



Rijkswaterstaat
*Ministry of Infrastructure
and Water Management*



An introduction on ecological impacts of offshore wind energy

Policy Seminar
Netherlands Offshore Wind

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Rijkswaterstaat

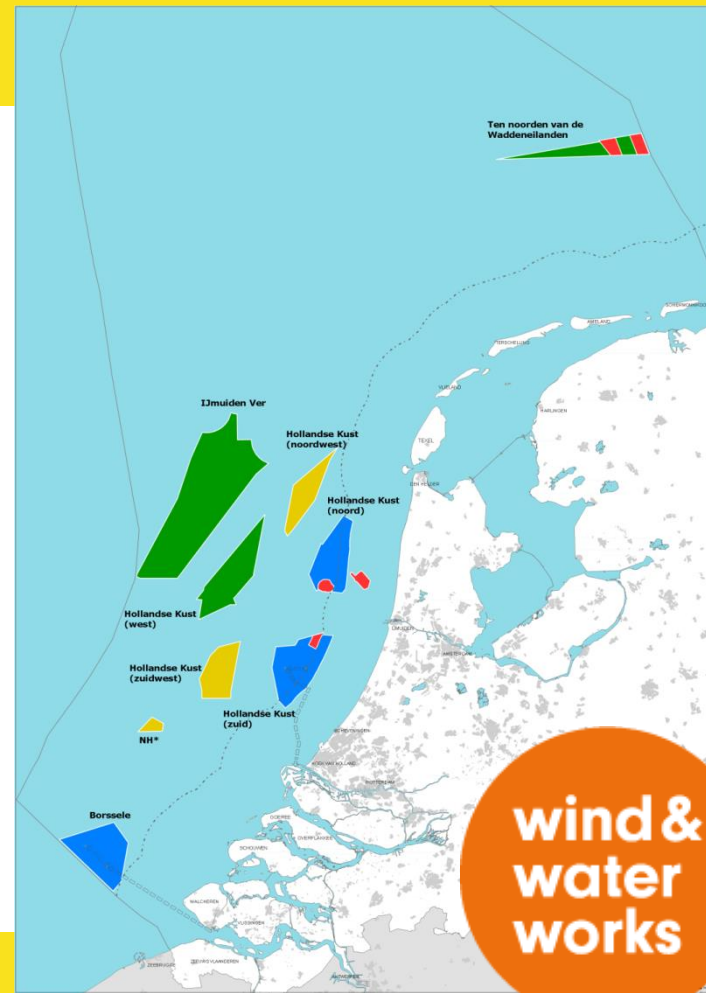
Tokyo, 25 February 2019

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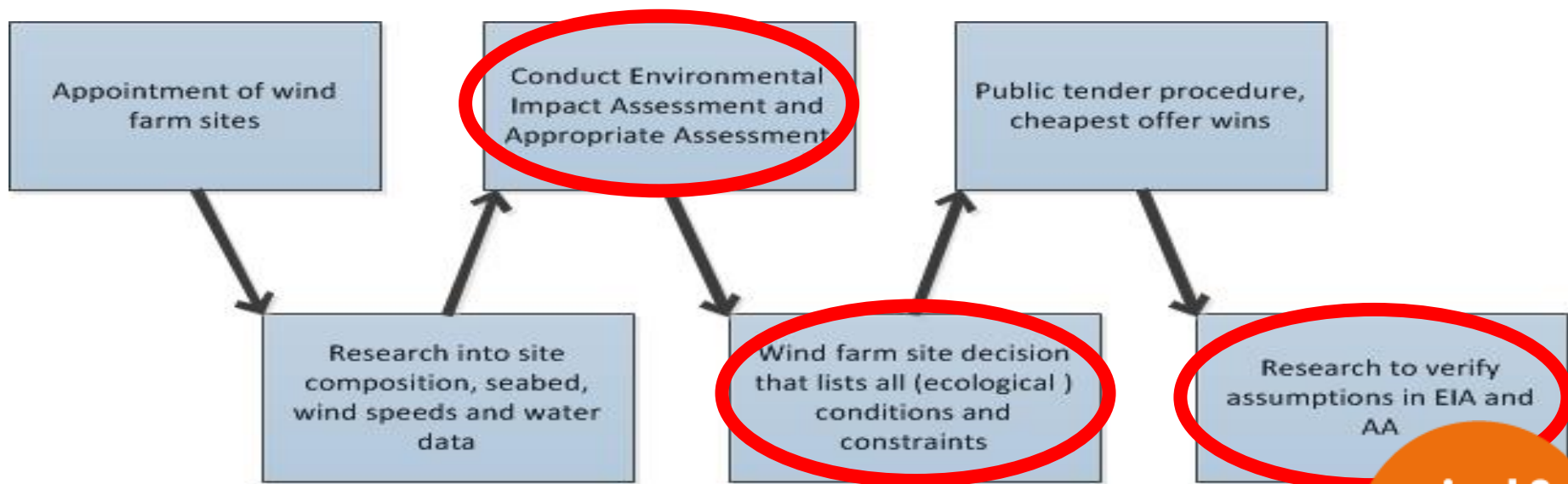
Clear pipeline of projects

	Wind farm site	GW	tender	operational
1	Borssele I and II	2 x 0.35	2016	2020
2	Borssele III and IV	2 x 0.35	2016	2020
3	HK zuid I and II	2 x 0.35	2017	2021
4	HK zuid III and IV	2 x 0.35	2019	2022
5	HK noord V	0.7	2019	2023
	Wind farm site	GW	tender	operational
6	HK west	2 x 0.7	2021	2024/2025
7	Ten Noorden vd Wadden	0.7	2022	2026
8	IJmuiden Ver I and II	2 x 1.0	2023	2027/2028
9	IJmuiden Ver III and IV	2 x 1.0	2025	2029/2030





Step wise procedure

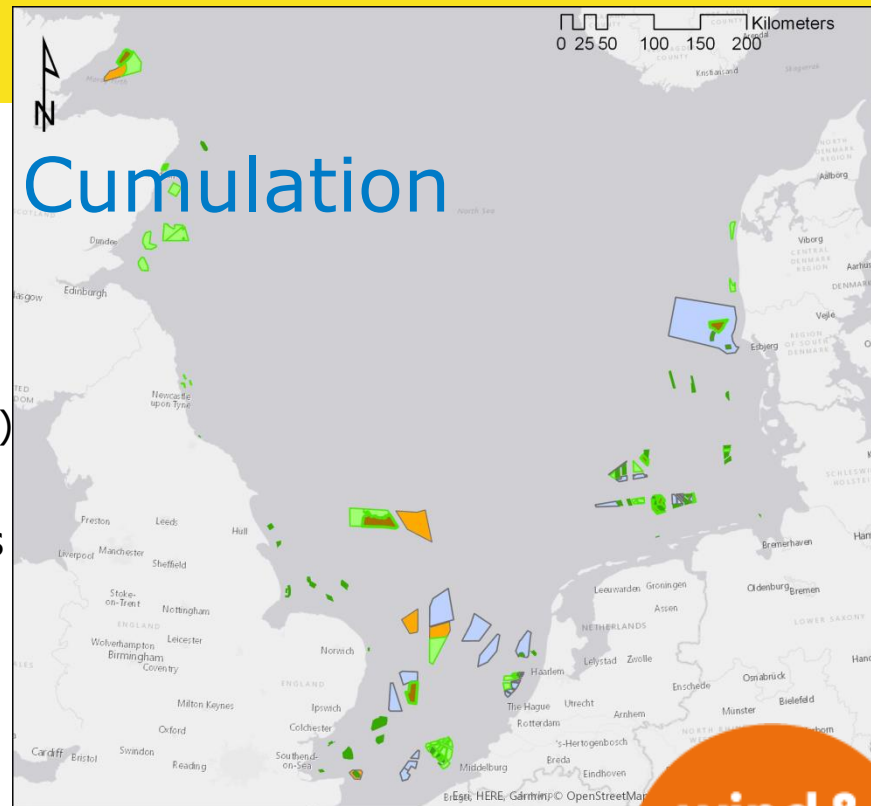




Framework Ecology and Cumulation

Cumulative effects of offshore wind farms:

- birds (collisions and habitat loss)
 - bats (collisions)
 - marine mammals (disturbance by piling sound)
- Strategic advice on roll-out of roadmap's in relation to nature legislation
 - Advice regarding regulations for wind farm site decisions (on ecology)
 - Basis for monitoring and research on offshore wind



OWP KEC 2018 (update)

OWP status

Decommissioned

Cancelled

Proposed

Development

Application

Authorised

Construction

Operational

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Current mitigating measures in WF site decisions

Birds

1. Bigger turbines (and thus fewer and further spaced out)
2. Stopping the rotors during mass bird migration peaks



Marine mammals & fish:

1. Acoustic deterring devices and low piling energy at the start of pile driving
2. Maximum noise level under water while pile driving



Bats

1. Stopping the rotors during periods of expected bat migration



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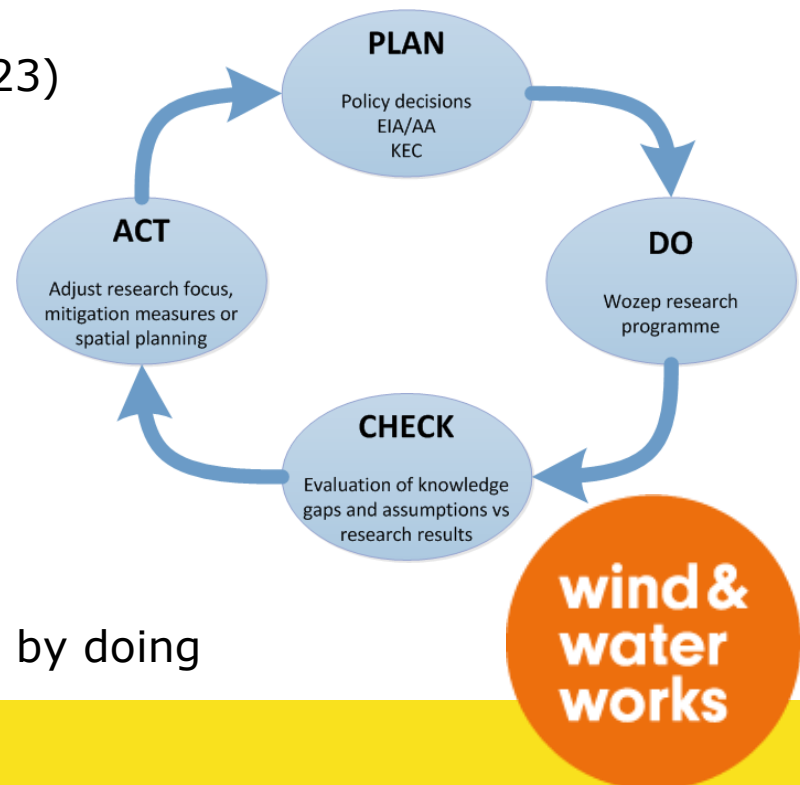


Offshore Wind Ecological Programme (Wozep)

Goals of Wozep research programme (2016-2023)

- Reduce uncertainties in knowledge gaps and assumptions in EIA/AA
 - Reduce uncertainties in upscaling offshore wind energy after 2030
- Effectiveness and necessity of mitigation measures

Part of adaptive management process: learning by doing

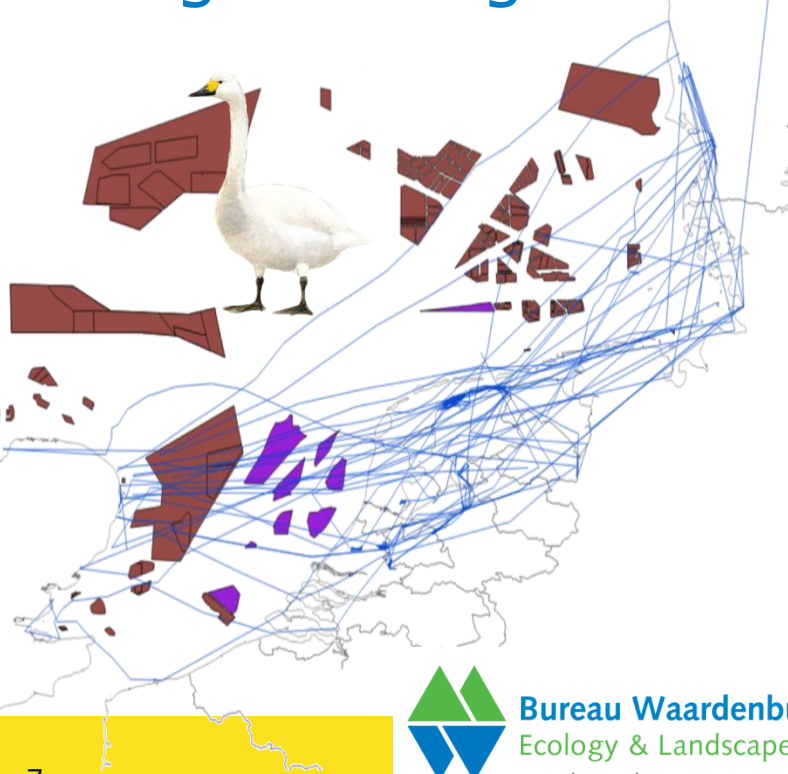




Using tracking data for CRM

	Herring Gull	
	Old estimate	New estimate
Speed (m/s)	12.8	11.3
Percentage under 25 m	75%	65%
Nocturnal activity	50%	1%
Percentage flying	40%	30%

Data from Griffin et al, 2016



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Conclusions

Procedure

- Cumulative impacts assessed – strategic advice in relation to nature legislation
- Conditions, including mitigation measures, are known in tender phase
- Costs of mitigation measures are not in the way of cost effective roll-out

Monitoring & research are the basis for better insight in:

- The magnitude of the impact (e.g. number of collisions)
- The sensitivity of populations of protected species to the impact
- Changes in impacts over time (e.g. habituation)
- Necessity and effectiveness of mitigation measures (e.g. curtailment during mass migration)

→ Reducing uncertainties in magnitude and significance of impacts =
Reducing uncertainties in upscaling offshore wind energy after 2030

A circular logo with an orange-to-red gradient background. The text "wind & water works" is written in white, lowercase, sans-serif font, stacked in three lines.

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Questions?



<https://www.noordzeeloket.nl/en/functions-and-use/offshore-wind-energy/ecology/>

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