

# RWE



**Best Practice: RWE continuous mining in Germany and consulting projects overseas.**  
Arie-Johann Heiertz – Head of Mining and Materials Handling

# Who we are

## Engineering. Consulting. Utility roots.

- Heritage in Mining & Power Generation
- Owner/Operator of 3 large-scale open-cast coal mines (~ 100Mtpa)
- 55+ years international projects experience
- 1,250+ projects executed successfully
- 300+ in-house experts
- Key Competences:  
Project planning, operation & maintenance, training
- Talent Pool:  
Innovation & New Technologies  
(green mining incl. emission reduction, renewable/hybrid energy solutions)



Mining



Thermal Power



O & M



Renewables



# Who we are





# Where we come from

## RWE operates in the Rhenish lignite deposit for >100 years

**Openpit Garzweiler**

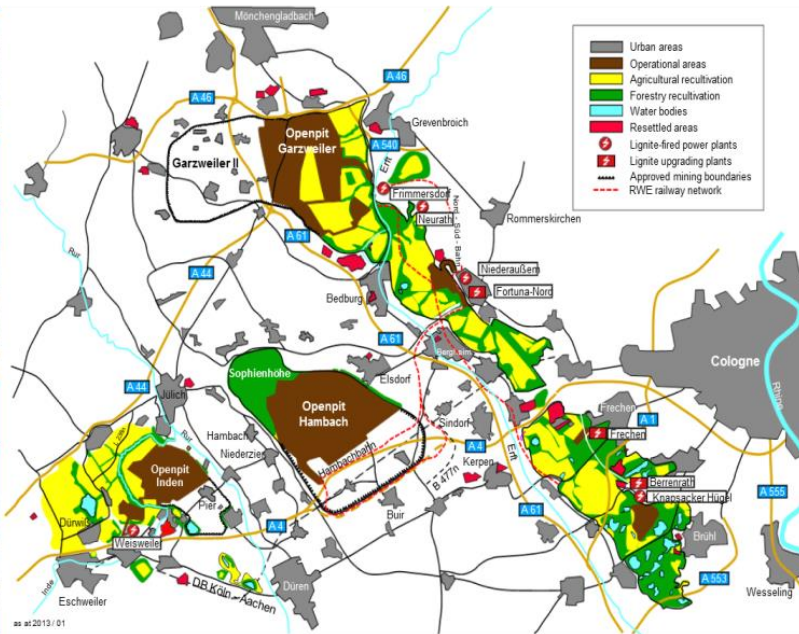

production 40 Mio. t/a  
2 power plants with 5.500 MW

**Openpit Hambach**


production 42 Mio. t/a  
2 power plants with 5.500 MW

**Openpit Inden**


production 22 Mio. t/a  
1 power plant with 2.000 MW



**Overburden: 1.000 Mio. t/a**

### Maintenance Center



maintenance of big machinery  
technical support / development

### Logistics



330 km of own railwaysystem  
47 locomotives

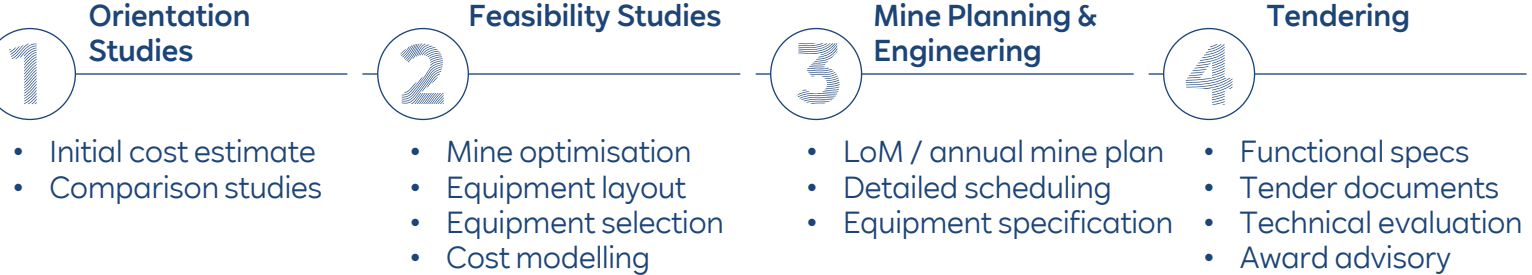
### Dewatering



1.500 wells  
750 km of pipework  
4 waterworks

# RWE engineering and consulting services for sustainable in-pit crushing and conveying (IPCC) solutions

## OFF-SITE



## ON-SITE



Partly Remote Possible

# RWE mines

## Mining operation since more than 100 years.

250 km of belt  
conveyors



Largest belt width  
2.80 m



37 Large Mining  
Machines

Capacity of up to  
38,500 t/h



Fully continuous

Reduced dust and  
diesel emissions



# Safety and Environmental Improvement Continuous Mining Solutions





# Environmental Impact

## CO<sub>2</sub> Emissions & Employment

In-pit Crushing and Conveying positively impacts the environment when:

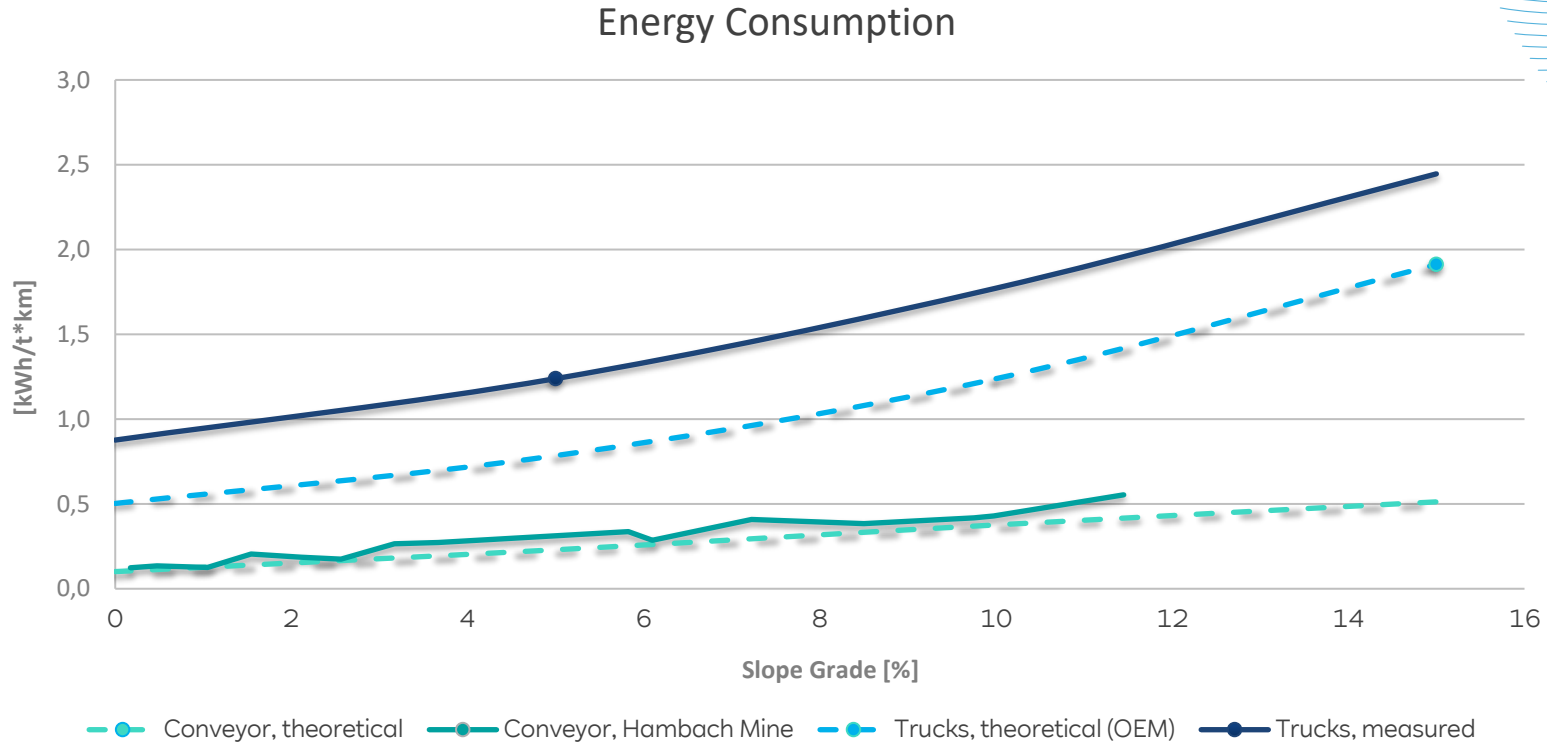
- The technology/equipment that replaces truck haulage uses renewable electricity or an energy mix – up to **85% of Greenhouse gas (GHG) emission reduction** can be achieved if the IPCC equipment is powered by e.g. hydro energy!
- The generation of dust by truck haulage is an issue – conveyor transport generates less dust and can be easier suppressed (covered conveyors, belt cleaning devices,)
- The consumption of water for dust suppression is an issue – with the application of continuous mining and material handling equipment water usage for dust suppression can be limited to material transfers and conveyors only



CO<sub>2</sub> reduction potential of IPCC:  
30 – 85% (compared to conventional S&T)!



# Energy Consumption of Material Transport Modes



# Environmental Impact

## Dust emissions & Mitigation

RWE assists operators in developing operational improvements to prevent and mitigate atmospheric emissions arising during materials handling and processing.

Particulate matter is often emitted by:

- wind erosion
- material handling
- haul roads
- loading processes
- combustions in furnaces.

We support you from the early-stage planning process to development strategies in order to eliminate the dust source.





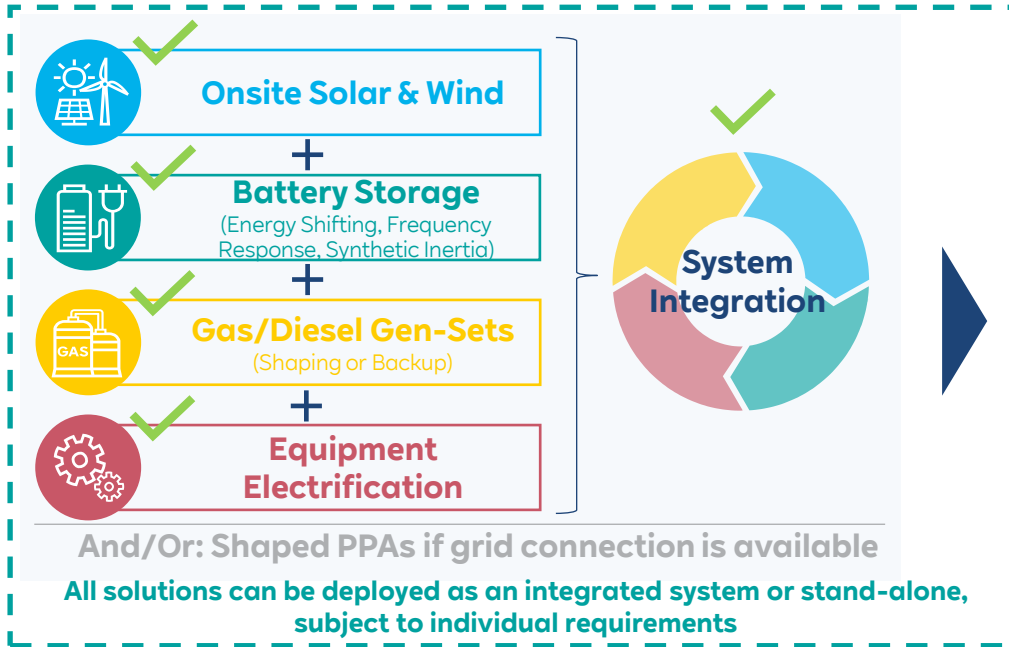
# Green Mining Solutions

## RWE Renewables



# RWE has the expertise to provide solutions catering to Australia's ambitious GHG targets

## RWE



### Australia's GHG Ambitions:

- Australia will increase its ambition to reduce carbon emissions from 26% to 28% by 2030, with the firm prospect of becoming a carbon neutral country by 2050.



# Optimal solution to reduce GHG emissions in the mining sector

## On-site Solutions



- I Complete off-grid solution:** In-situ Solar/Wind assets, Batteries and Diesel Gen-sets with Energy Management System to harmonize mix
  - ❖ Fuel mix composition optimized to desired degree of RES penetration and/or to minimize cost of energy for a specific mine
- II On-site Renewables component (if grid connected):** In-situ Solar/Wind asset to reduce mine's dependency on grid electricity or feed (excess) electricity into the grid
  - ❖ Addition of battery storage can also be explored based on need
- III Electrification of material handling equipment:** Adaptation of In-Pit Crushing and Conveying methodology combined with electrification of loading and hauling processes

## Power Purchase Agreement (PPA)



- IV Bilateral PPA or Bundled PPA (if grid connected):** Electricity supplied by offsite Renewable asset(s) (e.g. on reclaimed land) via grid
  - ❖ Supply can be customized to meet portfolio needs or a specific mine's load profile through bundled PPA, combining multiple sources of generation

## The choice of solution also depends on...

- Sufficient renewable resource (solar irradiation / wind speeds)
- Land availability
- Ground conditions
- Site accessibility and serviceability
- Mine requirements (if connected):
  - Intra-day load profile
  - Power grid constraints (e.g. access to national grid, technical parameters)

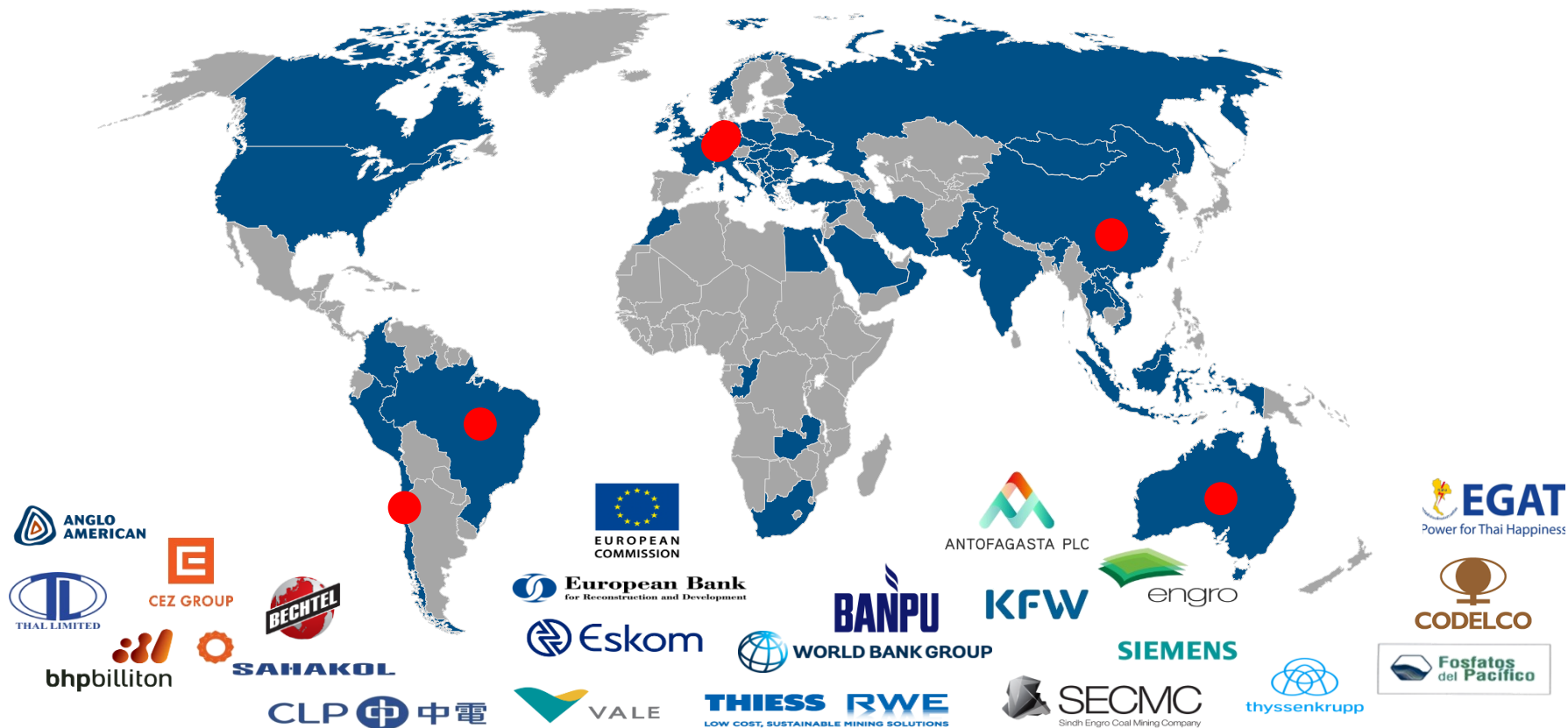
# Our Experience Worldwide

Large mining projects RWETI was and still is involved in (selection)





# Our experience worldwide



# Our experience in South America

## Large mining projects RWETI was and still is involved in

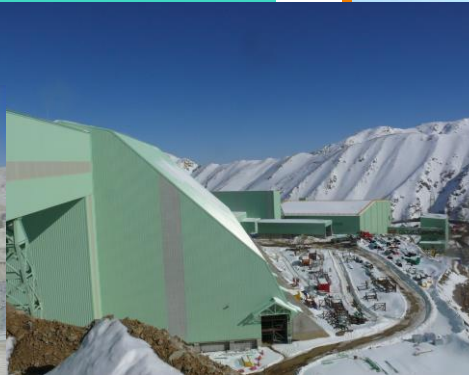
### RWE lignite mines:

- 3 mines
- 100 mio t/a coal
- 550 bcm/a overburden
- Up to 450 m deep



### Various mining operations in Chile:

- Chuquicamata
- Los Pelambres
- Radomiro Tomic
- Minera Escondida
- Centinela
- Collahuasi
- Esperanza



### Various iron ore operations in Brazil:

- S11D
- Mina de Aguas Claras
- Different iron ore ports







Review and optimization of a belt conveyor system

- running through a twelve Kilometres long tunnel
- overcome a 1,600 meters drop in elevation

Increase of the current daily output from 125,000 t to 175,000 t

## Copper Ore – Plant Optimisation

**Client:** Minera Los Pelambres, Chile  
**Services:** Technical Audit,  
Downhill Conveyor Design,  
Capacity Increase





## Iron-Ore – Mine Contract

2

**Client:** Vale, Brazil  
**Services:** Technical Operations Support,  
Emission Reduction Assessment,  
Operational Excellence Training





## Greenhouse Gas - Emission Reduction

3

**Client Services:** Major Coal Miner in Queensland  
Support to New Generation Mine Design,  
Advice on IPCC Equipment Application,  
Renewable Energy Generation Options





## BWE/IPCC Mine Expansion Study



**Client:** NLC – Neyveli Lignite Corp, India  
**Services:** Feasibility Study for Mine Expansion,  
Equipment Rehabilitation Schedule,  
Power Plant Interlinkage Study





# Thank you for your attention!