

Province of Groningen

In case of a flooding event



Quick tour through Groningen



2004-2015: 16% of Groningen area
under influence of
natural gas extraction
and subsidence

GRO

Stroom van energie

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Situation nowadays

Risk of breach: 1/4000 years



What is at risk?



Local species



What is at risk?

Homes



€ 46 Billion

Investments

Agriculture



€ 9,5 Billion

Groningen
Seaports



€ 37 Billion

Costs of Flooding

Projected damages: €20 billion

Death toll: 500-1000 people





70% of the Dutch Gas Production
If Groningen Gas Field
gas production stops
56% of the European Gas Production

Worst case scenario?

1304000 sea level rise

1 / 100!?

1 / 2000!

‘Watersnoodramp’ – Zeeland, 1953

Presentation by

Miriam von Thenen

&

André Dijkstra

Music

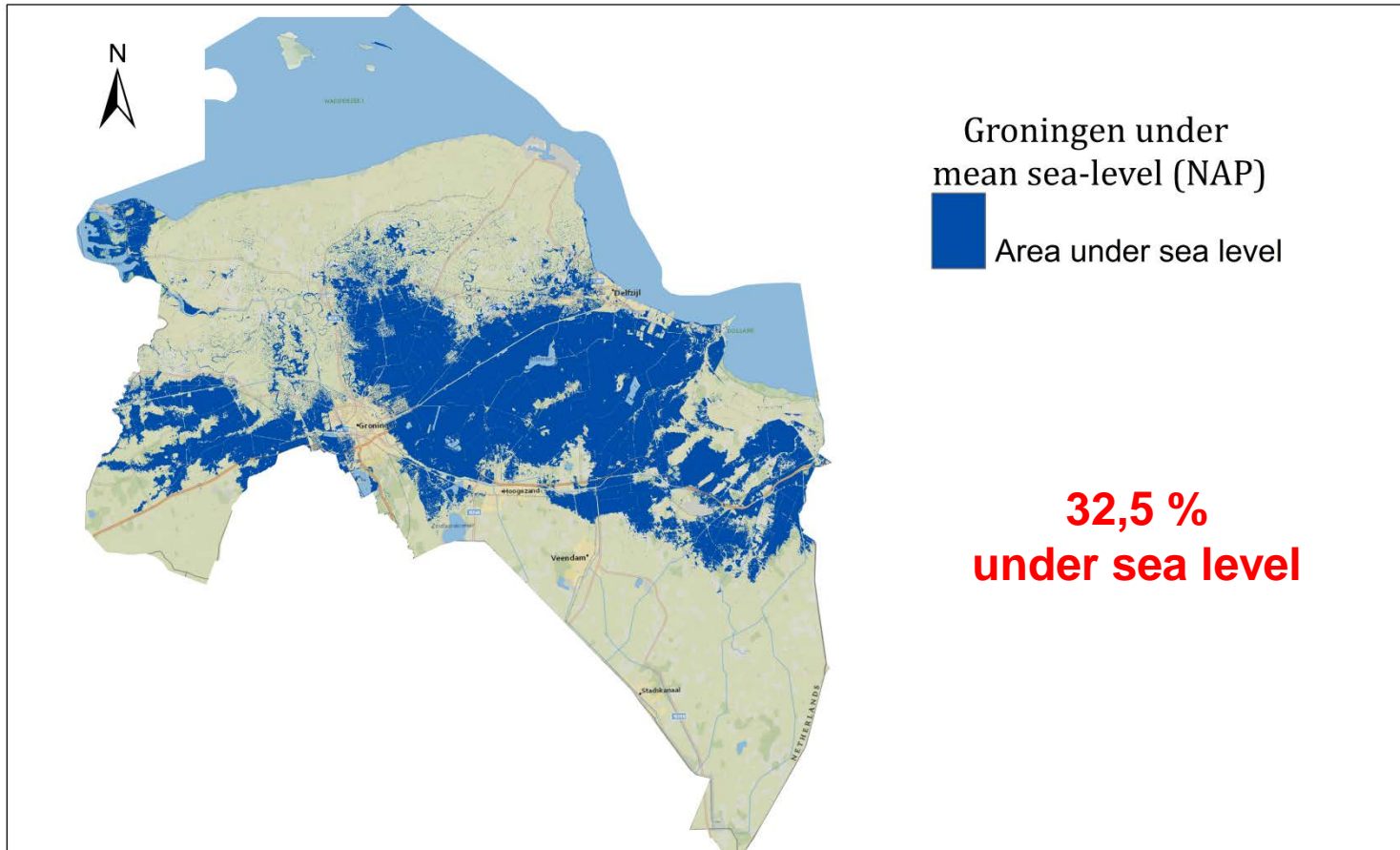
‘Main Theme’ – The Tudors

‘Strength and Honor’ – Gladiator sound track

Sea level rise and subsidence in Groningen

Presented by
André Dijkstra, André Eshuis, Sandra Kunze
and Miriam von Thenen

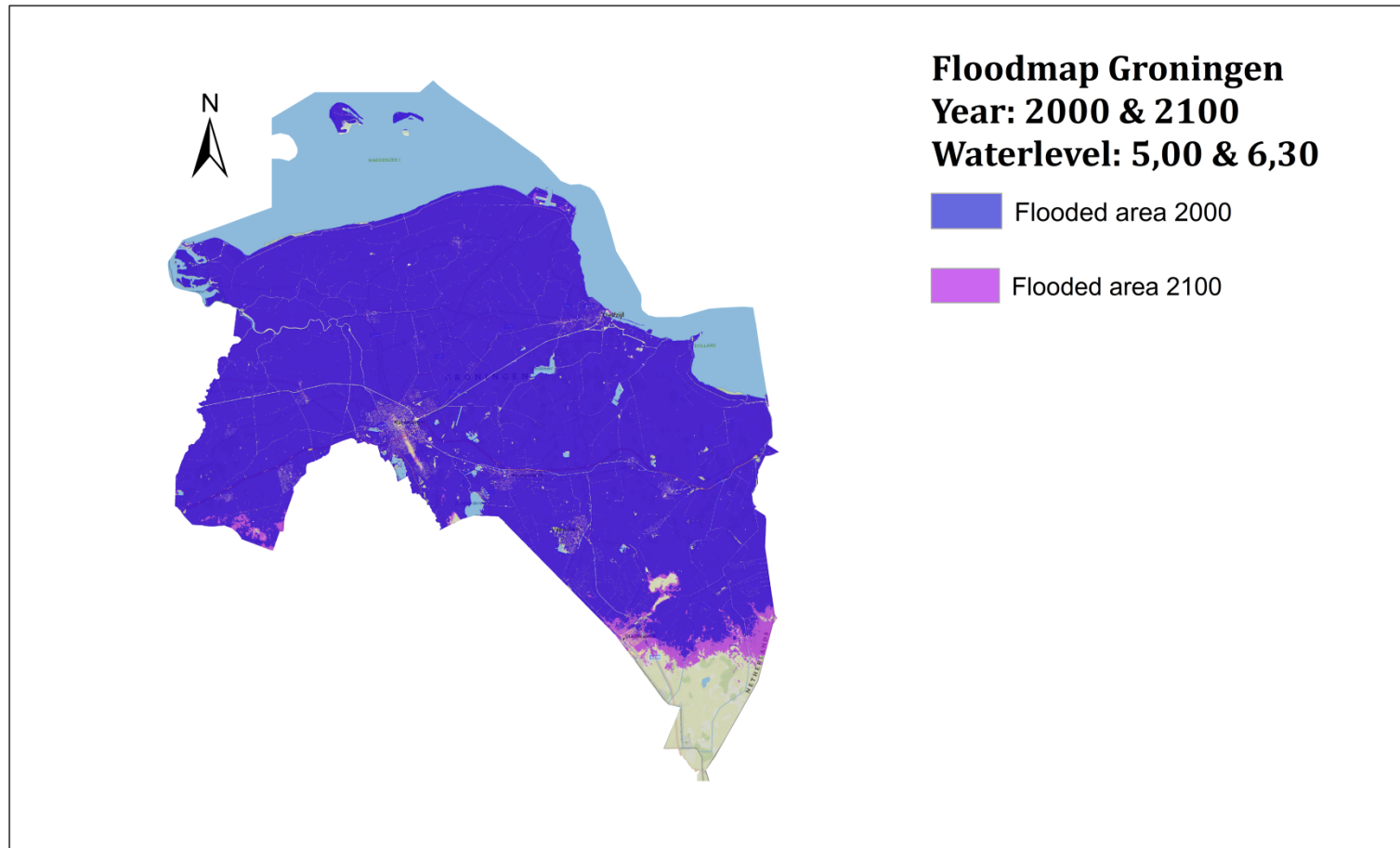
Groningen



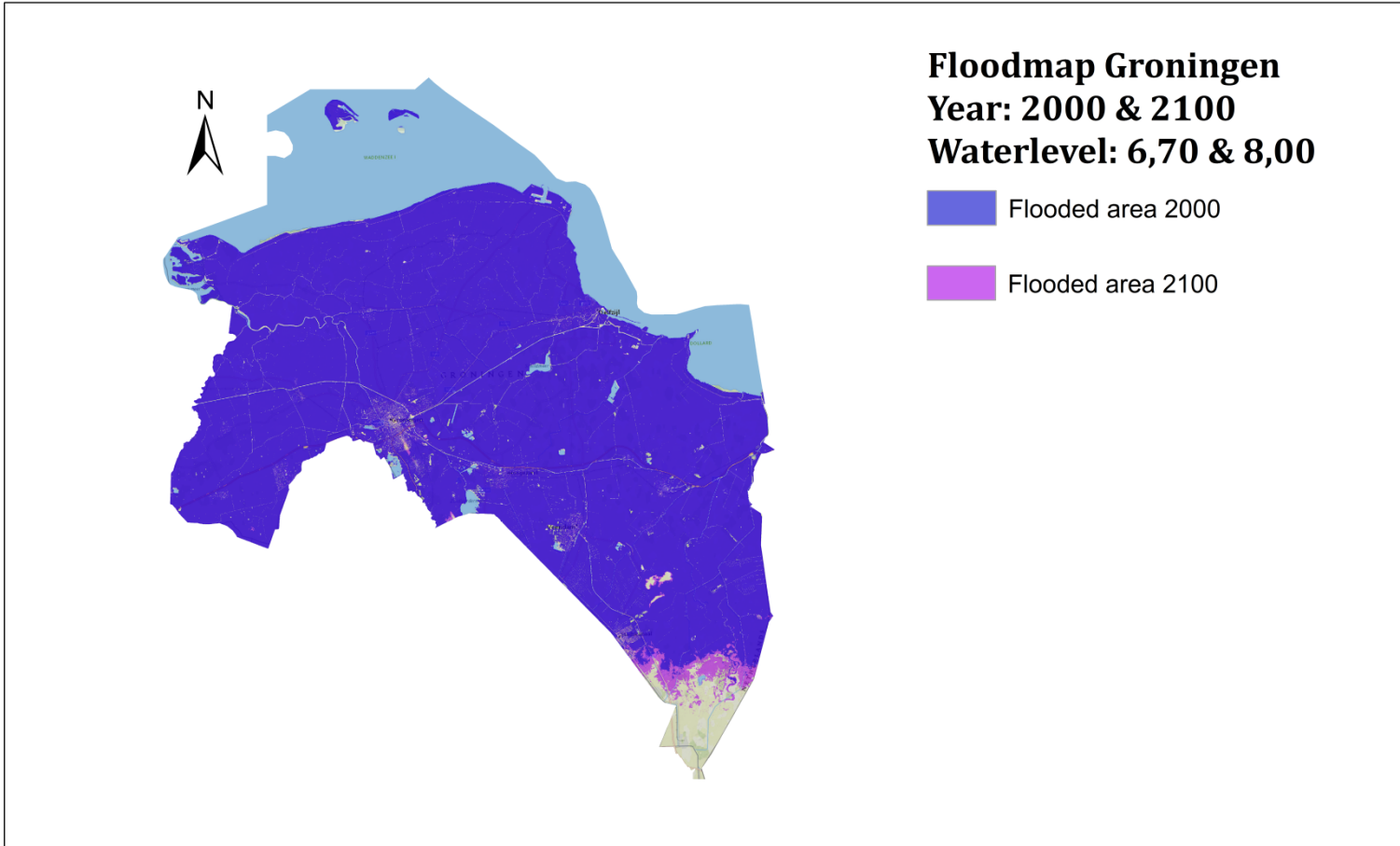
Content

- Flood Scenario's
- Chance of breach nowadays
- Effects of flooding
- Chance of breach in 2100
- Possible solutions
- Perspective

Flooding Groningen, 5.00m



Flooding Groningen, 6.70m



Chance of dike breach nowadays

Once every **4000** years



Effects of flooding



Ecological impacts



Impacts on safety

Inhabitants of the city are in danger

Most of the city



Seawater reaches the city within 36 hours!

Economic impacts



91%-95% under water
8,6 – 9,0 billion



Buildings flooded
81.052 square km

Economic impacts



35% of Power production

15% of Chemical industry

Google Data storage

Economic impacts



Flooded Groningen Gas Field

Significance for the Netherlands

Significance for Europe

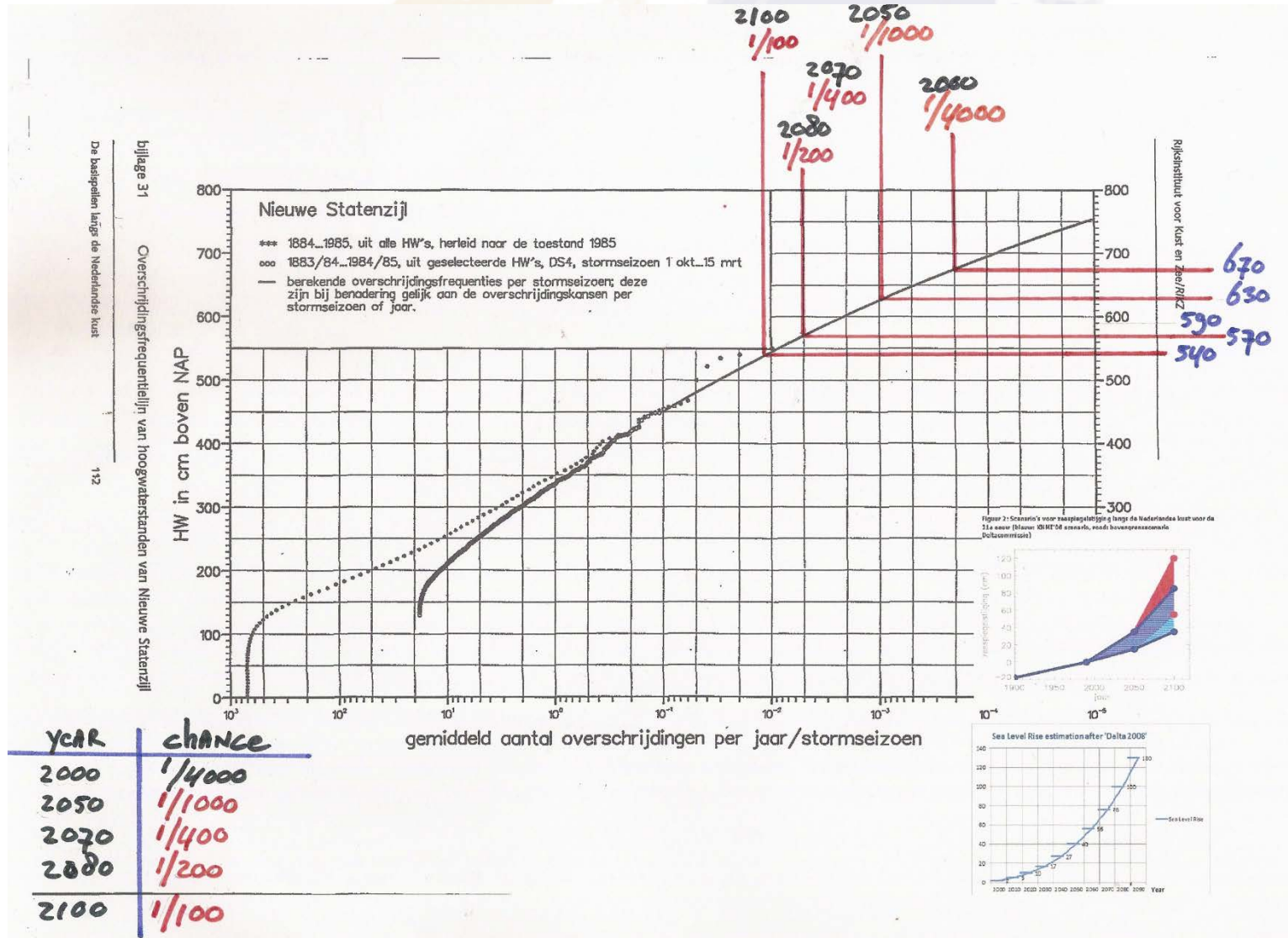
- 70% of the gas production
- 58% of the European gas production
- 36% of power stations run on gas



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Chance of breach in 2100



Chance of breach in 2100

2000 → 1/4000

2050 → 1/1000

2070 → 1/400

2080 → 1/200

2100 → 1/100

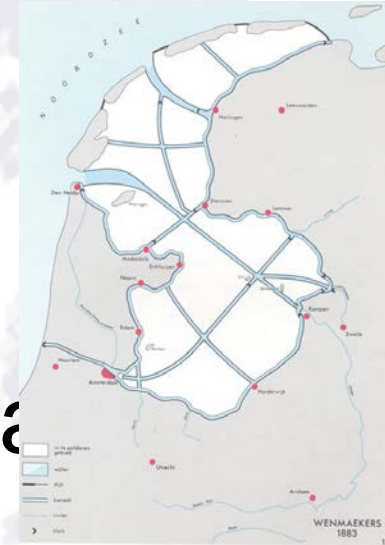
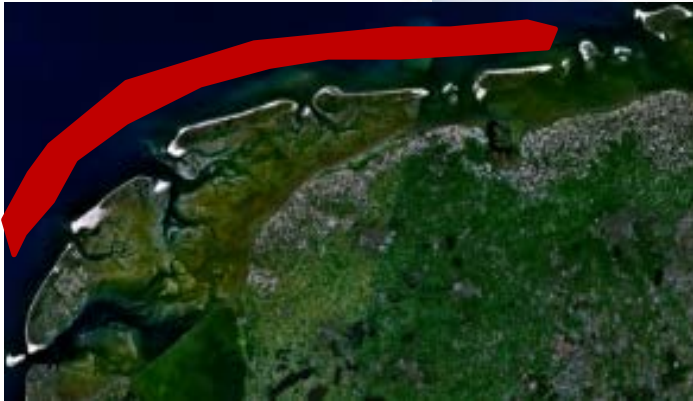


Chance of breach in 2100



Which risk is tolerable?

Possible Solutions

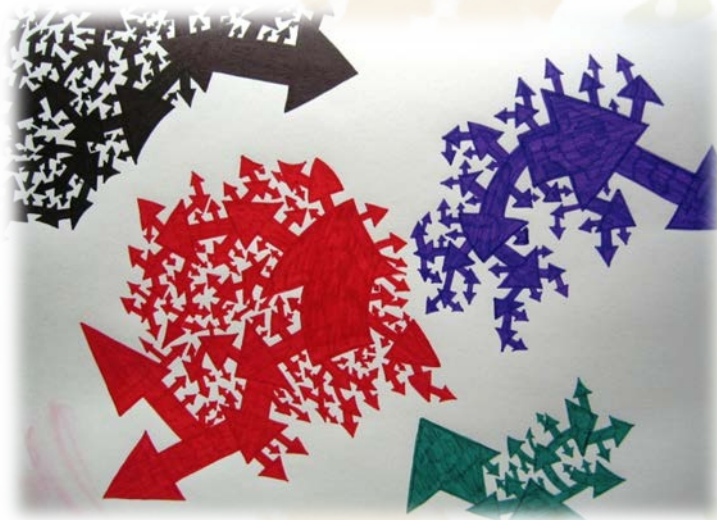


New plans for the a



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People
Planet
Profit



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