



Ammonia Safety

Safety and public perception

Antea Group

Understanding today.
Improving tomorrow.

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About us



Antea Group is an international engineering and consultancy firm. We combine valuable knowledge with a pragmatic approach, to come up with workable solutions. This makes us a multifaceted, independent partner for companies and government bodies

Just as we have been for over 65 years now

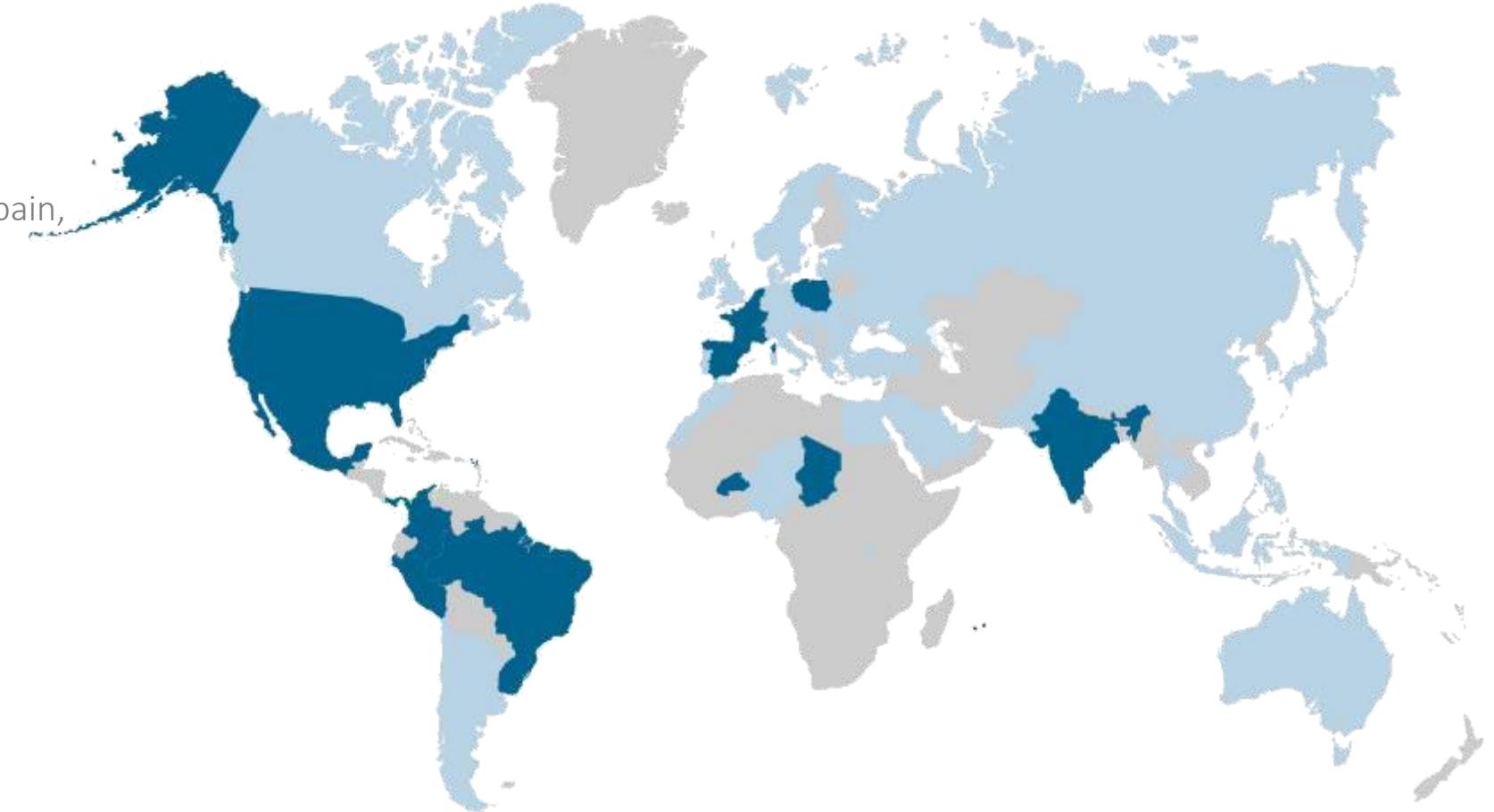
Understanding today.
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WORLDWIDE

Offices in:

The Netherlands, France, USA, Belgium, Spain,
Poland, India and Brazil

More than 90 offices



Presentation: Safety and ammonia

- Use of ammonia and energy transition
- Ammonia Risks
- Safety during design
- Quantitative Risk Analyses (QRA): effect of measures
- In case of a LoC: what to do
- Ammonia: public perception
- Summary

Use of ammonia in industries

- Storage
- Usage as raw material to produce fertiliser e.g.
- Use in renewable energy (storage hydrogen, marine fuel)
- Transportation: via pipeline, ship, truck or rail

Port areas in the picture for ammonia

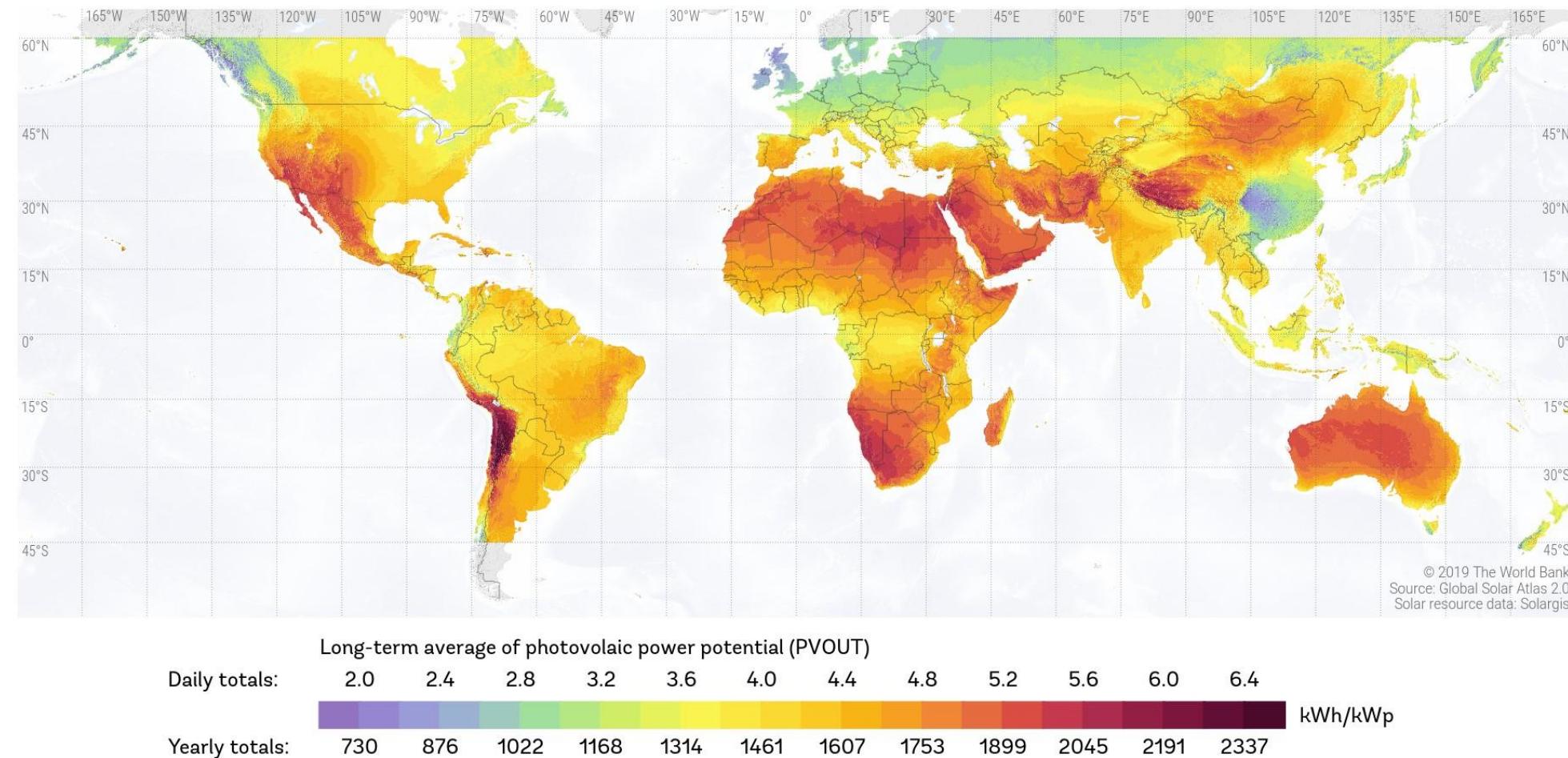
SOLAR RESOURCE MAP

PHOTOVOLTAIC POWER POTENTIAL

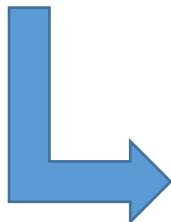
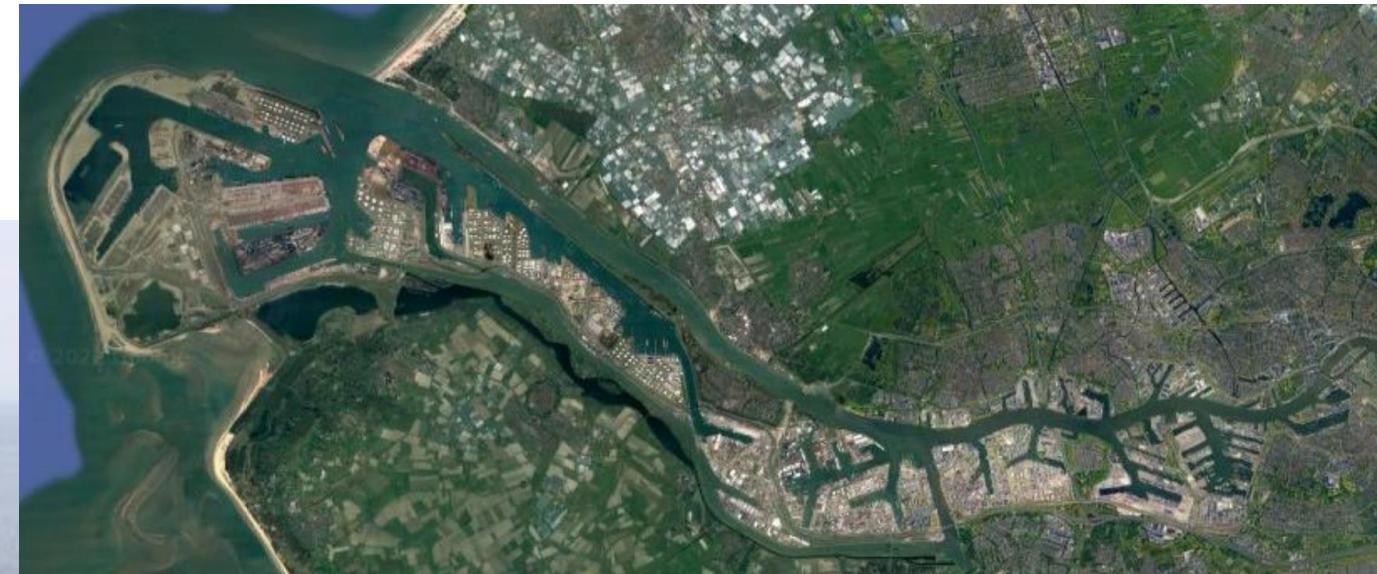
WORLD BANK GROUP

ESMAP

SOLARGIS



Port areas in the picture for ammonia



Health risks by contact ammonia



- Inhalation: **Ammonia** is irritating and corrosive. Exposure to high concentrations of **ammonia** in air causes immediate burning of the nose, throat and respiratory tract.
- This can cause bronchiolar and alveolar edema, and airway destruction resulting in respiratory distress or failure.
- When exposed to a liquid pool fire: risk of boiling Liquid expanding vaporous explosion

How to deal with public safety risks

How to deal with (negative) public perception

Dealing with public safety risks of NH₃

1. Quantitative risk analyses:
 - a) industrial site
 - b) transportation
 - c) reduce or mitigate the probability of an incident
2. To reduce the effects of an incident:
 - a) look at the environment
 - b) reduce the ammonia pool
 - c) reduce the dispersion of the ammonia cloud
3. Safety management:
 - a) best available techniques
 - b) control and manage safety measures

Quantitative risk analyses



How to deal with the (negative) image



verdrinken door dijkdoorbraak

Sterven door een bijensteek

Door de bliksem getroffen worden

Externe veiligheid

Vliegen

Werk in een gemiddeld bedrijf

Lopen in het verkeer

Fietsen

Werk in landbouw en visserij

Autorijden

Brommer rijden

Sigaret roken (pakje per dag)

Kans op overlijden per jaar

liegtuig	1 op de 10 miljoen
	1 op de 10 miljoen
	1 op de 5,5 miljoen
	1 op de 2 miljoen
	1 op 1.000 miljoen (10^{-6})
	1 op de 814.000
	1 op de 77.000
	1 op de 54.000
	1 op de 26.000
	1 op de 14.000
	1 op de 5.700
	1 op de 5.000
	1 op de 200



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nderstanding today.
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Take action
against
riding bombs

ROOD SEIN VOOR DE AMMONIAK-TREIN

AMMONIAK-TREIN VAN HET SPOOR NU OOK IN LIMBURG!

De aanhoudende groei van de ammoniak-treinen leidt tot een groeiende gevaar voor de bevolking en de omgeving. De treinen zijn een belangrijke factor in de ontwikkeling van de Nederlandse economie, maar ze kunnen ook leiden tot ernstige risico's voor de gezondheid en de veiligheid van de bevolking.

AMMONIAK-TREINEN
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**Explosive growth:
toxic trains**



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How to improve your image

- Show why ammonia is beneficial for society
 - Energy transition, climate and planet proof
- Be safe in what you do
 - Safe by design: Minimize the risks in an early stage
 - Control and manage safety measures
 - Testing and inspecting, and keep up a good administration
 - Safety management and Safety culture: starts with good and responsible leadership
- Explain what you do
 - Good relationship with authorities: follow up safety legislation and permit rules
 - Good relationship with your neighbours: be transparent in what you do

License to operate!

Summary

Managing Risks and image of ammonia:

- ✓ Don't be afraid, but be aware of the risks
- ✓ Implement, manage and control safety measures applicable for your specific situation
- ✓ Safety culture = good leadership = be an example for your employees
- ✓ Manage public perception: don't ignore feelings of unsafety or other complaints in the surroundings of your business, but: inform, discuss, open up!



Thank you for your
attention!

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