

# The future of exploitation in North Netherlands

## Salt extraction and production in Harlingen, by Durk van Tuinen



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# General Introduction



## **Frisia Zout B.V. started 1995 on shore (green field)**

- Solution mining = pumping freshwater into deep underground salt layers
- Capacity 1,2 million ton salt per year
- Deepest salt caverns in the world at that time (2500 – 2800 m)
- Project mainly economic driven (capex € 120 million)
- Environmental and social impact subordinate back then
- Predicted subsidence rate 1 – 2 cm/y over 18 years; 35 cm after 60 years
- Subsidence bowl diameter app 6000 m

## **Two cases:**

- production on shore 1995-2021 (Barradeel & Barradeel II)
- production under Wadden Sea started 01.09.2021

## Production on shore 1995-2021

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**Barradeel: plan 18 million tons of salt with 3 caverns. However...**

...Higher subsidence rate: 4-5 cm/y in stead of 1-2 cm, due to high temperature and high pressure causing salt creep / squeeze

- Economic impact: increase of cost price
- Environmental impact: increased relative groundwater level and salination of groundwater in agricultural polders
- Social impact: Landowners and habitants worried about increased subsidence rates

### **Outcome**

- Stop production in 2003 (almost 35 cm subsidence)
- Reduction production (10 million ton instead of 18 million ton)
- Mitigations for groundwater levels elaborated with waterboard authorities

# Barradeel II

**Phase I: subsidence max 30 cm**

**Phase II: subsidence > 30 cm**

- Production started 2003 after Environmental impact study (MER)
- In 2008 still no agreement with waterboard authorities (WBA) due to
  - new policy WBA (higher water levels in the polder)
  - no willingness of stakeholders to cooperate
- Production 2003 – 2008 subsidence > 10 cm



## Area development plan

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New initiative province of Friesland brings together all stakeholders

### **Outcome: an overall area development plan**

- water level adjustment
- environmental improvements (KRW)
- upgrade village centers
- upgraded and new roads
- land swap (more house lots)
- no phase II for Frisia Zout
- budget € 48 million (thereof € 17 million due to salt and gas production)

**Conclusion: Social impact; repaired afterwards; production limitations for Frisia**

# Production under Wadden Sea

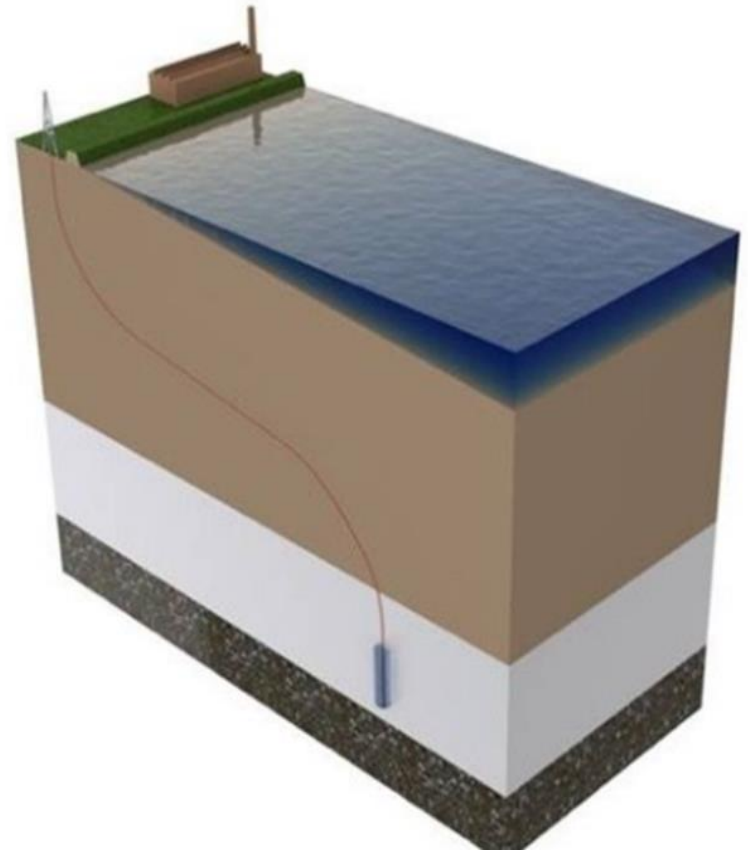
## Minister Economic Affairs (EZK):

*“Start an Environmental Impact Study (MER) before granting concession Havenmond” (winningvergunning)*

- **consulting/informing 40-50 stakeholders**
- **inviting 20 NGO's and GO's to participate in the process**
- **conducting 6 workshops for advice and judgement (no commitment)**

## Outcome Environmental Impact Study

- **only 5 views / comments (>100 expected)**
- **single, combined comment / view from NGO's**
- **positive appreciation committee for the EIS**
- **good basis for further permitting process**



# Permitting process

## Key permits

- mining concession (winningvergunning)
- operation plan (instemmingsbesluit op winningsplan)
- environmental permit (vergunning Wet Natuurbescherming)

## Resistance

- NGO's generally against mining in Wadden Sea area

## Outcome

- Green light highest court (Raad van State)
- Permits irrevocable



Waddenvereniging

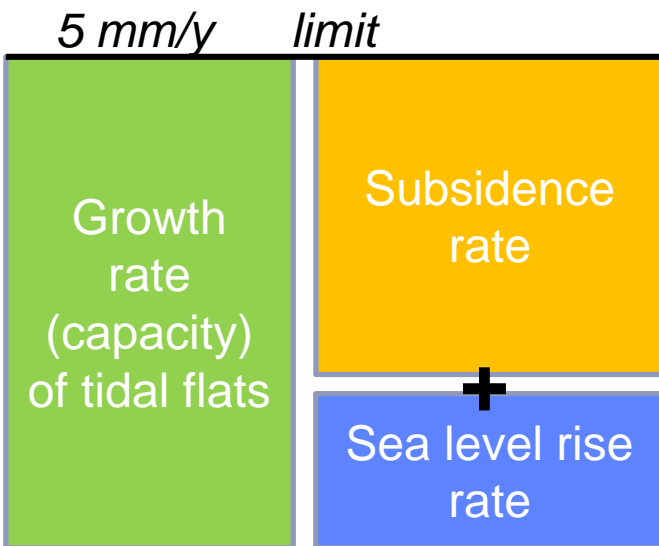


Voorpagina > Ons werk > Zoutwinning > Geen zoutwinning onder het Werelderfgoed Waddenzee!

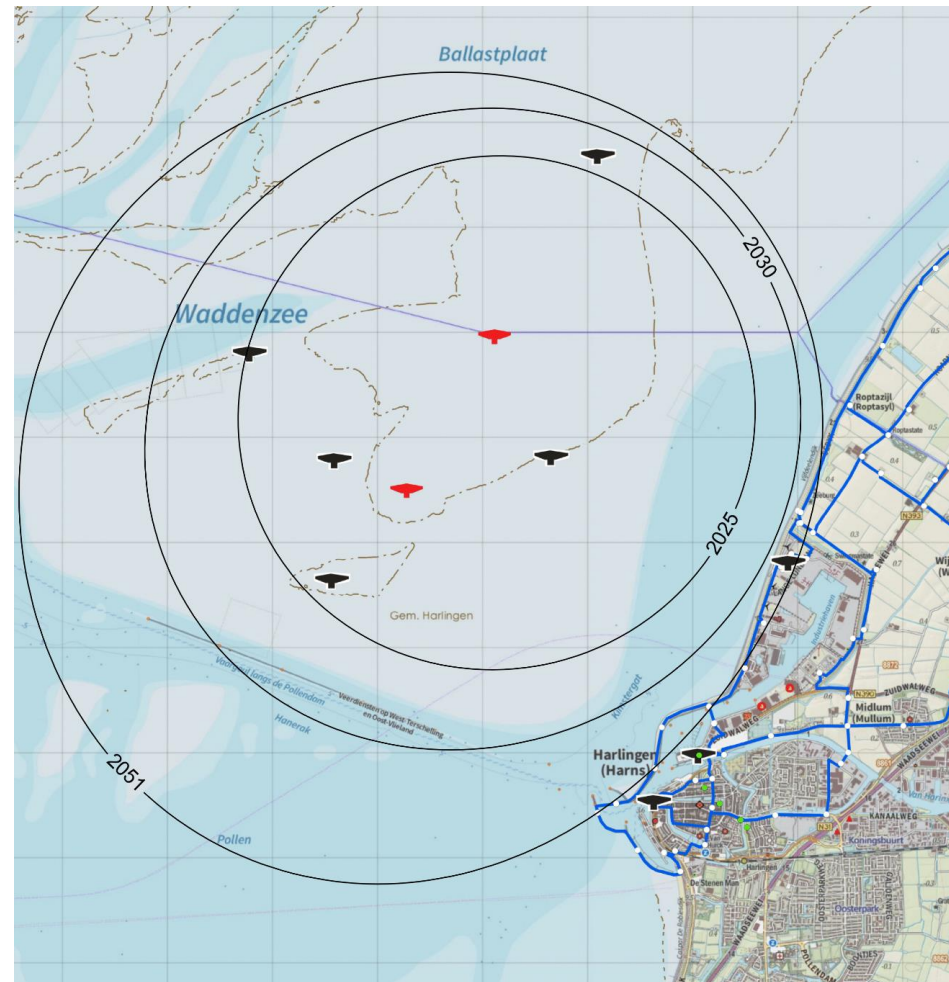
**Geen zoutwinning onder het Werelderfgoed Waddenzee!** 

# Permit requirements

- No subsidence of tidal flats
- No damage to natural values
- Hand on Tap – principle



- Annual monitoring and reporting, both geodetic and ecological (incl. independent auditing of results)



2 cm contours for deep subsidence in different years



## Finding local support for mining activity

### But than...

- Owners of real estate in the city of Harlingen start asking questions regarding possible impact in the city
- Request additional monitoring program for the city



### Pilot Harlingen

- Stakeholder collaboration for joined fact finding
- Frisia Zout financed the hardware
- Data collection and analyses together
- Funding operational cost by governments
- Agreement on thresholds (limit values regarding subsidence / tilt )
- Communication with inhabitants Harlingen

## Key learnings for Frisia

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- Involve stakeholders in an early stage (personal individual visits)
- Be open to alternatives
  - Take enough time
  - Engineer ideas together (co-create)
- Participate in stakeholder collaboration (especially when you don't have to)
  - Stay involved in realization of projects, become part of the community
- Remain in touch with stakeholders



Thank you for your attention



# Oplosmijnbouw

