

# Empowering the future: Getting ready for renewable electricity sourcing

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## Heidelberg Materials is one of the world's largest building materials companies



**51,000**  
employees  
on 5 continents



**3,000**  
locations  
worldwide

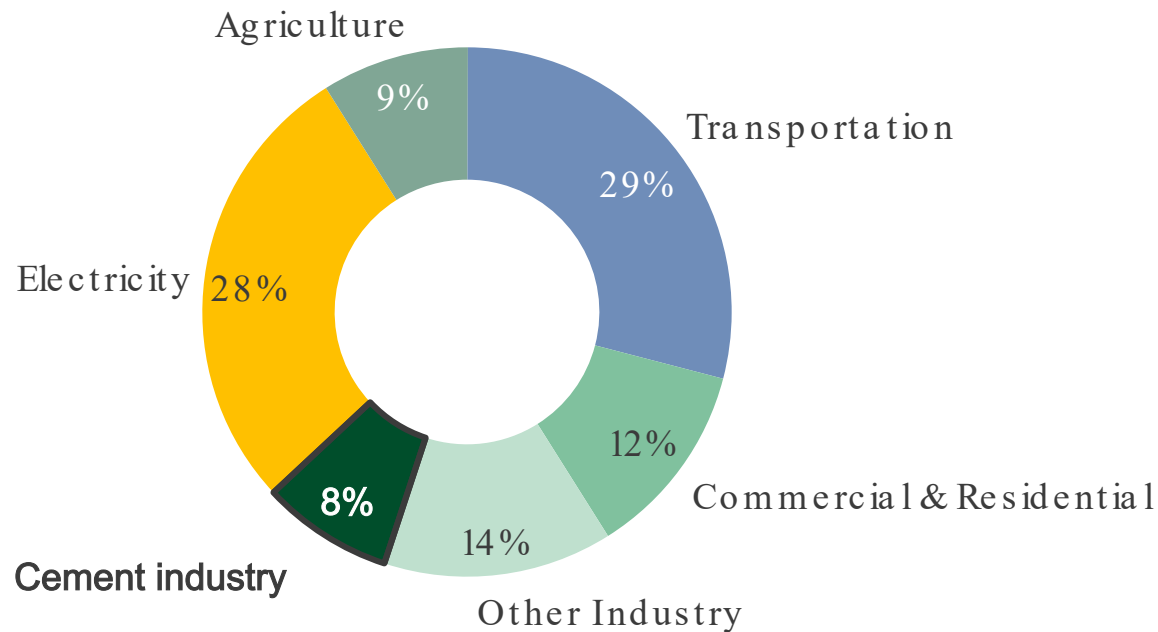


Leading positions in cement,  
aggregates, and ready-mixed  
concrete



## Bringing Down CO<sub>2</sub> Emissions: The Key Challenge for the Cement Industry

The **cement** industry is responsible for approximately **8% of global CO<sub>2</sub> emissions**<sup>1</sup>







**Electricity emissions** in cement industry make up **~0.4% of global CO<sub>2</sub> emissions**

Emission type	Share Cement	Share Global emissions	Mitigation measure
Scope 1 (process)	44%	3.5%	Carbon Capture (no alternative)
Scope 1 (fuel)	23%	1.8%	Carbon Capture, low/ no carbon fuels
<b>Scope 2 (electricity)</b>	<b>5%</b>	<b>0.4%</b>	<b>Green electricity (focus today)</b>
Scope 3 (other)	28%	2.3%	Various measures
<b>Total</b>	<b>100%</b>	<b>8%</b>	



## Electricity: Portfolio of CO<sub>2</sub> emission reduction levers is available. Challenge is to identify suitable measures according to risk appetite / local conditions / economics

Various measures are available to reduce CO<sub>2</sub> which come with different characteristics and risks

Exemplary measures	(1) 	(2) 	(3) 	(4) 
On-site PPA <sup>1</sup>	✓	✗	✗	✓
Off-site PPA <sup>1</sup>	✓	✓	✗	✓
Own investment (on-site)	✓	✗	✓	✓
Virtual PPA <sup>1</sup>	✗	✓	✗	✓
GOs	✗	✓	✗	✗
Grid Greening	✗	✗	✗	✗
Efficiency measures	✗	✗	✓	✓

 Electricity delivery  GOs  Investment needed  Long term commitment

Challenge: Elaborate company specific strategy for identified measures mostly based on:

### External factors

- Competitor Benchmark
- Expectation from external stakeholders
- Subsidies

### Company Strategy

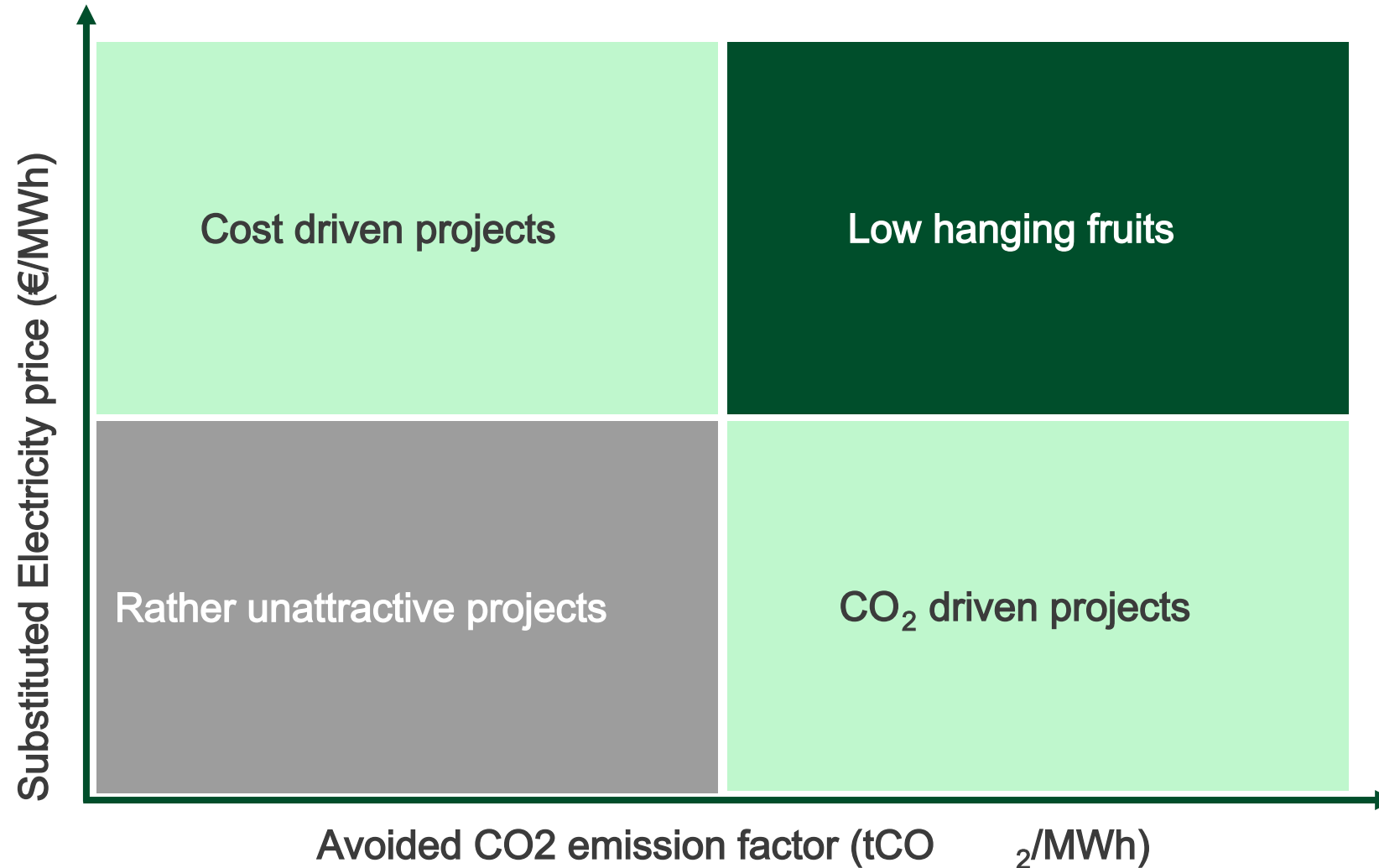
- Company sustainability targets
- Possibility to engage into long term commitments
- Available resources in-house
- Electricity consumption pattern / seasonality
- Overall electricity consumption

### Internal economic requirements

- Willingness to pay premiums for green electricity
- Cash availability and payback / NPV requirements
- .....



## Portfolio approach: Attractiveness of renewable electricity projects mainly depends on avoided electricity price, CO<sub>2</sub> emissions and the value of those



## „Old World“ vs. „New World“: Business case evaluation for renewable electricity projects is complex while crucial needed information is not publicly available

„Old World“: Hedged market pricing for the liquid time period (depending on country liquid time horizon can be e.g. 3y) is publicly available and can be used as a benchmark price for regular market hedges.

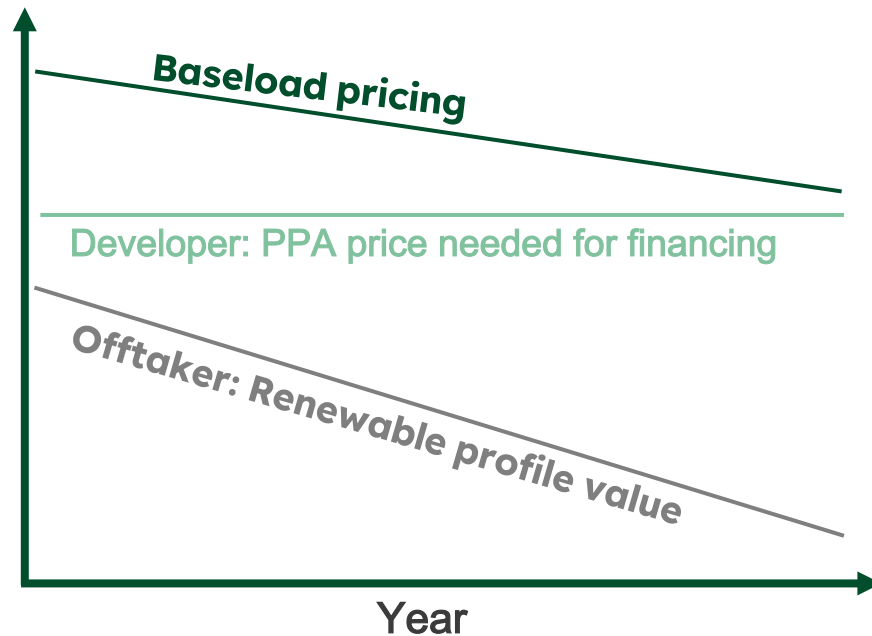
„New World“: For renewable electricity projects the following criteria can apply in addition which substantially increases complexity for business calculations:

✓ Baseload price (illiquid)	Is usually <b>not publicly available</b> on the Power exchange. As PPA durations are often >10y, such Baseload prices need to be estimated.
✓ Capture rate <sup>1</sup>	Capture rates are <b>not publicly available and figures vary substantially</b> between sources. This ends up in highly subjective business cases.
✓ Value of green electricity	Value e.g. also depends on whether the value of green electricity can be priced into the manufactured products.
✓ Balancing costs	Future balancing costs are <b>not publicly available</b> and apply in case balancing risks are with offtaker.
✓ Third party volume costs	Can apply for <b>physical PPAs</b> .
✓ Accounting costs	Can apply for <b>virtual (financially settled)</b> PPAs.
✓ Other criteria	E.g. funding, avoided regulatory cost



## Challenging Environment for New-Built Off-Site PPAs – Creative approaches needed for economic projects

Decreasing trend for renewable profile values makes economics for projects challenging



Also other factors contribute to a challenging market environment

- Values for renewable profiles decrease amid decreasing capture rates.
- Baseload Market pricing is highly volatile which results in fluctuating business cases.
- Government tariffs for renewable projects are partially very attractive which puts floor pricing on PPA tariffs.
- Higher interest rates had a bullish impact on PPA pricing.
- Uncertain project timelines amid permitting constraints / uncertainty in regulation.

- PPAs for new -built off -site projects are currently usually not in the money , as offered PPA pricing is in most cases above renewable profile value.
- Creative approaches are usually needed to get economic projects done (e.g. funding, avoided regulatory cost, ...)



**Thank you!**

**Questions?**







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