

Risk analysis basics according to BOVEN

- There is no such thing as no risk
 - Measuring risks is difficult
 - Sound Dutch policy basis is individual risk however
 - We have to define reasonable computational rules
 - If the risk is uncertain, we have to guestimate
 - Precaution is risky in itself
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- Application: The BOVEN risk mixing console compares old fossil risks with new ET risks
 - Workshop means that you will be asked to help define reasonable risk policies for some examples



- BOVEN is a group of decentral politicians: mayors, aldermen and provincial executives: politicians for a safe energy transition
- BOVEN helps to combine the responsibility for a safe energy transition with the societal need to realise the energy transition
- Members of BOVEN bear every day the responsibility for permitting energy transition initiatives.
- The ministry of Economic Affairs and Climate is a partner in BOVEN.
- Several guidelines have been published up to now. Two today!

When risk policy derails ...



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the ET will be unnecessary delayed ...



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Disclaimer: all statements in this presentation are statistical statements. So there always are exceptions!

- All activities cause risks
- No activity is a risk in itself: the 'healthy worker' effect means that those working live a decade longer in terms of healthy life years than those without jobs.
- Safety measures are a risk in itself: every 15 million spend on safety measures cost a statistical life.



- Classically risk analysts talk about risk as a composition of probability and effect so

$$R = P * E$$

- But how to compute P or E in a ever more society or for new risks?



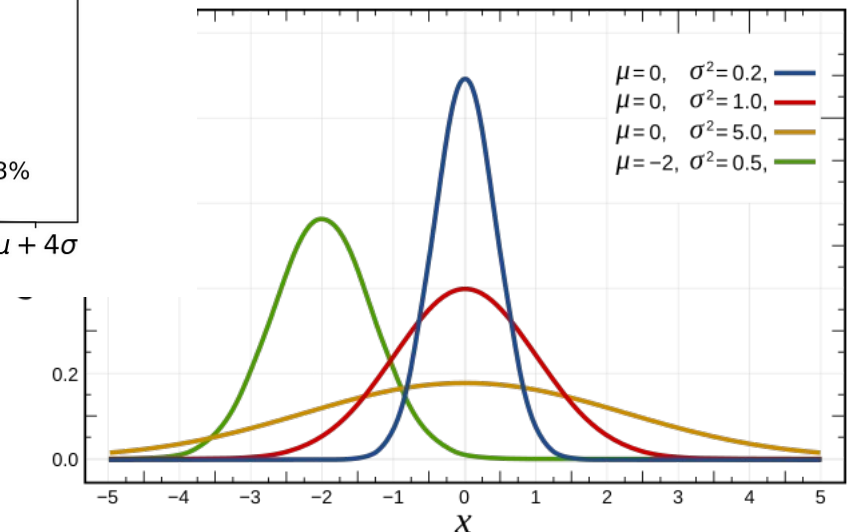
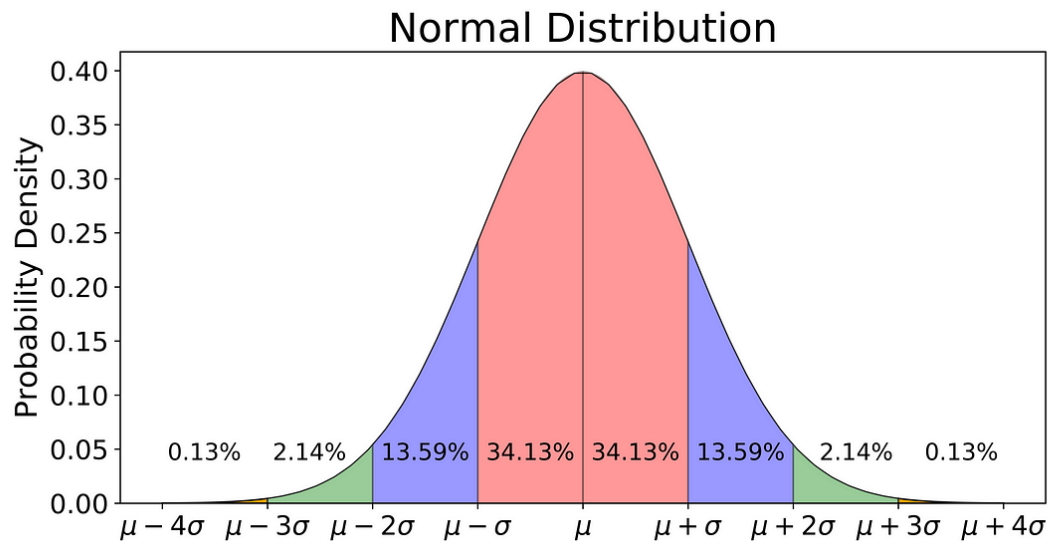
- Since 1989 'Dealing with risk' Dutch risk policies have, more or less, be directed by a norm on the individual risk of dying (IR).
- General rule
 - IR for a risk category is accepted when the IR is smaller than 1 in the 100.000 year. Usually denoted as $IR < 10^{-5}$
 - IR for a subrisk is accepted when $IR < 10^{-6}$.
- Examples: flooding, construction safety, exposure to asbestos.
- The two problematic examples already deviate form the basis at this point: food additives are judged by 'no observed effect' so zero risk . The recommendations for batteries are based on 'let's make is more safe'



- Dying is but one of the risks you face in life 😊 .
- The WHO therefore introduced the Disability Adjusted Life Year (DALY) as a measure of health effects.
- Dutch advisory boards have advised to maximize the reasonable investment in preventing a loss of a DALY at 80.000 euro's. There just is so much many available ...
- This allows for (not so popular) cross risk domain prioritising of safety investments
- It's considered political tricky to say this aloud.
- Examples: medicines (but ...) , vaccines (but ...), number of fire trucks at airports.



- Striving to be on the safe side of things causes problems
- All important technical rule: use the expected value (average)





- For a new risk there is no statistical basis to compute the risk. Help!
- Rule of thumb '9 out of 10' new risks are actually not that new, i.e. there is a reasonable analogue somewhere out there (often in nature)
- When the risk is really new ... permitting is impossible ... only step by step piloting and monitoring is a way forward.



- There are many forms of the precautionary principle. Let's take this one: 'the absence of proof of a negative effect is no argument for not taking sound safety measures.'
- For the ET: not acting is allowing people to continue to die from fossil risks like air pollution.
- Example: afraid of batteries at home? Every year 5 people die from CO-intoxication...



- Does this presentation give you useful insights?
- How can we use these insights to mend the examples of problematic risk policies?
- And more general: what elements can you use in deciding/advising about the ET?



- BOVEN developed the risk mixing console as an instrument for informing local authorities on the risks of the ET they permit.
- Clearly, using the reasonable risk calculation rules.
- You have to fill in the new energy form you want to consider: solar, wind, biomass, H₂ for heating or geothermic.
- The scale you want to focus on: local (+ number inhabitants), regional (+number of inhabitants), national or worldwide.
- Optional: chose a risk mitigation measure for comparison. For example sound isolation or the construction of a roundabout.



- A comparison of the gain or loss of 'healthy life years'. More precise the delta in terms of Disability Adjusted Life Years
- Lets look at the example of wind turbines. It is the delta between energy production using fossils causing air pollution and energy production using wind turbines causing noise and a very small extra risk of falling blades:
 - You loose DALY's because of sound and falling blades
 - You win DALY's because of less air pollution.
- So note that occupational health effects are not part of the risk mixing console.



- New wind turbines in the municipality of Beuningen.

MER-alternatieven van Windpark Beuningen.



- We consider the two new wind turbines of 4,8 MW each in the red circle.
- Beuningen has 26,000 inhabitants and is part of the Gelderland with 2 million inhabitants

The input parameters



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- Question: Number of people within the 10^{-6} safety contour?
Answer: 0
- Question: number of people passing along roads within the 10^{-6} safety contour?
Answer: 1 per minute for both turbines, so 2,880 per day



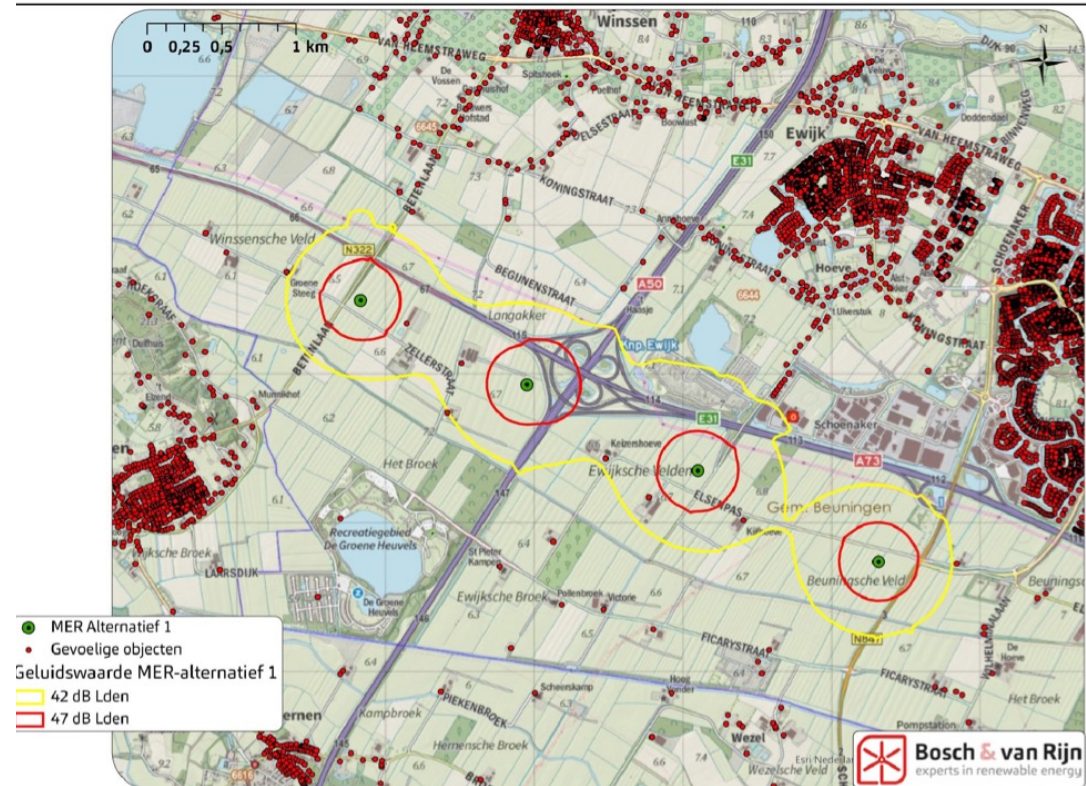
The input parameters



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- Question: how many people live within the 45-47 dB contour, the 40-44 dB contour and the 35-39 dB contour?
Answer: 2, 20 en 100 respectively

Figuur 8 L_{den} 47- en 42 dB-contour alternatief 1 – GE 4.8 158 op 165m ashoogte

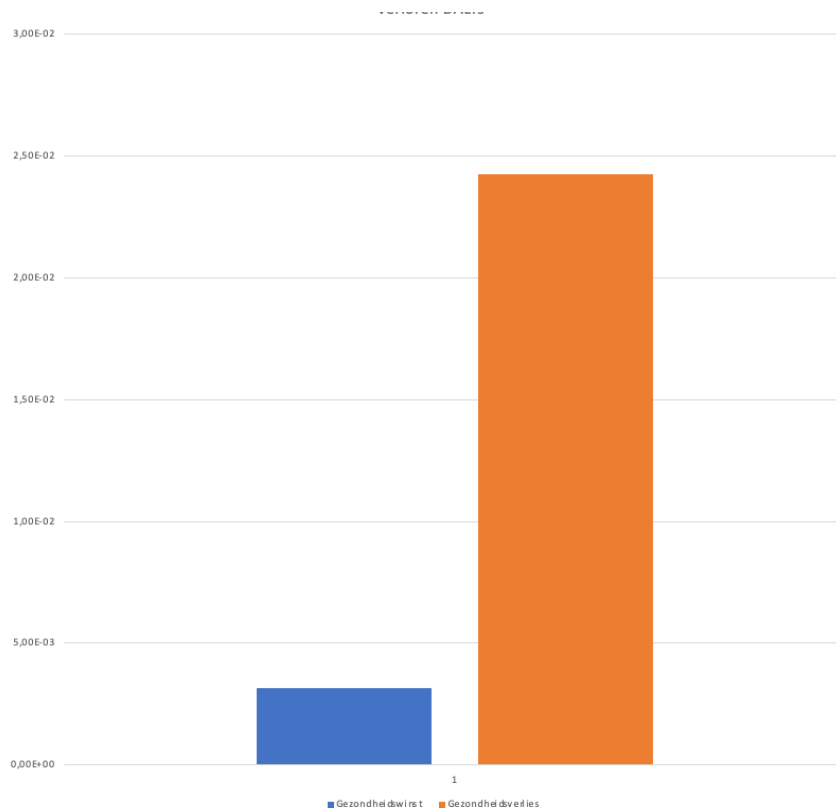


The perspective we are interested in



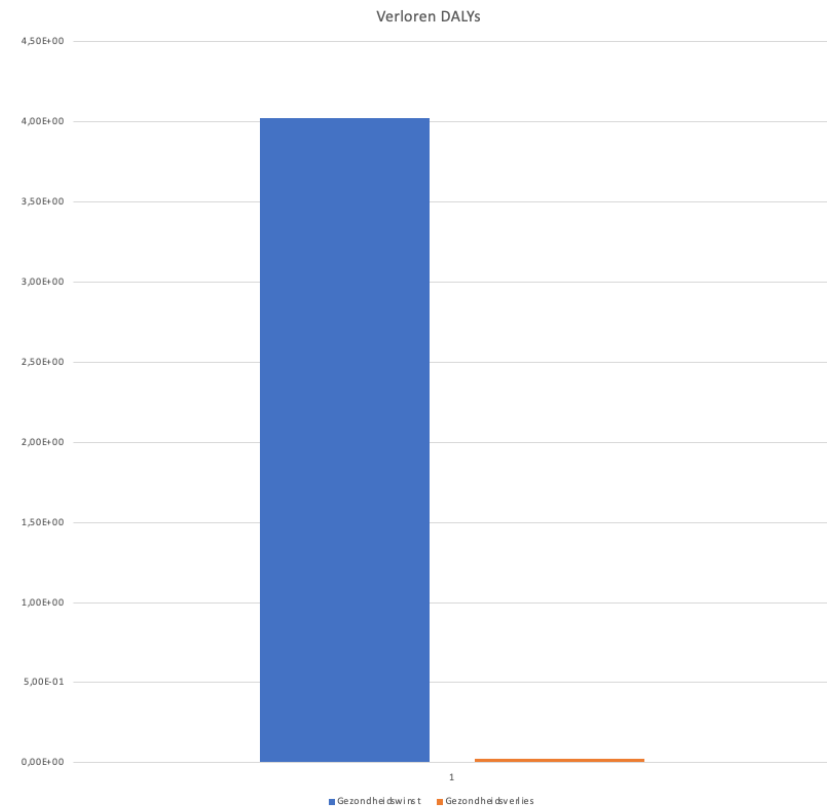
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- The scale ... we present local and worldwide



DALY gain p.y. 0.004

DALY loss p.y. 0.02



<- DALY gain p.y. 4

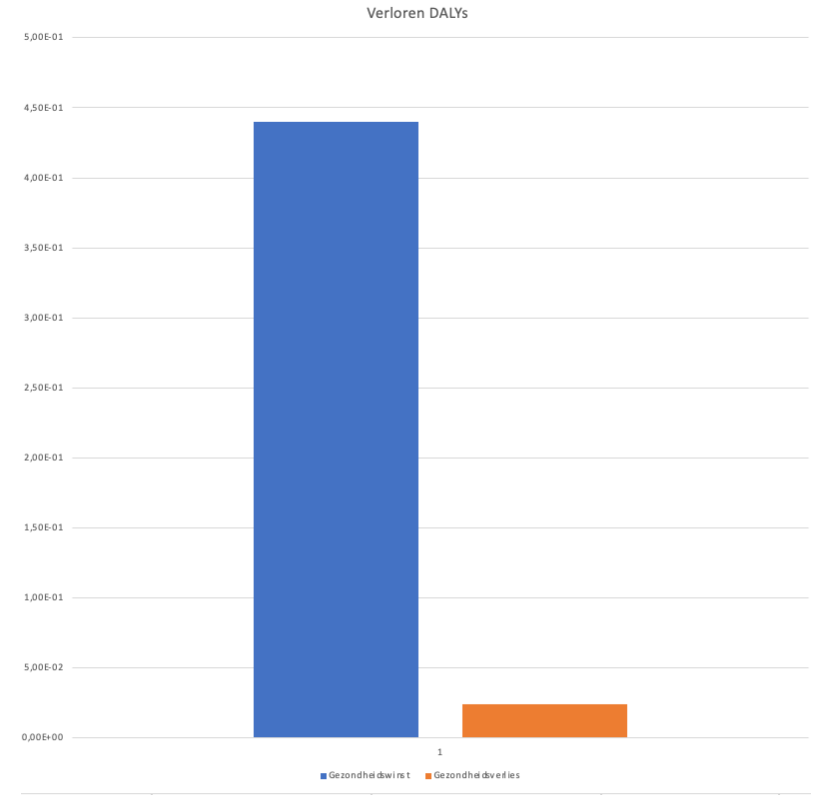
DALY loss p.y. 0.02

A possible comparison



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- Constructing a roundabout for 2 cars per minute: gain of roundabout versus local loss wind turbine

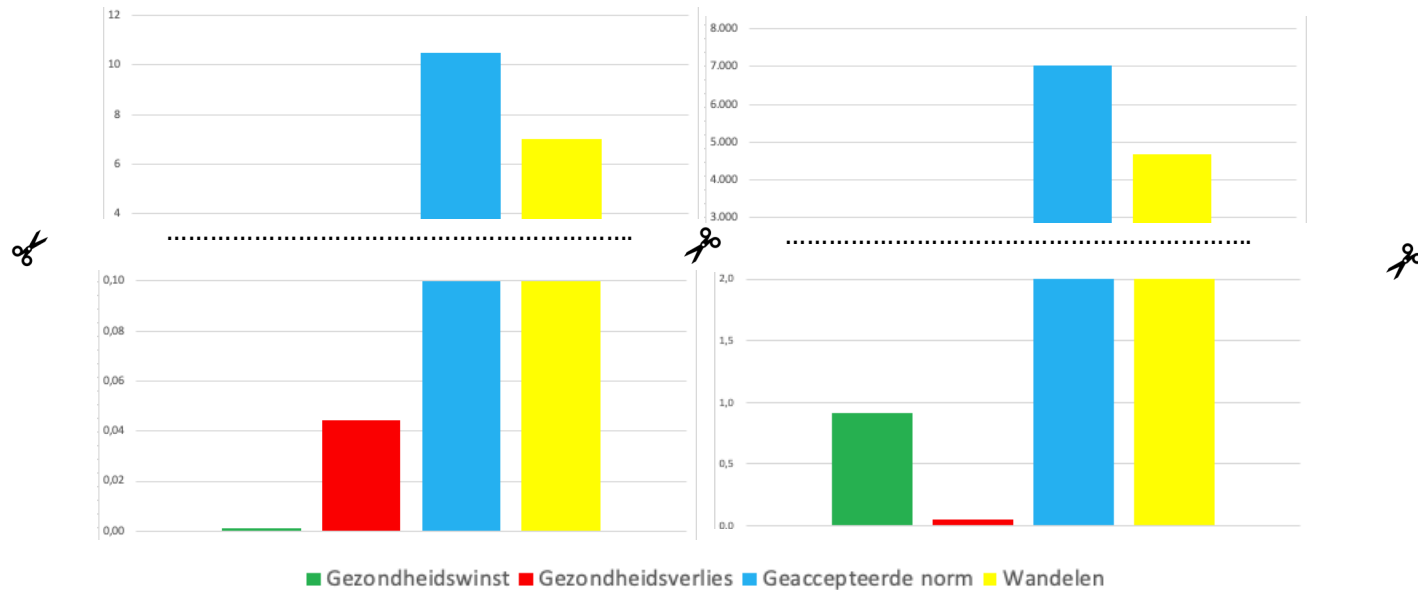


DALY gain p.y. 0.5

DALY loss p.y. 0.02



- Again local and Mondial, but now versus Dutch 10^{-5} norm and walking on the street



Thank You



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All feedback is welcome: i.helsloot@crisislab.nl

This presentation (and the risk mixing console) can be found at
www.werkgroep-boven.nl.