

MASTERCLASS

Masterplan energietransitie voor de procesindustrie

Rotterdam – 25 september 2024



Simone van Tongeren
Projectleider Klimaat
Deltalinqs

WELKOM

AGENDA

- 1 Introductie
- 2 New Energy & Infrastructure
- 3 Masterplan energietransitie procesindustrie
- 4 Case: Shin-Etsu
- 5 Case: Gouda Refractories
- 6 Paneldiscussie
- 7 Afsluiting plenaire sessie
- 8 Netwerkborrel

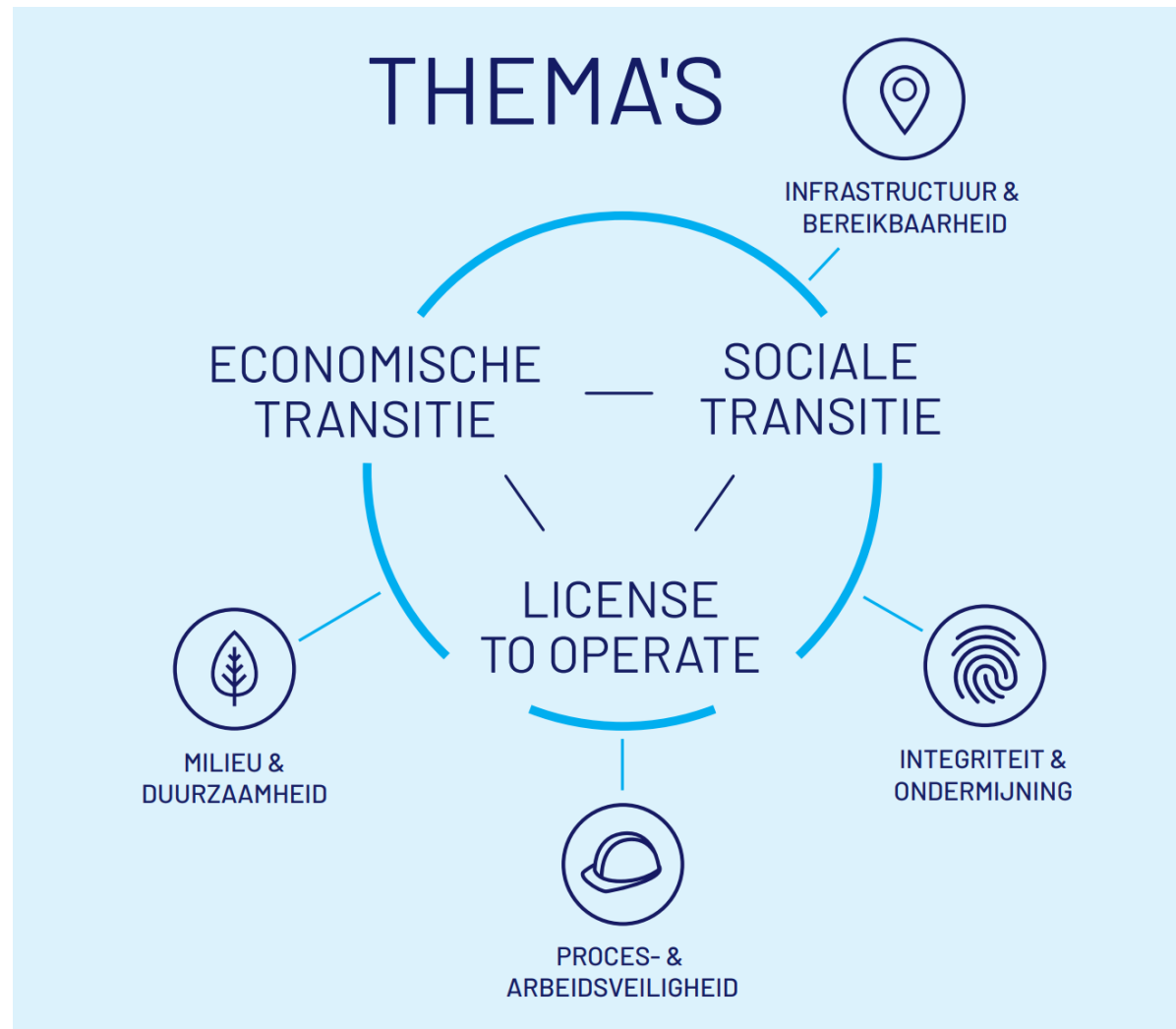
ABOUT US



Deltalinqs

KHEngineering

GROTE DIVERSITEIT AAN ONDERWERPEN BIJ DELTALINQS



ECONOMISCHE TRANSITIE PIJLER STAAT VOOR



Aanjagen & Inspireren



Verbinden & Versnellen



LOC 1:
Elektriciteit &
Energiesysteem



LOC 2:
Mobiliteit &
Duurzaam transport



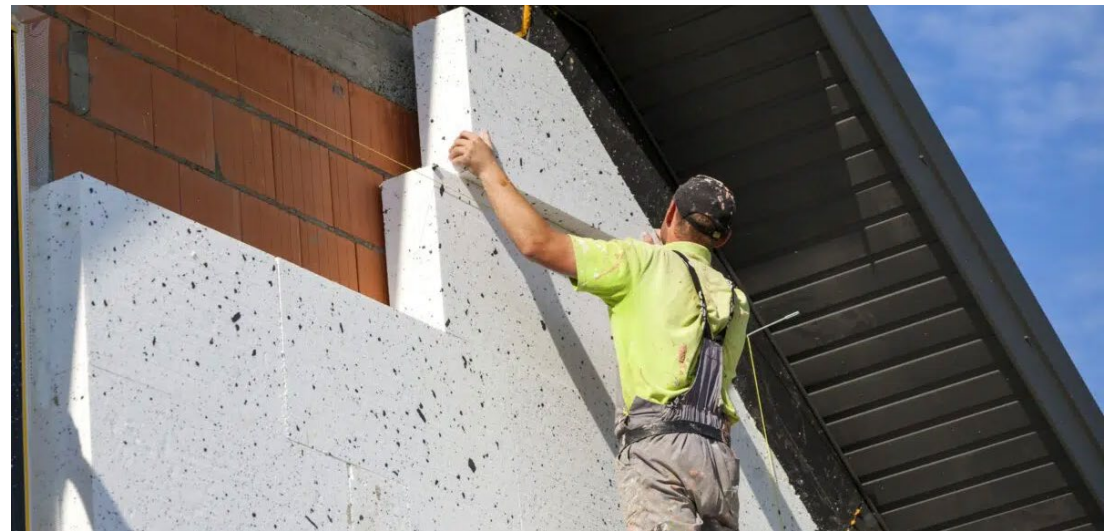
LOC 3:
Industrie &
Havenbedrijven



LOC 4:
Grondstoffen

LOC 0: Proces & Overkoepelende onderwerpen

CRUCIALE LOGISTIEKE ROL EN VERDUURZAMING DOOR CLUSTER



INTRODUCTIE



Simone van Tongeren
Projectleider Klimaat
Deltalinqs



Marc Steigenga
Chief Executive Officer
KH Engineering



Kees Vonk
Commercial Manager
KH Engineering

NEW ENERGY & INFRASTRUCTURE (NE&I)

WHO WE ARE

200
Clients

20
Projects
on location

74
Years of
experience

500
Colleagues

4
High Value
Centers

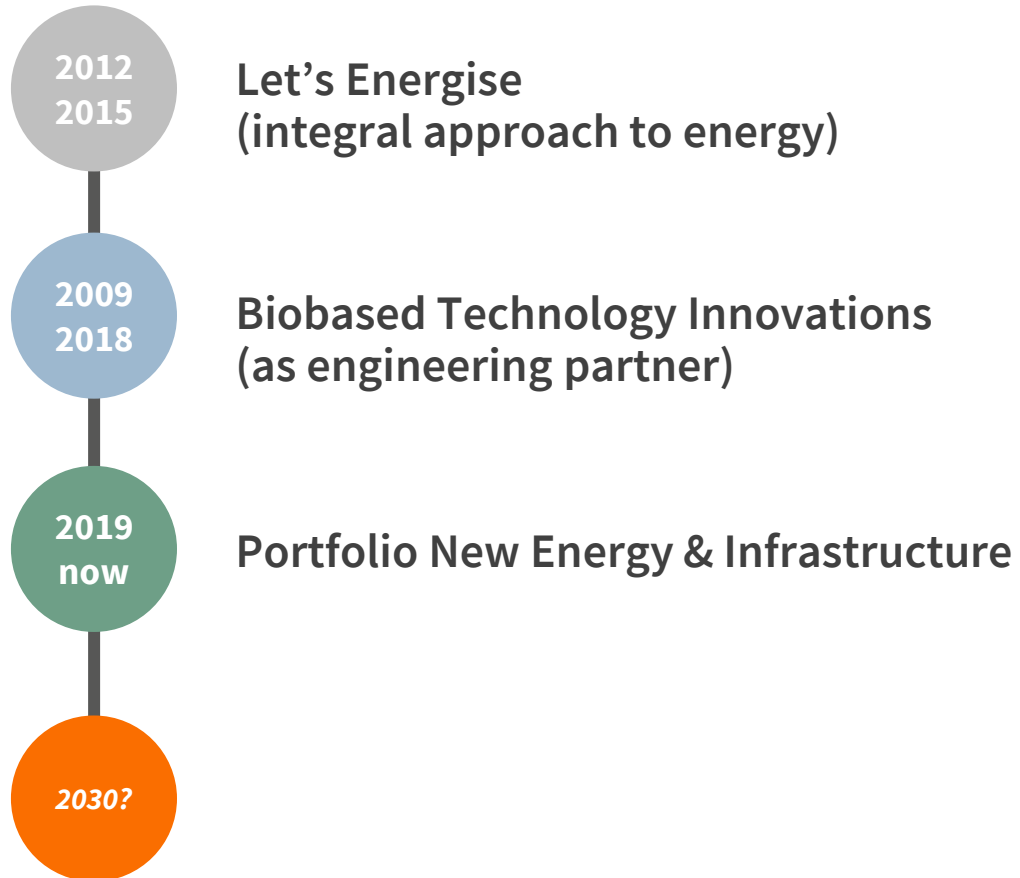
5
Markets

3
Offices

1500
Projects
per year



MORE THAN 10 YEARS OF INNOVATION



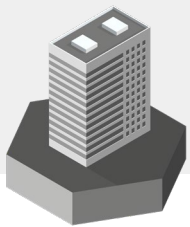
*We have
ALWAYS been
forward-thinking*



FOCUS CLUSTERS

1. General/strategic

- Laws
- Regulations
- Subsidies
- Masterplan/roadmap
- Energy scan



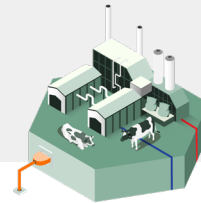
2. (Renewable) Energy

- Energy sources
- Electrification
- Hydrogen
- CC(U)S
- Power-to-X
- Storage/peak shaving



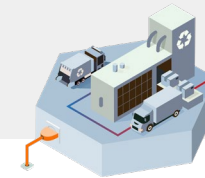
3. Biobased Economy

- Biorefinery
- Value chains
- Bio-to-X
- Drop-in chemicals



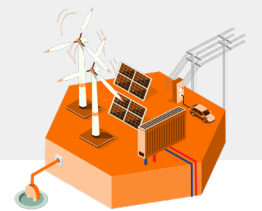
4. Circular Economy

- Separation
- Treatment
- Plastics
- Metals
- Waste-to-X

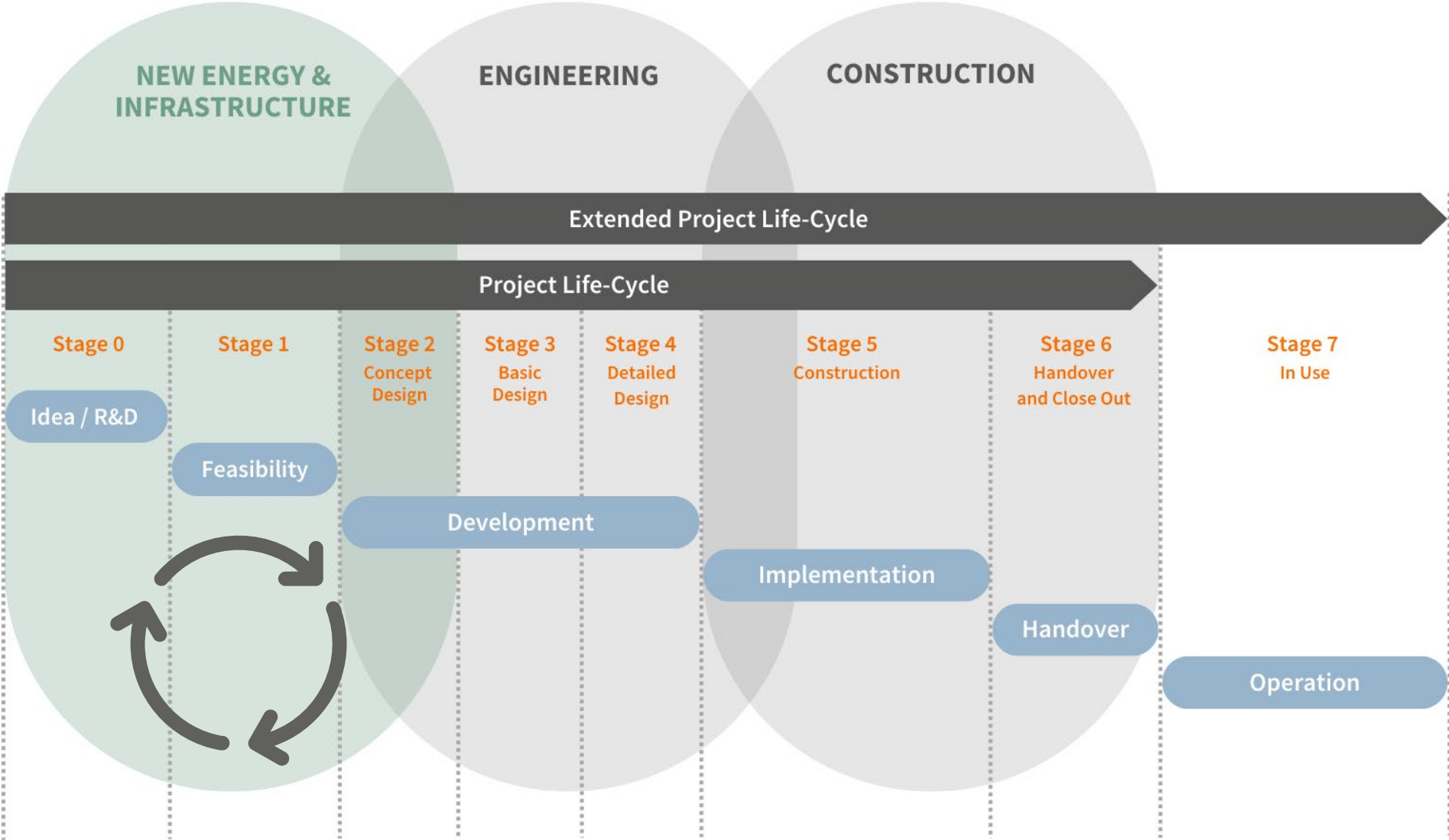


5. Infrastructure

- Electricity & Power
- Heating networks
- Energy distribution
- Powering hubs grid



OUR INVOLVEMENT



MARKETS





Serdar Erdag
Account Manager NE&I
KH Engineering

MASTERPLAN ENERGIETRANSITIE PROCESINDUSTRIE

KANSEN DIE DE ENERGIETRANSITIE BIEDT



Minder afhankelijk van energieleveranciers en schommelende tarieven



De concurrentiepositie van het bedrijf verbetert



Omwonenden, klanten én medewerkers kijken positiever naar de organisatie

EXTERNE DRIVERS



Energiebesparingsplicht



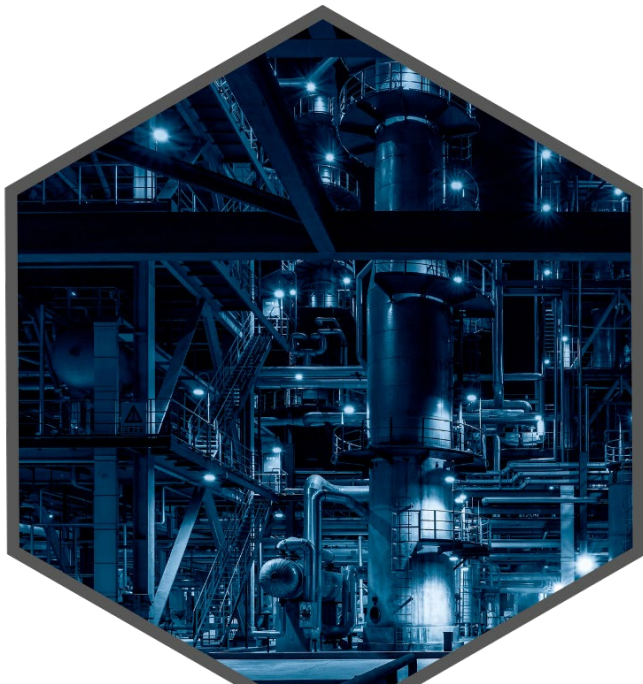
Subsidies



Wet- en regelgeving
(future-proof)

DE UITDAGINGEN VAN EEN BROWNFIELD
KADER VAN (ON)MOGELIJKHEDEN BIJ DE ENERGIETRANSITIE

UITDAGINGEN IN BROWNFIELD



Gebrek aan ruimte

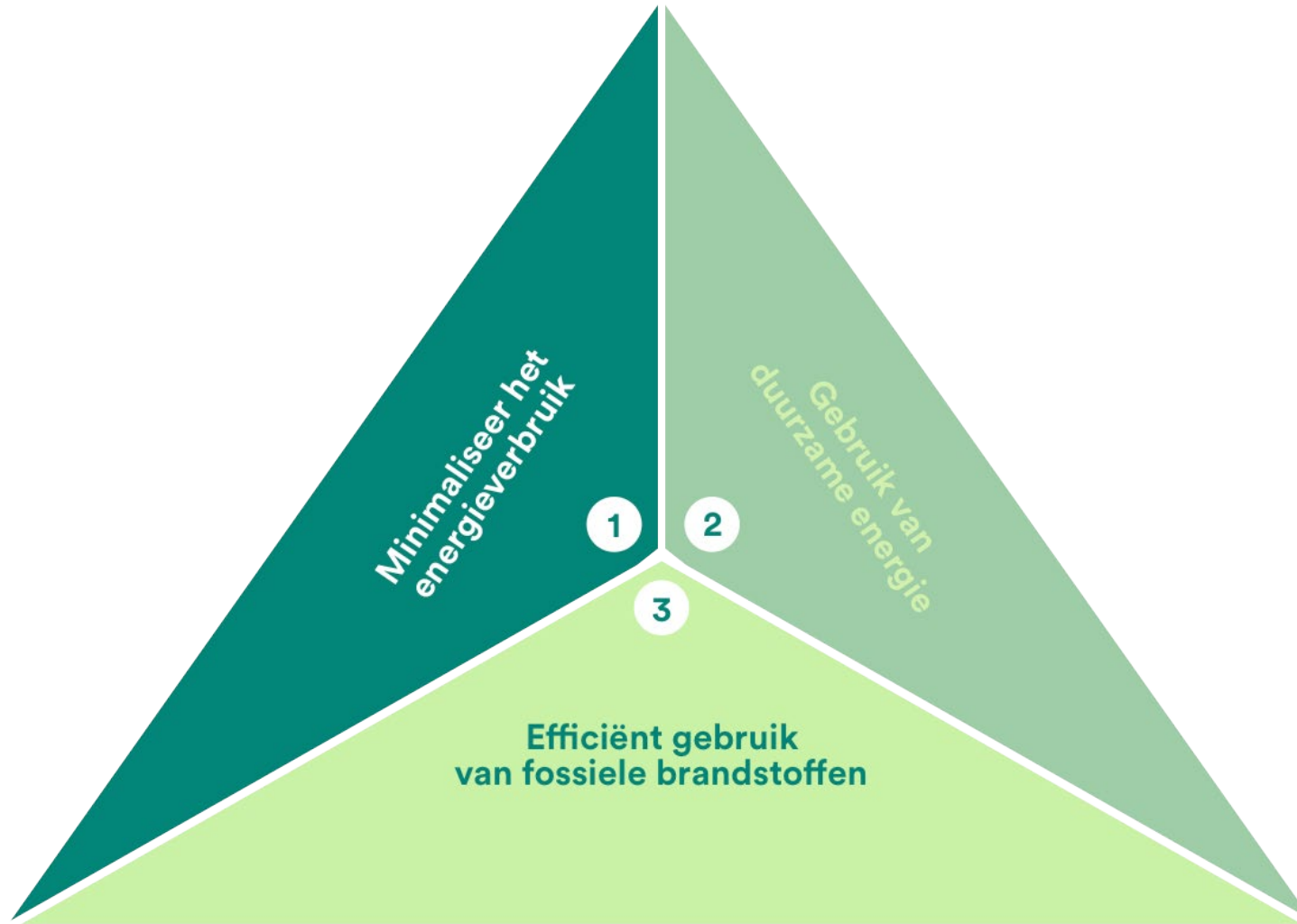


Productieproces

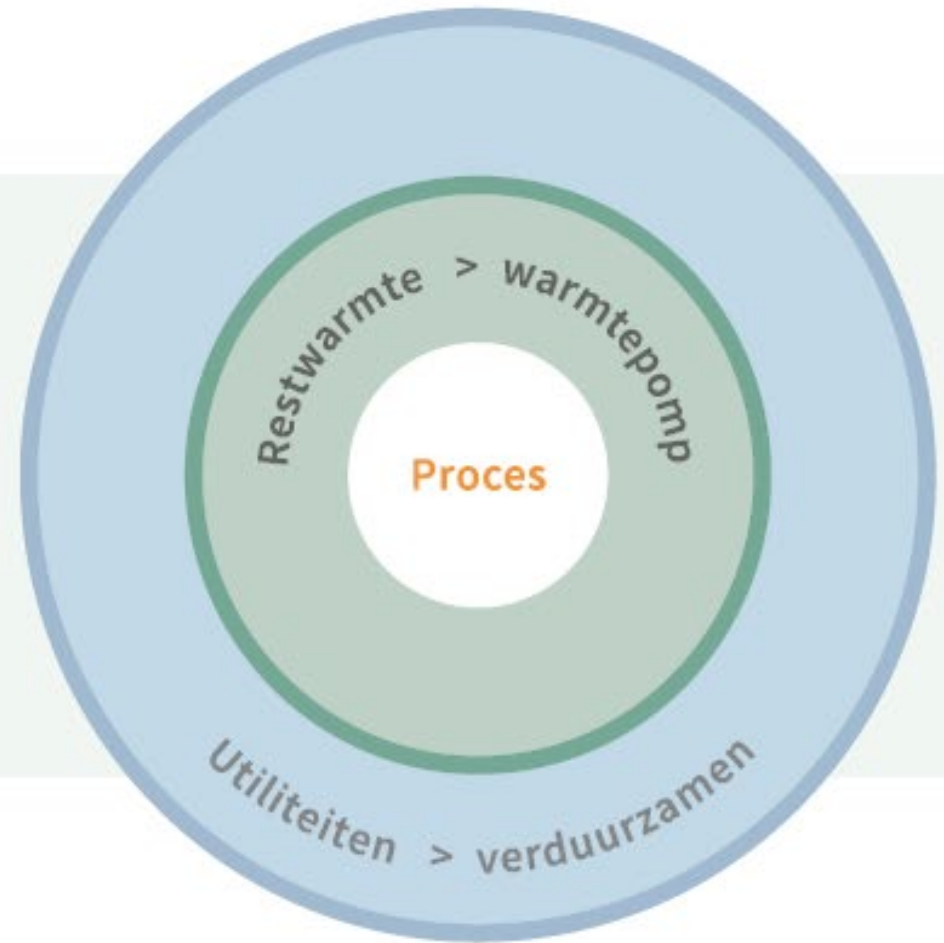


Risico's & vergunningen

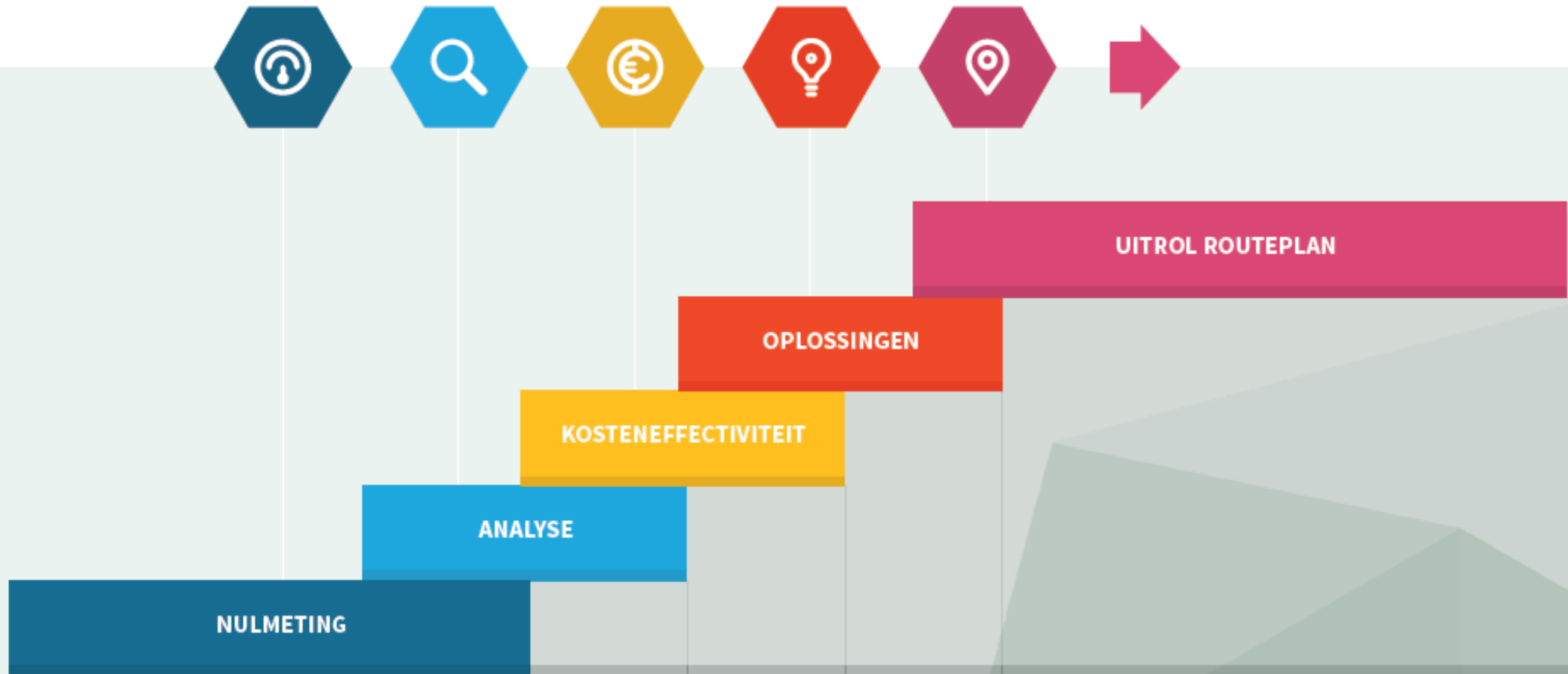
ENERGIETRANSITIE & TRIAS ENERGETICA



*Een laagdrempelige energietransitie?
Dat kan door alleen de utiliteiten te
verduurzamen. In deze 'schil van de ui'
zitten de quick wins.*



STRATEGISCHE ROUTEKAART





Albert Keukens
Sustainability Manager
Shin-Etsu

CASE: SHIN-ETSU

Energie-efficiency en –transitie Shin-Etsu PVC B.V.

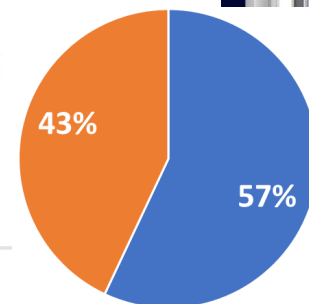
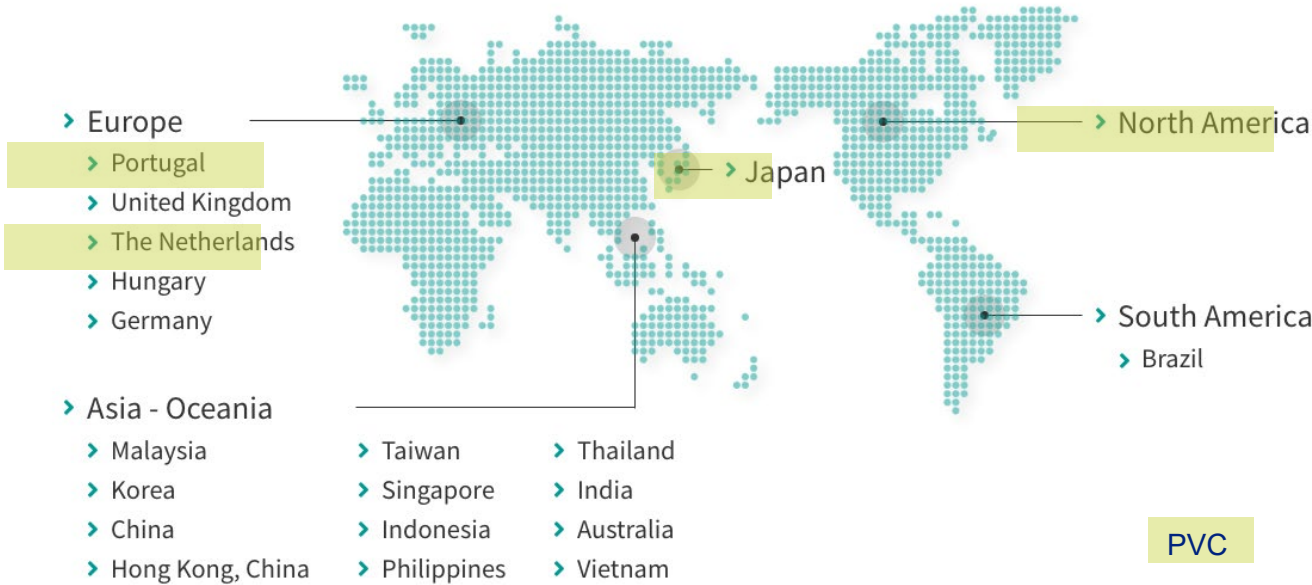
Masterplan energietransitie voor de procesindustrie

Albert Keukens, Sustainability Manager

Shin-Etsu Chemical Co.



Worldwide Network



PVC

Major Bases of Operation / Worldwide Network

Overseas sales ratio

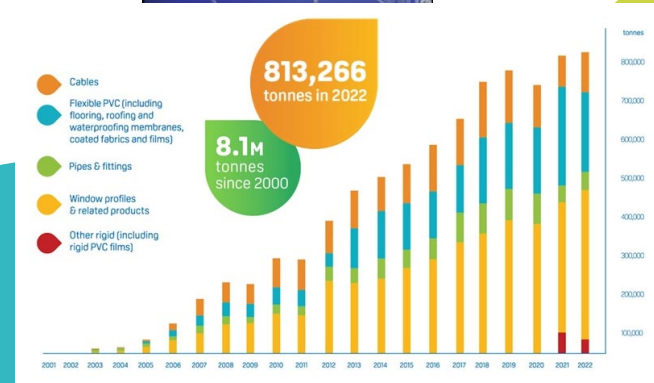
about 80 %

Overseas bases

23 countries

Global employees

26,004 employees



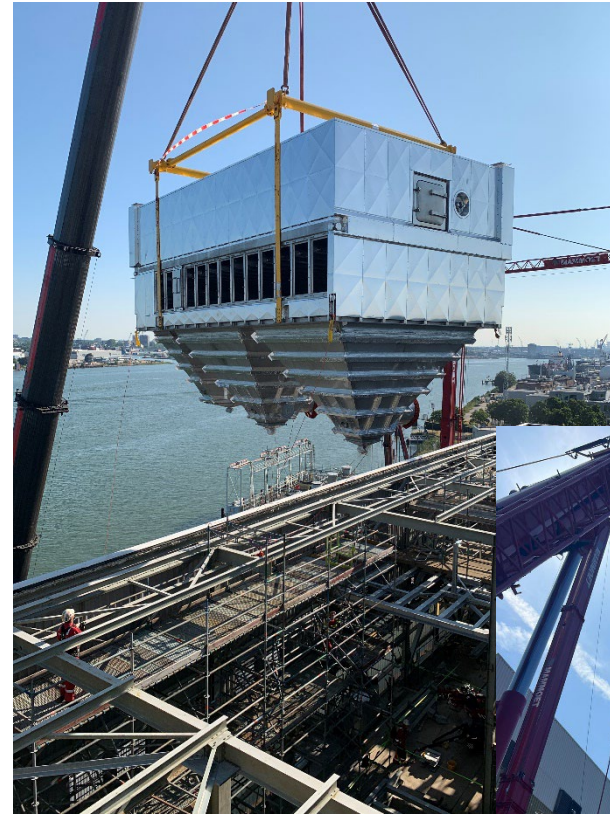
Shin-Etsu PVC B.V.



Werk in uitvoering



VCM plant



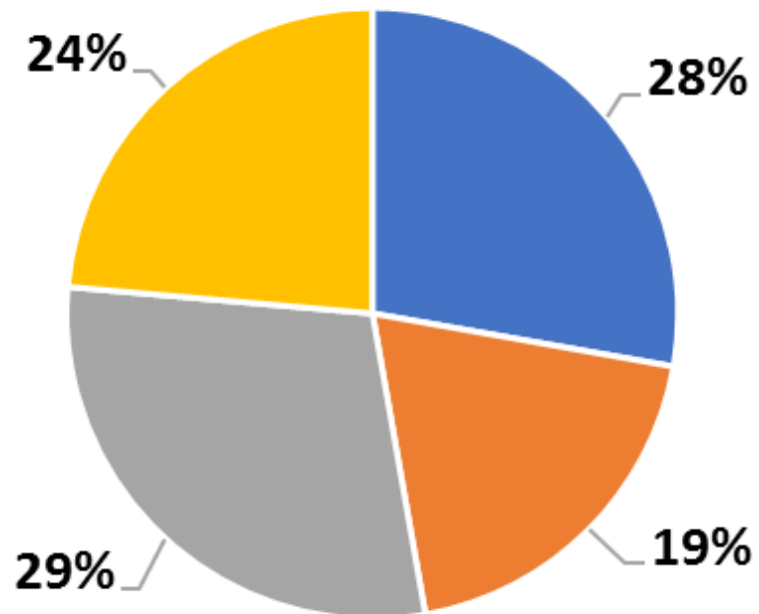
PVC plant



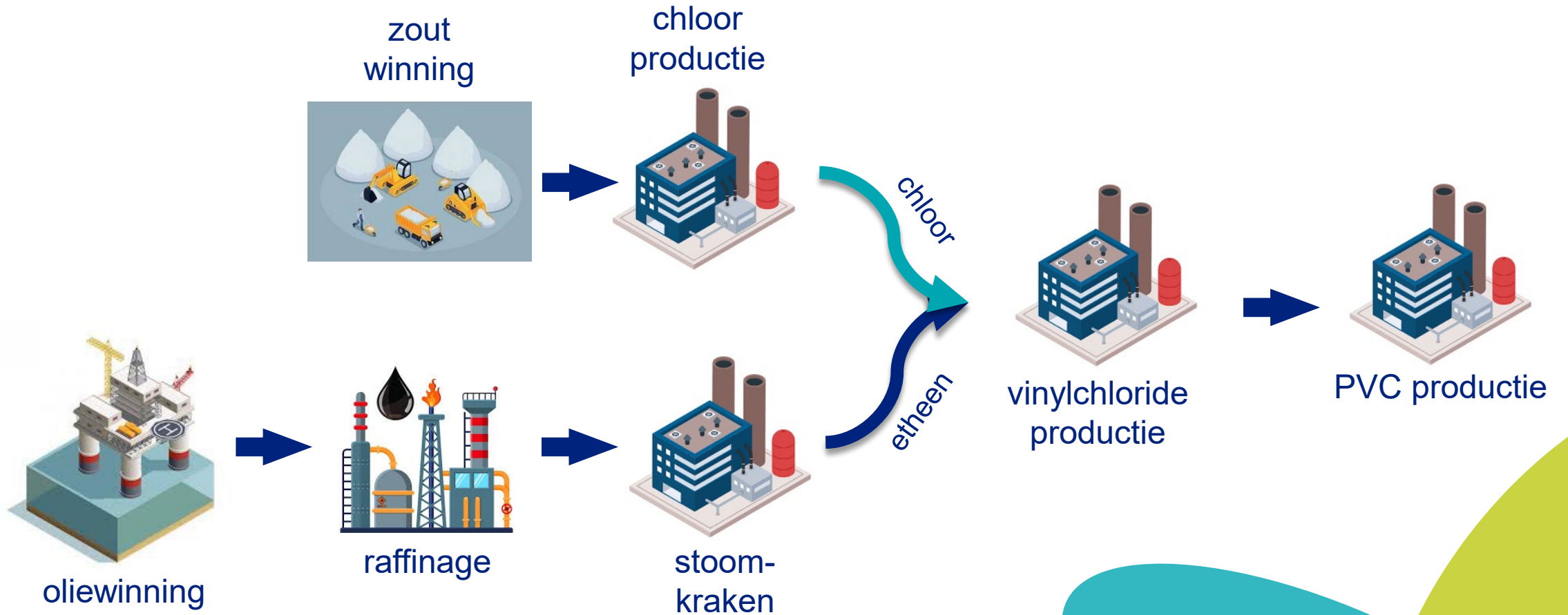
Belang energiebesparing vs energietransitie

Verduurzaming VCM/PVC Productie

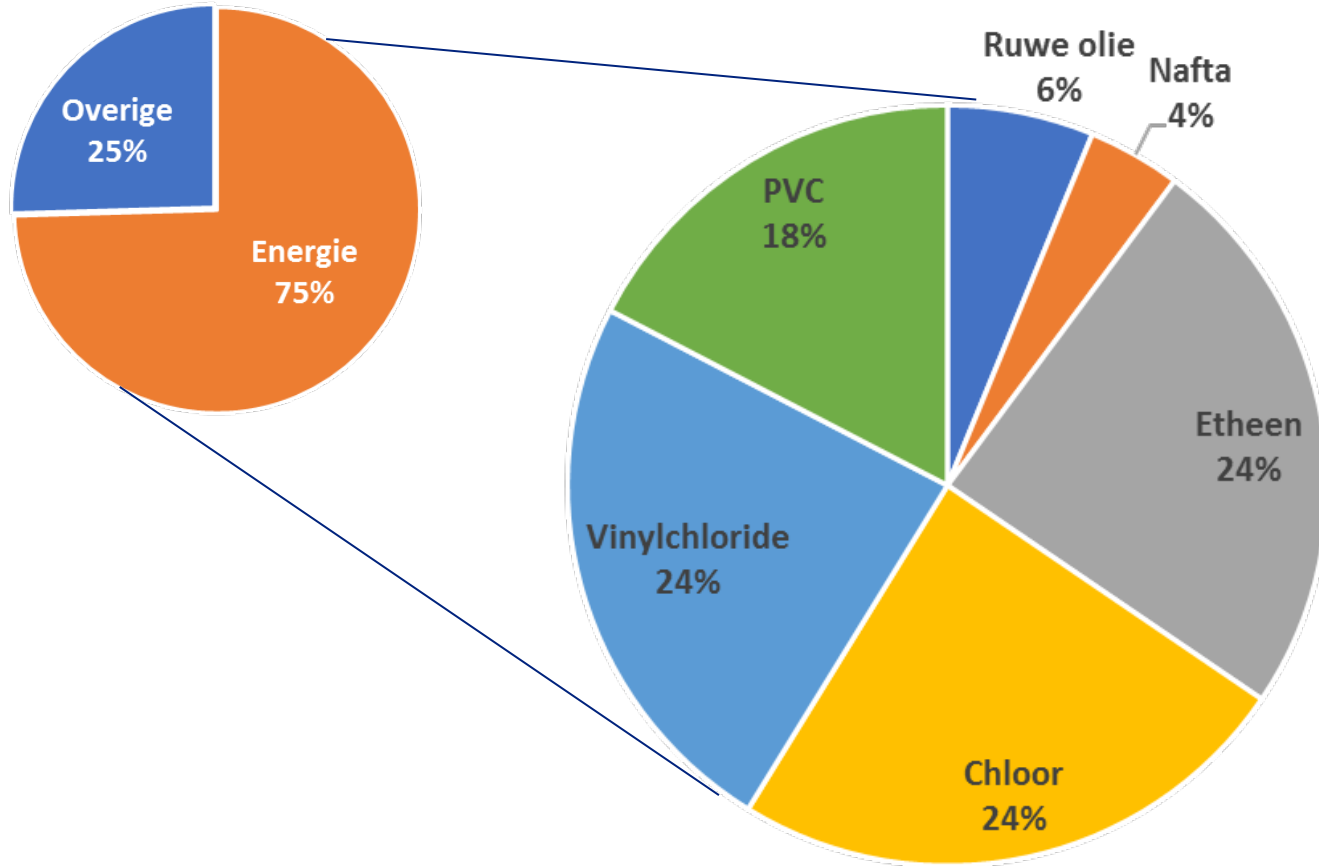
- Energie efficiency
- Hernieuwbare elektriciteit
- Uitfaseren aardgas
- Verduurzamen warmtevraag



Waardeketen “cradle-to-gate”



PVC carbon footprint (cradle-to-gate)



Energie(besparings)projecten

Stimulerende factoren

- Energiekosten
- CO₂ kosten en CBAM
- Marktvraag (lagere footprint)
- Wet- en regelgeving
- Subsidie, mits ...
- Bedrijfsdoelstellingen
- Reputatie

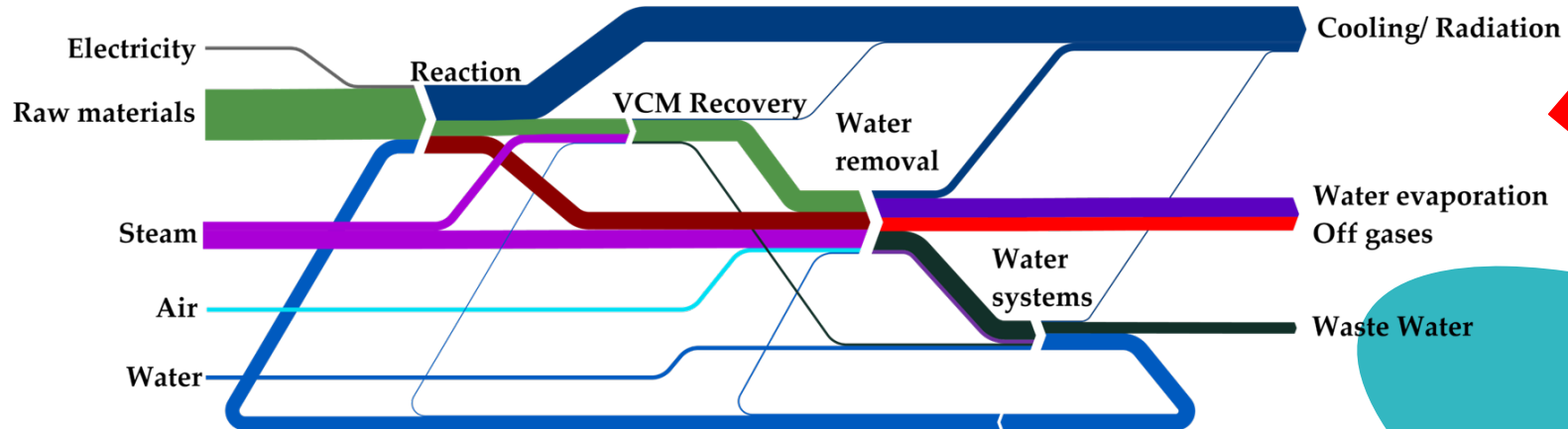
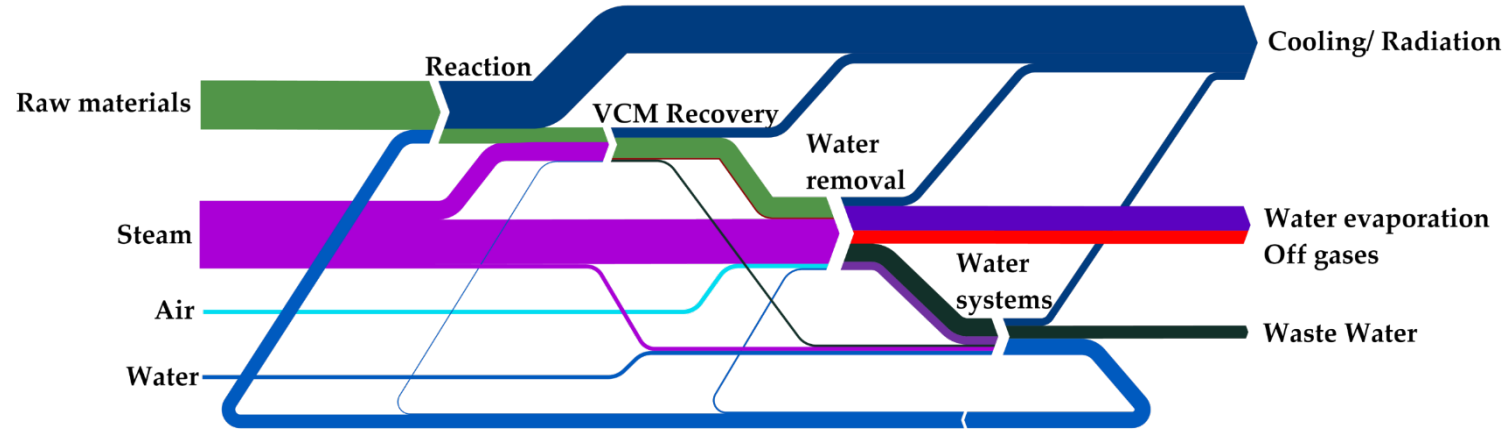
Remmende factoren

- Pay-out
- Investeringsruimte
- Capaciteit infrastructuur
- Concurrentie van buiten NL/EU
- Onduidelijk overheidsbeleid
- Beschikbaarheid personeel
- Technische complexiteit
- Ruimte
- Kosten duurzame energie

Energie-efficiency studie PVC fabriek

2018

theoretische potentie



- 48%

beperkt aantal,
maar grote
projecten

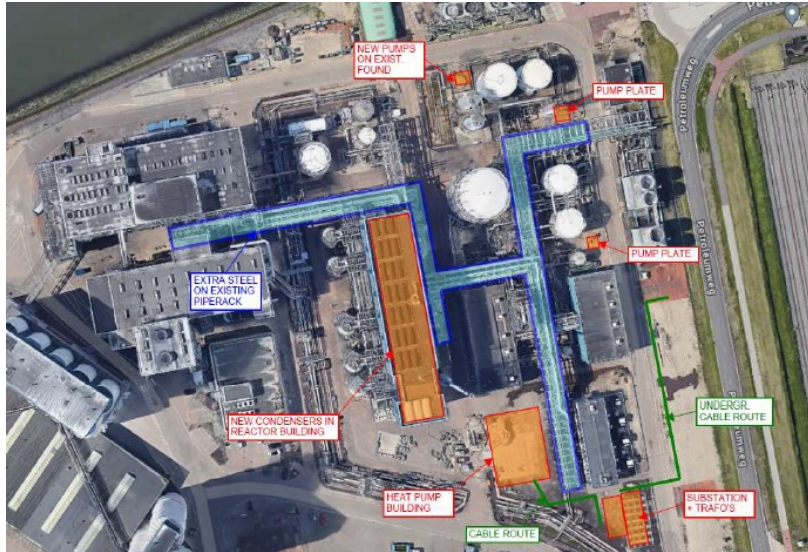
Tot zover over energiebesparing en –transitie ...

- Energiebesparing levert een significante bijdrage aan verduurzaming
... EN verlaagt de variabele kosten significant
- Carbon footprint wordt gedomineerd door energieverbruik in de keten
- Footprint-verlaging is een gezamenlijke inspanning
- Eerst energiebesparing, dan energietransitie
- Besluitvorming energieprojecten is complex
- Grotere projecten zijn het meest kansrijk
- Subsidie-aanvraag onderdeel van projectplanning

Brownfield

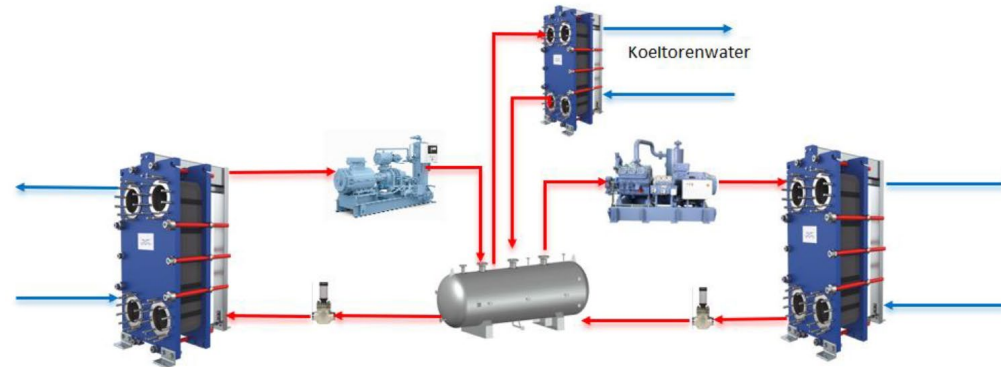
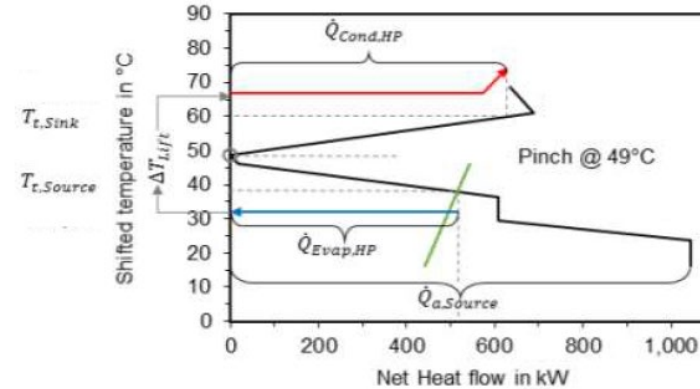


Toepassen van warmtepompen en 25 kV aansluiting



Karakteristieken:

- Complex, invasief project
- Brownfield
- Gefaseerde uitvoering
- Bouwen tijdens bedrijf
- Onderhuur



Ervaringen feasibility-fase

- **Doel:** scope in voldoende detail + dekkende, betrouwbare kostenschatting
- **Intensieve samenwerking KH/SE** – flexibiliteit
- **Focus op kostenbepalende scope** – uitwerken in voldoende detail
- **3D scan bestaande installatie** – meer zekerheid brownfield scope
- **Multidisciplinaire constructiereview** tijdens feasibility
- **Multidisciplinaire value engineering** sessie tijdens feasibility
- **Identificatie delen greenfield en brownfield** – kan cost-estimate verbeteren
- **Zicht op** aanbiedingen en levertijden kritische apparatuur
- **Beoordeling** bestaande vergunningsruimte

Kostenbepalende factoren in brownfield omgeving

- Capaciteit bestaande leidingbruggen
- Aanwezigheid ondergrondse leidingen en kabels
- I/O capaciteit besturingssysteem
- Capaciteit E-systeem
- Bestaande Ex-zonering – mogelijk dezoneren
- Mogelijke derving tbv aansluitingen
- (Complexe) steigers – impact op vluchtwegen
- Doorlooptijd – realistische planning
- Kwaliteit van bestaande as-built tekeningenset
- Eisen aan betrouwbaarheid
- Risico “scope-creep”

Afsluitend



Verduurzaming van bestaande fabrieken:

- veel dimensies
- veel stakeholders
- veel disciplines
- veel risico's

KH whitepaper

Masterplan energietransitie voor de procesindustrie



Wilfred Buijs
Chief Operating Officer
Gouda Refractories

CASE: GOUDA REFRACTORIES



GOUDA *refractories group*



GOUDA *refractories*



GOUDA *vuurvast belgium*



GOUDA *vuurvast services*



GOUDA *feuerfest services*



GOUDA *refractories nordic*

Company Presentation

Refractories | making it possible



01

GROUP INFORMATION

COMPANY MOTTO

“ Being a **LEADING, SUSTAINABLE AND HIGH-QUALITY NICHE SUPPLIER** of refractory solutions globally and provider of refractory services in North-West Europe.”

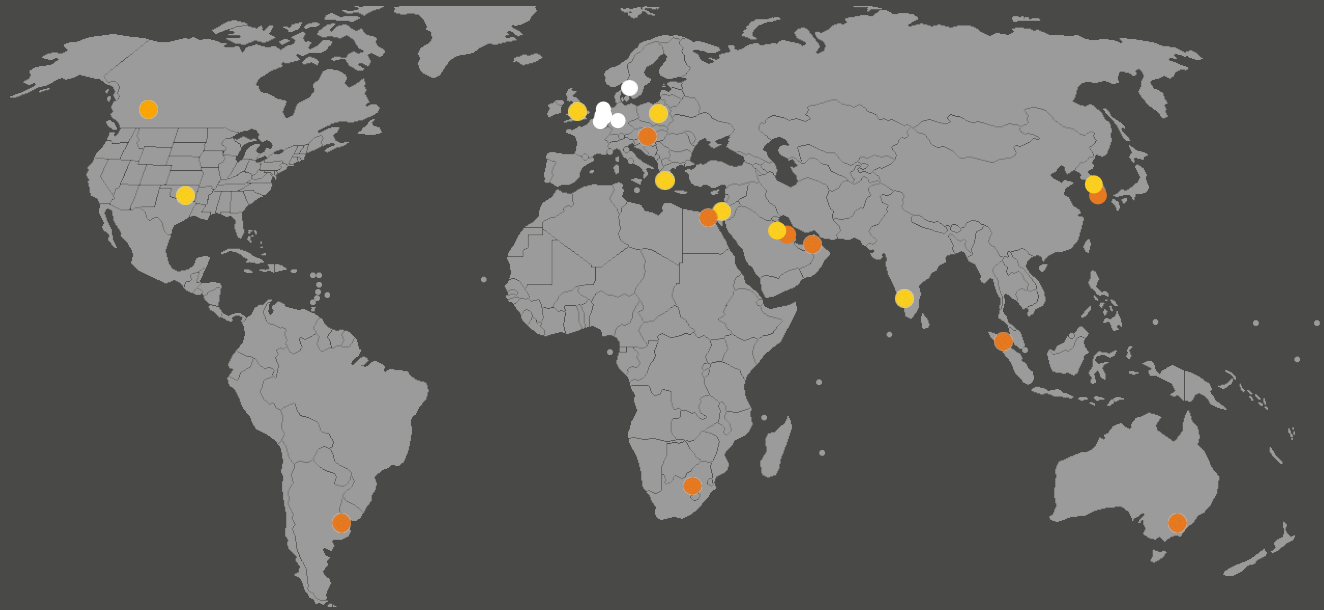
BASIC DATA

- Founded in **1901**
- Owned by **Gilde Equity Management**
- 250+ direct **Group Employees**
- **Production Capacity:**
 - Bricks: 60.000 MT per year
 - Monolithics: 25.000 MT per year
 - Prefab: 6.000 MT per year

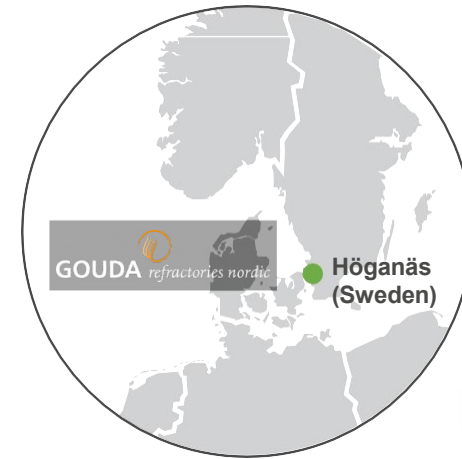


GLOBAL NETWORK

- Group Companies
- Representation ENERGY & CHEMICALS
- Representation non-ferrous METALS
- Representation full scope / others



Gouda Refractories Brick Plant & Head Office
Gouda Refractories Monolithics Plant



REFERENCES

Long history in supplying refractory materials, (maintenance & installation) services and complete solutions for many key players across industries:

- Installers
- OEM's
- Licensors
- EPC Contractors
- End Users



PRODUCTION - GOUDA



Tunnel Kiln 2
(27.000 MT/yr)

Tunnel Kiln 1
(18.000 MT/yr)

Tunnel Kiln 3
(27.000 MT/yr)

Office
Buildings

The background of the slide is a blurred industrial scene. On the left, there are stacks of grey rectangular blocks. On the right, a close-up of a metal drill bit is shown cutting into a surface, with bright sparks and a red light source visible. A white rectangular box is overlaid on the right side of the image, containing the text 'COMPANY ACTIVITIES'.

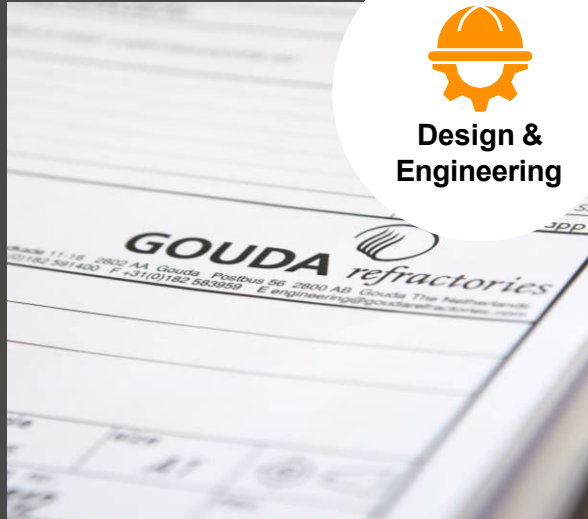
02

**COMPANY
ACTIVITIES**

CORE ACTIVITIES



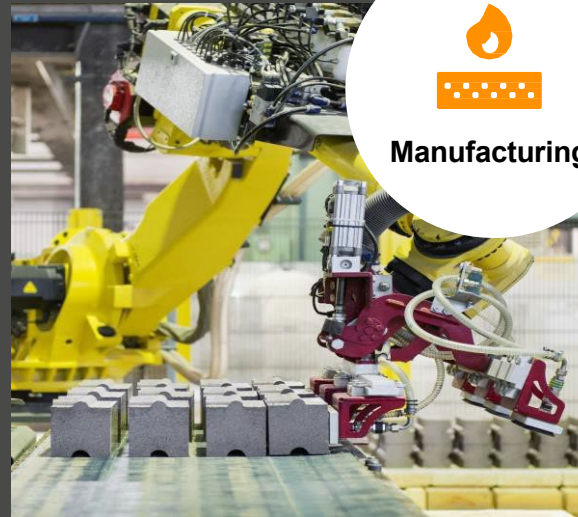
Design & Engineering



- Mechanical Design Calculations
 - ANSYS
- Heat Transfer Calculations
 - Simu-Therm
- Design Drawings
 - Autocad, Inventor



Manufacturing



In own facilities in The Netherlands:

- Refractory Bricks (30% - 99% Al₂O₃)
- Insulating Monolithics
- Dense Refractory Monolithics
- (Ultra) Low Cement Refractory Monolithics
- Prefabricated (Pre-fired) Shapes



Installation

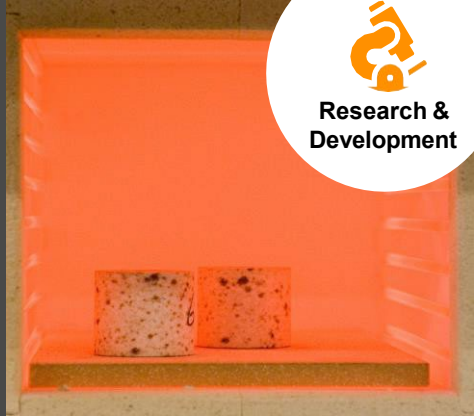


- Own, full Maintenance & Installation Service of all type of Refractory Linings in Belgium, Netherlands, Nordics, France, Austria, Germany, UK and Greece
- Alliance with Strategic Partners Worldwide to provide installation services around the world, for instance Middle East, Poland and Baltics
- Project Management

SUPPORT ACTIVITIES



Research & Development



- Fully Equipped Laboratory
- Independently ISO Certified
- Own R&D Programmes
- XRF (X-Ray Fluorescence)
- SEM (Scanning Electron Microscope)
- Post-Mortem Research & Reporting



Procurement



Procurement of strategic materials for own production and all-in projects:

- Raw Materials
- Ceramic Fiber Products
- Refractory Anchors
- Insulating Fire Bricks
- Special Products



Logistics



In-house facilities and experience to make optimized use of strategic location close to road network, Port of Rotterdam and Schiphol Airport for:

- Door-to-Door Deliveries by Truck
- Containerized Transport by Ship
- Emergency Supply by Air

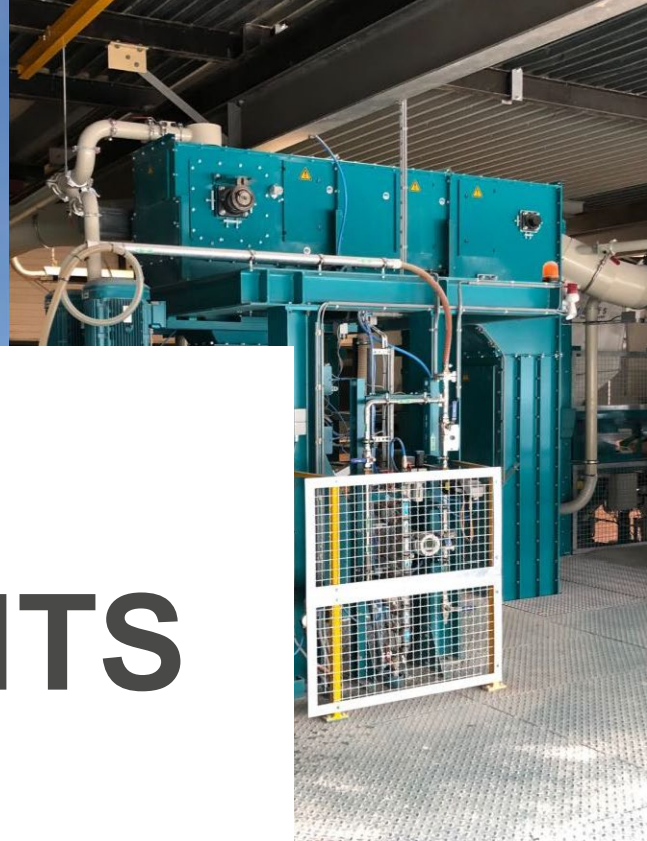
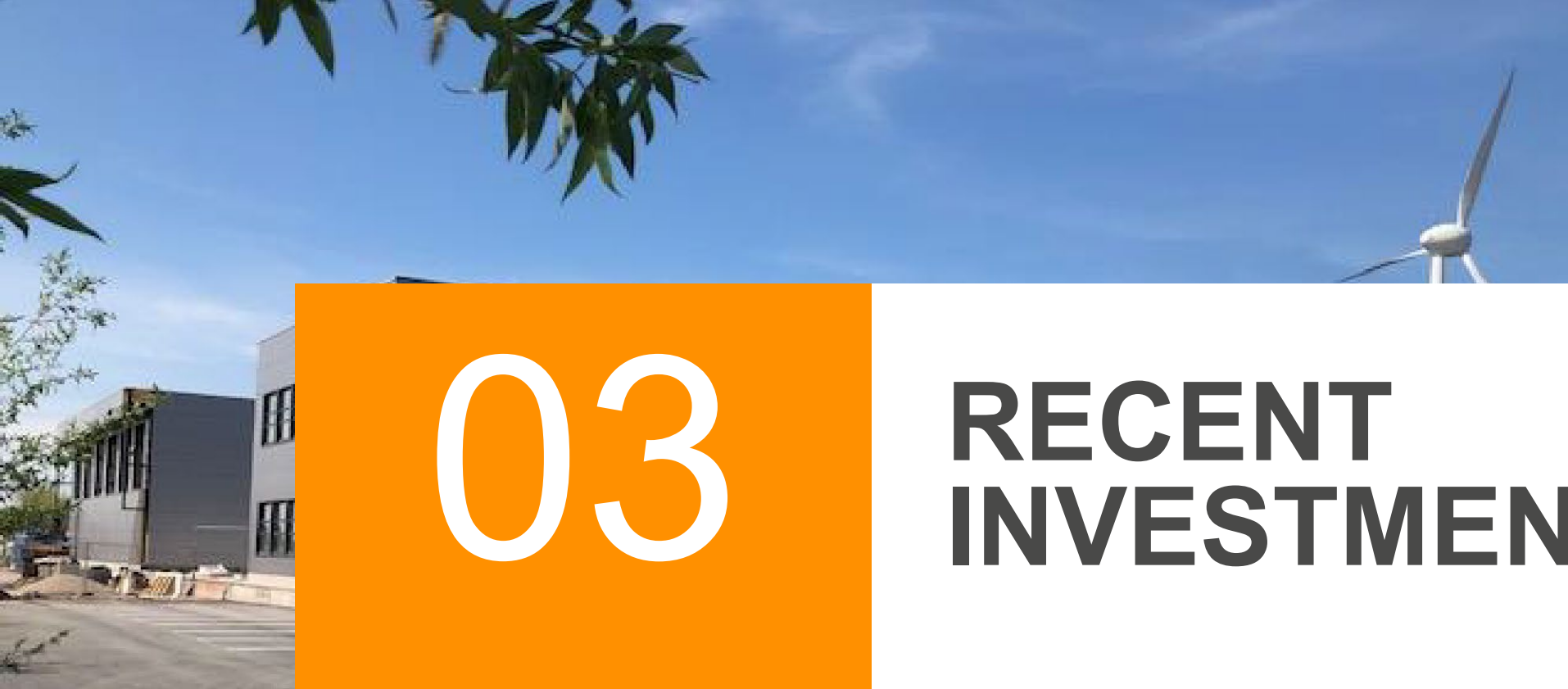


Field Services



Client Site Field Services:

- Verification of Installation Procedures
- Verification of Dry-out Procedures
- Trouble Shooting
- Root Cause Analysis
- Maintenance Inspection Services
- On-the-job Training of Operators



03

RECENT INVESTMENTS



NEW LAEIS HIGH-PERFORMANCE PRESS

Further investment in strategic operational plan with the purchase of a LAEIS high-performance latest generation press HPF V.

- 1.600 tonnes Press
 - Operational Q1 2024
-
- 1.000 tonnes Press
 - Operational Q3 2024



NEW HIGH QUALITY MIXING INSTALLATION

- State of Art Production Line
- Increase Process Control
- No Risk of Contamination
- New Possibilities for Product Development
- Capacity: 4.000 kg/hour

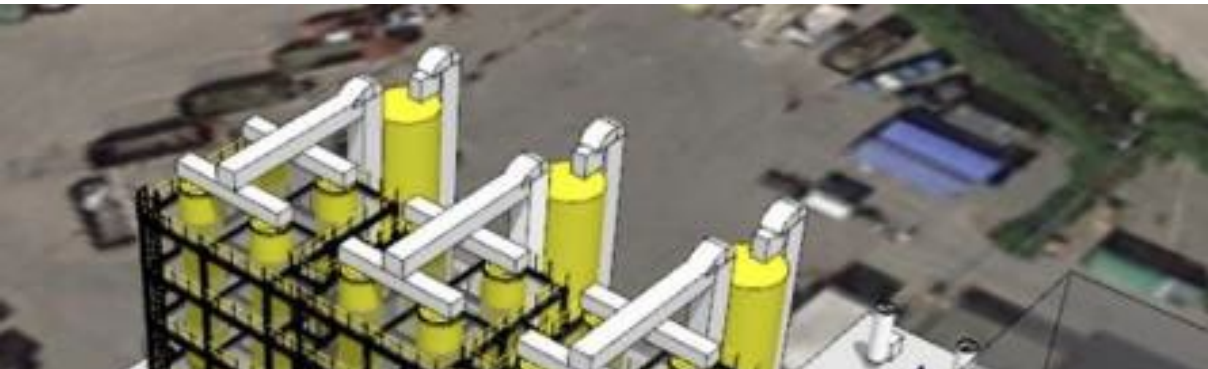


NEW LAB & OFFICE

Acquisition of 15.000 m² of adjacent land from the city council of Gouda. With this acquisition the ambitions and further development of Gouda Refractories will be realized.

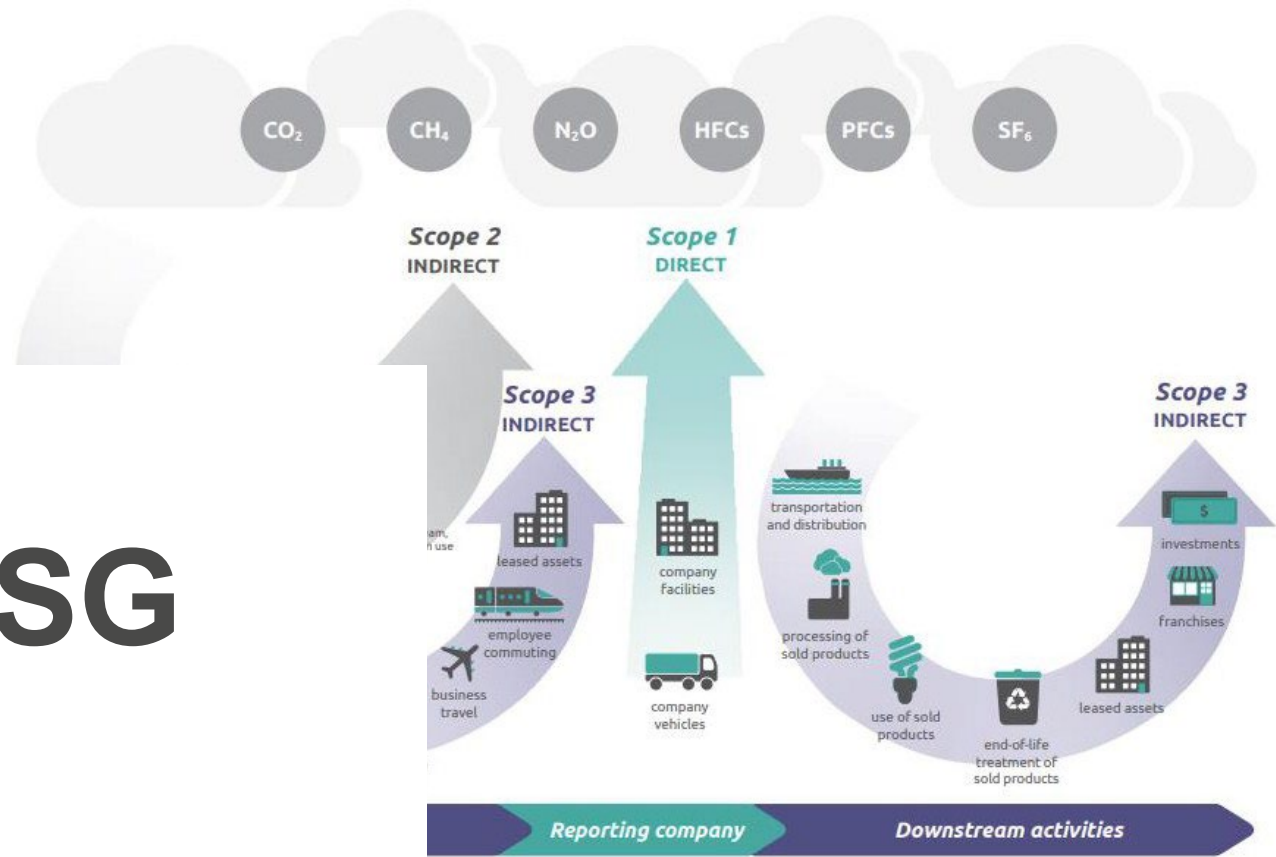
- **Red: 11.258 m²**
Developed for new office & cutting-edge laboratory facilities (for product development and further improvements to the production process)
- **Blue: 3.652 m²**
Since September 1 2024 available for energy transition





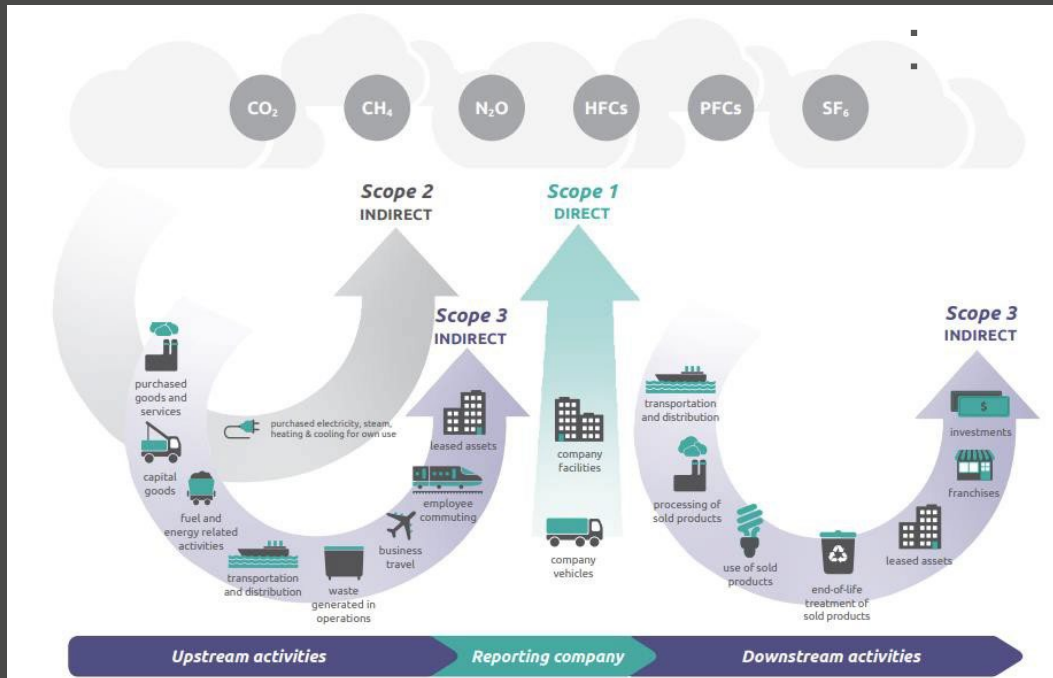
04

ESG



The EU is driving carbon reduction efforts

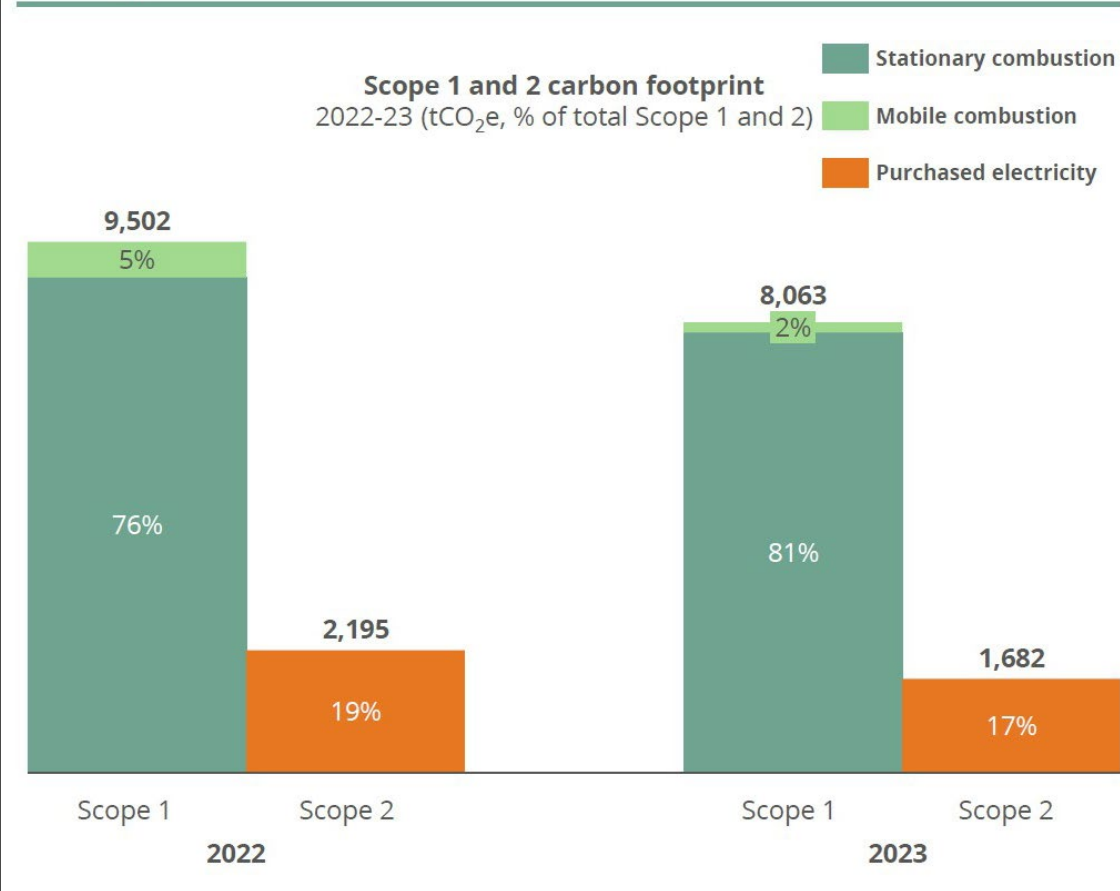
There are several key mechanisms that the European Union utilizes to push carbon reduction



1. European Green Deal (EU)
2. European Climate Law (EU)
3. Emissions Trading System (ETS) (EU)
4. Energy Efficiency Directive (EED)
5. EU Carbon Border Adjustment Mechanism (CBAM)
6. Dutch CO₂ Tax

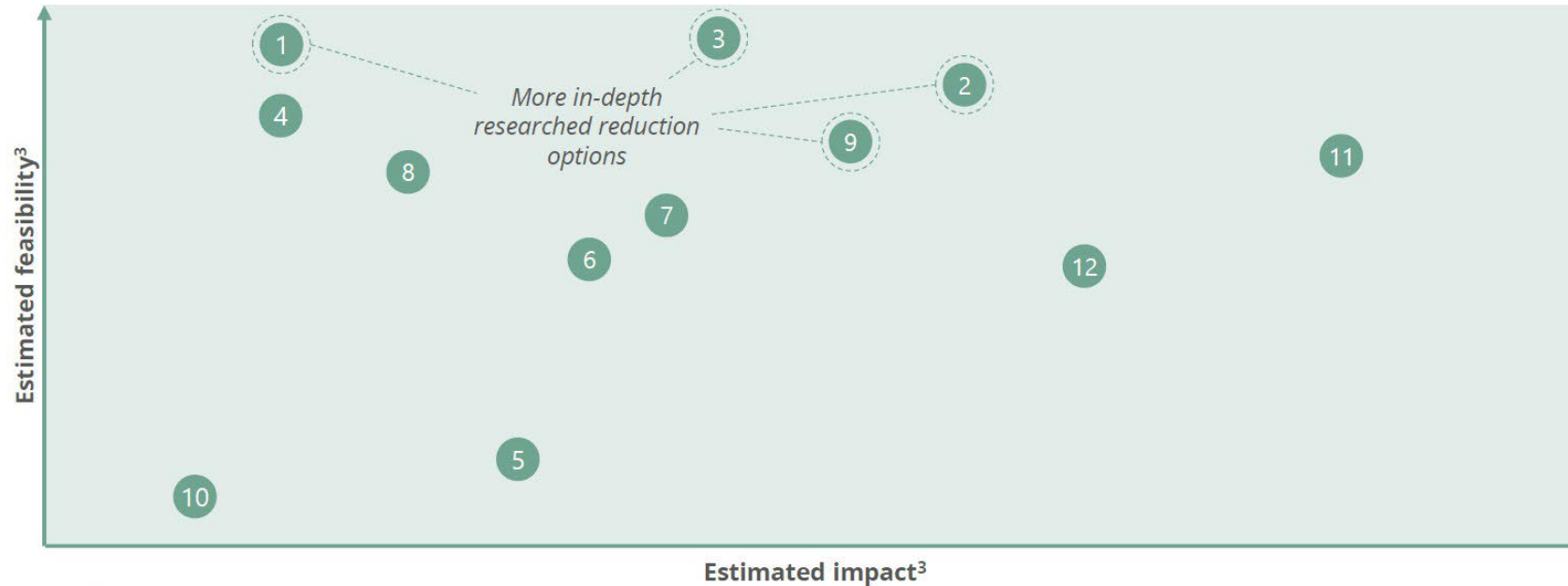
Scope 1 & 2

GRG's operational carbon footprint is mainly driven by the gas consumption for powering the kilns



Carbon reduction opportunities exploration

The figure below visually represents the feasibility study, and compares these options, plotting them by estimated feasibility (costs, technology, dependencies) and impact (reduction potential), as elaborated upon in the feasibility study. GRG aims to conduct more in-depth research into select options while remaining adaptable to emerging opportunities from political initiatives and technological innovations.



Comments

- 1 GRG aims to place ~2000-3000 **solar panels** on its roofs.
- 2 A subsidy has been granted to further explore the possibilities of DCI¹ units in collaboration with **DOPS**².
- 3 GRG is expected to **optimise its tunnel kiln energy efficiency** in the future as well. However, this option is not currently being further explored due to grid issues in the Netherlands.
- 9 While a **biogas installation** appeared to be a highly promising reduction mechanism, current research has revealed that it is not a suitable solution, due to extensive land use.

Legend

- | | | | | | |
|---------------------------|---|-----------------------------|-----------------------|----------------------------|-------------------------------|
| 1 Solar panels | 3 Optimising efficiency of tunnel kilns | 5 Electrification | 7 Hydrogen connection | 9 Biogas | 11 GoOs ¹ |
| 2 DCI (DOPS) ² | 4 Windmill | 6 Smart hydrogen generation | 8 Heat recovery | 10 CO ₂ capture | 12 Ammonia (NH ₃) |

2 feasibility studies started

Description	Solar panels	Direct Carbon Immobilisation
Pros	<ul style="list-style-type: none"> GRG aims to place 2,000 to 3,000 solar panels on its Dutch production location. The payback time for this option is expected to be around 8 years The carbon reduction is estimated to be ~2-4% of scope 2 emissions 	<ul style="list-style-type: none"> GRG aims to replace natural gas by syngas by placing 8 Direct Carbon Immobilisation units from DOPS¹ The payback time for this option is expected to be around 5 years GRG estimates that the carbon reduction will be ~55% of scope 1 emissions
Cons	<ul style="list-style-type: none"> Available and easy technology Instantly lowers electricity costs SDE++ subsidy² is available Property owner made the roofs available free of charge 	<ul style="list-style-type: none"> Highly subsidised incl. local investment funds Once the technology has proven its viability, it offers large potential for gas reduction Research into placing DCI units at GRG has been subsidised and is currently conducted
	<ul style="list-style-type: none"> Only a slight scope 2 carbon footprint reduction The asbestos roofs of the Dutch location had to be replaced first Only available for placements on roofs that are not directly above tunnel kilns due to radiation 	<ul style="list-style-type: none"> Necessitates a new feedstock source (activated coal and wood pallets) for which partners are required As it is a new technology, it still needs further development and demonstration

No definitive reduction options have been selected yet; GRG will continue to explore the most effective possibilities while staying adaptable to market developments.



05

QUESTIONS?



Simone van Tongeren
Deltalinqs



Albert Keukens
Shin-Etsu



Wilfred Buijs
Gouda Refractories



Jos Sentjens
KH Engineering



Marcel de Boer
KH Engineering

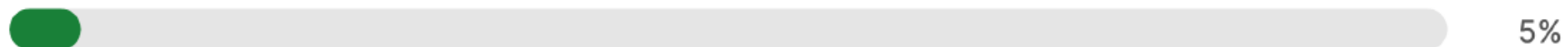
PANELDISCUSSIE



Hoe ver staat jouw bedrijf in de energietransitie van brownfields?

Multiple Choice Poll 64 votes 64 participants

We hebben de transitie bijna voltooid. - 3 votes



We zitten in de middenfase van de transitie. - 28 votes



We hebben net de eerste stappen gezet. - 29 votes



We zijn nog niet begonnen aan de transitie. - 4 votes





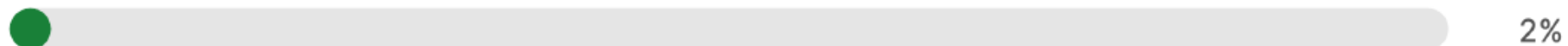
Het is financieel haalbaar om brownfields volledig te transformeren naar groene industriële locaties zonder verlies van productiecapaciteit.

Multiple Choice Poll 62 votes 62 participants

Ja, met de juiste investeringen. - 21 votes



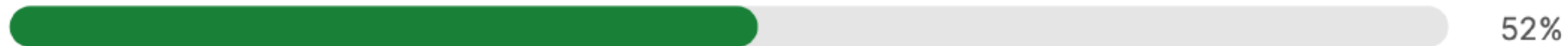
Alleen als de productiecapaciteit wordt verminderd. - 1 vote



Nee, het is financieel onhaalbaar. - 8 votes



Alleen mogelijk met overheidssteun. - 32 votes

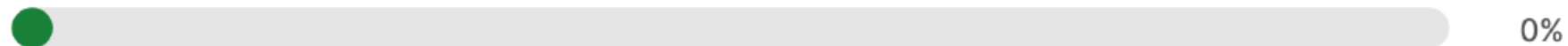




De energietransitie van brownfields kan alleen succesvol worden gerealiseerd door regionale samenwerking.

Multiple Choice Poll  57 votes  57 participants

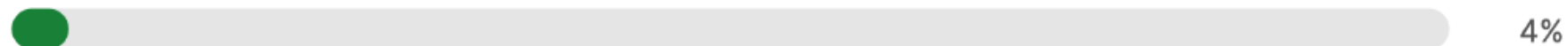
Een bedrijf kan de transitie volledig zelfstandig uitvoeren. - 0 votes



Regionale samenwerking is noodzakelijk voor succes. - 36 votes



Alleen grote bedrijven kunnen het alleen doen, kleinere bedrijven hebben samenwerking nodig. - 2 votes



Samenwerking is handig, maar niet noodzakelijk. - 19 votes

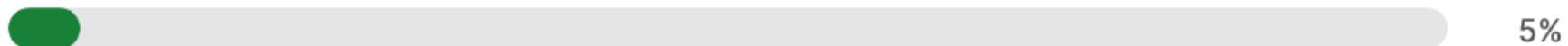




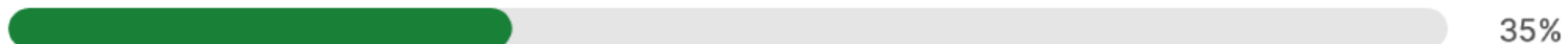
De energietransitie vraagt om actie, maar subsidies blijven vaak uit. Wat moet de aanpak zijn voor bedrijven?

Multiple Choice Poll 55 votes 55 participants

Wachten op subsidies voordat grote stappen worden gezet. - 3 votes



Zelf investeren in duurzame oplossingen om vooruitgang te boeken. - 19 votes



Samenwerken met andere bedrijven of partners om gezamenlijke financiering en subsidies te verkrijgen - 20 votes



Lobbyen bij de overheid voor beleid. - 13 votes





De energietransitie is een gezamenlijke verantwoordelijkheid, maar iedereen speelt zijn eigen rol. Wat doe jij persoonlijk om hieraan bij te dragen?

Multiple Choice Poll 59 votes 59 participants

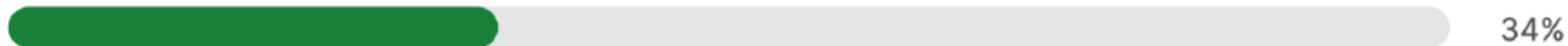
Ik volg de ontwikkelingen, maar wacht nog met actie tot er duidelijkere richtlijnen zijn. - 0 votes



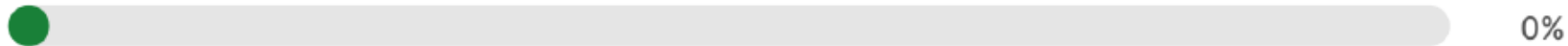
Ik pas waar mogelijk energiebesparende maatregelen toe in mijn werk en dagelijks leven. - 39 votes



Ik implementeer structurele en innovatieve veranderingen op het gebied van duurzaamheid binnen mijn werk en/of thuis. - 20 votes



Ik zie de noodzaak, maar heb nog geen concrete acties ondernomen - 0 votes



THANK YOU



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Projectleider Klimaat
Deltalinqs



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