

**Haarlem**

**3 maart 2026**

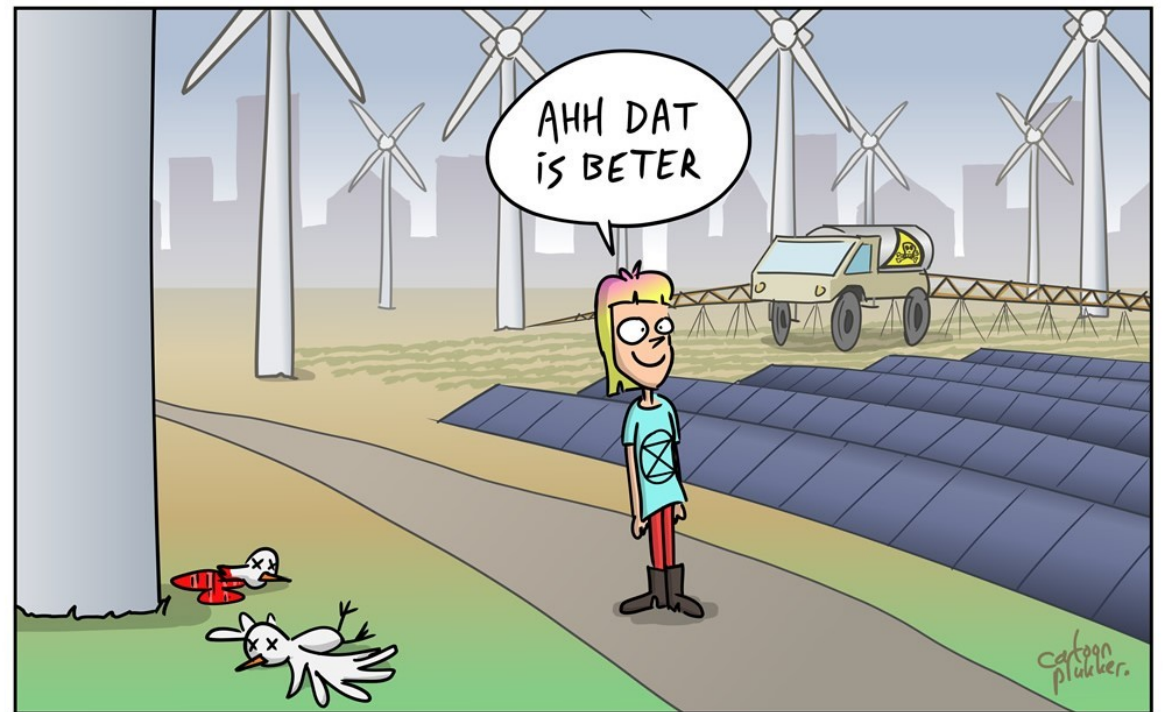
**Bert Weteringe**

- Auteur
- Vliegtuigbouwkundig Ingenieur
- Onafhankelijk onderzoeksjournalist

**[www.metdewindmee.com](http://www.metdewindmee.com)**

# Windhandel

De impact van grootschalige  
energie-opwekking met windturbines





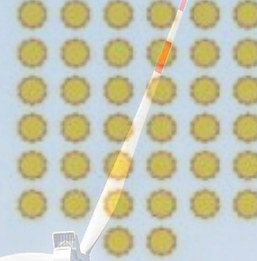
## Land Requirements for Clean Energy Technologies

Nuclear



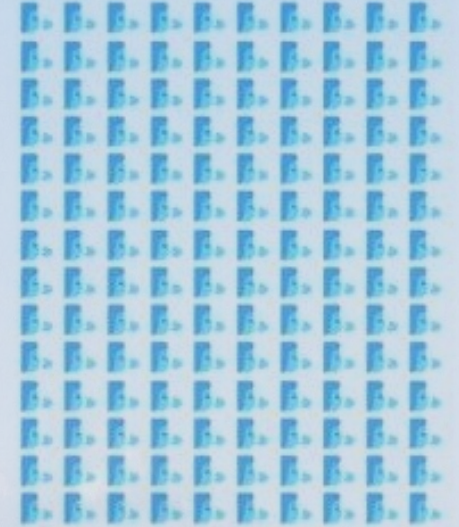
640 acres  
1,000 MW

Solar PV

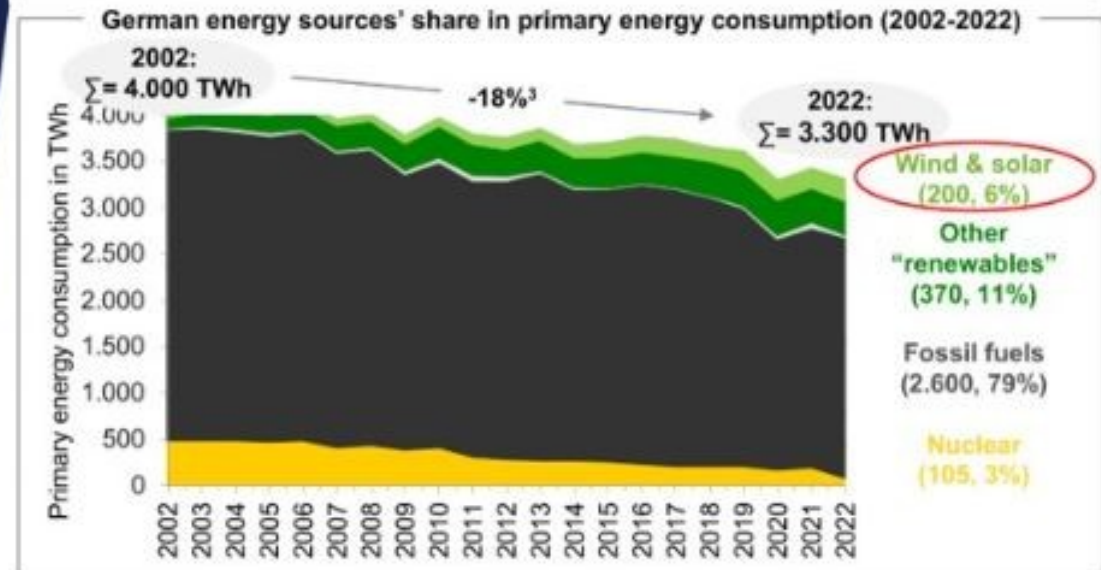
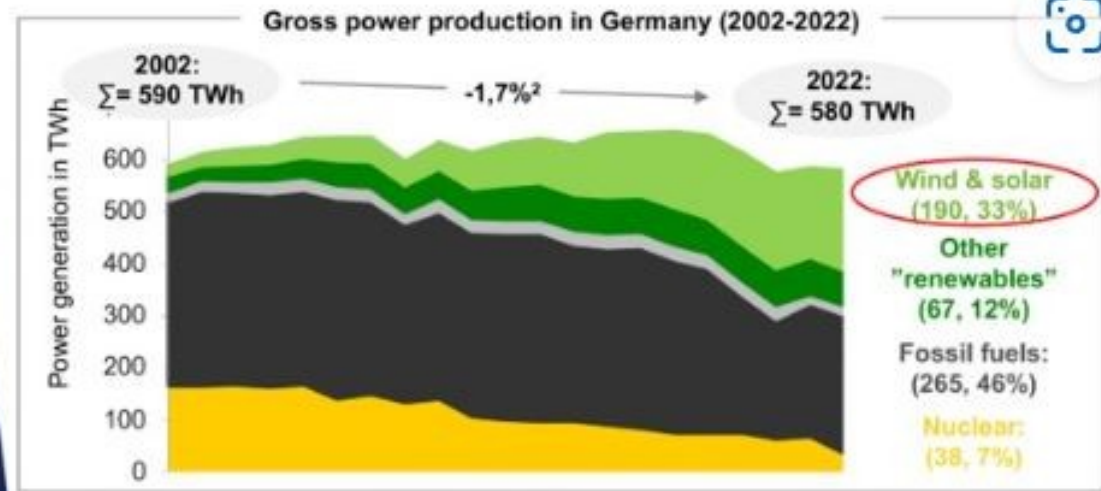


24,000 acres  
4,000 MW

Onshore Wind



89,600 acres  
2,800 MW



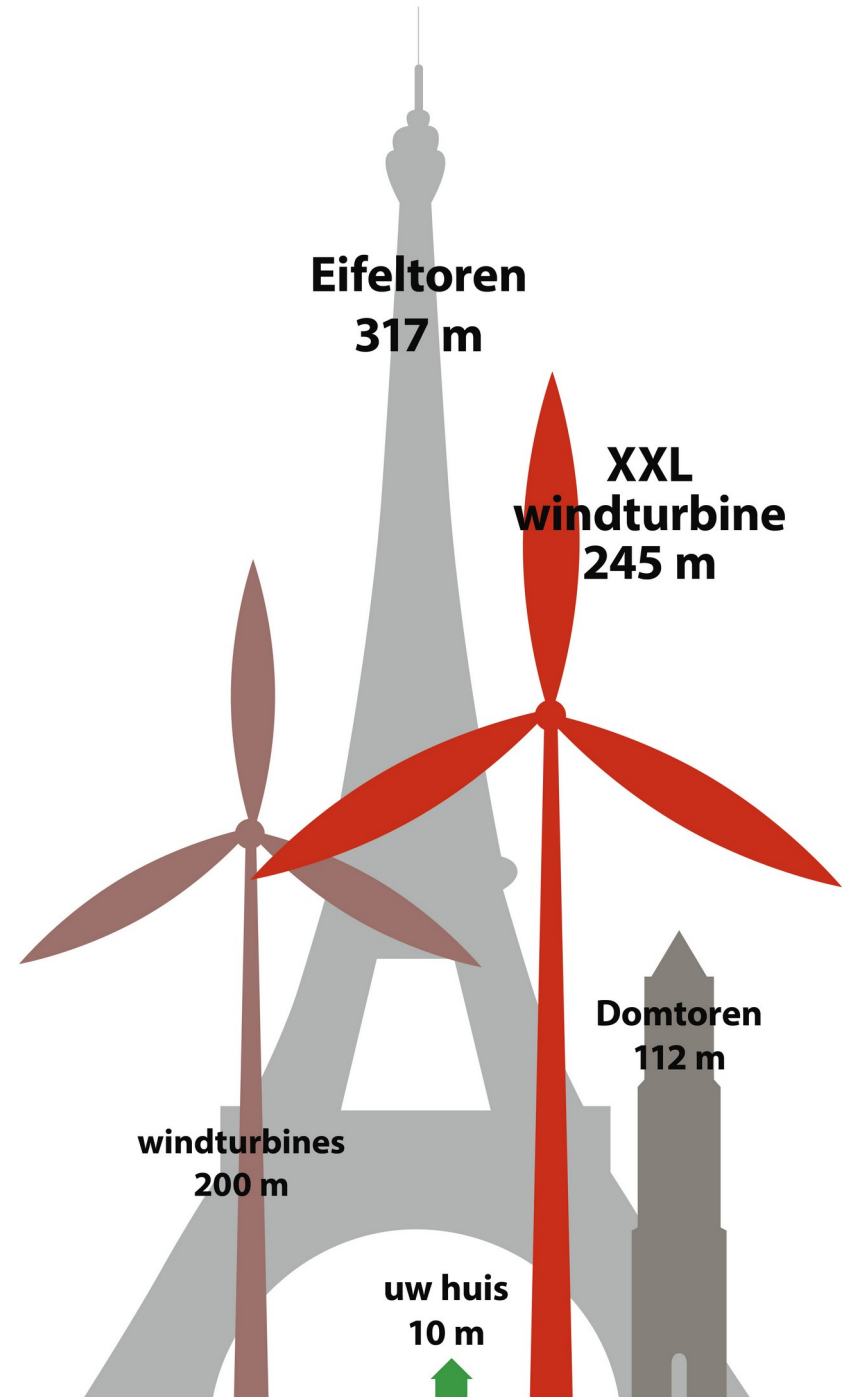
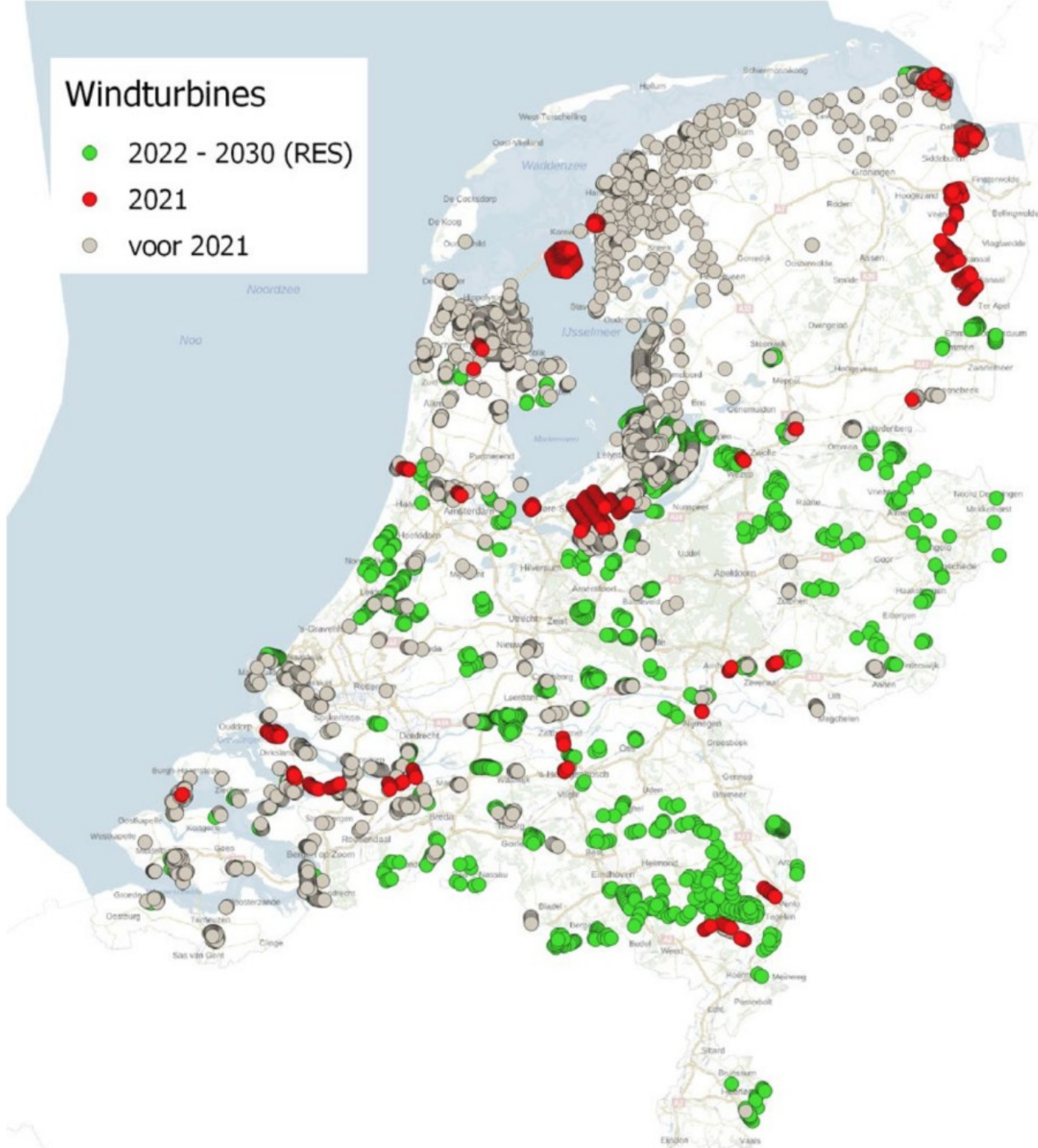
©Schernikau

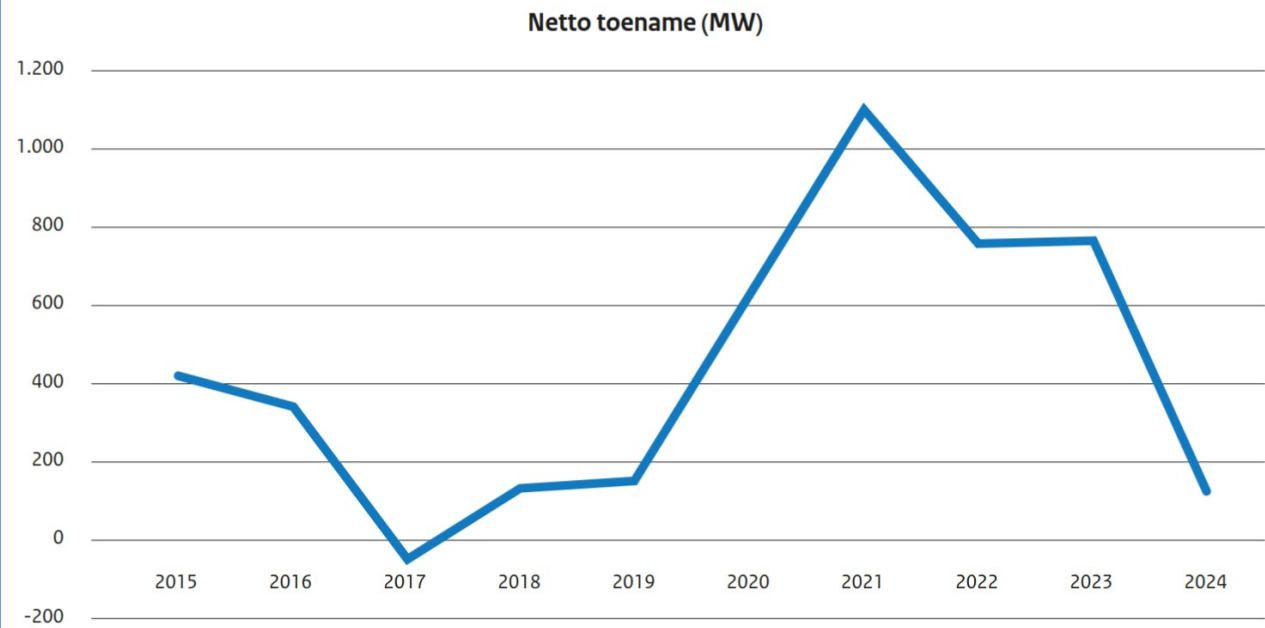
Figure 7: German installed power capacity, electricity production, and primary energy

Notes: (1) CAGR: +3,5%; (2) CAGR: +0,1%; (3) CAGR: -0,9%; (4) Including hydro and biomass. High resolution figures are available at [www.unpopular-truth.com](http://www.unpopular-truth.com).

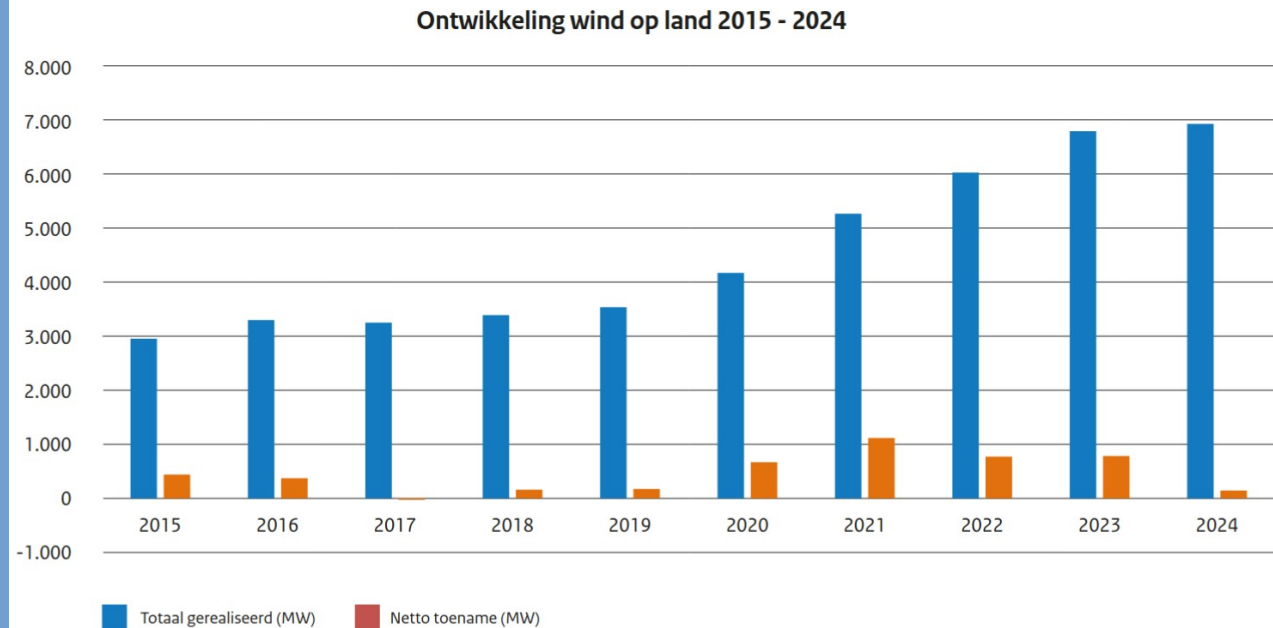
## Windturbines

- 2022 - 2030 (RES)
- 2021
- voor 2021





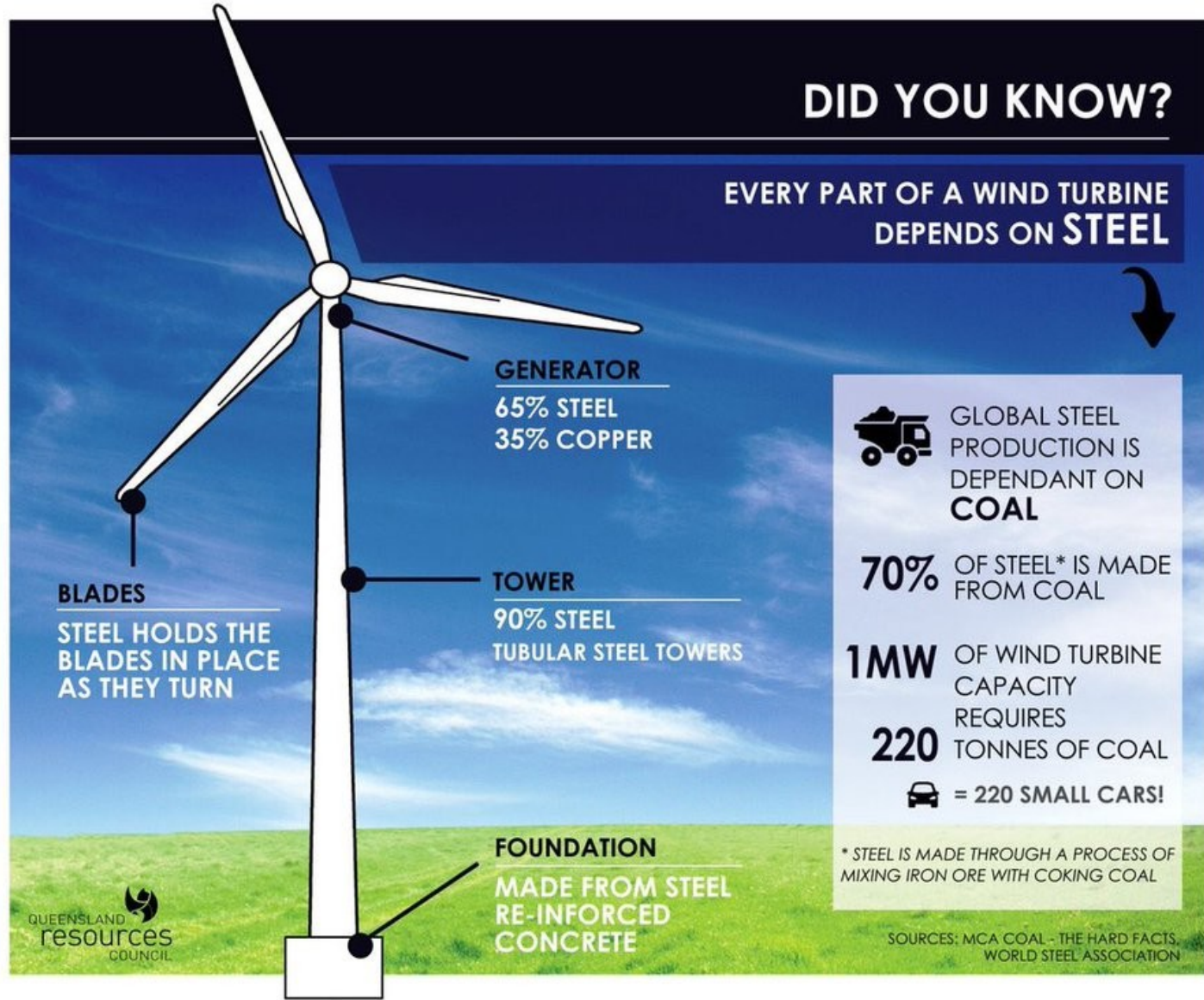
**Figuur 1:** Jaarlijkse netto toename in operationeel vermogen Wind op Land



**Figuur 2:** Jaarlijks operationeel vermogen en netto toename wind op land

# DID YOU KNOW?

EVERY PART OF A WIND TURBINE  
DEPENDS ON **STEEL**



**GENERATOR**  
65% STEEL  
35% COPPER

**BLADES**  
STEEL HOLDS THE  
BLADES IN PLACE  
AS THEY TURN

**TOWER**  
90% STEEL  
TUBULAR STEEL TOWERS

**FOUNDATION**  
MADE FROM STEEL  
RE-INFORCED  
CONCRETE



GLOBAL STEEL  
PRODUCTION IS  
DEPENDANT ON  
**COAL**

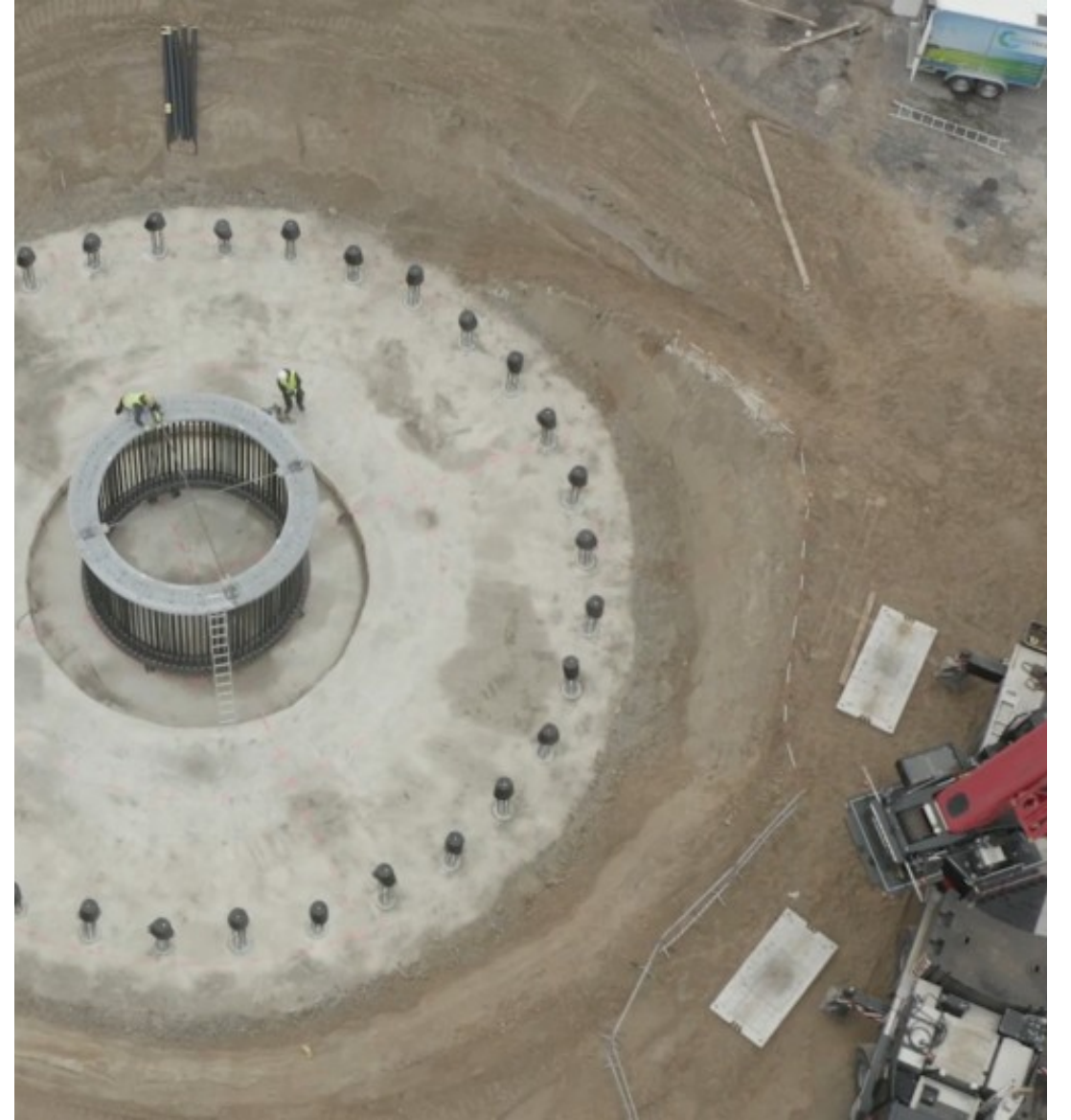
**70%** OF STEEL\* IS MADE  
FROM COAL

**1MW** OF WIND TURBINE  
CAPACITY  
REQUIRES  
**220** TONNES OF COAL

 = 220 SMALL CARS!

\* STEEL IS MADE THROUGH A PROCESS OF  
MIXING IRON ORE WITH COKING COAL

SOURCES: MCA COAL - THE HARD FACTS,  
WORLD STEEL ASSOCIATION







# MIXED UP



PLANTATION Balsa  
Ecuador



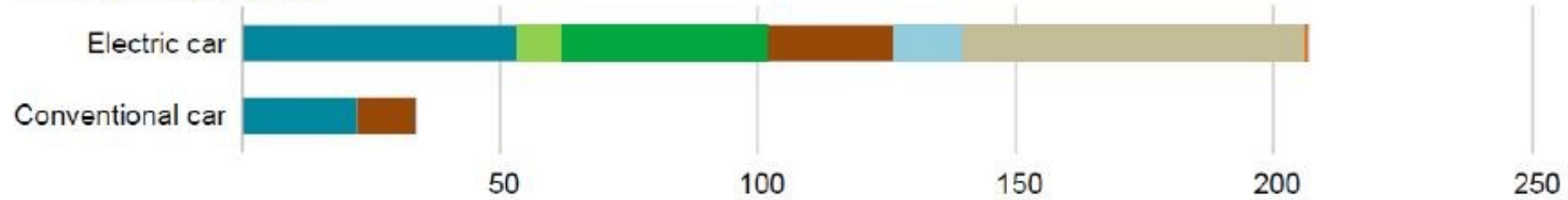
WILD Balsa  
Ecuador + Peru



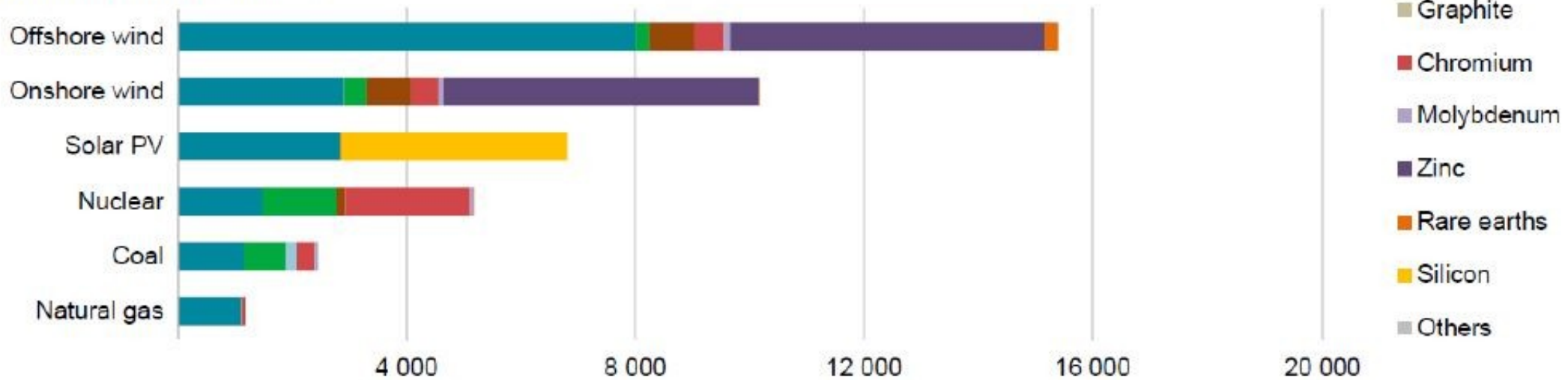
ECUADOR'S  
Balsa EXPORTS

## Minerals used in selected clean energy technologies

### Transport (kg/vehicle)



### Power generation (kg/MW)



IEA. All rights reserved.

Notes: kg = kilogramme; MW = megawatt. Steel and aluminium not included. See Chapter 1 and Annex for details on the assumptions and methodologies.

(Source: The Role of Critical Minerals in Clean Energy Transitions IEA)



## Investeringskosten:

Op land:

~ € 1,3 miljoen per MW

Op zee:

~ € 3,3 miljoen per MW

## Operationele kosten:

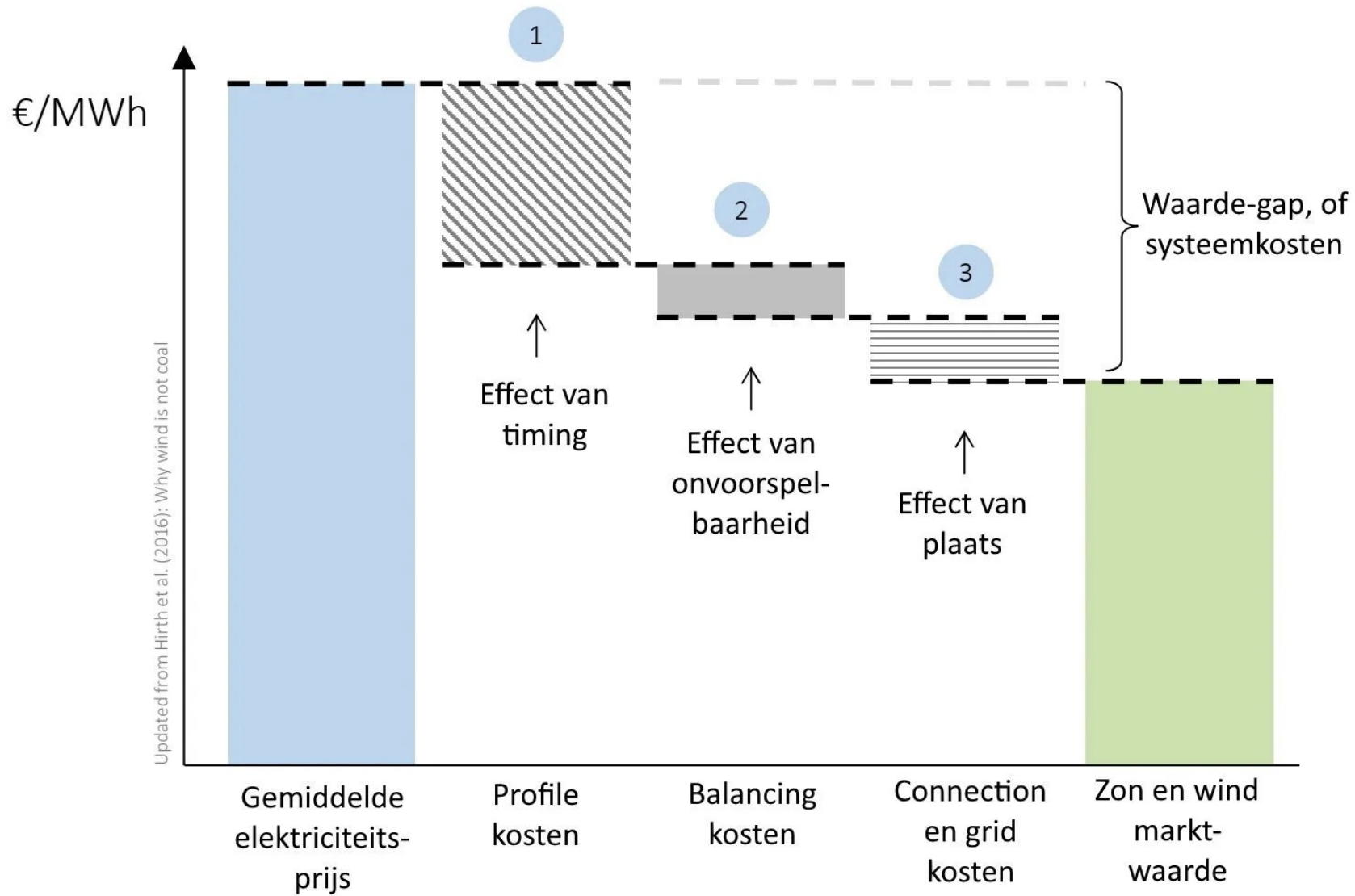
Op land:

~ € 140.000 / jr

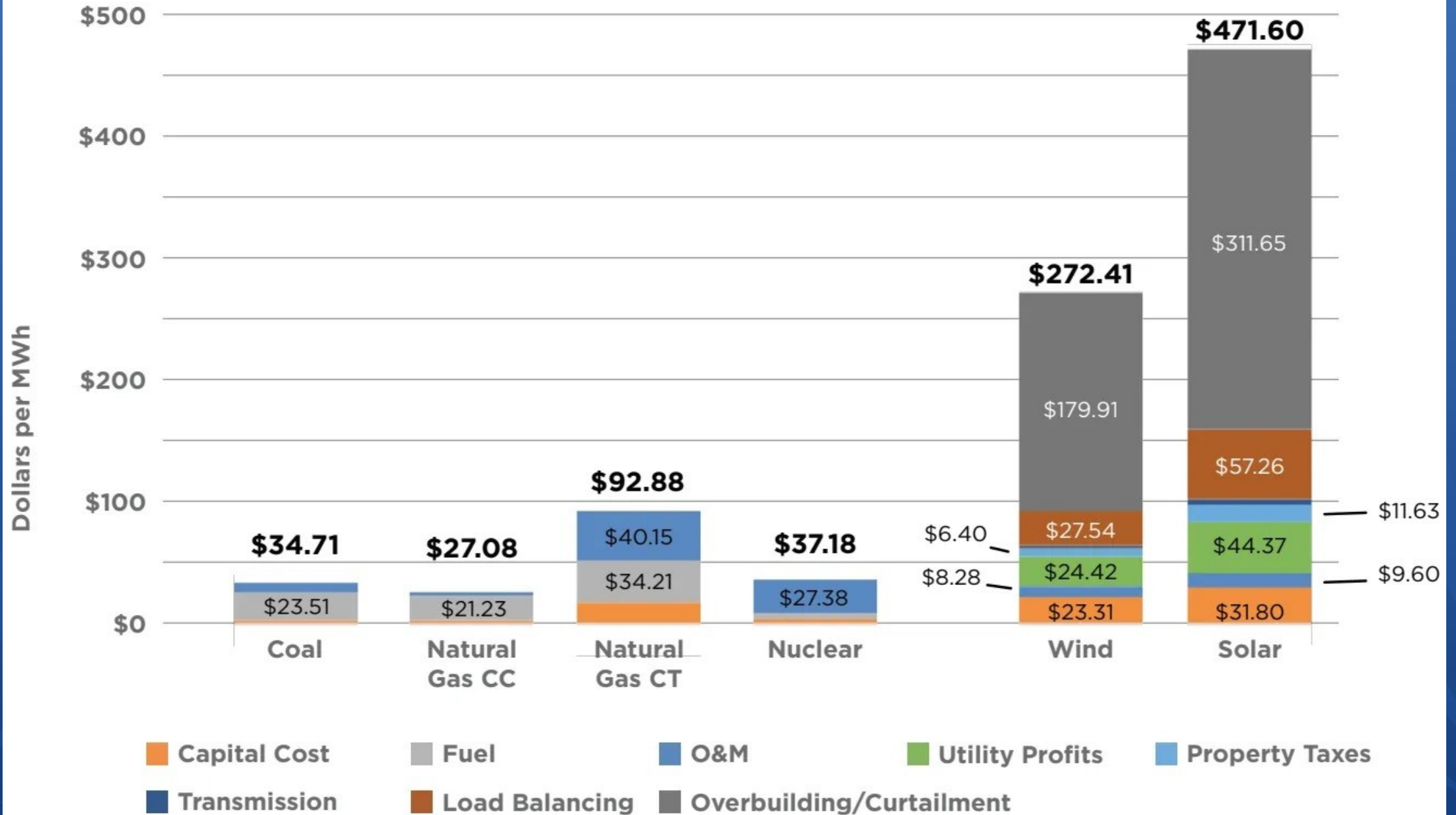
Op zee:

~ € 800.000 / jr





# Full System LCOE: Existing vs. New Energy Sources

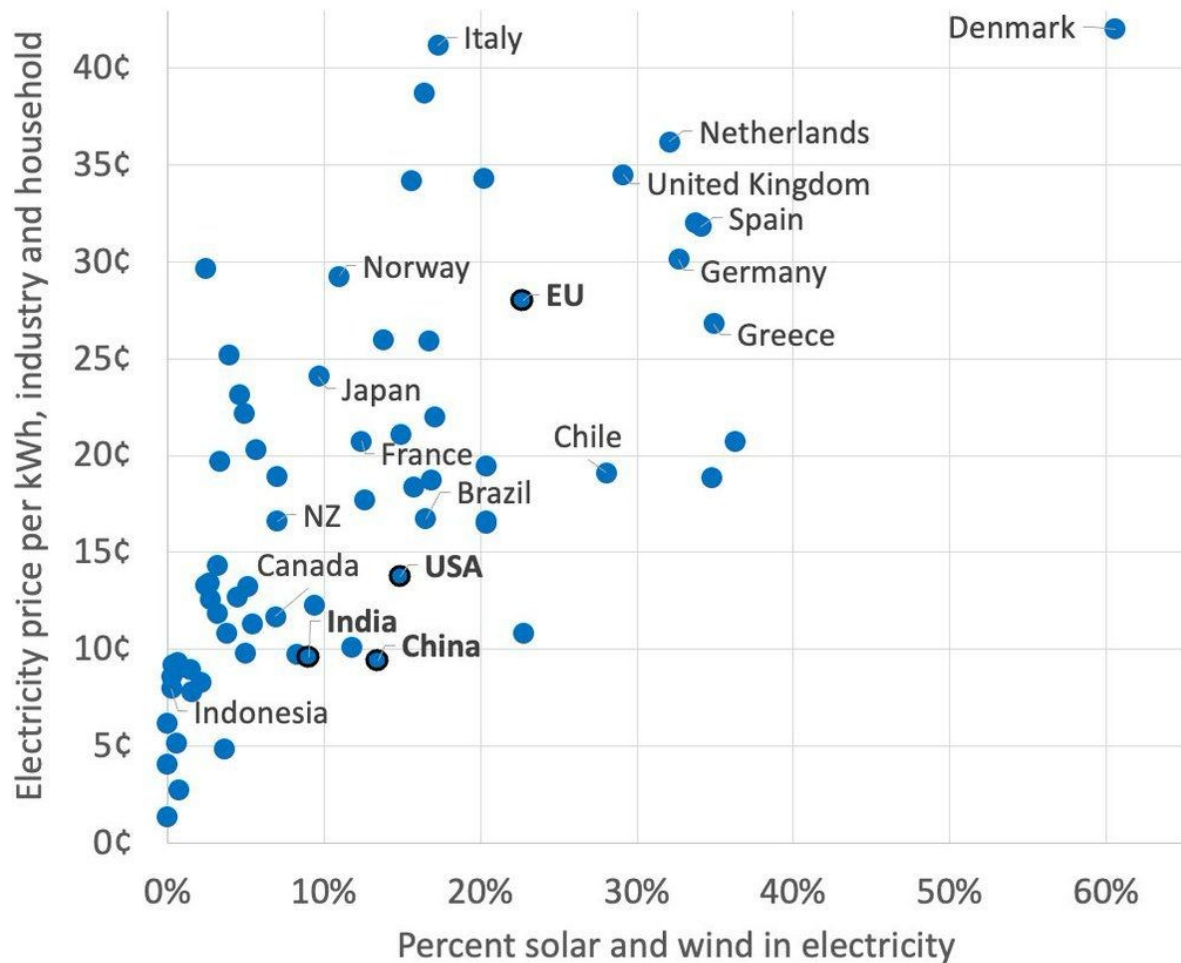


# Expensive Solar and Wind

The elites tell you that solar and wind are cheap

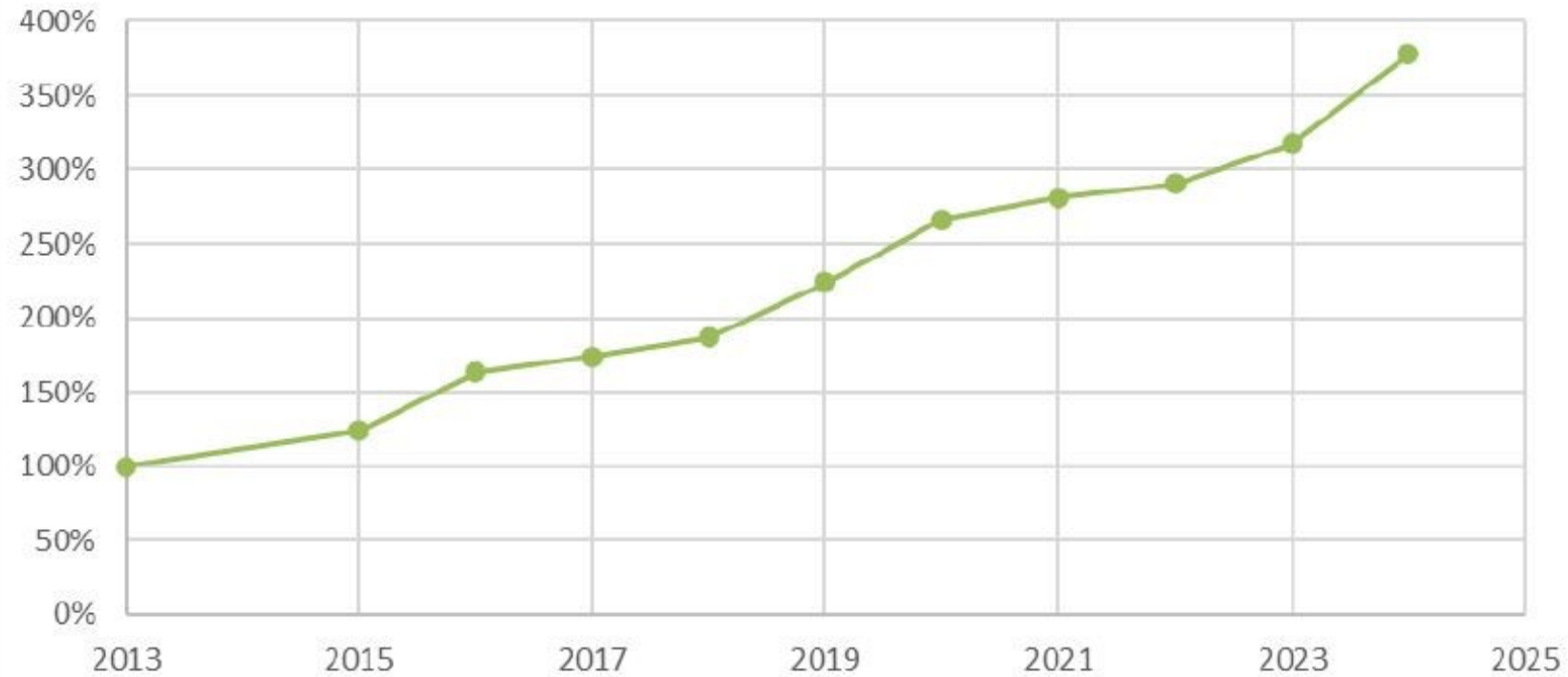
Reality: The more solar and wind, the costlier it gets

That is because solar and wind are worthless when not sunny and windy  
Data for 2022, but same result for 2019, just before Covid and Ukraine war



All data for 2022. Price in US¢ for residential and industry from International Energy Agency, <https://www.iea.org/data-and-statistics/data-product/energy-prices>, weighted by consumption and adjusted to 2024US\$, <https://www.bls.gov/cpi>. Percent solar and wind generation of all national generation from <https://ember-energy.org/data>, excluding countries with less than 50% of their consumption covered by domestic generation (i.e., Luxemburg producing just 18% and Lithuania 32%). This leaves 68 country observations (vs 78 in 2019). China is missing in IEA data (only residential prices from 2019). Here, China estimated from very similar Statista estimates ([www.statista.com/statistics/1373587/business-electricity-price-china](http://www.statista.com/statistics/1373587/business-electricity-price-china) and [www.statista.com/statistics/1373587/household-electricity-price-china](http://www.statista.com/statistics/1373587/household-electricity-price-china)). The similar scatter plot for 2019 shows less solar+wind and lower prices, but it has a substantially similar least-square line. [x.com/BjornLomborg](https://x.com/BjornLomborg)

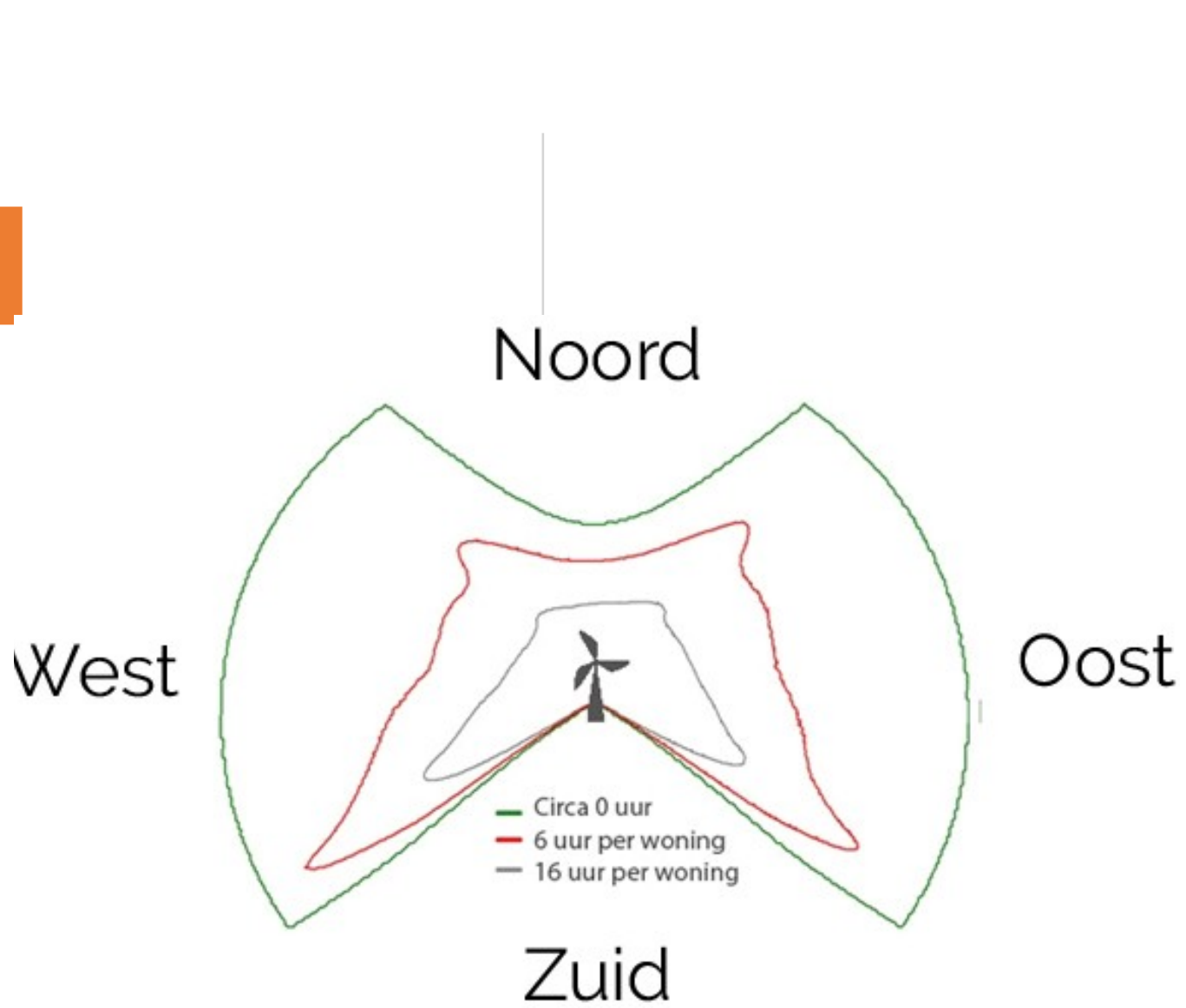
### Toename belasting op gas, sinds 2013



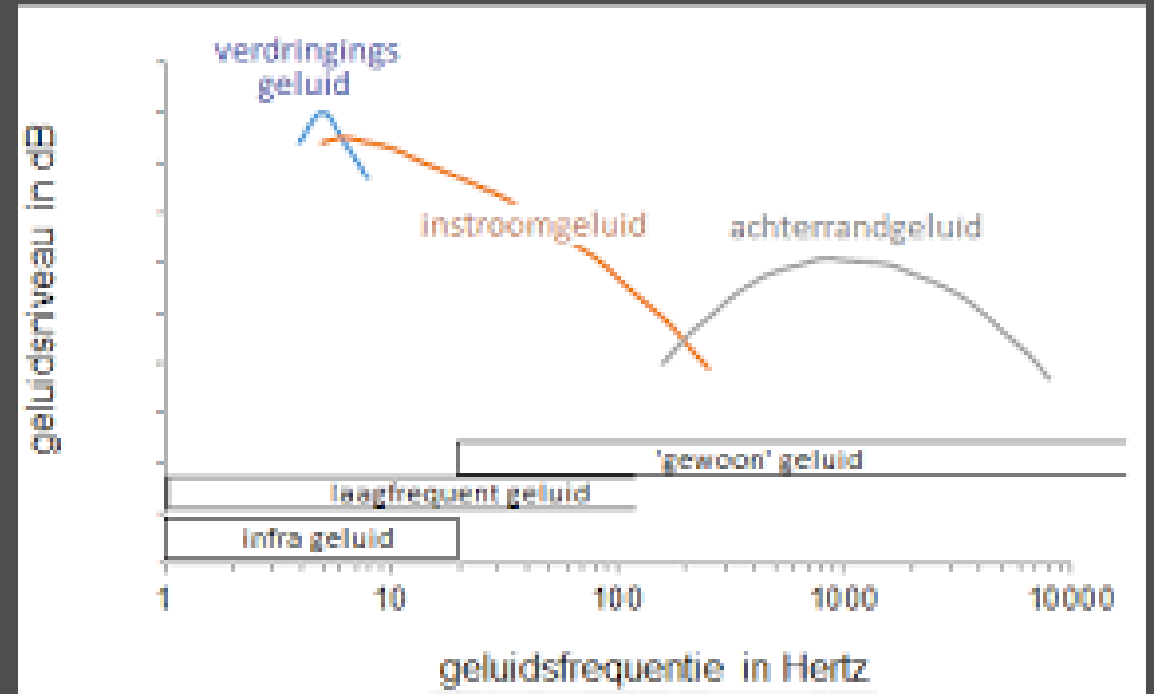
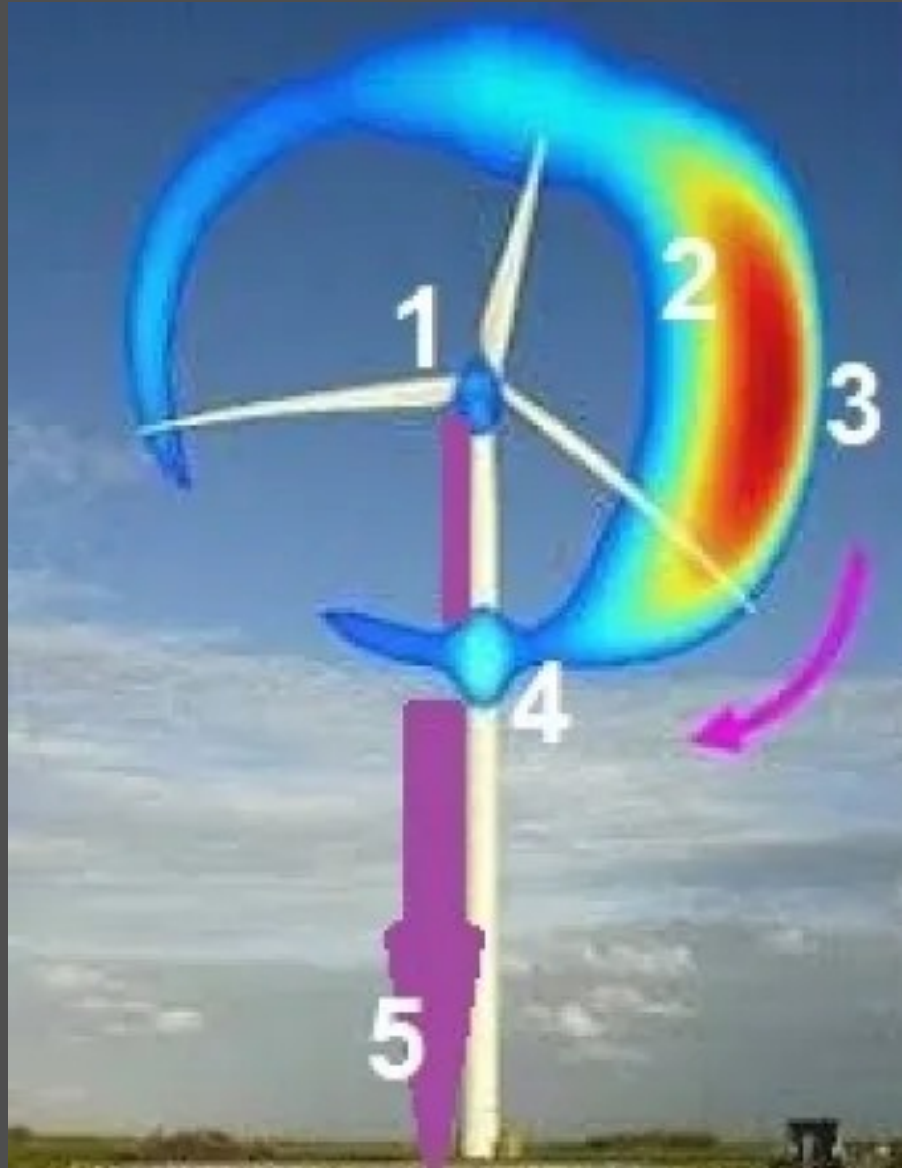
Jaar	Incl. BTW, in centen
2024	70,5
2023	59,3
2022	54,3
2021	52,5
2020	49,7
2019	41,8
2018	34,9
2017	32,5
2016	30,5
2015	23,1
2013	18,7

# WIND ISN'T WORKING

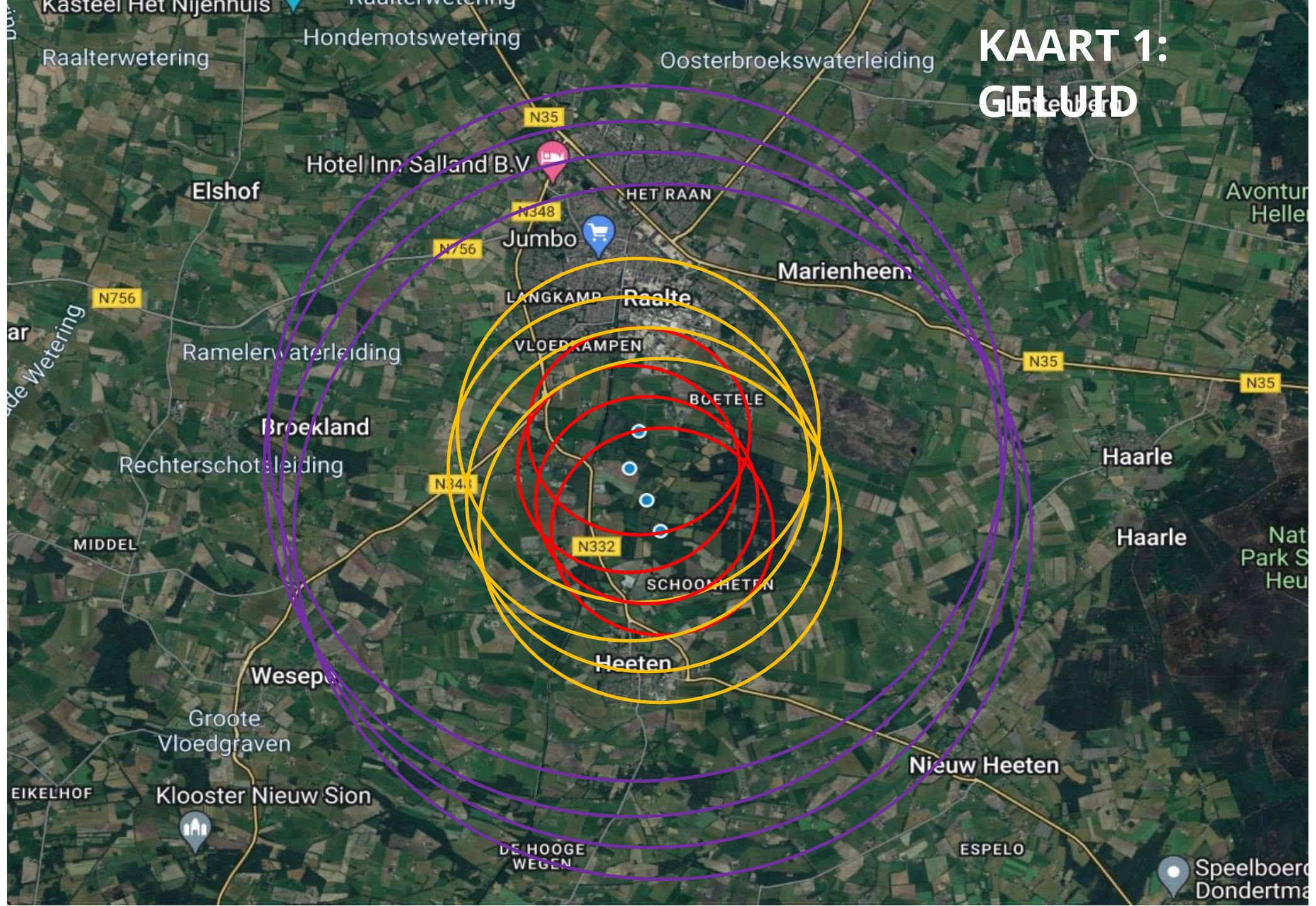






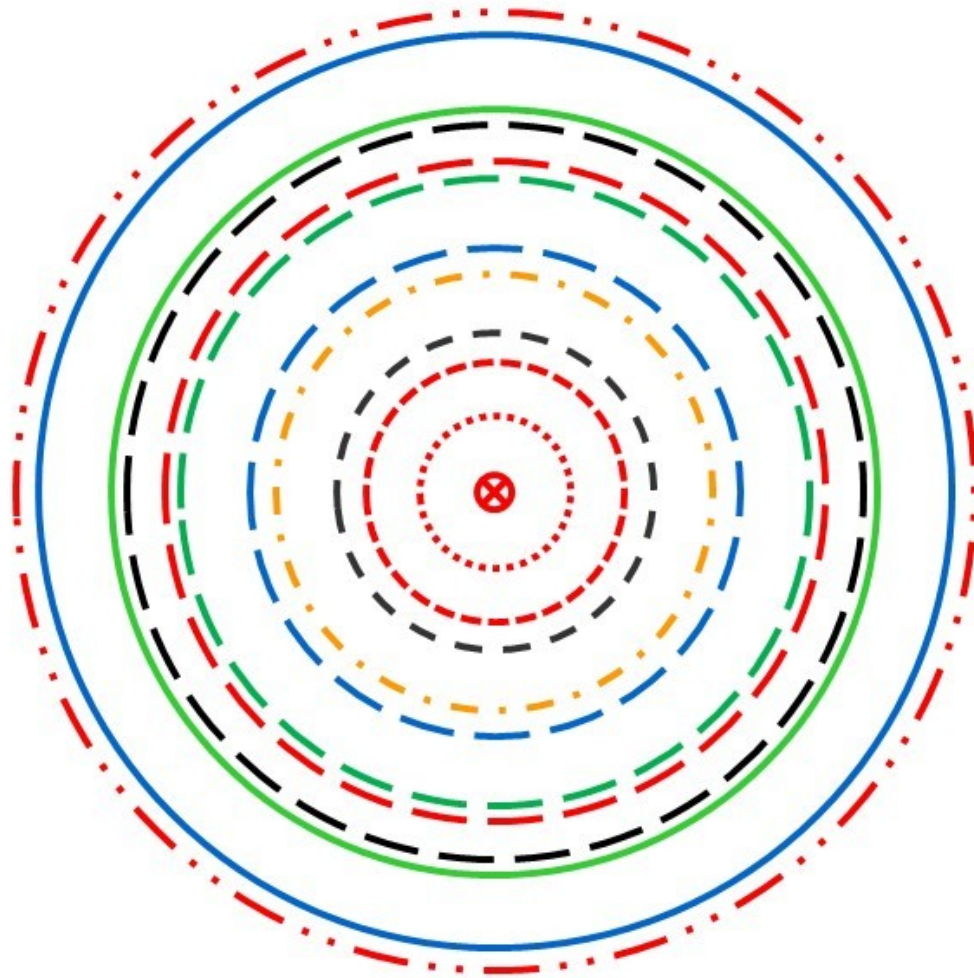


# KAART 1: GELUID





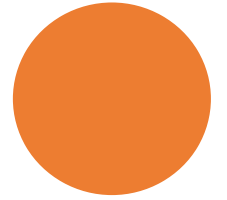
Afstanden volgens geluidsnorm voor de nacht voor V150-4.0MW, ashoogte 155 m



- Denemarken
- Frankrijk Zweden
- Duitsland
- Vlaanderen
- Wallonië
- Tsjechië Finland Itale Luxemburg
- Ierland
- Noorwegen
- Liechtenstein Letland Portugal Zwitserland
- Nederland zonder mitigatie
- Nederland met mitigatie

## Citaat uit nota van toelichting 'ontwerpbesluit windturbines leefomgeving'

- Bij een losse afstandsnorm (zonder andere milieunormen) van driemaal de tiphoogte (705 respectievelijk 840 m) is er volgens het plan-MER sprake van een zeer negatief effect op de plaatsingsruimte.
- Gezien de doelstellingen van de energietransitie is hier niet voor gekozen.



**Citaat**

# Schokkende verhalen van omwonenden windturbines

Enkele omwonenden van windturbines zijn geïnterviewd en de verhalen zijn gepubliceerd op de website van Stichting Clintel, klik op de foto om de verhalen te lezen.

We gaan door met deze interviewreeks, omdat het belangrijk is dat toekomstige omwonenden van windturbines weten waar ze mee te maken gaan krijgen.

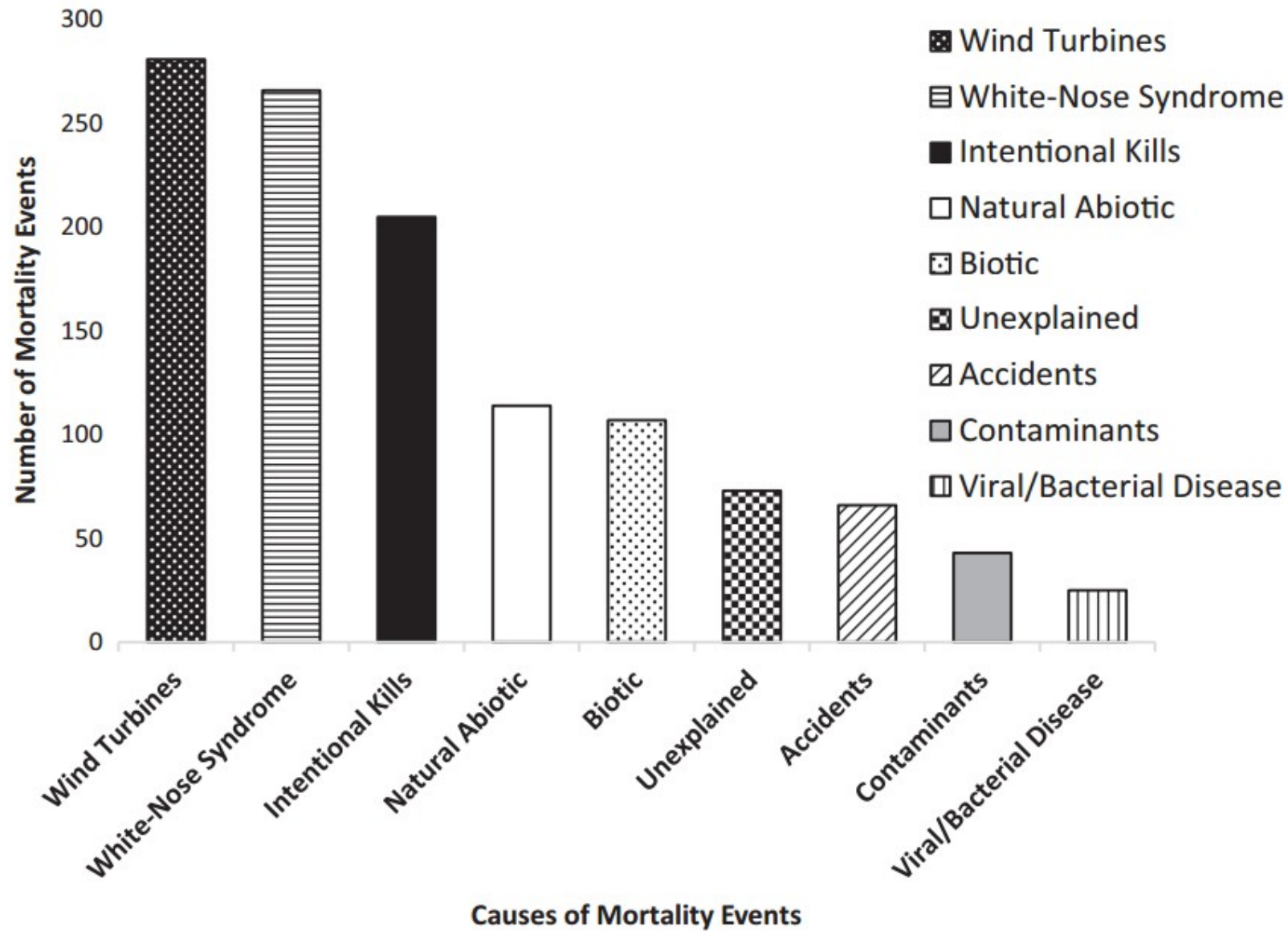
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**Deze geluidsnorm voor turbines is niet te verkopen**  
(klik op de foto voor het artikel)













# Wat dan wel?

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## Vanuit huidig systeemdenken:

- Thorium gesmolten zout reactor technologie
- Alternatieve batterijtechnologie, geen Li-ion maar:
  - Sodium, of
  - Fluoride-ion, of
  - Magnesium-ion
- Circulariteit van mineralen

## Vanuit menselijk perspectief:

- het is aan ons om een nieuw systeem op te bouwen
- herstructurering van de samenleving





Bert Weteringe

# Windhandel

De impact van grootschalige  
energieopwekking met windturbines

# Liquid Fuel Fission – Th MSR

- Each commercial reactor is planned to be able to produce 100 MW of thermal heat, or 40 MW of electricity
  - This is a modular system, where many units can be fitted together to construct a range of power capacities
- Each reactor is the size of a 40 foot shipping container
- Electricity will be sold at a projected 2 cents/kWh
- Reactors will be available for the sale of electricity in 2028 (at this stage)
  - Copenhagen Atomic will not sell the reactors. They will finance, build, own and operate them for the customer.

Test rig with a full sized reactor to pilot test the water circuit



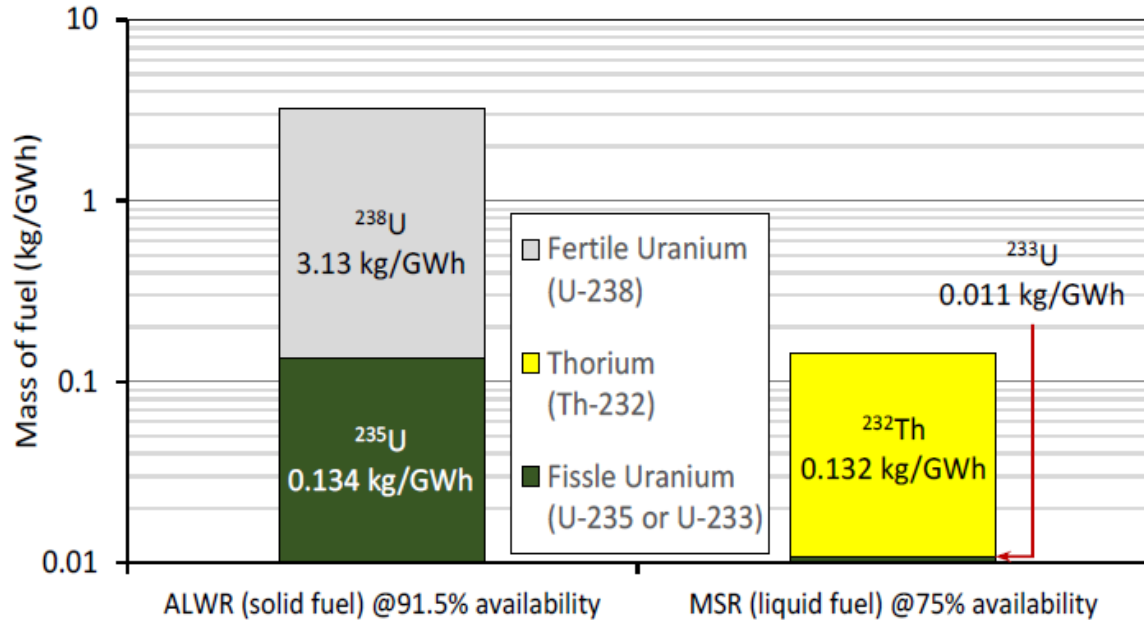
<https://www.copenhagenatomics.com/>

# Mass balance Th MSR to U ALWR

## Reactor fuel consumed

## SNF waste produced

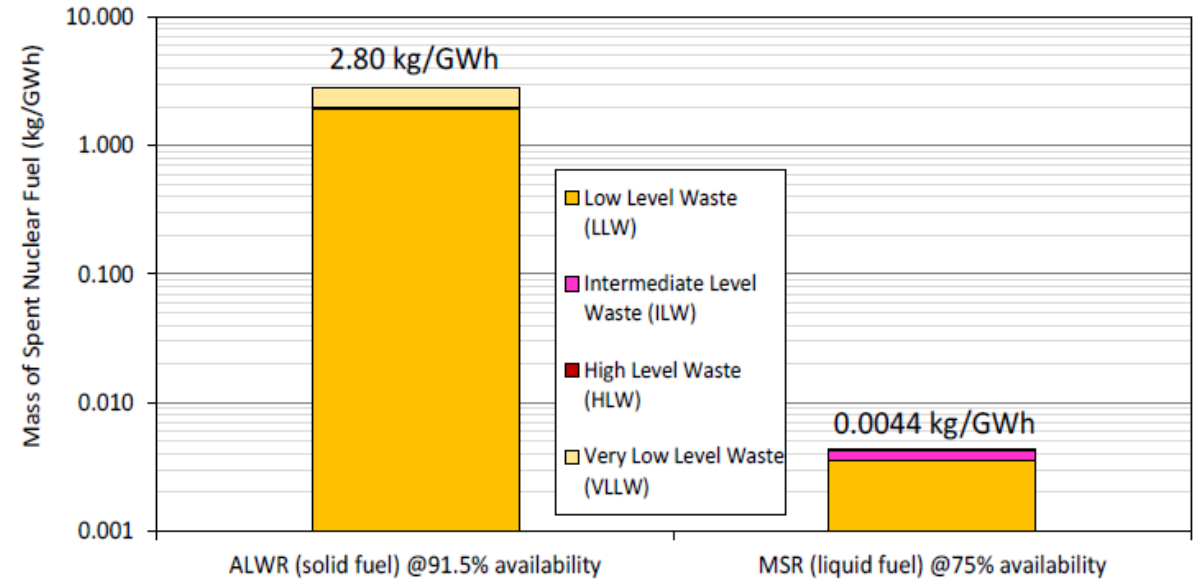
Mass of reactor fuel consumed to generate 1 GWh of electricity



**U**  
**3.27 kg/GWh**

**Th**  
**0.143 kg/GWh**

Mass of Spent Nuclear Fuel (SNF) waste generated to produce 1 GWh of electricity



**U**  
**2.80 kg/GWh**

**Th**  
**0.0044 kg/GWh**