



Impact Mitigation Strategy of the Baltic Offshore Grid



**Baltic
InteGrid**
Integrated Baltic Offshore
Wind Electricity Grid Development

May 15th 2018, Bremerhaven



Baltic InteGrid Project – general informations

❖ 14 Project Partners and Associated Organisations

❖ Duration 2016–2019

❖ 5 Work Packages:

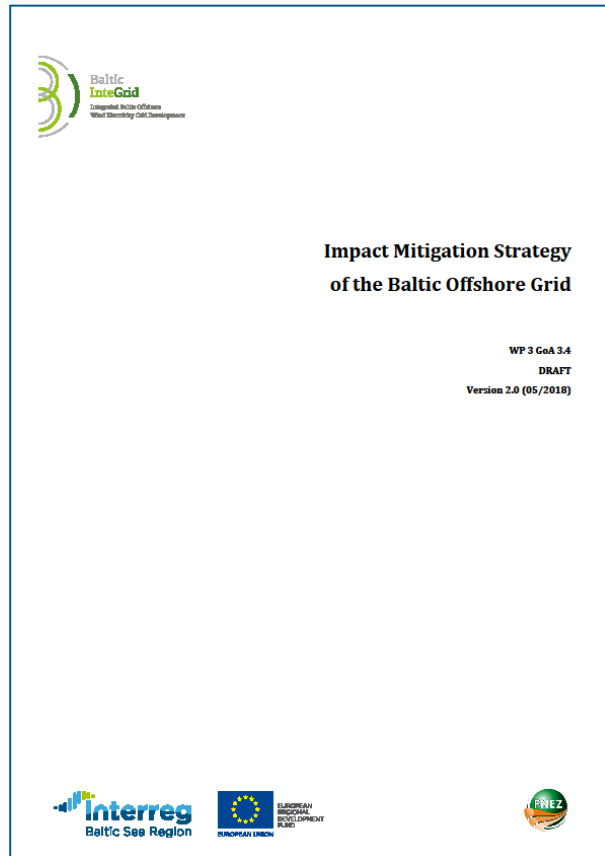
- WP1 – Project Management (led by: Institute for Climate Protection, Energy and Mobility (IKEM))
- WP2 – Baltic Offshore Grid Forum (led by: German Offshore Wind Energy Foundation (Stiftung OFFSHORE-WINDENERGIE))
- WP3 – High-Level Baltic Grid Concept (led by: Energy Agency for Southeast Sweden (EAS))
- WP4 – In-depth feasibility studies (led by: Foundation for Sustainable Energy (FNEZ))
- WP5 – Recommendations (led by: Aalto University)

❖ Activities → 6 Thematic Working Groups:

- Policy & Regulation (led by: Institute for Climate Protection, Energy and Mobility (IKEM))
- Market & Supply Chain (led by: Rostock Business and Technology Development GmbH)
- Technology & Grid Design (led by: Technical University of Denmark)
- Environment & Society (led by: Foundation for Sustainable Energy (FNEZ))
- Spatial Planning (led by: Maritime Institute in Gdańsk)
- Cost-Benefit Analysis (led by: Deutsche WindGuard)



Impact Mitigation Strategy of the Baltic Offshore Grid



- Output of the WP3
- Main objective - to develop guidelines, assumptions for the strategic environmental impact assessment and to identify good practices for the environmental procedure for infrastructure offshore investments such as BOG through:
 - establishing standards of environment and socio-economic impact analysis
 - analysis of offshore and onshore potential significant impacts of the BOG
 - creating an assumption of mitigation strategy for the BOG
 - recommendations for the EIA process for the BOG (in advance) and social dialogue

Key issues, scope and contents

1. Baltic Offshore Grid

- Objective and scope of BOG
- Offshore wind energy industry development in the Baltic Sea
- BOG variants

2. Purpose of the Mitigation Strategy

- Strategic character of the document
- Linking Baltic Offshore Grid to other strategic documents

3. Legal framework

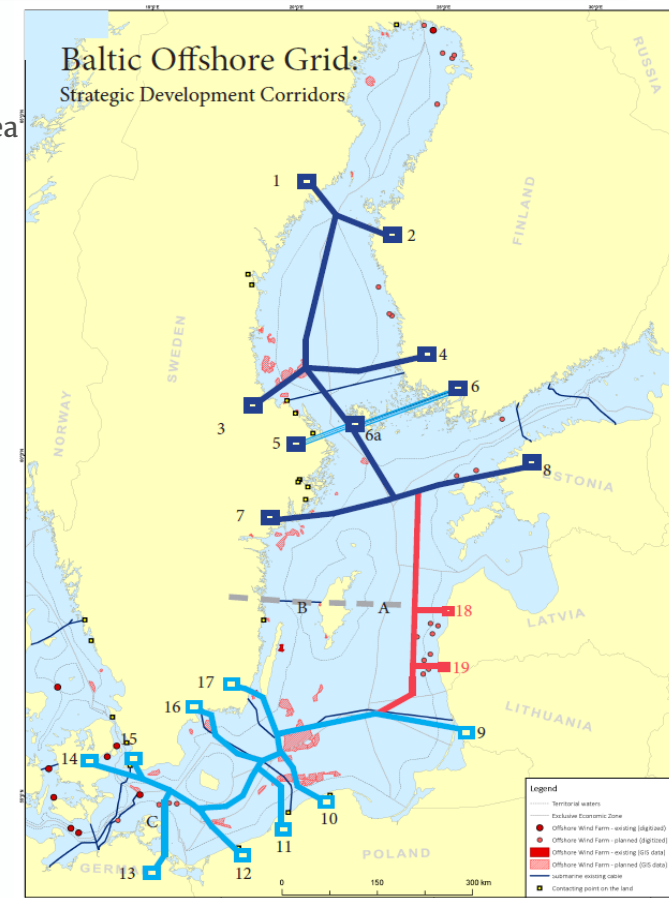
4. Methodological assumptions for the assessment based on the strategic assessment of the environmental impact of BOG

5. Characteristic of the environment – baseline

6. Potential impacts of BOG, mitigation measures and recommendations for environmental impact assessment

7. Recommendation for EIA for BOG projects

- Recommendations for EIA
- Recommendation for social dialogue



Definition of the Baltic Offshore Grid

<p>Q1: How to describe BOG and what does it mean?</p>	<p>BOG is a concept of offshore transmission infrastructure in the Baltic Sea to link offshore wind farms (OWF) to electro energetic network and to transmit electric energy onshore while making a cross-border exchange of electric energy possible between the countries of the Baltic Sea Region</p>
<p>Q2: How to define BOG's goals?</p>	<p>G1-increasing the possibility to connect OWF in the Baltic Sea Region and maximisation of advantages resulting from the OWF development, increasing OWF energy supplies stability through the possibility to transmit the energy where it is currently needed (not only in the country where they are installed) G2-increasing the energy supplies safety through additional possibilities of cross-border exchange G3-further integration of energy markets as a result of continuous efforts to unify energy market in the Baltic Sea Region by establishing new cross-border connections and allowing for interconnected exchange of energy G4-OWF cost reduction by application of more coordinated attitude to OWF connection, while establishing cross-border connections (a connection has a function of transmitting the OWF energy and a transmission factor at the same time)</p>
<p>Q3: What is a time schedule for BOG?</p>	<p>Long-term perspective for 2050</p>
<p>Q4: What are the expectations of BOG?</p>	<p>(i) increase in the renewable energy sources share in energy mixes of the countries in the Baltic Sea Region; (ii) improvement of energy security, (iii) diversification of electricity supplies, (iv) reduction of energy prices in the region</p>

Definition of the Baltic Offshore Grid

Q5: What are the variants of the BOG?

Variant 0 – no execution of BOG; assumes individual connection of all OWF radially or connecting project groups located in one area without integrating with the offshore cross-border connections. At the same time the execution of new underwater cross-border connections is scarce and executed by means of separate investments (instead, onshore connections are executed);

Variant 1 – assumes the integration of all OWF projects with the offshore transmission grid; at the same time this is the furthest reaching scenario (so called “worst case scenario”) in terms of the level of integration of the OWF development with BOG; This variant includes integration Southern Baltic grid with Northern Baltic via connection near Baltic countries – Estonia, Latvia and Lithuania

CONCLUSIONS:

- (i) BOG is based on conceptual assumptions and does not set a framework for the implementation of specific projects, defines only general and theoretical directions for the Baltic transmission network
- (ii) BOG will contribute (directly or indirectly) to meeting the priorities of the EU energy policy
- (iii) IMS as a strategy/plan/programme for the development of cross-border electricity grids

Strategic character of the Impact Mitigation Strategy of the Baltic Offshore Grid

- ❖ basis for the environmental impact assessment in strategic terms for the BOG concept
- ❖ long-term perspective
- ❖ identification and analysis the environmental, social and economic conditions for addressing in particular the following challenges: high and growing demand for electricity, inadequate level of generation and transmission infrastructure, and climate protection and market integration commitments
- ❖ the assumptions and scope of the strategic environmental assessment provided for in the SEA Directive can be adapted for the purpose of developing the IMS
- ❖ methodology also based on general requirements of: the Espoo Convention and the Strategic Protocol to the Espoo Convention, the EIA Directive



Methodology

objective

an element of the cross-border electricity grid (as a basic objective)

type

BOG as a linear infrastructure project

variants

variant 0 - no execution of BOG

variant 1 - integration of all OWF projects with the offshore transmission grid

area/coverage

BOG as an offshore transmission infrastructure integrated with OWF in the Baltic Sea

environment

identification of main natural environment components (biotic and abiotic) as BOG surroundings

potential impacts

BOG as a potential cause of changes in the environment

**significant potential
impacts**

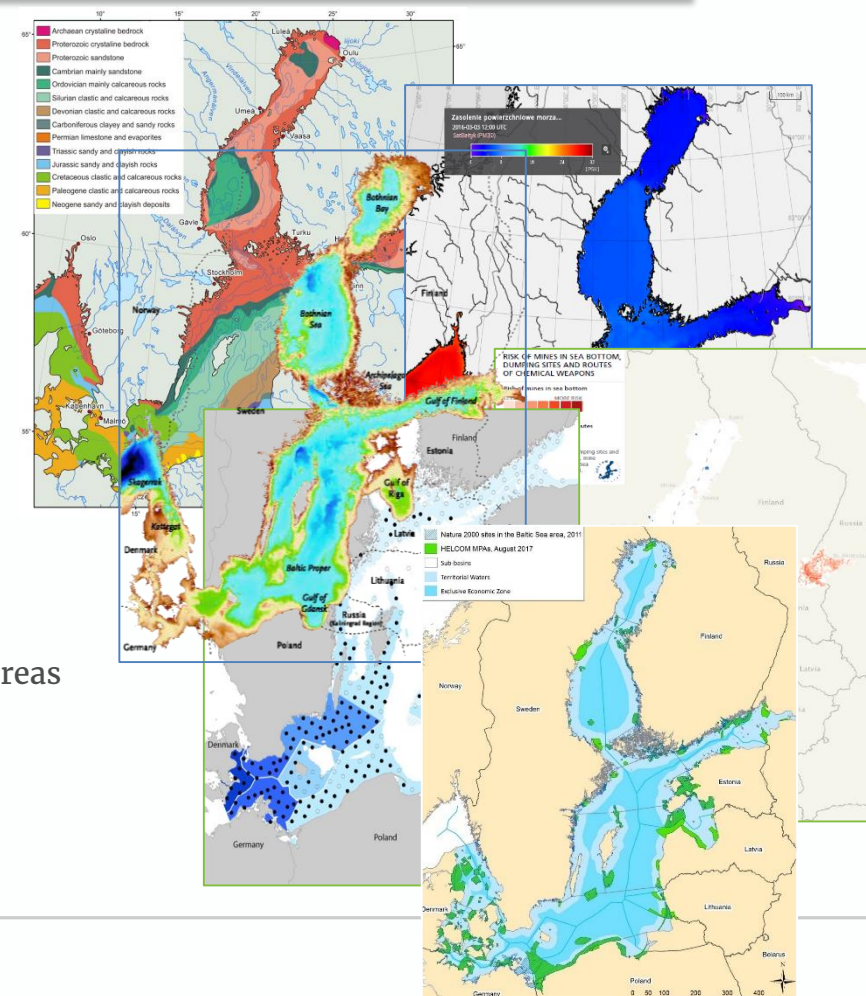
as a combination with cumulative and cross-border impacts

actions to mitigate

the actions aiming to prevent, reduce or environmental compensation of negative impacts which may result from the BOG execution were indicated

Environmental status and other sea users in the Baltic Sea

- ❖ collection of data and sources:
 - environment conditions of the Baltic Sea
 - spatial information
 - BOG concept
- ❖ analysis and selection of information
- ❖ preparation of information regarding:
 - physical and chemical environment
 - hydrography, climate and air quality
 - biological environment
 - socio-economic environment, protected areas and Nature 2000



Potential impacts & comparative analysis

Disturbances and emissions	Impact														
	Environmental receptors								Socio-economic receptors						
	Natura 2000	Natural habitats - onshore	Benthic and pelagic habitats	Fish	Marine mammals	Birds	Coastal area/landfill	Climate	Fishery	Shipping and shipping lanes	Cultural heritage	Spatial planning	Visual landscape	Chemical warfare and UXO	Minerals deposits
physical existence of cables (HVAC, HVDC) and high voltage stations (OHVS) - offshore	Y	N	Y	(Y)	(Y)	(Y)	N	(Y)	Y	Y	N	Y	Y		Y
seabed disturbance	Y	N	Y	Y	(Y)	(Y)	N	N	(Y)	N	N	N	N	Y	N
changes in morphology of the coastal zone	Y	Y	N	N	N	N	Y	N	N	N	Y	Y	Y	Y	N
transformer stations and cables existence - onshore	Y	Y	N	N	N	Y	N	(Y)	N	N	N	Y	Y	N	Y
land occupation (onshore transformer stations)	Y	Y	N	N	N	Y	N	N	N	N	Y	Y	?	N	Y
limitation in land use (onshore cables and transformer stations)	N	N	N	N	N	N	N	N	N	N	N	Y	N	N	Y
emission of temperature and electromagnetic field	N	N	Y	Y	Y	N	N	N	(Y)	N	N	Y	N	N	N

Scale/intensity of potential impact

V"1"<V"0"

V"0"<V"1"

V"0"≈V"1"

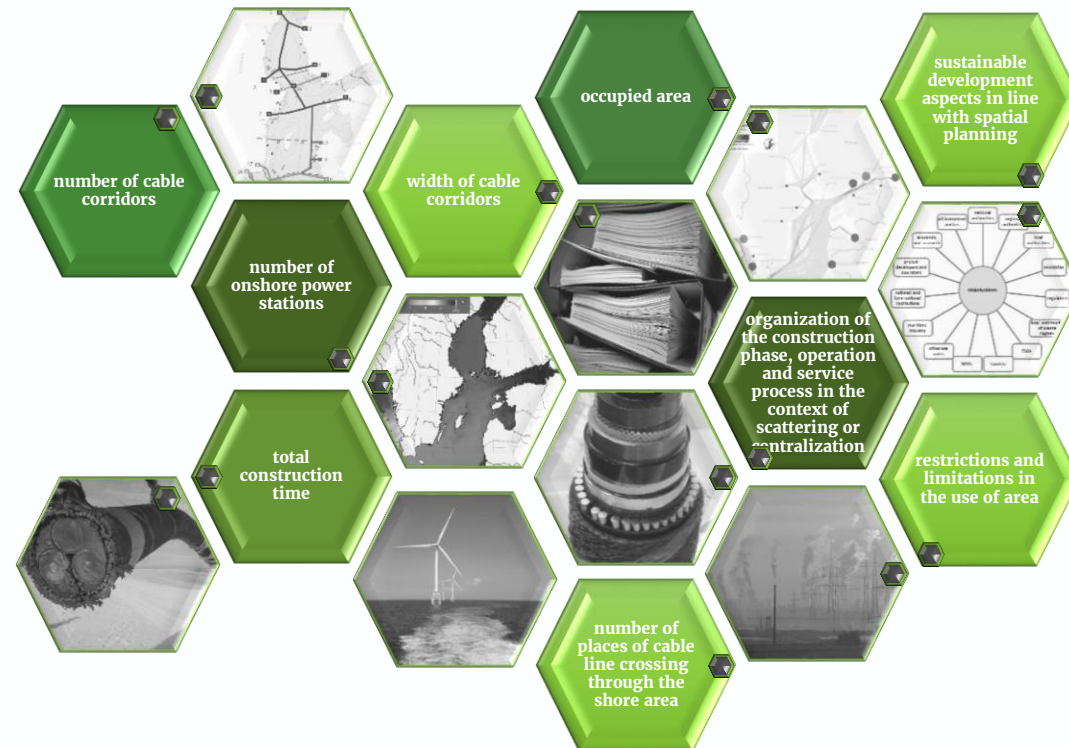
() - indirect impact

"Y" - Yes; "N" - No

Results & recommendations (1)

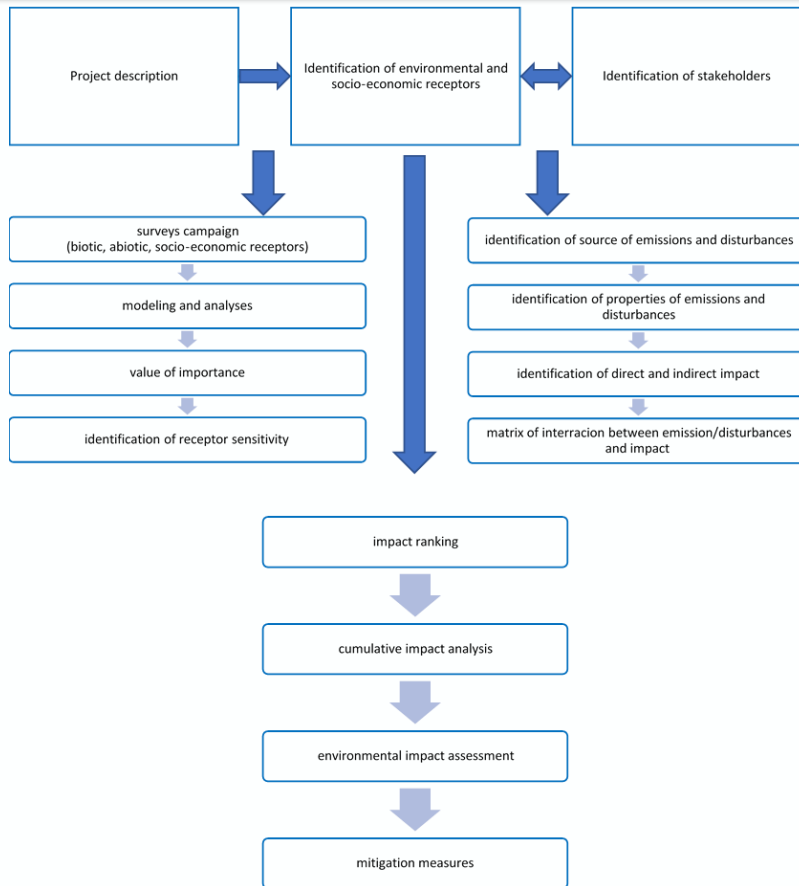
CONCLUSION: V1 is more beneficial for the environment than V0

- more spatially limited interventions in the natural environment, including Natura 2000 sites
- less interference in the coastal zone in line
- less difficulties for fishing and shipping during the construction and operation phase
- lower risk of damage to the cable line connected with fishing and shipping activities
- lower risk of interference in the cultural heritage value, chemical warfare and unexploded ordnance (UXO)
- less restrictions in terms of spatial planning and management of mineral deposits (mining areas)
- more limited visual impact due to less cable corridors and number of onshore power stations



Results & recommendations (2) - Recommendation for EIA

Methodology



Bounding conditions envelope concept as a basis to describe the project

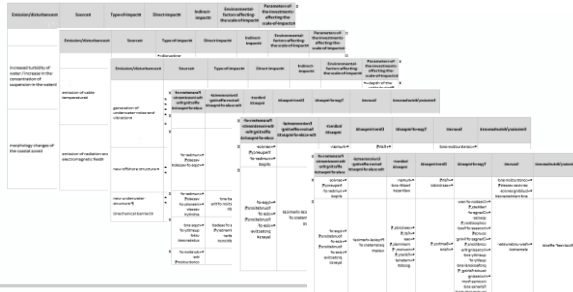
- takes into account that a project evolves over a number of years
- forms a framework within which a project must be developed
- allows flexible interpretation of the investor's intentions in the initial stages of the investment while at the same time binding the project development process with the results of the EIA
- should be applied the "worst case scenario"

Results & recommendations (4) - Recommendation for EIA

Matrix of interaction between emissions and impacts (sea/land)

Emission/disturbances	Source	Type-of-impact	Direct-impact	Indirect-impact	Environmental-factors-affecting-the-scale-of-impact	Parameters-of-the-investments-affecting-the-scale-of-impact
disturbance-of-the-seabed-sediments-(other-physical-disturbance-of-the-seabed)	<ul style="list-style-type: none"> → cable-laying → anchoring-ships → sampling → survey-activities → preparation-of-seabed-for-installation-of-cables-and-foundations → installation-of-foundations → installation-of-protective-layers-against-leaching 	<ul style="list-style-type: none"> → displacement-and-change-of-habitats → reduction-of-population → reduction-of-source-of-feeding → risk-of-damage-the-archaeological-valuable-objects → leaching-of-burrowing-raw-materials 	<ul style="list-style-type: none"> → sediments → benthos → fish 	<ul style="list-style-type: none"> → sea-birds → sea-mammals → cultural-heritage 	<ul style="list-style-type: none"> → type-of-seabed → benthic-habitats → size-of-sediments-layer 	<ul style="list-style-type: none"> → size-and-number-of-cables → method-of-cables-laying → intensity-of-the-ground-work → type-and-size-of-foundations → size-of-protective-layer
release-of-contaminations,-nutrients-from-the-sediment-into-the-water-column	<ul style="list-style-type: none"> → ground-works → cable-laying → heat-emission-from-cables → sampling → installation-of-foundations → survey-activities 	<ul style="list-style-type: none"> → increase-in-the-amount-of-pollutants-and-nutrients-in-the-water → changes-in-living-conditions → population-decline 	<ul style="list-style-type: none"> → benthos → fish → sea-mammals → hydro-chemical-conditions 	<ul style="list-style-type: none"> → sea-birds → human-health-and-wellness 	<ul style="list-style-type: none"> → types-and-amount-of-pollution-deposited-in-the-sediments → type-of-sediment → weather-conditions 	<ul style="list-style-type: none"> → size-and-number-of-cables → method-of-cables-laying → width-and-depth-of-the-cable-corridor

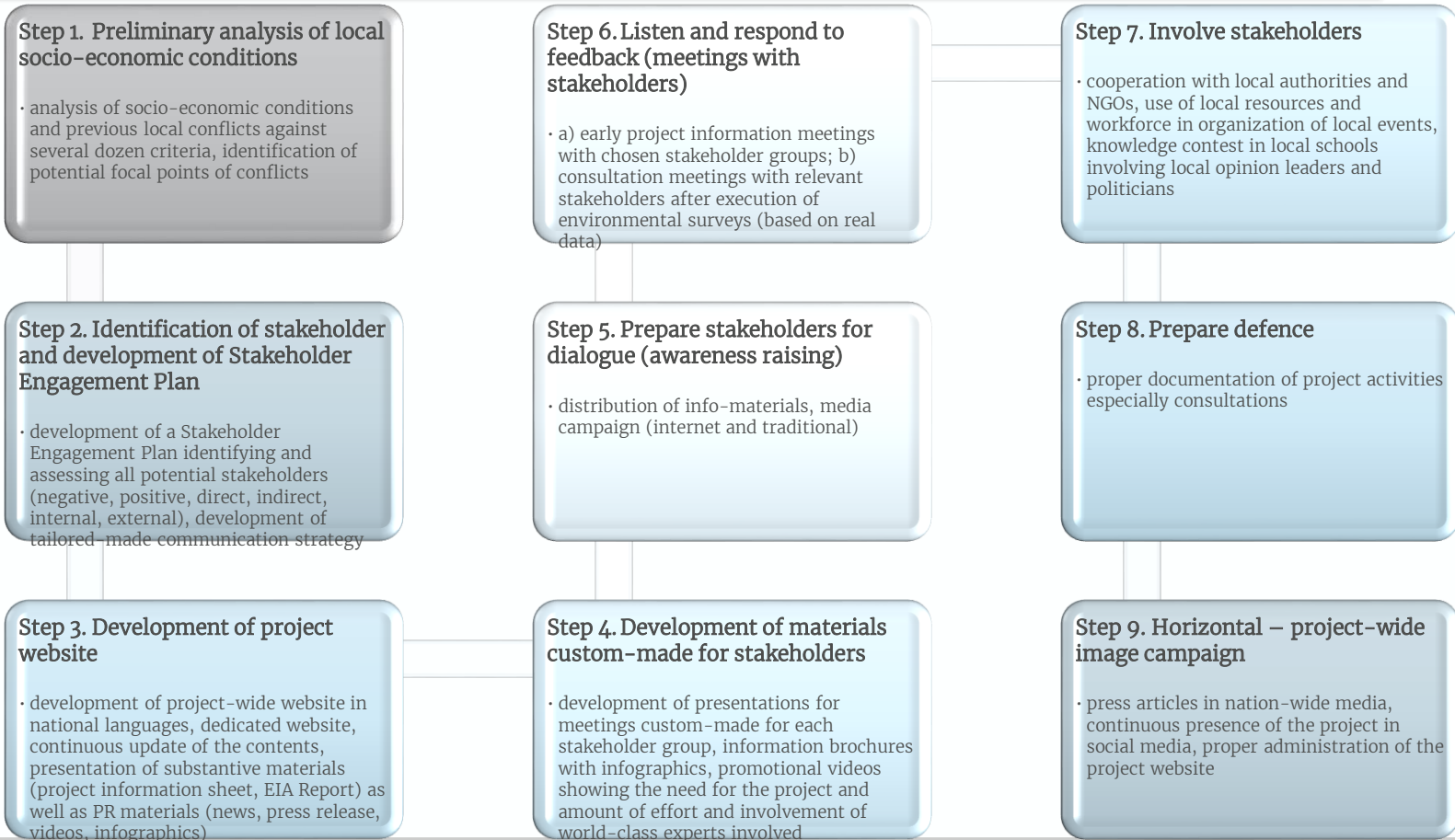
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Results & recommendations (5) - Recommendation for social dialogue



Results & recommendations (6) - Recommendation for social dialogue



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