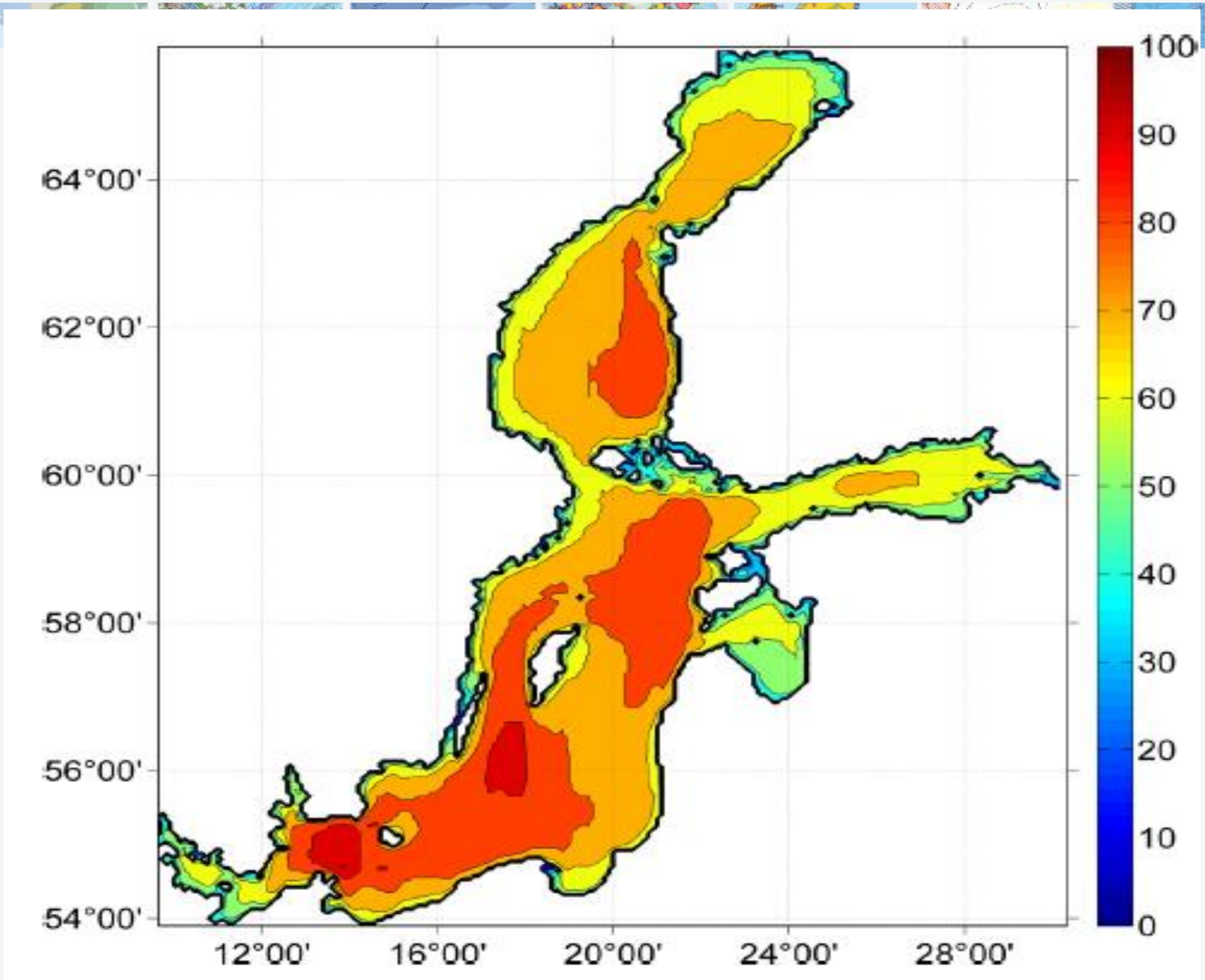
And this is all for high wave potential waters …
…and Baltic sea is not amongst those…or?

Source: Centre for Renewable Energy Sources (CRES), 2002



Baltic Sea potential



Long-term mean wave height [cm]. source: Raame, 2010

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Baltic Sea specifics/preconditions

No tides
Semi enclosed
Shorter wavelength
- Relatively low energy yeld
- Limited space
- Sensitive environment

Growing RES economy
Maritime Spatial Planning
Fostering Inovations - ERDF
Developing offshore wind
Developing offshore grid
- Growing tech.potential
- Demand for green energy
- Political will

Lithuanian case

AIM:

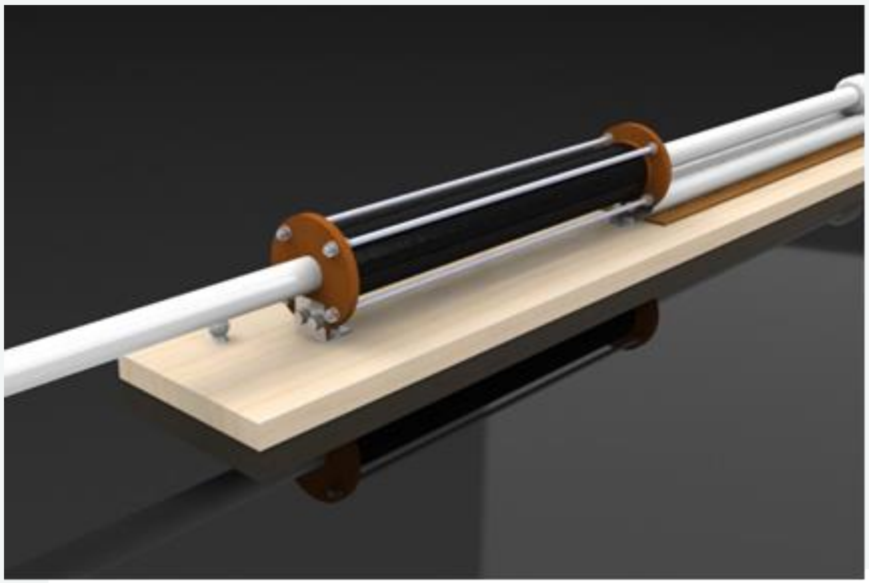
- Develop highly efficient wave energy generator;

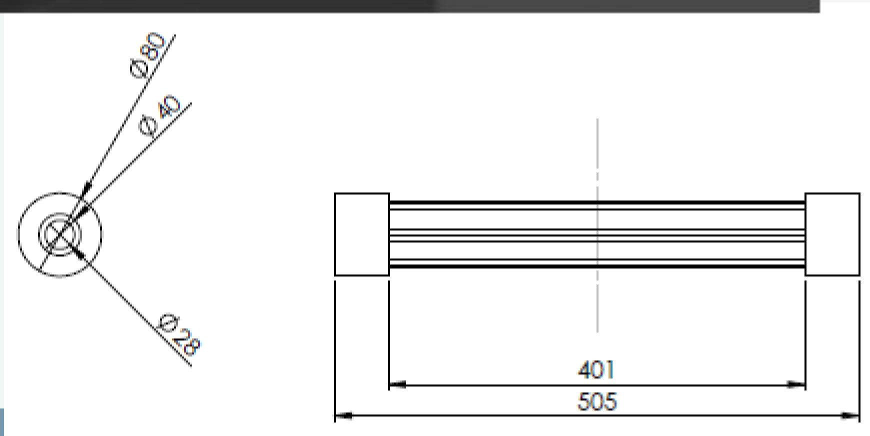
- Provide with pre-demonstration prototype/-s of suitable installation/-s

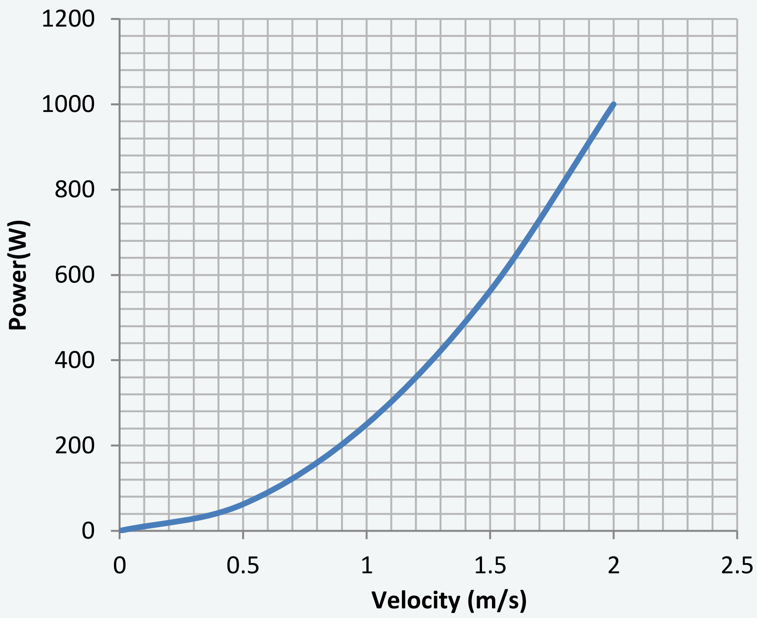
FOCUS ON:

- Develop low cost, small scale solutions for "low" wave energy basins

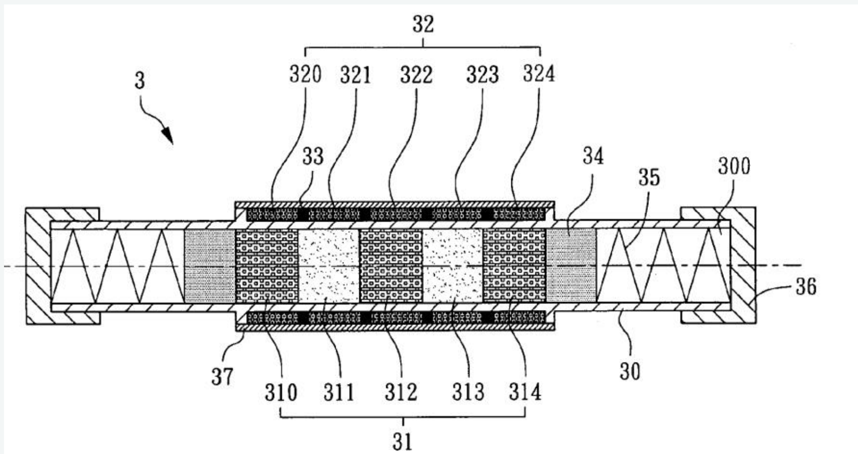
1st Phase – development of linear generator

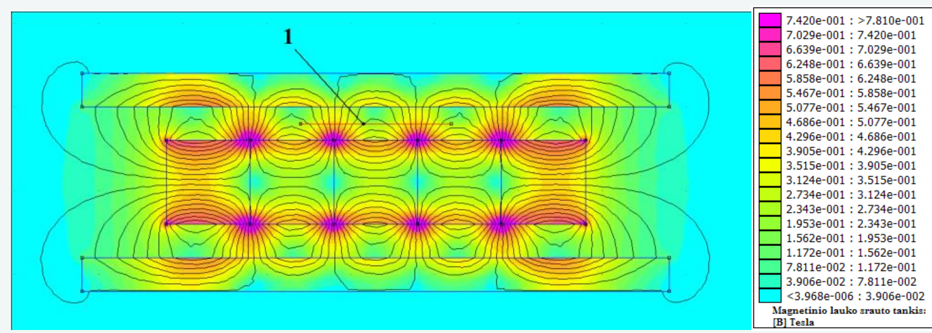


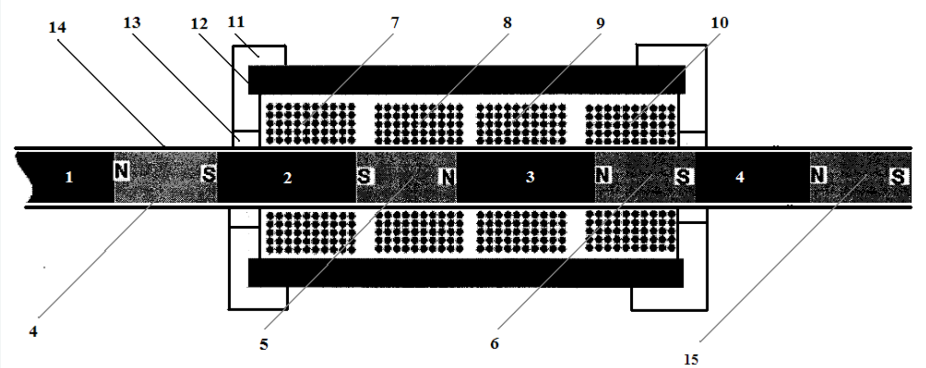


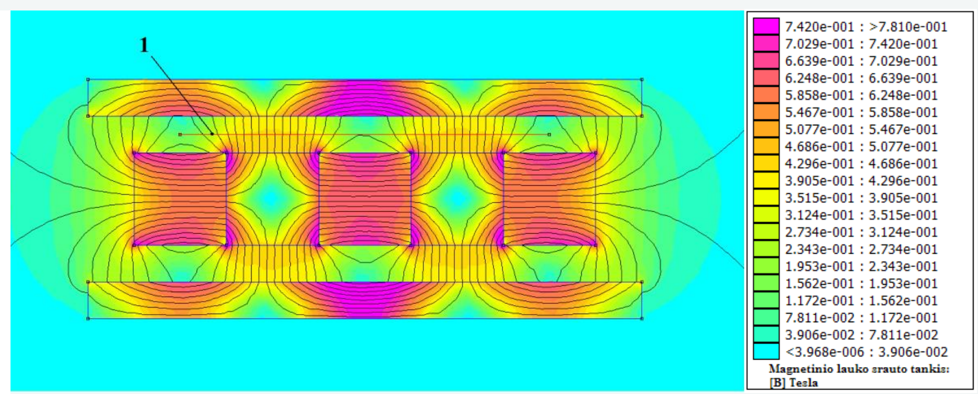


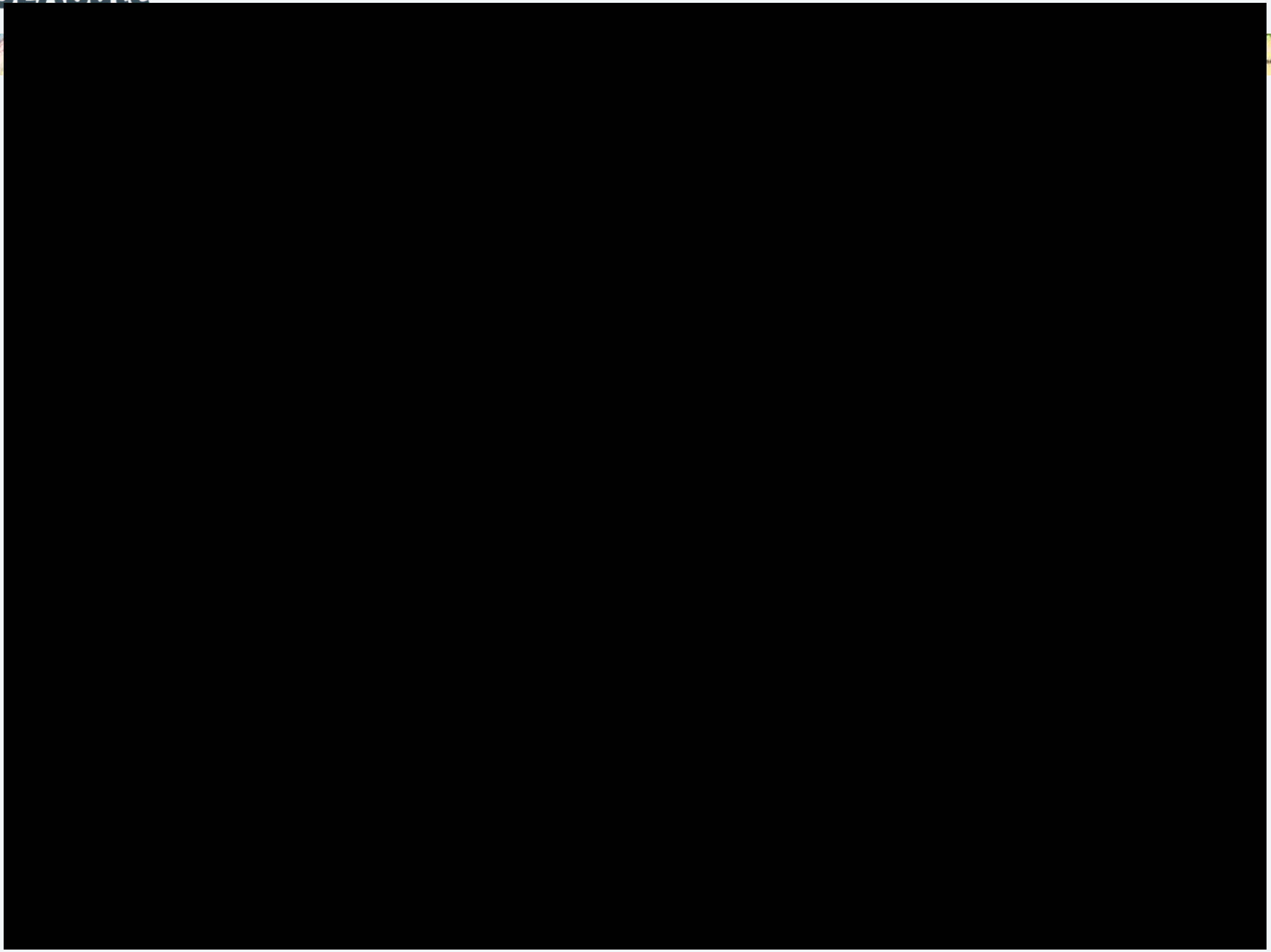
MULTI-LEVEL GOVERNANCE
IN MARITIME SPATIAL PLANNING
THROUGHOUT THE BALTIC SEA REGION
PartiSEApate











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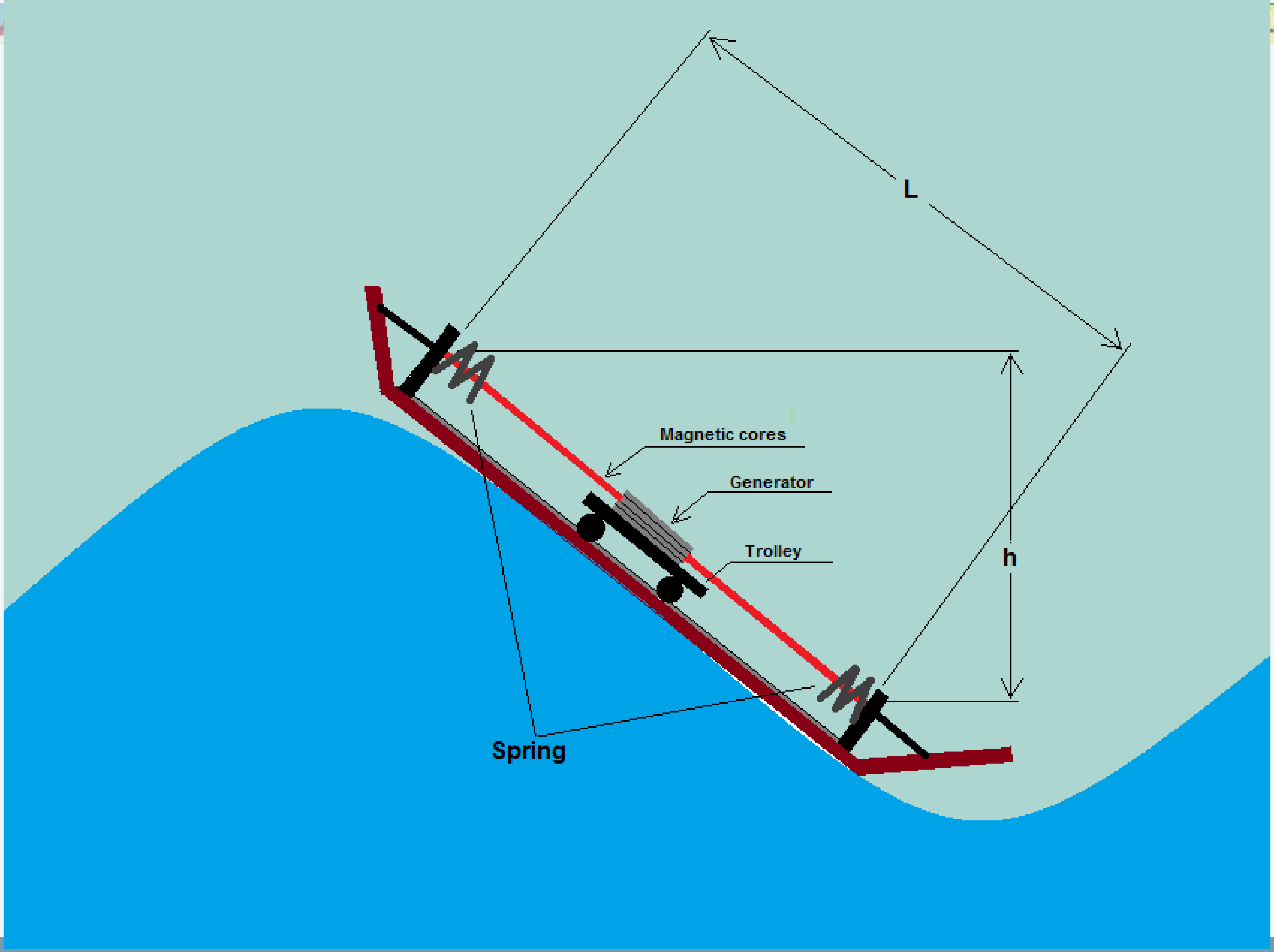
First pilot



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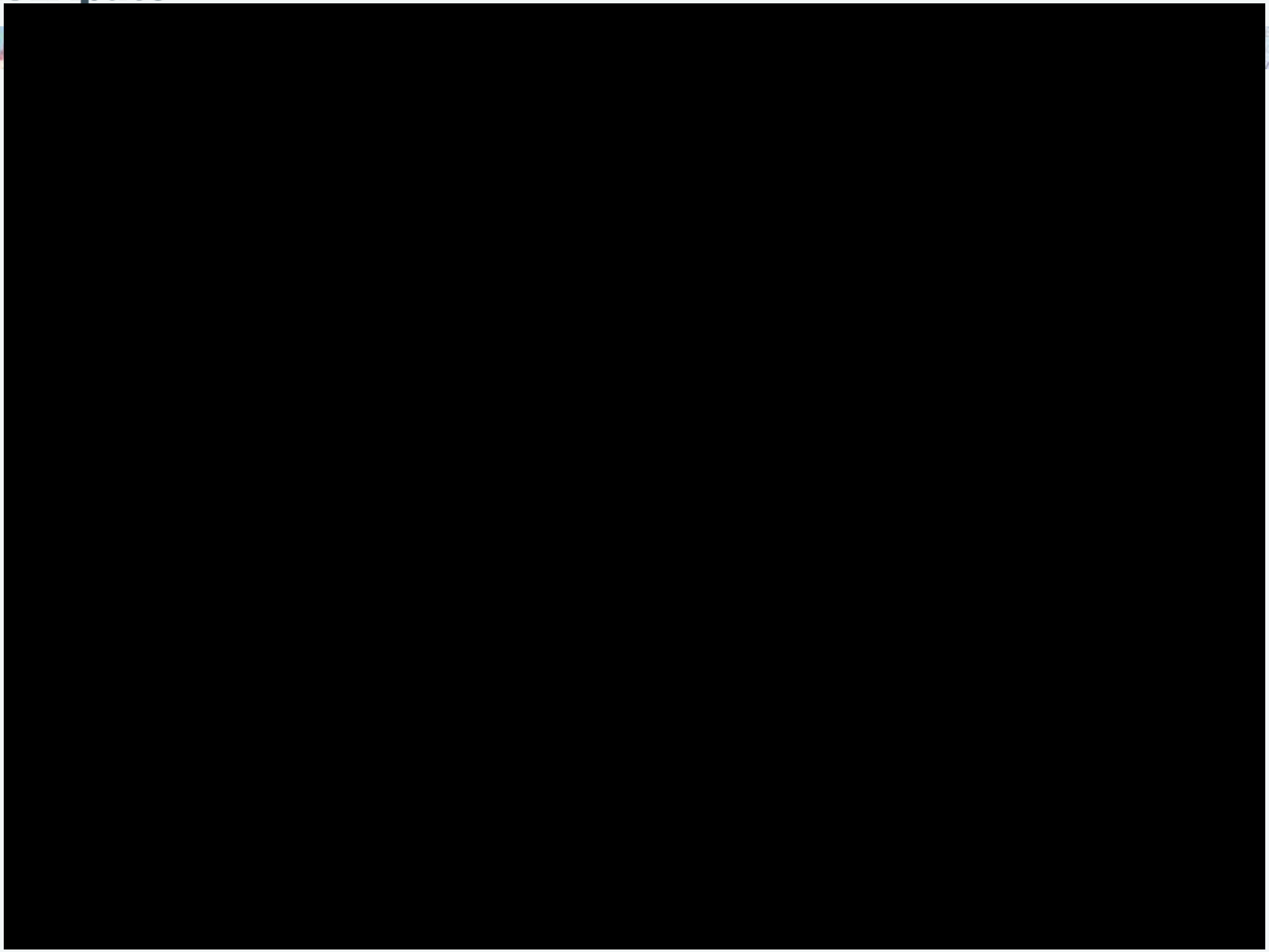
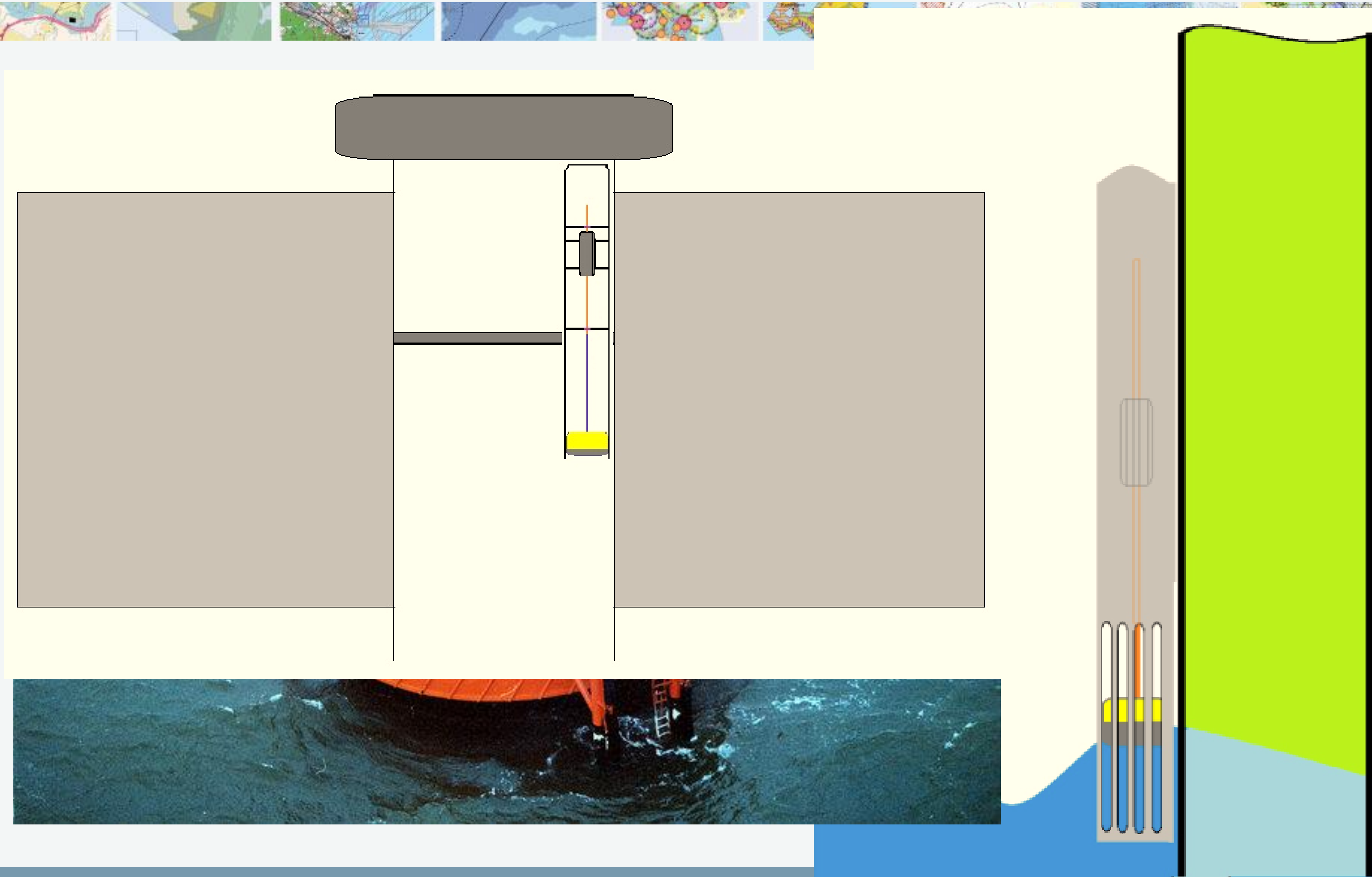
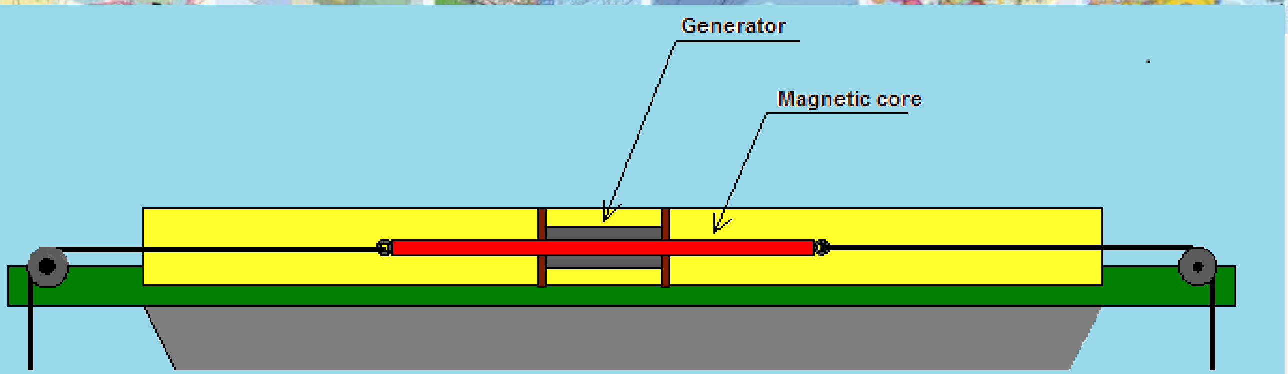


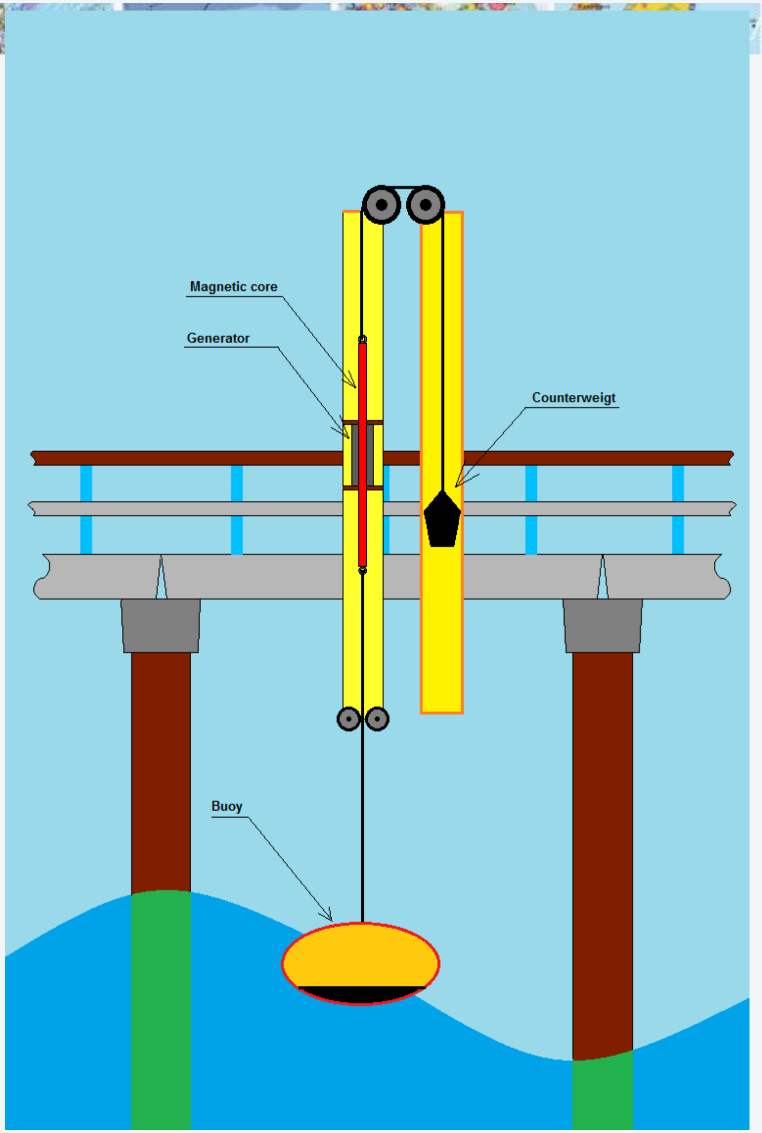
Concept :
power supply for the buoys



Pilot No 2:
power supply for the sea bridge



Concept : power supply for the sea bridge 2



Thank you,
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