

[Earthquakes Europe's gas field | Aardbevingen Groningen | Erdbeben Europas Gasfeld \(dwarshuis.com\)](#)

From a commercial success to a disaster in slow motion: The social impact of gas extraction in the Province of Groningen

23/08/2022 – DEEPNL Summer school

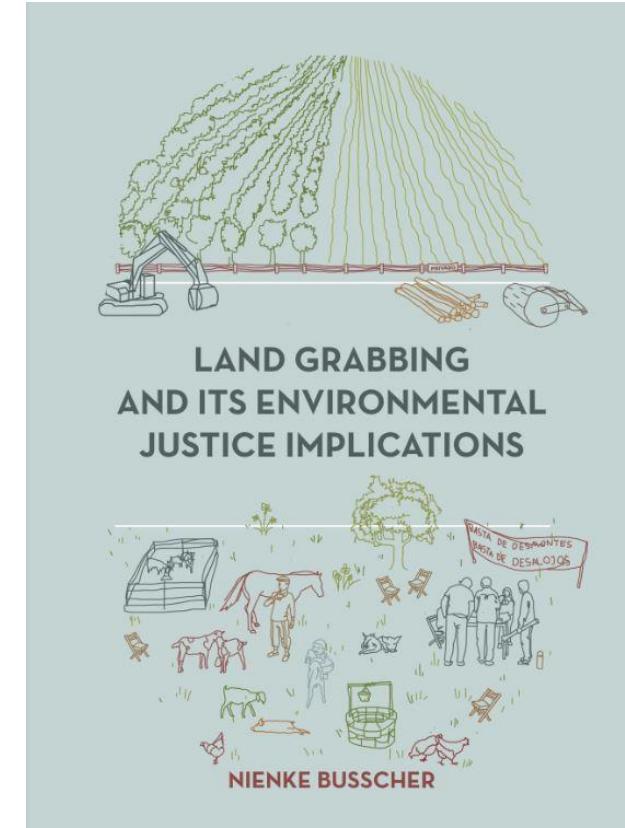
DR. NIENKE BUSSCHER



Kennisplatform
Leefbaar en Kansrijk
Groningen



About me





The Knowledge Platform – Social impacts of mining and energy projects



The Knowledge Platform

2013: Knowledge monopoly Ministry of Economic Affairs and NAM

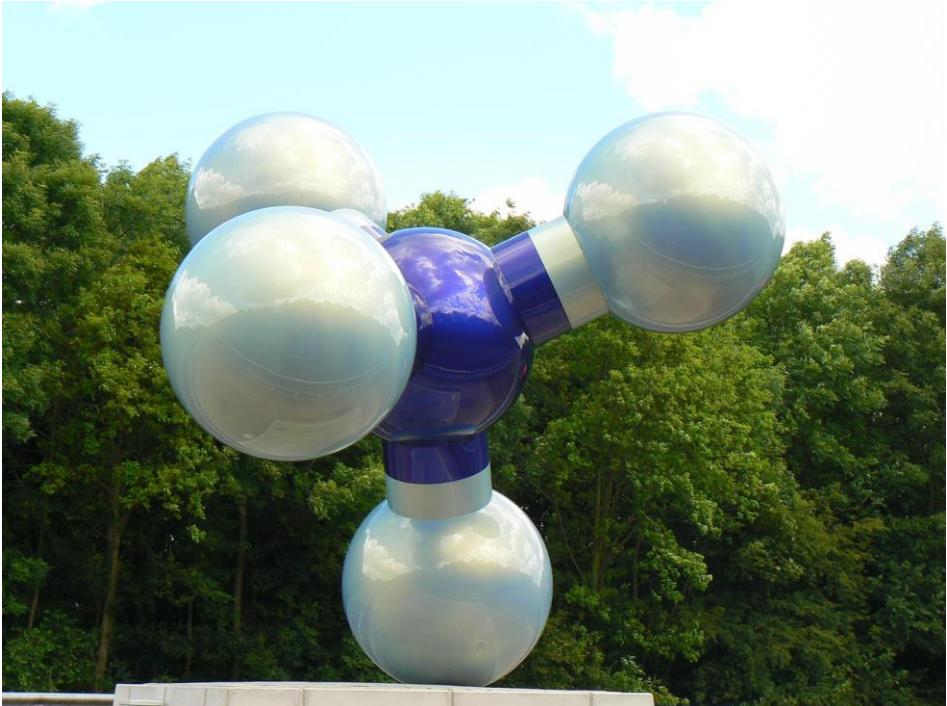
Current situation: 3 Knowledge Platforms

3 themes:

- Societal impact
- Recovery
- Lessons



Setting the scene



2009: Artwork celebrating the 50 years of gas extraction in the Province of Groningen.



2019: Artwork symbolising the negative impact of the gas extraction.

This presentation

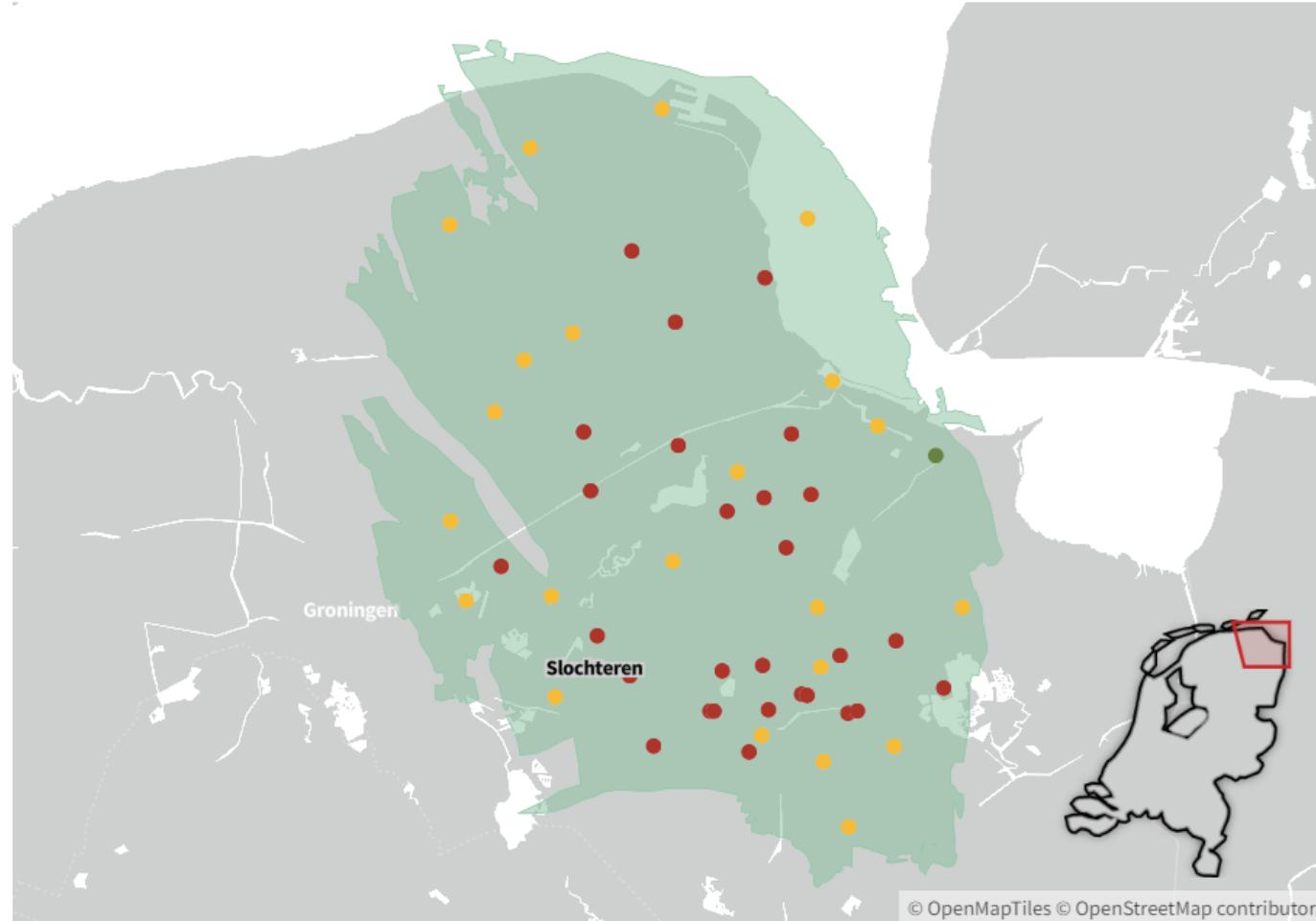
- The Groningen gas field
- Societal impact of the gas extraction
- Challenges ahead and lessons learned

The Groningen gas field

1. Location
2. History and characteristics
3. Benefits, wealth and controversy
4. Earthquakes and soil subsidence
5. The governance
6. International context

1.Location

Locatie Groningen-gasveld



Bron: [NLOG](#) • NRC 170622 / RL

Credit: NRC, 2022

2. History and characteristics

- 1959: The Groningen gas field discovered.
- 1963: Industrial gas extraction started.
- 3 km: depth of the gas, in a porous layer of sandstone.
- 900 km²
- 2740 billion m³ gas – 523 m³ remains (Damveld, 2022).
- Top 10 gas fields – biggest of Europe.

2. History and characteristics

- Mine on land – low extraction costs.
- Densely populated.
- Highly efficient operation – centralised control facility.
- Transition (international) households to Groninger gas.



3. Benefits, wealth and controversy

- General support for and dependence on gas.
- Recovery and employment after world War II.
- Welfare state (pensions).
- Large infrastructural works paid from revenues.
- Only 1% to Groningen (Instituut voor Onderzoek Overheidsuitgaven, 2006).
- Caused the economic phenomenon called 'Dutch Disease'.

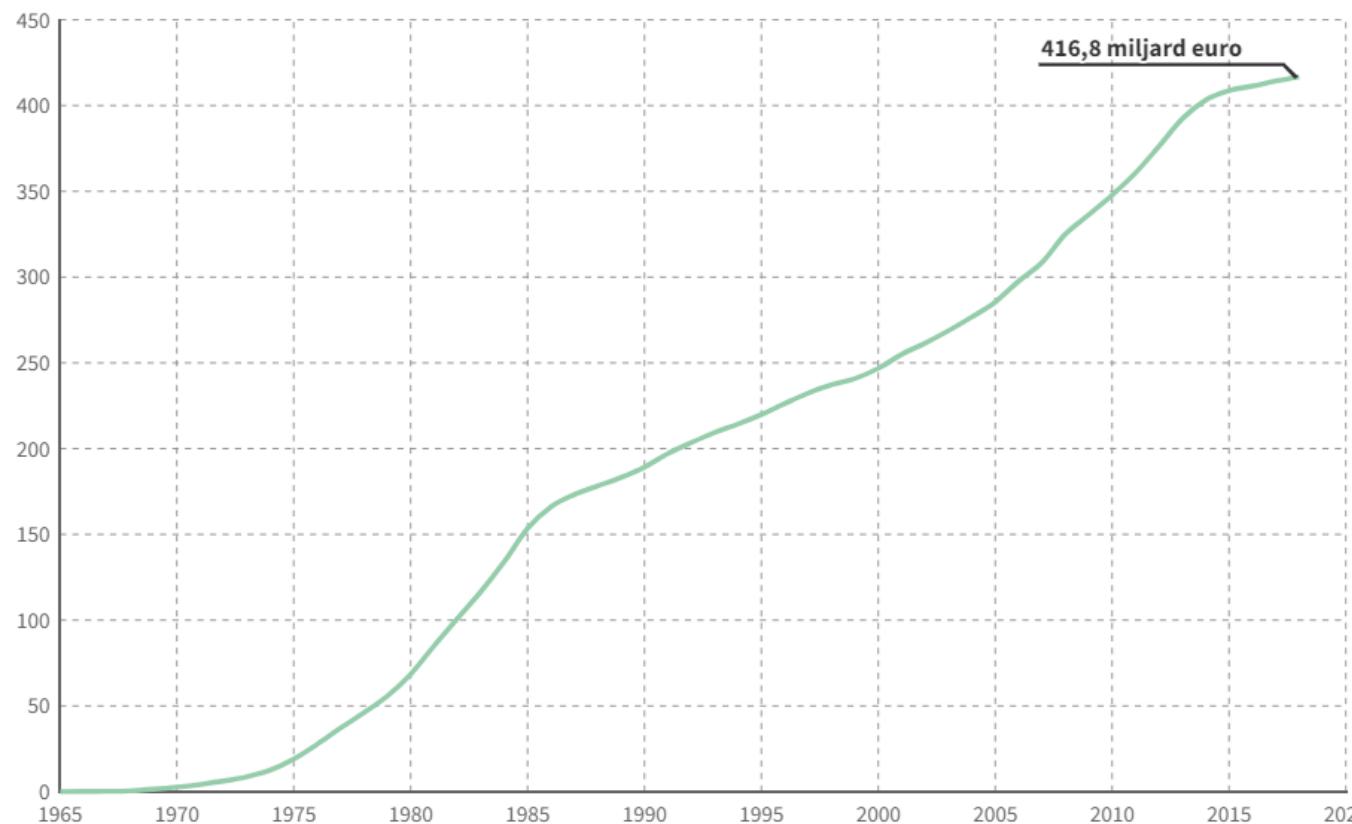


Source: Nieuwsblad van het Noorden, 1960

3. Benefits, wealth and controversy

Cumulatieve aardgasbaten overheid, in miljarden euro's

Omgereden naar prijsniveau 2018



Bron: [CBS](#)

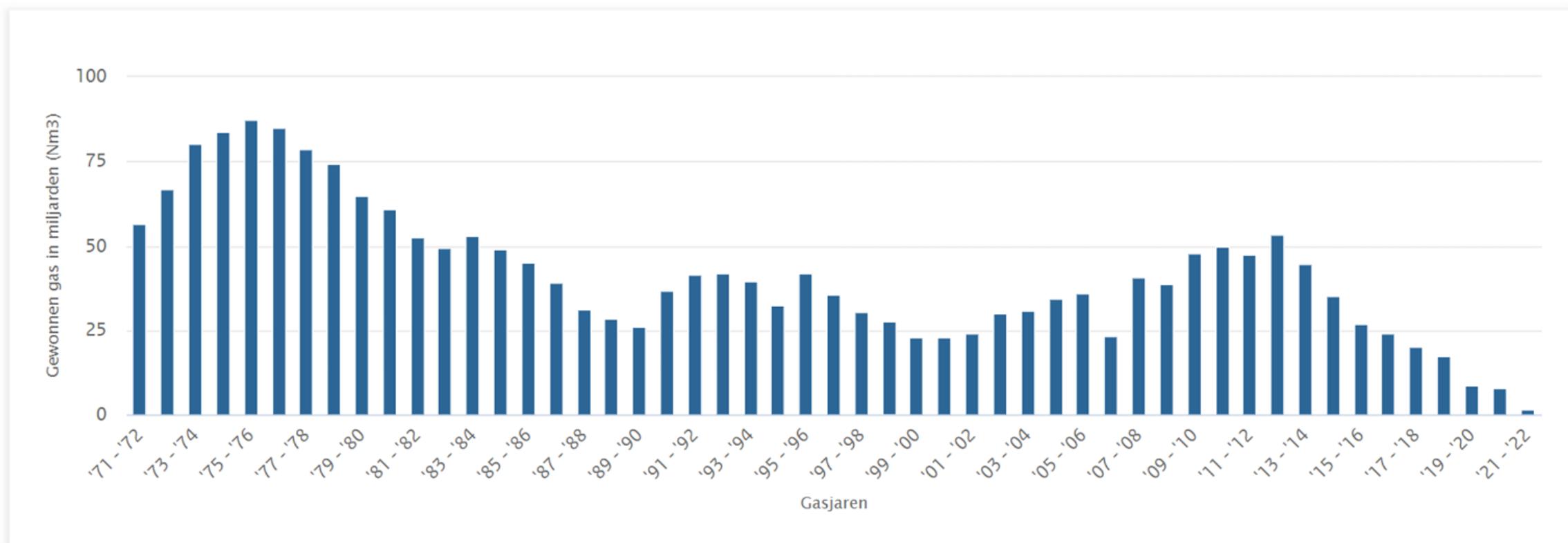
Credit: NRC, 2022

3. Benefits, wealth and controversy

- Earthquakes are not part of the traditional hazard scape of the Netherlands (Bakema et al., 2018).
- Earthquakes take only seconds, shallow depth.
- 1963 engineer Willem Meiborg warns for soil movement due to gas extraction. The NAM denied.
- 1986 first earthquake.
- 1986 Geographer Meent van der Sluis expressed his concerns. He was publicly ridiculed.

3. Benefits, wealth and controversy

Jaarlijks gewonnen gas uit het Groningenveld



Bron: NLOG

Laatst bijgewerkt: 26-04-2022

3. Benefits, wealth and controversy

Until 1993: problems denied by NAM and the Dutch government.

3 fold denial:

1. Causal links gas extraction and earthquakes.
2. Earthquakes cause damage.
3. Earthquakes cause safety issues.

Mitigation strategies:

- Identify buildings at risk + reinforcement.
- Reduction gas extraction only in 2014.

3. Benefits, wealth and controversy

PREMIUM

NAM: 2800 huizen in Groningen versterken

22 december 2017, 11:59 · Groningen

Deel dit artikel



Source: Dagblad van het Noorden, 2017

PREMIUM

Toezichthouder SodM: beoordelen huizen in aardbevingsgebied Groningen gaat goede kant op, versterkingsoperatie loopt nog steeds niet goed

Lyanne Levy en Bas van Sluis · 23 juni 2022, 14:50 · Groningen

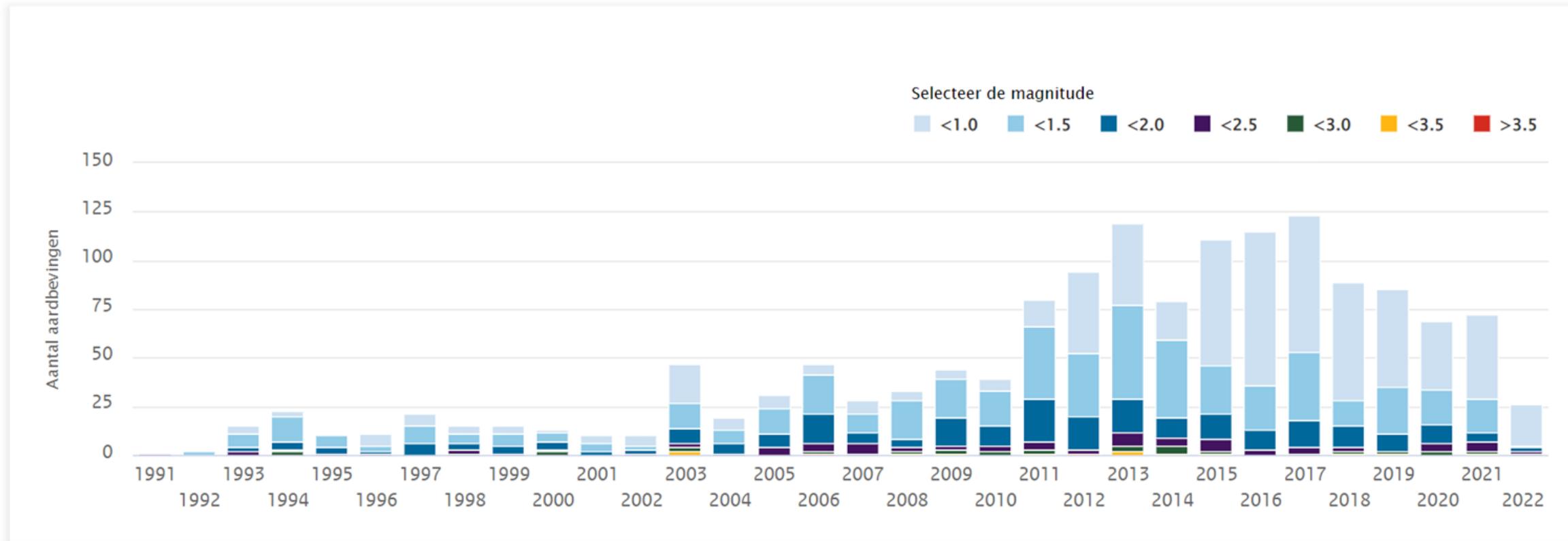
Deel dit artikel



Source: Dagblad van het Noorden, 2022

4. Earthquakes and soil subsidence

Aantal aardbevingen in het Groningenveld



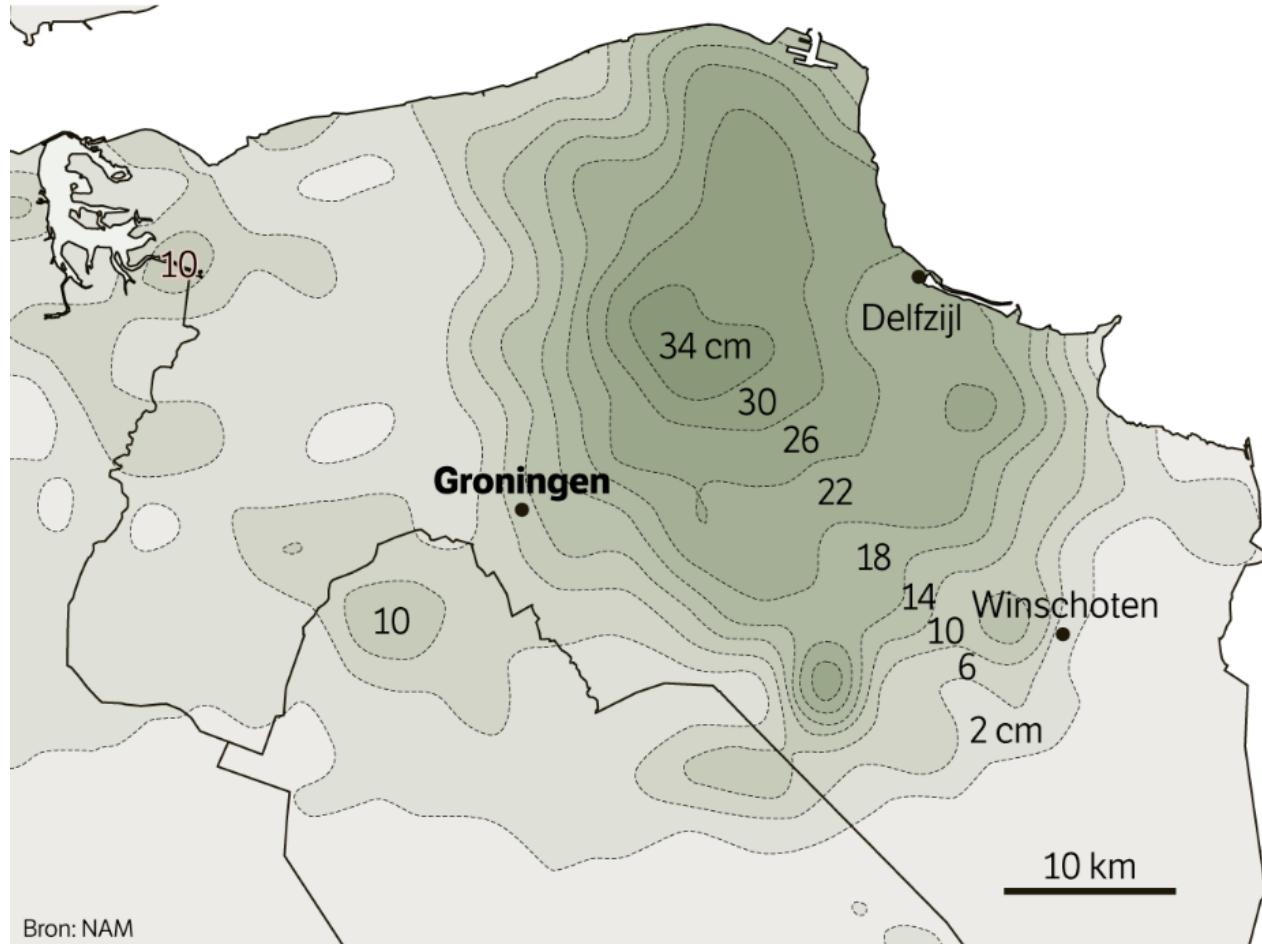
Bron: KNMI

Laatst bijgewerkt: 14-08-2022

4. Earthquakes and soil subsidence

Bodemdaling door gaswinning vanaf de start van de gasproductie tot 2018

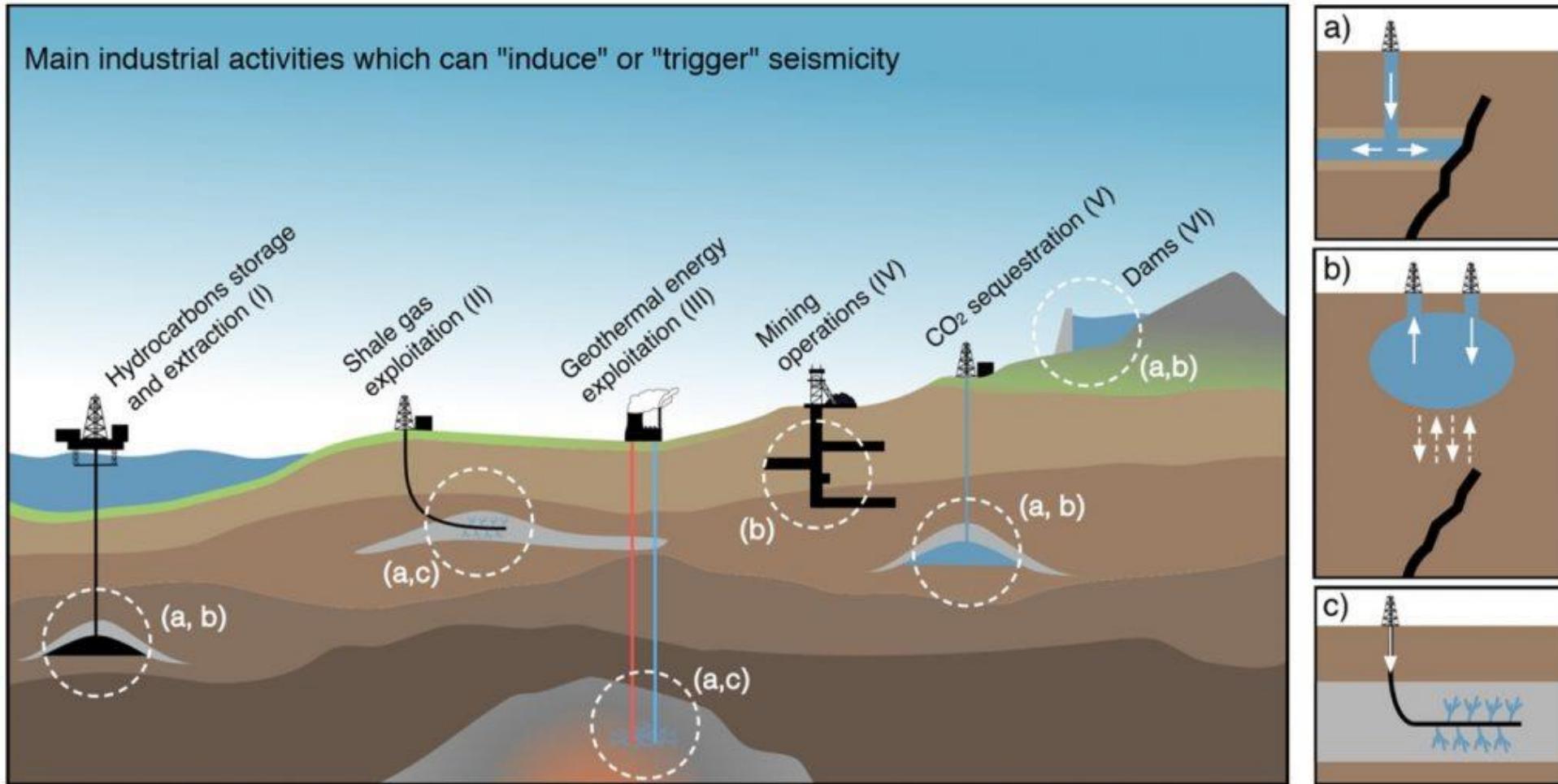
Gemodelleerd op basis van beschikbare waterpasdata van 1964 tot 2018



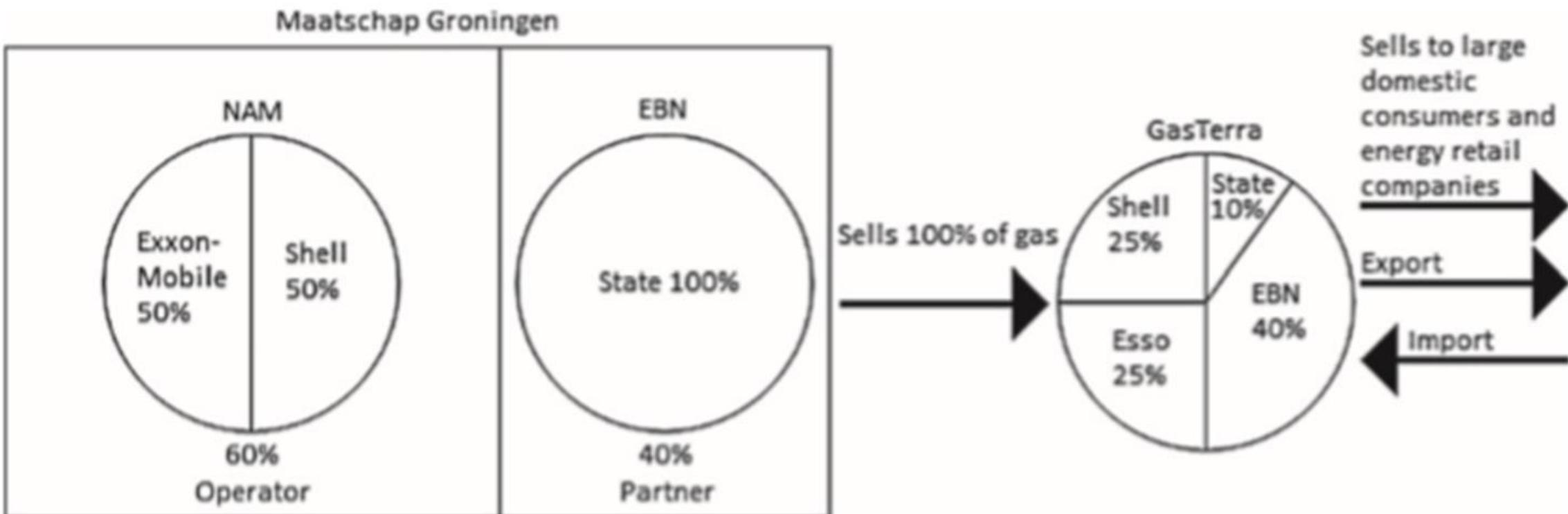
Bron: NAM

Credit: NRC, 2022

4. Earthquakes and soil subsidence



5. Governance



Source: van der Voort & Vanclay, 2015

5. Governance

- Initially the NAM was responsible for resolving earthquake issues: damage repair and reinforcement.
- Damage claims and reinforcement procedures intransparent.
- In 2015 burden of proof changed.
- National government took over responsibility over operation in 2020.
- Parliamentary Inquiry started in 2021.

5. Governance

- Increasing societal pressure on Dutch government.
- 2009: Groninger Bodembeweging established.
- 2012: turning point with highest gasquake so far (M3.6).
- Earthquakes as high as M5.0 possible.
- 2018: announcement to end gas extraction.

NOS Nieuws • Donderdag 29 maart 2018, 19:29 •
Aangepast donderdag 29 maart 2018, 19:29



Hoe Wiebes tot historisch besluit kwam om gaskraan dicht te draaien

De Groningse gaskraan gaat helemaal dicht en minister Wiebes maakte vandaag bekend hoe hij dat wil doen. Er komt een stikstof-installatie om buitenlands gas geschikt te maken voor gebruik in Nederland.

De komende jaren wordt de gasexport naar het buitenland teruggeschoefd. Binnen twaalf jaar moet de gaskraan helemaal dicht zijn. Na jarenlang wiken en wegen is dit het definitieve besluit. Hoe kwam dat precies tot stand?

NOS Nieuws • Dinsdag 10 september 2019, 12:14 •
Aangepast dinsdag 10 september 2019, 13:09



Gaswinning Groningen stopt al in 2022

Het kabinet wil dat er veel eerder een eind komt aan de gaswinning in Groningen dan eerder was gepland. Minister Wiebes gaat nu uit van medio 2022. Eerder was nog sprake van 2030. Wiebes zegt verder dat de gaswinning volgend jaar al onder het 'veilige niveau' van 12 miljard kubieke meter komt, namelijk 11,8 miljard, in plaats van de eerder gedachte 15,9 miljard.

6. International context

- Increasing international pressure to continue extraction.
- War in Ukraine and dependency on Russia.
- Contracts with other countries.
- Delay in building the nitrogen factory Zuidbroek.

REUTERS®

World ▾ Business ▾ Legal ▾ Markets ▾ Breakingviews Technology ▾ Investigations More ▾

March 16, 2022
12:03 PM GMT+1
Last Updated 2 months ago

Business

For Dutch province, Ukraine war is a call to pump natural gas

By Anthony Deutch

7 minute read

Twitter Facebook LinkedIn Email Print



Current situation

- Unclear if gas extraction will stop.
- The earthquakes has long been perceived of a technical and financial problem, it has become a societal problem;
 - Bureaucracy, inequality and insecurities.
- The institutional landscape changes constantly. Governance is the problem instead (Bovenhoff et al., 2021).
- Even if gas extraction stops, earthquakes may continue for 10–15 years or more.

Portrait



Societal impact of the gas extraction

1. Material damage
2. Immaterial damage
 - a) Policies and communication
 - b) The housing market and economic developments
 - c) Health and wellbeing

1. Material impact

- 410,000 residents exposed to induced earthquakes.
- Thousands of houses are or will be demolished as they are unsafe.
- Many buildings need fortification and are damaged.
- Not only houses but also schools, churches and hospitals are affected.
- Technical solutions instead of common sense.
- Inspection costs €10.000 – €100.000.

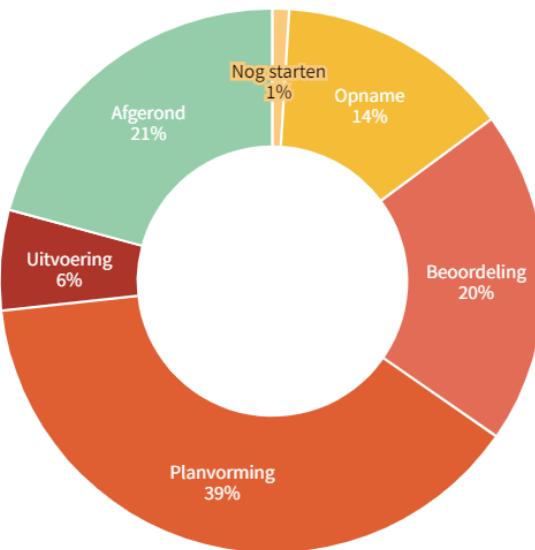


1. Material impact

reinforcement of possibly 27.000 buildings

Verdeling adressen over de versterkingsfasen, stand 30 juni 2022

Totaal 27.181 adressen



Bron: [NGC](#)

■ Nog starten: Het versterkingstraject is nog niet gestart

■ Opname: Verzamelen bouwtechnische gegevens

■ Beoordeling: Voldoet het pand aan de veiligheidsnorm?

■ Planvorming: Voor adressen die niet aan de veiligheidsnorm voldoen

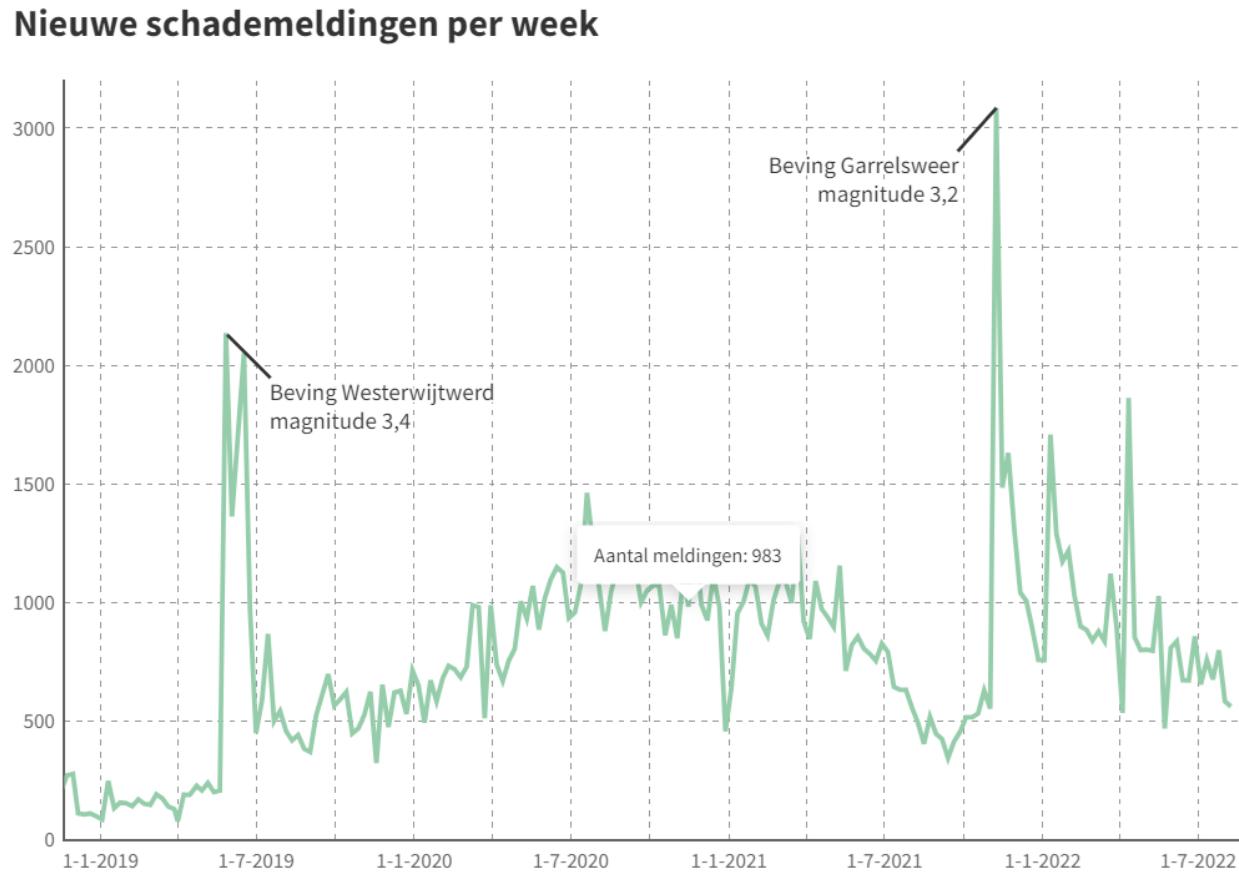
■ Uitvoering: De eigenaar is akkoord met het versterkingsplan

■ Afgereond: Adres voldoet al aan veiligheidsnorm, het pand is versterkt, of wordt gesloopt

Credit: NRC, 2022

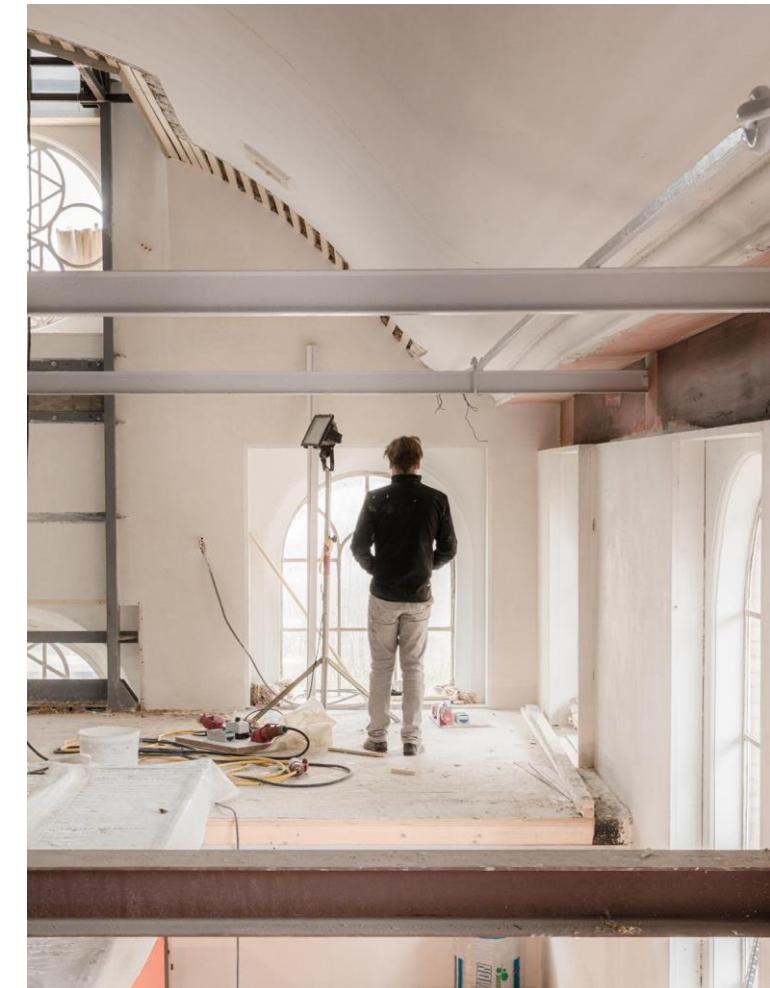
1. Material impact

appr. 20.000 damage claims pending



Bron: [IMG](#)

Credit: NRC, 2022



1. Immaterial impact

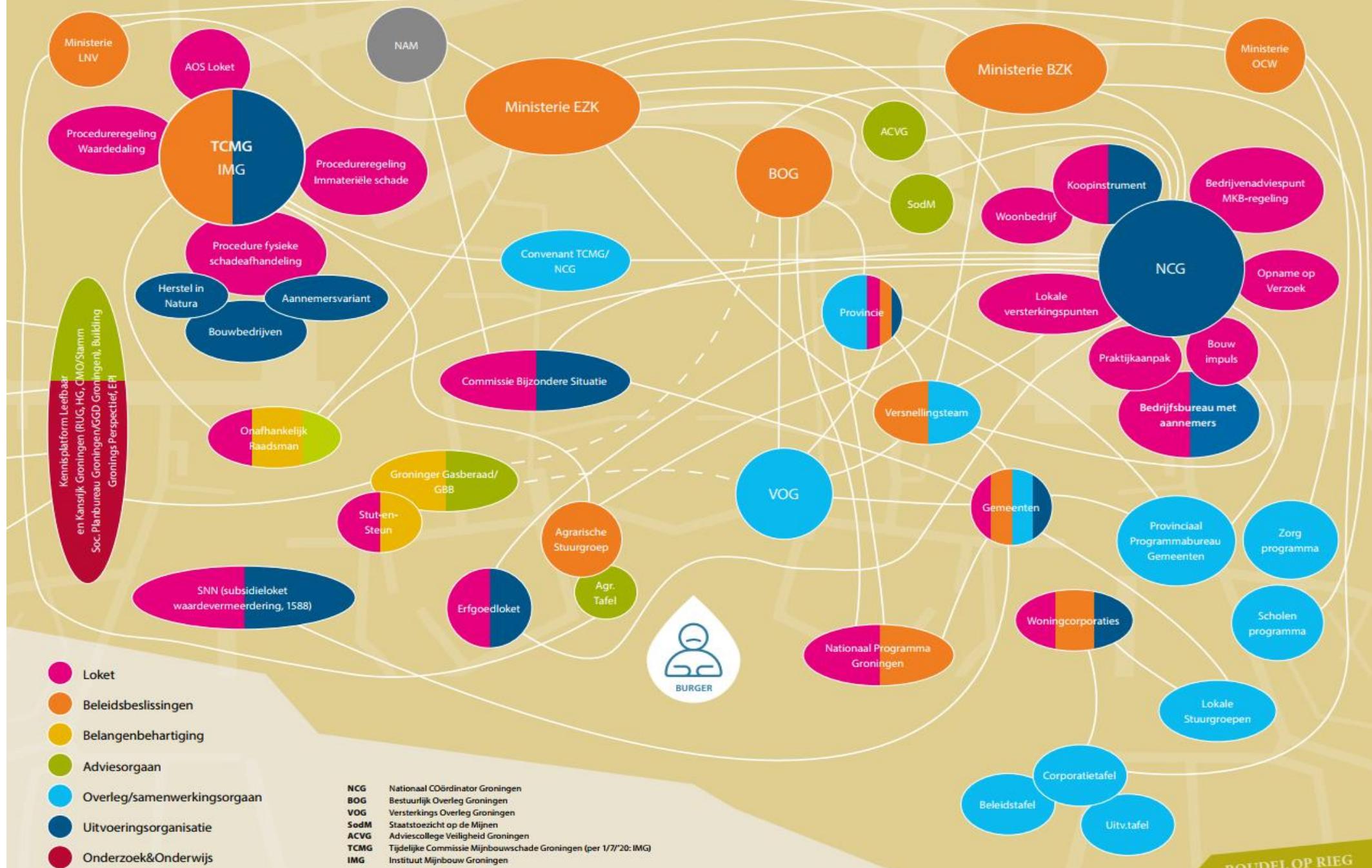
- Daily lives of many people are affected on different levels.
- People may need to leave their homes temporarily.
- Long-term insecurity.
- Economic interest is still placed above the interests of inhabitants.



a) Policies and communication

- Procedures are stressor for inhabitants.
- Insufficient communication.
- Feelings of injustice, dissatisfaction and frustration.





a) Policies and communication

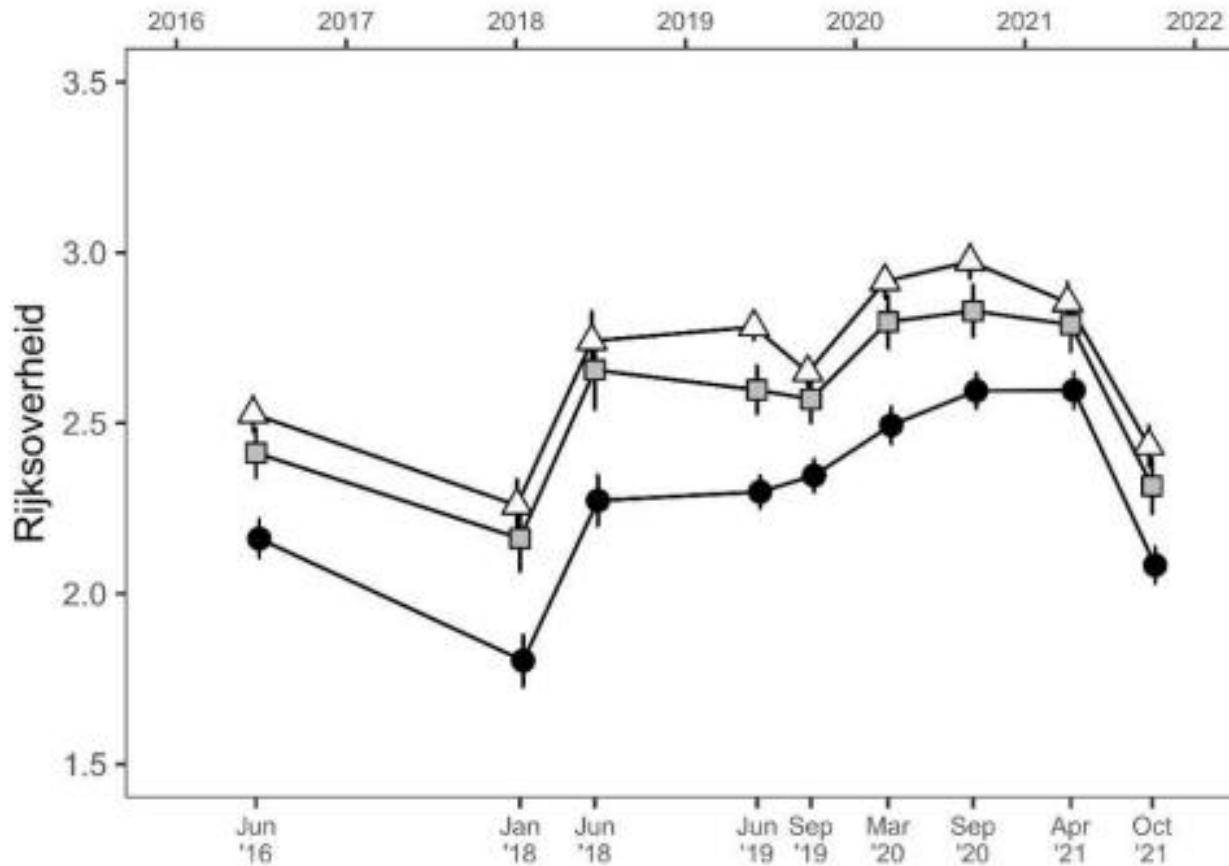


Figure: Trust in institutions on a scale of 1 to 5 as a function of time and trust, with a confidence interval of 95% (Stroebe et al., 2022).

b) The housing market and economic impact

- Distorted housing market.
- Investments region.
- Economic impact on households.



c) Health and wellbeing

- Chronic stress, fear, insomnia, depression.
- Frustration and powerlessness.
- People with multiple damage claims feel significantly less safe (Stroebe et al., 2022)
- Children and young people experience similar health impact as adults.



Challenges ahead and lessons learned

1. Restoration of relations and regaining trust
2. Vision for the future
3. Lessons learned

1. Restoration of relations and regaining trust

- Relations are damaged.
- Torchlight processions and other forms of civic action.
- No Social License to Operate.





1. Restoration of relations and regaining trust

- Problems in Groningen have been denied far too long.
- National government made efforts to mitigate the impact. But many broken promises.
- Many people have been exposed to uncertainty for years.
- Reconciliation and restoring trust vital.

2. A vision for the future

- Money is not the solution.
- Participation and dialogue on different levels.
- Integral approach.



3. Lessons learned

- Need for Social Impact Assessment before the start of any project, plan, program.
- Mining processes are unpredictable – Acknowledge uncertainty.
- Listen to citizens and give them control.
- Develop monitoring system together with citizens.
- Importance of making responsibilities clear.
- Support of citizens crucial to any (mining) project.

Questions?

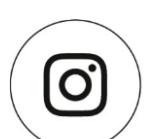


n.a.busscher@rug.nl

www.kennisplatformleefbaar.nl



@KPleefbaar



@Kennisplatform



Kennisplatform Leefbaar
en Kansrijk Groningen