

An aerial photograph showing a paved road that curves through a dense, green forest. To the left of the road is a large body of water with a vibrant blue-green hue. The scene is captured from a high angle, looking down on the landscape.

CELLCENTRIC | ANDREA ENGELEN

# cellcentric auf dem Weg der Brennstoffzellen-Industrialisierung

27. Juni 2024

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An aerial photograph showing a winding asphalt road that separates a dense green forest on the right from a large body of blue water on the left. The water has a textured surface with small ripples. The forest consists of many tall, thin trees, likely pines or firs, with vibrant green foliage. The road has a white center line and yellow edge lines.

# Warum Brennstoffzellen?



## Lighter, longer range and rapid refilling and zero emissions



### Less weight

The complete fuel cell system with its hydrogen tank and its smaller battery still allows a high payload. This is of great importance for the customer in long-haul transport.



### Longer range

Two specially designed hydrogen tanks are characterized by a high storage capacity for covering long distances. These are equivalent to the combustion powertrain that is used today.



### Rapid refilling

As with conventional diesel trucks, refueling at hydrogen refueling stations takes place at the same speed as refueling with diesel.

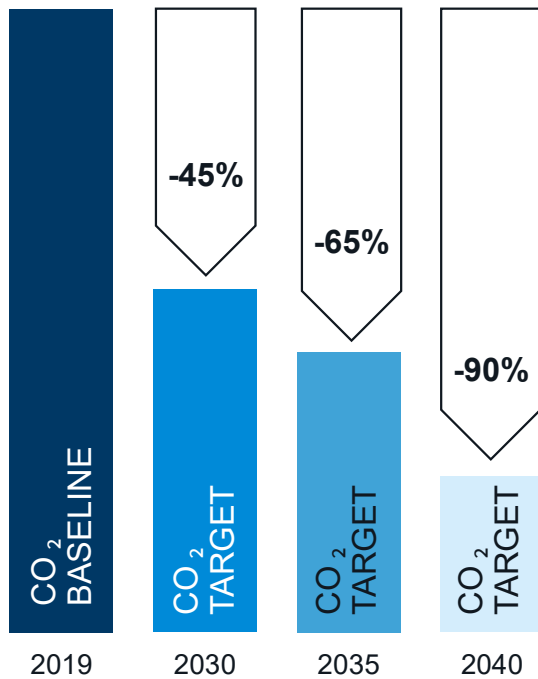


### Zero emission

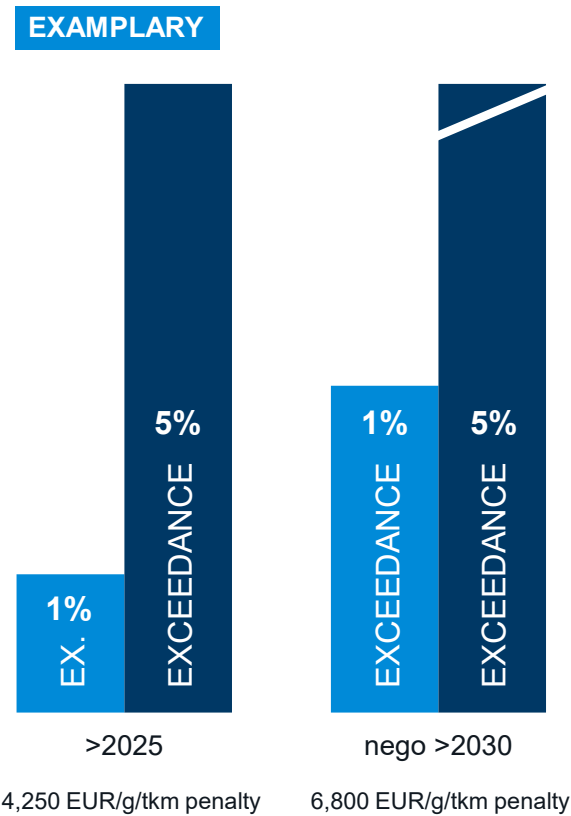
Emitting only water vapor. When hydrogen is used to power a fuel cell, the only by products are water vapor and heat - no pollutants or greenhouse gases.

# The European Green Deal set some of the most challenging CO<sub>2</sub> regulations for commercial vehicles worldwide: -45% by 2030 & -90% by 2040

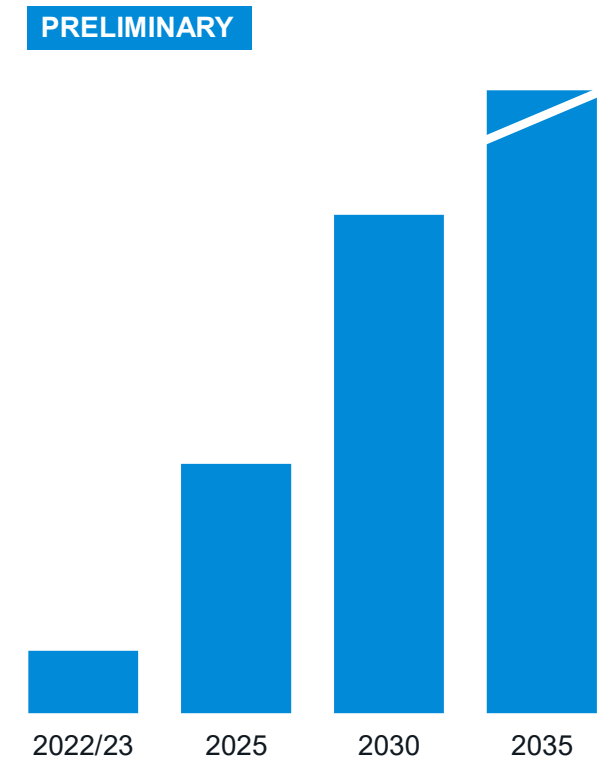
CO<sub>2</sub> TARGETS FOR TRUCKS



POTENTIALLY PROHIBITIVE FINES



RESULTING ZEV LH\* NUMBERS





An aerial photograph showing a winding asphalt road with yellow and white lane markings. The road curves from the top center towards the bottom center. To the left of the road is a large body of water with a vibrant blue-green hue and visible ripples. To the right of the road is a dense, lush green forest of tall trees. The overall scene is captured from a high-angle perspective, looking down on the landscape.

**über cellcentric**

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# With 30 years of know-how and over 800 patents cellcentric aims to become a leading global supplier of fuel cells

Ambitions CO<sub>2</sub>-neutral and sustainable transport by 2050



CO<sub>2</sub>-neutral by 2039



100% fossil fuel free by 2040



Our aim is, to become the **#1 supplier for fuel cells** to support Daimler Truck and Volvo Group Vision of CO<sub>2</sub> neutral transportation

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# Daimler Truck Hydrogen RecordRun Fully loaded @40 tons 1,047 km on one tank



# Volvo truck tests on public roads in severe weather conditions to demonstrate capabilities

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# Significant improvements in power density and cost reduction



## 2010 CITARO F-CELL

- Citaro Bus reached lifetime of >19.000 h



## 2018 GLC F-CELL

- Power density +100 %
- Platinum content -90 %



## 2022 BZA 100+

- Power output from 70 to 100+ kW
- New stack technology
- Production process for medium volumes



## 2025 BZA 150

- Power output from 100+ to ~143 kW
- Production process for high volumes
- Expected lifetime target **25.000 hours<sup>1</sup> / up to 10 years (long haul truck)**

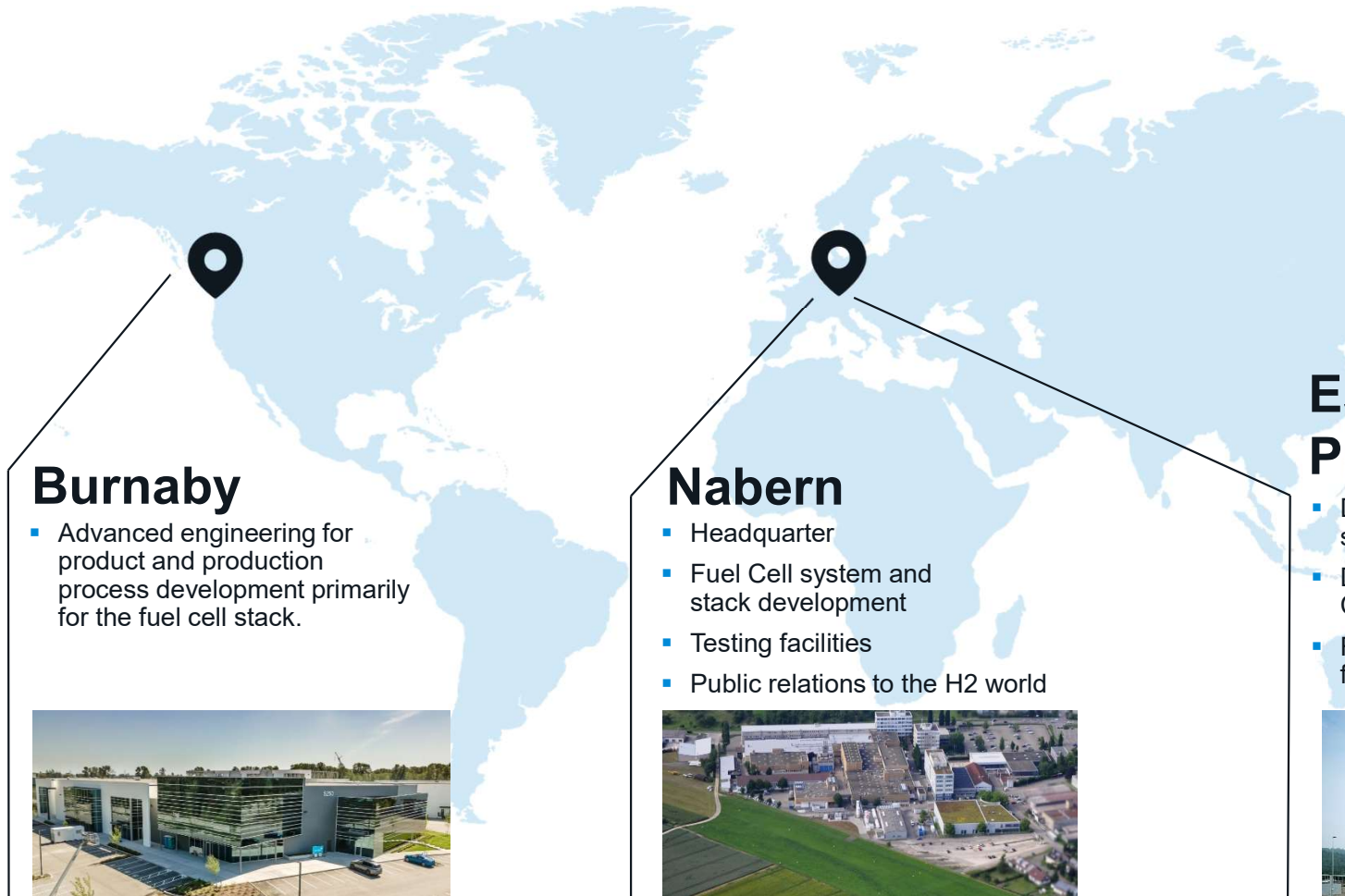


## 20XX NextGen

- Peak power of above 350 kW
- 20% less fuel\*
- 40% waste heat reduction\*
- 30% more power density & 40% less complexity\*

\*Comparison over BZA150

# cellcentric's research, development and production



> 500 employees support Fuel Cell activities from our main locations ...

## Burnaby

- Advanced engineering for product and production process development primarily for the fuel cell stack.



## Nabern

- Headquarter
- Fuel Cell system and stack development
- Testing facilities
- Public relations to the H2 world



## Esslingen – Pliensauvorstadt

- Development and test of large-scale production processes
- Development and production of CCM (Catalyst Coated Membrane)
- First large-scale machinery and fuel cell system production

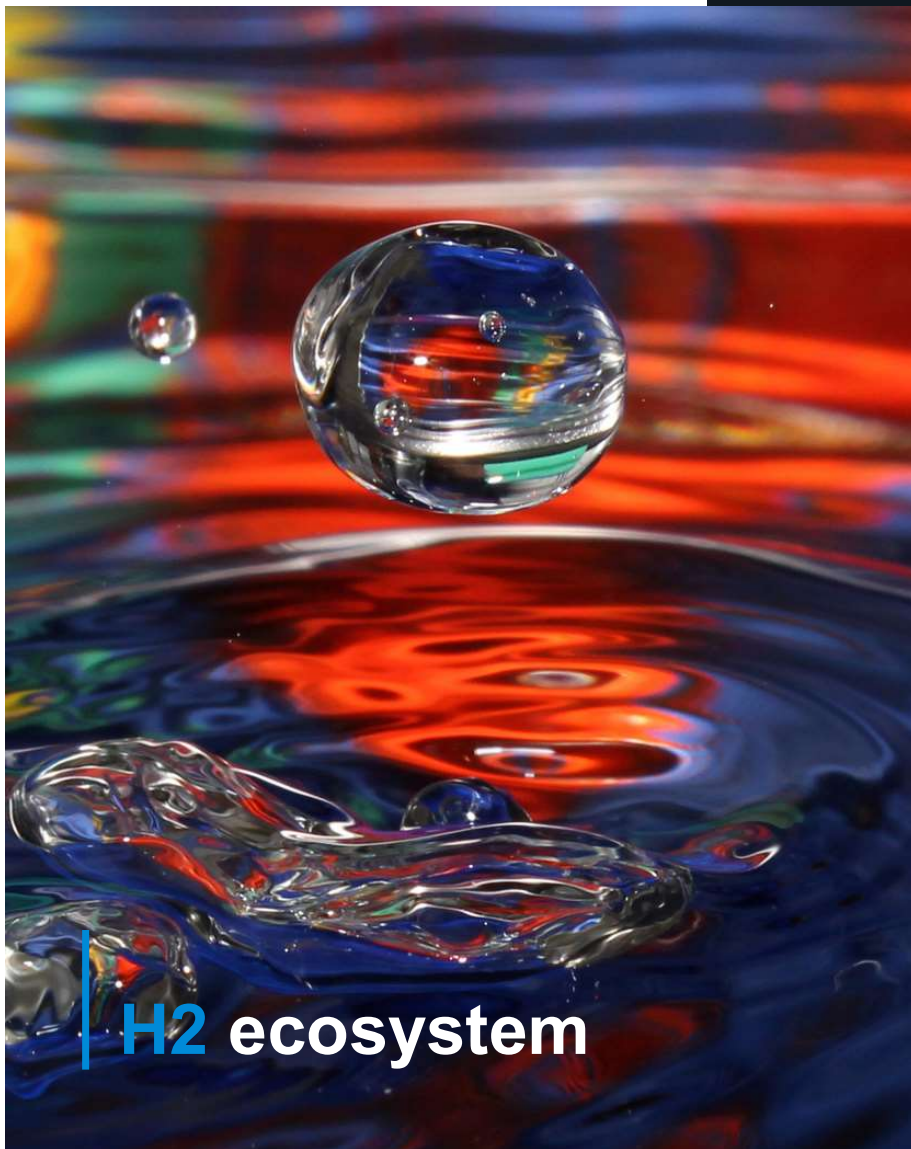




An aerial photograph showing a winding asphalt road that curves from the top center towards the bottom center. To the left of the road is a large body of water with a vibrant blue-green hue. To the right of the road is a dense, lush green forest. The scene is captured from a high angle, looking down.

# H2 ecosystem Herausforderungen





**H2 ecosystem**



## H2 Produktion

- In Deutschland bis zu 70% H2 Import
- Grüner H2 vs. sauberer H2



## Lagerung und Verteilung

- Effiziente Speicher aufgrund niedriger Energiedichte
- Hochdrucktanks und neue Verteilernetze



## Nutzung

- Industrie, Transport, und Notstromversorgung
- Reduziert CO<sub>2</sub>-Emissionen und fossile Abhängigkeit



## Sicherheit und Regulierung

- Strenge Standards und Vorschriften
- Die European Industrial Gases Association (EIGA)



## Wirtschaftliche- und Umweltvorteile

- H2-Ökosystem schafft Jobs und fördert Innovationen
- Reduziert Umweltbelastung durch saubere Energie



# Henne & Ei – Problem hemmt Investitionen und Geschwindigkeit, fehlende Investitionssicherheit

## H2 Anwendungen

Produktreife wird Realität, Industrialisierung für Volumen ist aktueller Fokus

## Regularien & Anreize

Wettbewerbsfähiger H2 Preis & Stabilität (subsidies, tax credits & concessional funds for green H2) für Investitionssicherheit

## Hauptfaktoren



## Fördermittel

- Geld wird knapper
- Hohe Bürokratie
- 60 Mrd. Euro in Fördermittel Kürzung (Urteil vom 15. November 2023)

## H2 Infrastruktur

- Zuverlässige H2 Versorgung für Investitions- und Kundensicherheit
- Wasserstoff Preis\*:  
DE 8-14€ / USA 12-15€ /  
China 2,5-4,5€



An aerial photograph showing a winding asphalt road on the left side, bordered by a dense green forest. To the right of the road is a large body of water with a deep blue hue. The scene is captured from a high angle, looking down.

# IPCEI Finanzierung



# Verfügbarkeit von finanziellen Ressourcen wichtiger Erfolgsfaktor für H2 Ecosystem Entwicklung

## Europe

### IPCEI – 19,4 Mrd. Euro

- 1. Hy2Tech: 35 Unternehmen aus 15 Mitgliedsstaaten 5,9 Mrd. €
- 2. Hy2Use: 29 Unternehmen aus 13 Mitgliedsstaaten 5,2 Mrd. €
- 3. Hy2Infra: 32 Unternehmen aus 7 Mitgliedsstaaten 6,9 Mrd. €
- 4. Hy2Move: 11 Unternehmen aus 7 Mitgliedsstaaten 1,4 Mrd. €

### European Innovation Fund

- 2024 Bewilligung von 4 Mrd. € aus 337 Bewerbungen mit Bedarf von 24,6 Mrd.

### RED III (Renewable Energy Directive)

- Verbindliche EU-weite Ziele mit 40% erneuerbaren Energiekonsum in 2030

## United States of America

### IRA – 369 Mrd. USD

- **Anreize** für die Produktion von grünem Wasserstoff und die **Umsetzung** von Clean Energy Programs
- **PTC** (Clean Hydrogen Production Tax Credit), **Steuer-Vorteil** von \$3 pro kg grünem H2 produziert

### IIJA (Infrastructure Investments and Jobs Act)

- 8,0 Mrd. **in den Bau** von regionalen H2 hubs

## People's Republic of China

### Five-Year Plan (2021-2025)

- Investments in Infrastruktur
- Genaue Zahlen unbekannt

### National Hydrogen Strategie

- Strategie, um H2 Produktion zu **skalieren**
- Staatliche Firmen investieren Mrd. in H2 **Produktion**
- **Bau** von 1.000 Tankstellen in den nächsten 5 Jahren
- Grüner Wasserstoff **USD 2.4/kg** in 2021, **USD 1,7/kg** in 2030

Fokus Europa-Fördermittel auf R&D, während USA Förderungen auf Investitionsanreize zielen

# Erfolgreiche Genehmigung der IPCEI Hy2Move Projekte im Mai 2024

11 companies with 13 projects as direct participants

Mobility and transport applications

Fuel cell technology

Hydrogen onboard storage solutions

Hydrogen production technologies

- Air Products 
- Airbus DE 
- Airbus ES 
- Airbus FR 
- BMW 
- Evolution synergetique 
- Hydrogene de France 
- Skelton 
- Tomark 

- Airbus DE 
- BMW 
- Hydrogene de France 
- Michelin 
- UFI 

- Airbus DE 
- Airbus ES 
- Airbus FR 
- BMW 
- Tomark 

- Air Products 
- Gen-Hy Cube 
- Michelin 
- Neumann & Esser 

Associated partner

Breuer Technical Development 

200+ indirect partners; universities, research technology organisations, SMEs, etc.



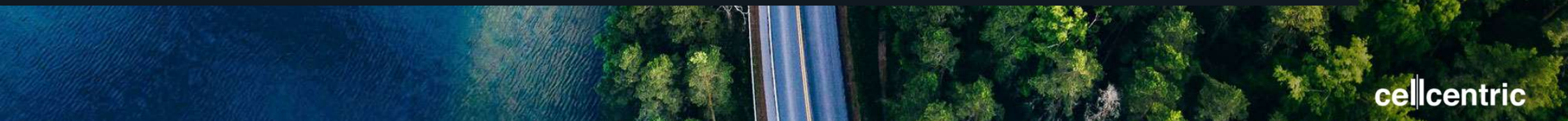


## IPCEI | cellcentric

- Ermöglicht die Entwicklung und Markteinführung **fortschrittlicher** Wasserstofftechnologien
- Ermöglicht erhebliche **finanzielle Unterstützung** für strategisch wichtige Projekte
- Aufwendige Administration, Bürokratie und Nominierungszeiten
- cellcentric setzt sein Projekt außerhalb der IPCEI-Förderung um, um **größere Flexibilität** angesichts der dynamischen Entwicklungen in der Wasserstoffwirtschaft zu erreichen
- Die **dynamische Marktentwicklung** erfordert Anpassungen, sodass die Entwicklung von cellcentric nicht mehr in bestehende Förderrichtlinien passt, dennoch bleibt die **Zusammenarbeit mit Förderbehörden wichtig**
- Wissenstransfer über **IP Sharing**



# Ausblick







## Pilot Produktion PSV Esslingen

- Die Pilotproduktion zeigt **cellcentric** als Vorreiter für umweltfreundliche Mobilität im Schwerlastverkehr
- Die neue Produktionsstätte ist ein bedeutender Schritt hin zur **industriellen Fertigung** von **Brennstoffzellensystemen**
- Die Pilotproduktion ermöglicht **effiziente Fertigung** durch **Automatisierung** und **vertikale Integration**





KLIMA|WERK WEILHEIM

## The most innovative and sustainable Fuel Cell factory in Europe

- Holistic, sustainable energy concept
- Green hydrogen production creates local heat for surrounding households
- Extensive green roofs and ecologically designed green areas
- Resource-saving construction, use of sustainable building materials and a powerful photovoltaic system on the roof
- In the medium term, another 450 jobs that are competitive worldwide





## H2 ecosystem kann nur in **Partnerschaft** und **Zusammenarbeit** erreicht werden



**Shareholders**



**Customers**



**Suppliers**



**Industrial Partners**



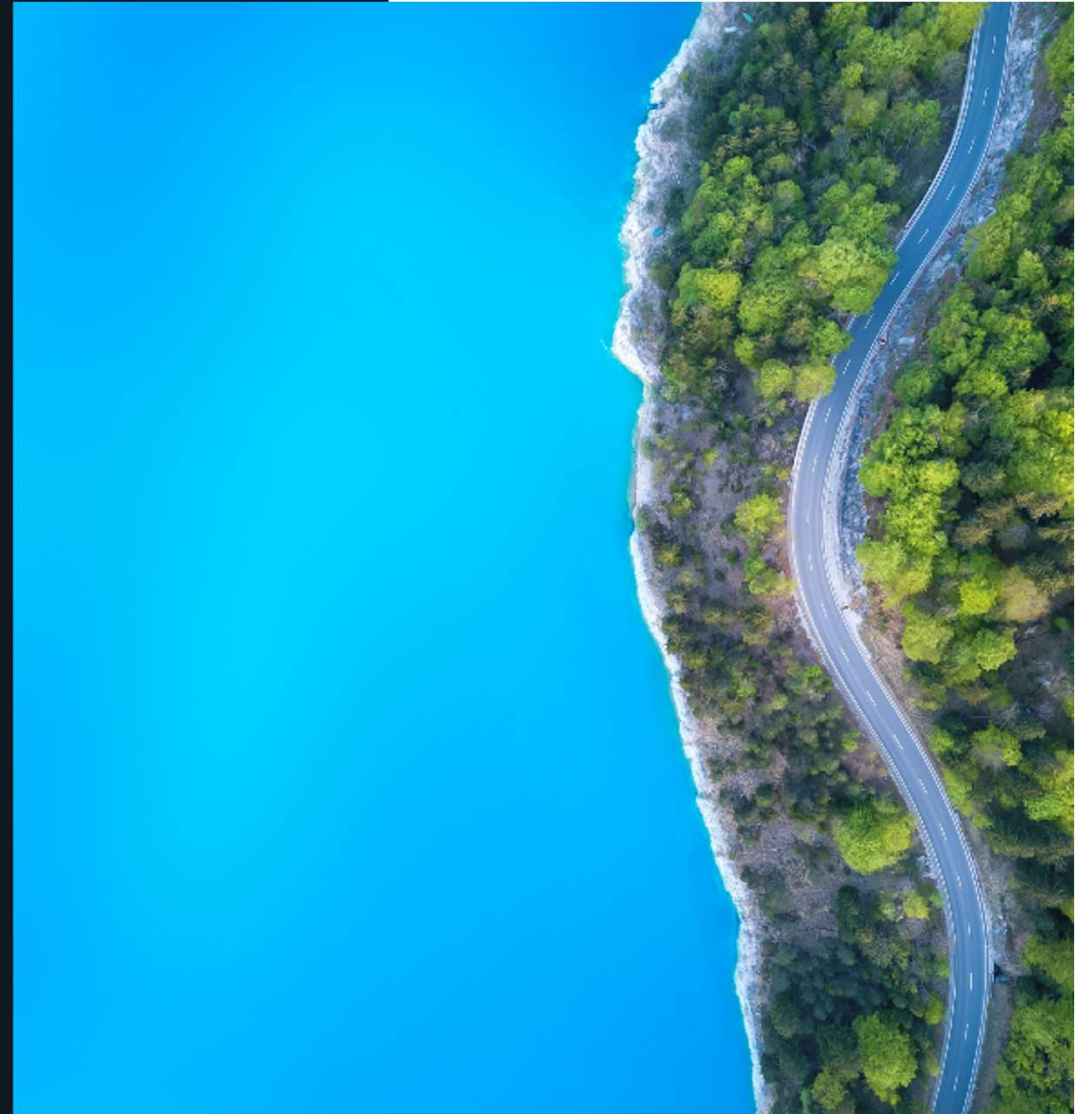
**Governments**

# We power sustainable life

Thank you for your attention.



Andrea Engelen





# We power sustainable life

## Get in touch

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 [LinkedIn company page](#)

