

Cementing Australia's Future



Cement, Clinker, Concrete

Cement

A binding agent that sets and hardens to adhere to building units such as stones, bricks, tiles etc

Clinker

Mix of limestone and minerals that have been heated in a kiln and have been transformed by heat.

Concrete

A material that consists of a mixture of cement, clinker, and water, with or without admixtures, fibers, or other cementitious materials.

The Australian Cement Industry

Production Growth



3% production growth rate since FY2013/14

10.4 million tonnes of cement in 2018

5.6 million tonnes of clinker in 2018

The Australian Cement Industry

\$4.7 billion

1,300 Australian direct jobs

**over 20,000 jobs in the
downstream market**

The Manufacturing Process

1

RAW EXTRACTION

Limestone and clay are extracted from the ground and sourced from local quarries.

2

CRUSHER

After extracting the raw materials, the rocks are crushed into a tennis ball sized pieces.

3

RAW MILL

Crushed rock is then finely ground and combined with other minerals.

4

PREHEATER

Material then moves through the preheater

5

KILN

The cement kiln heats all the ingredients to about 900- 1500 degrees celsius

6

CLINKER

Clinker is produced

7

BALL MILL

Ground with small amounts of gypsum, limestone, and other ingredients to make cement.

8

READY FOR USE

Manufacturing Process Emissions

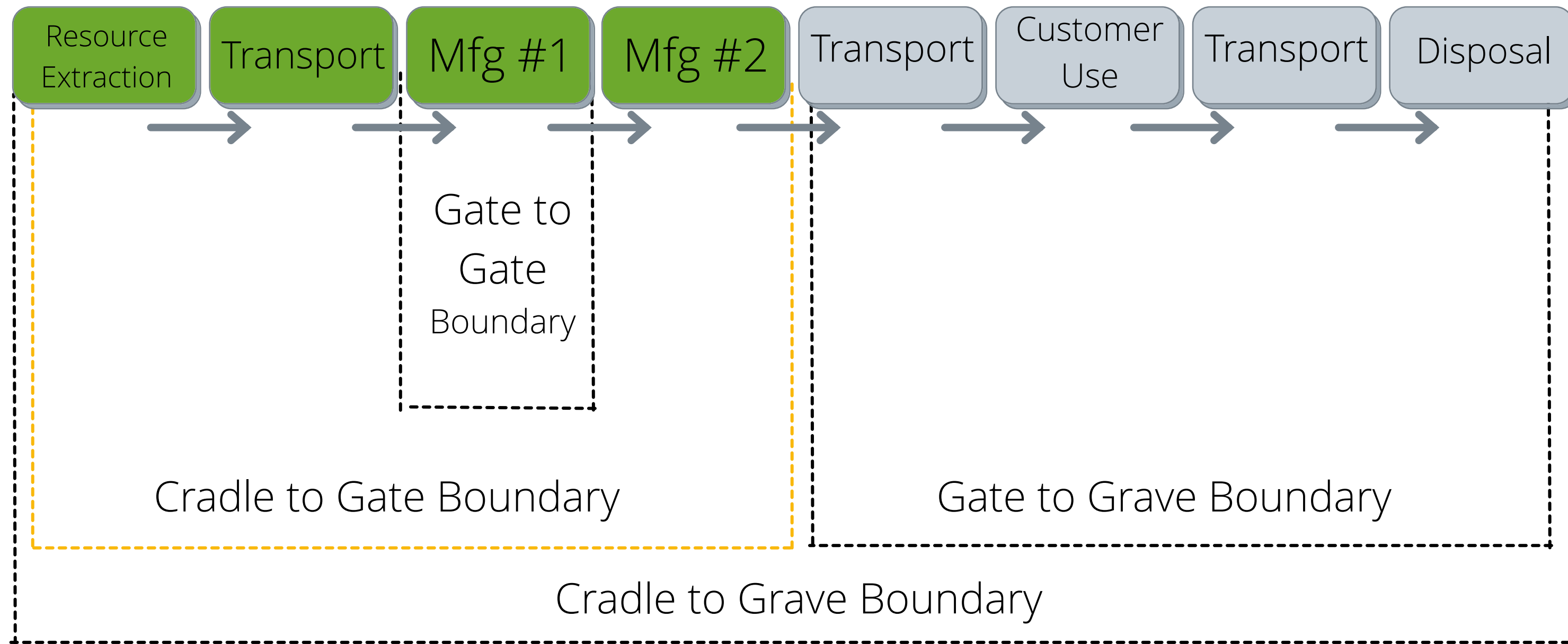


4% of Global Emissions from cement kiln process

4% of Global Emissions from the rest of cement process

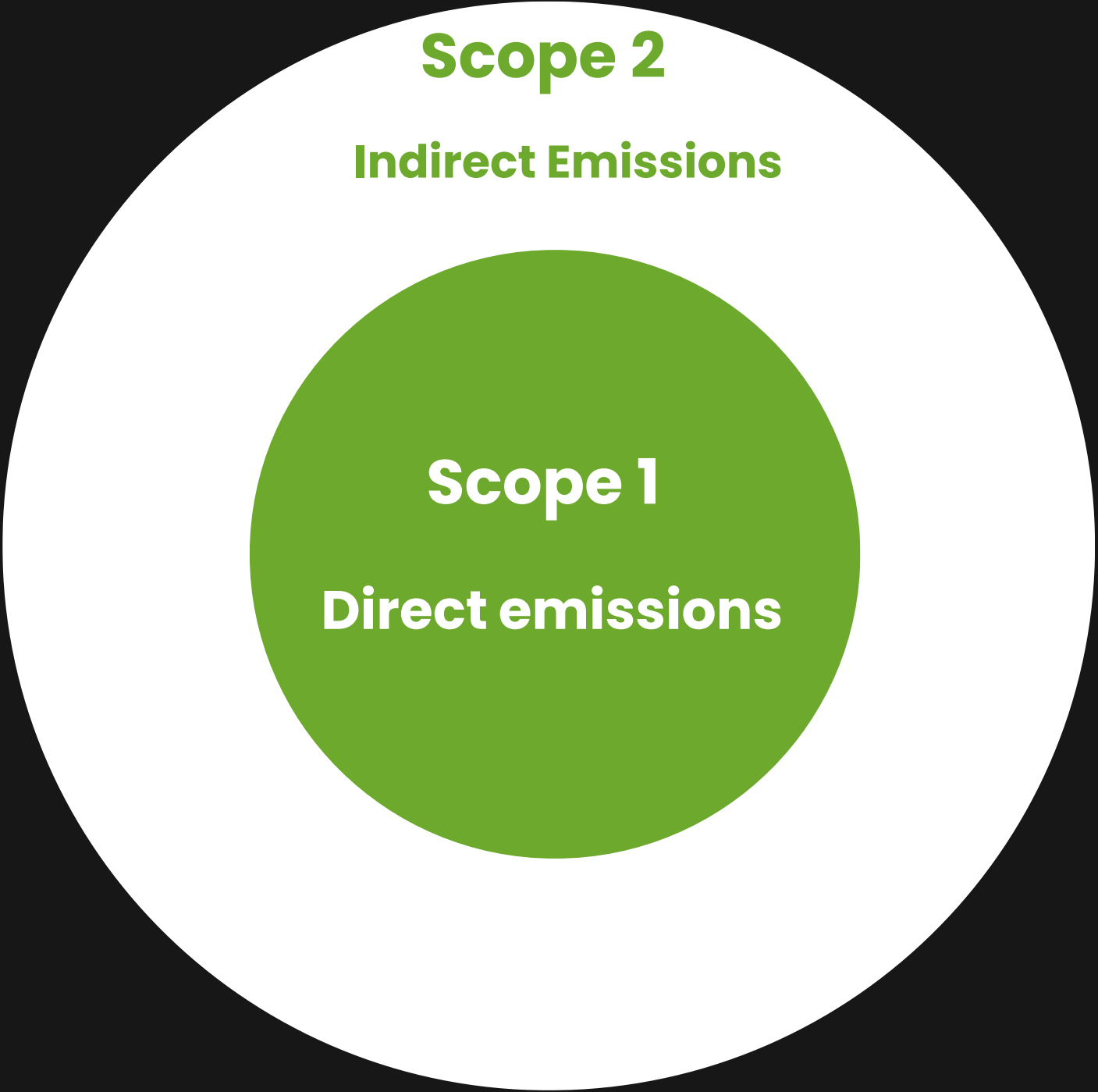
8% of Global Emissions from the cement process

Life Cycle Analysis



Scope Emissions

Scope 1 emissions are calculated from direct emission factors that are emitted per unit of activity during the emission release which includes initial manufacturing processes, mining and onsite disposals.



Scope 2 emissions are calculated from the indirect emissions of the generation of the electricity purchased and electricity consumed during the production.

Calculating Scope 1 Emissions

**Scope 1
Cement &
Clinker
Emissions**

**5.7 million tonnes of clinker
+
10.2 million cement tonnes =
8.6 million tonnes of emissions**

Calculating Scope 2 Emissions

Scope 2
Electricity
Purchased

923 GWh Electricity =
747,630 tonnes of emissions

Scope 2 Emissions

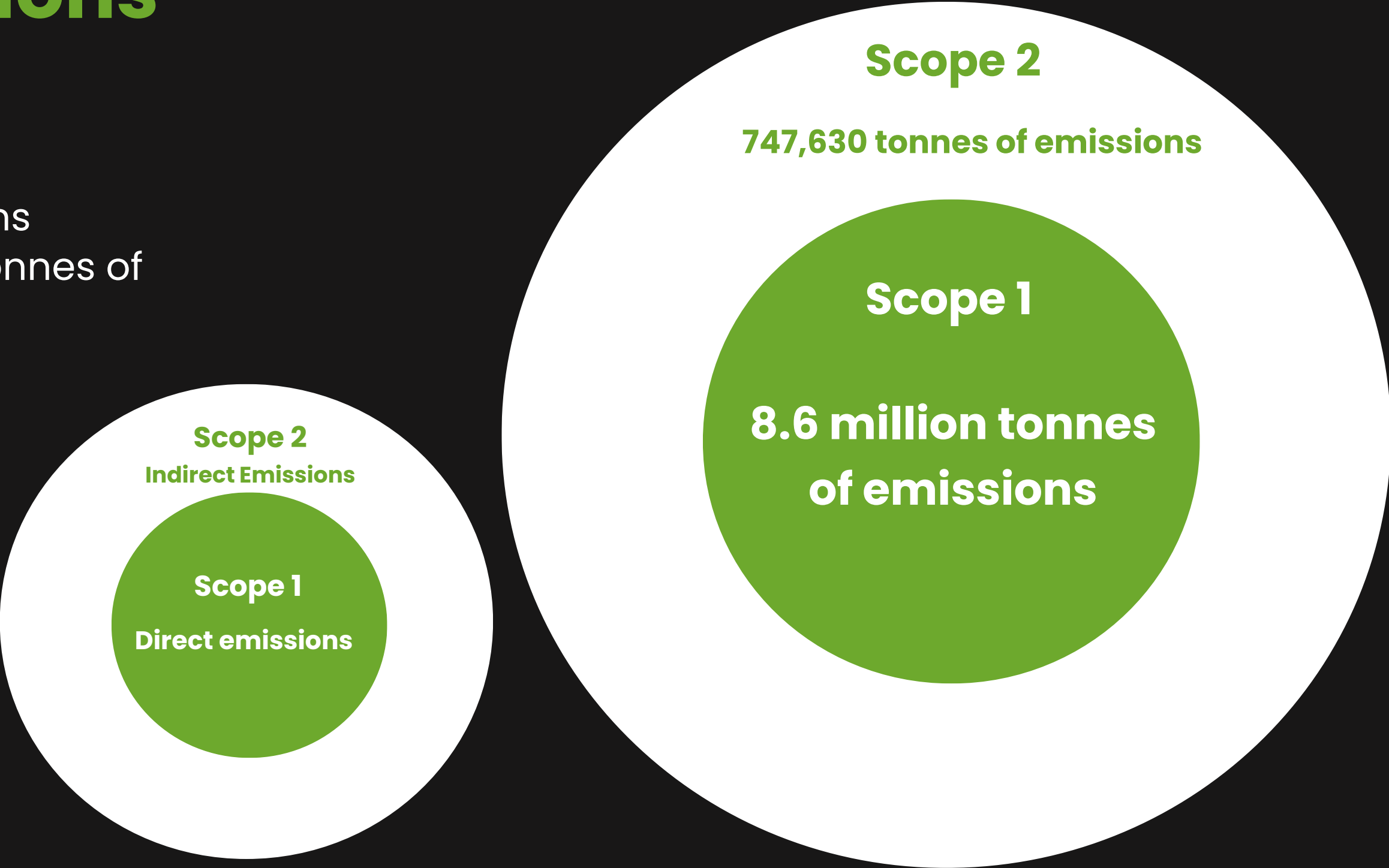


Total Scope Emissions

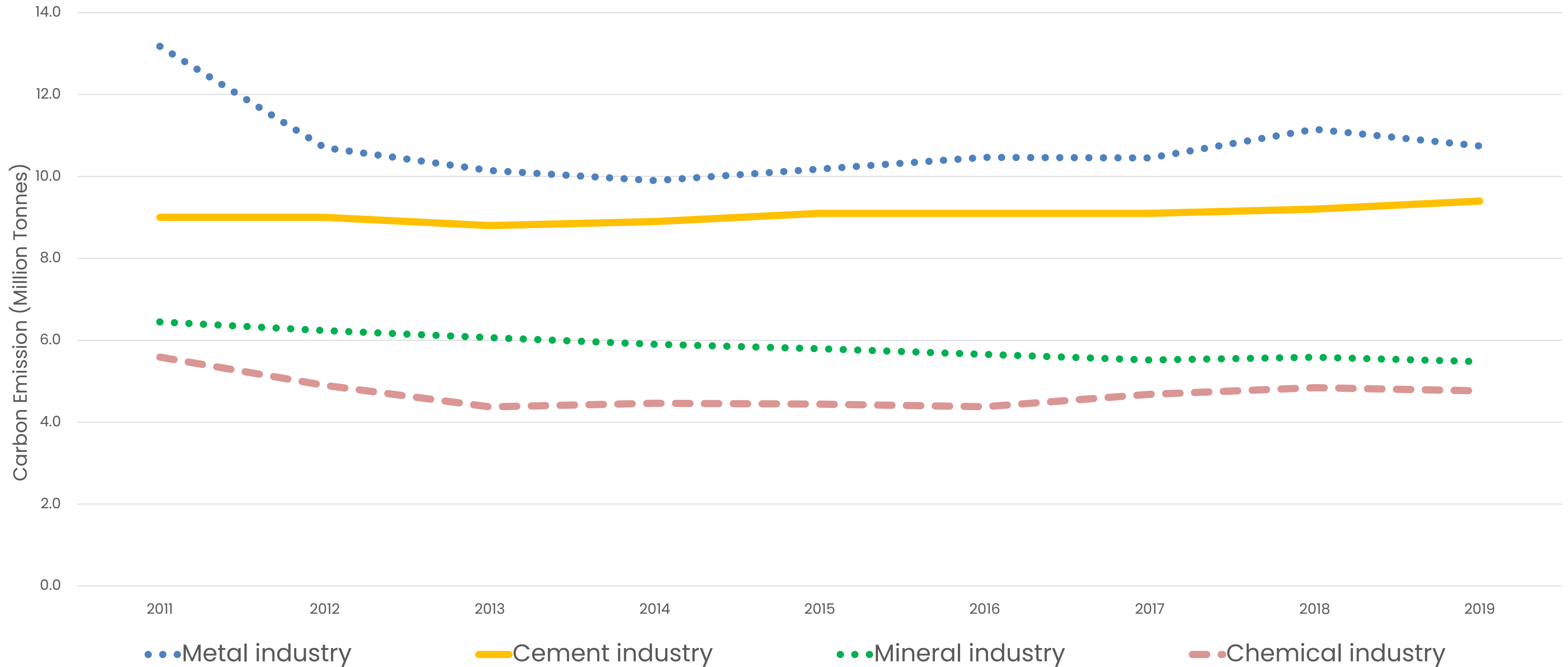
Scope 1 and Scope 2 emissions combined equal to **9,397,230** tonnes of carbon.

Equal to:

- 1.8 Million petrol-powered passenger vehicles
- 1.7 Million homes' electricity in 1 year
- 9 Billion pounds of coal burned
- 19 Million barrels of oil consumed



Industry Comparison Emissions

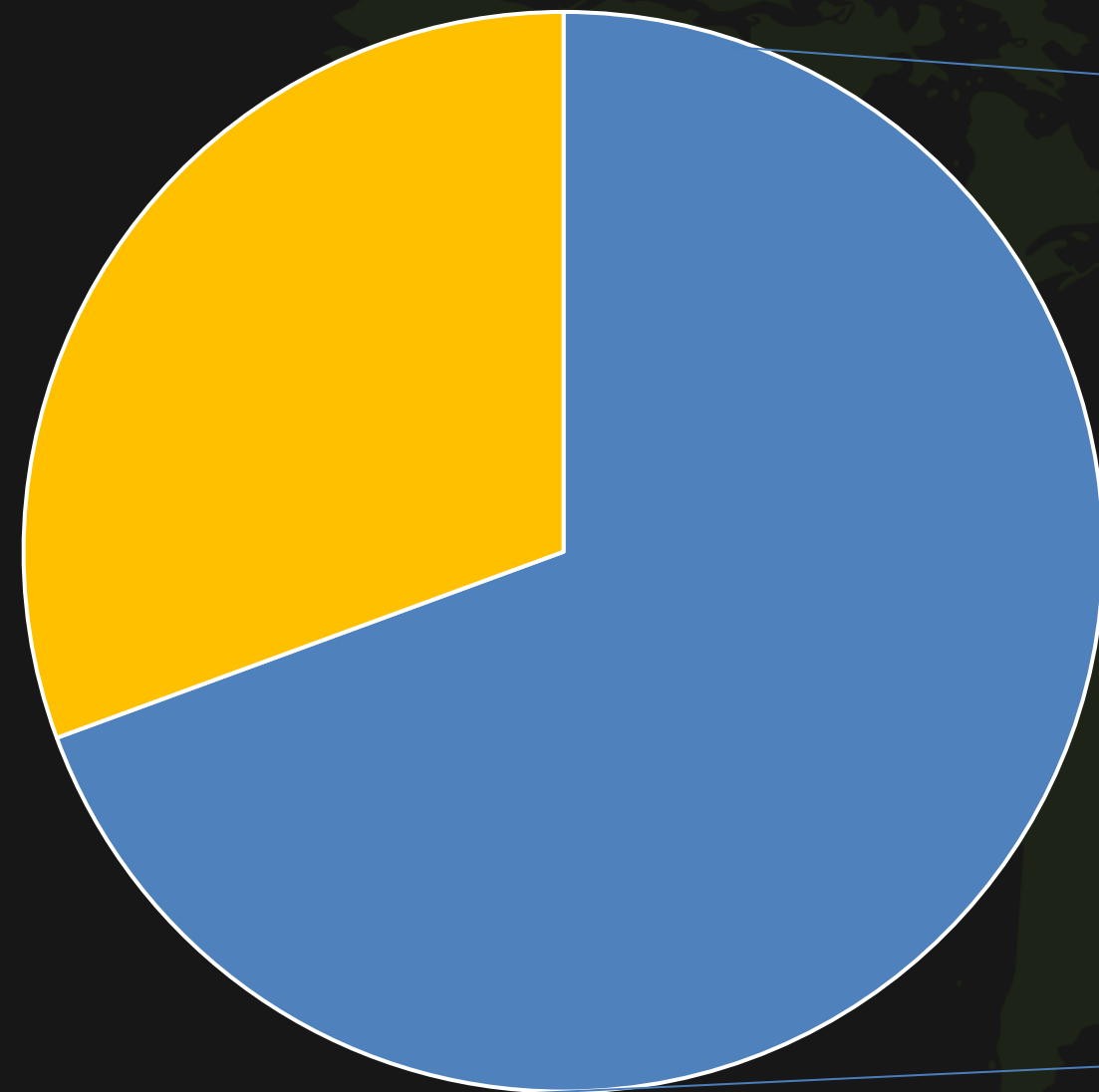


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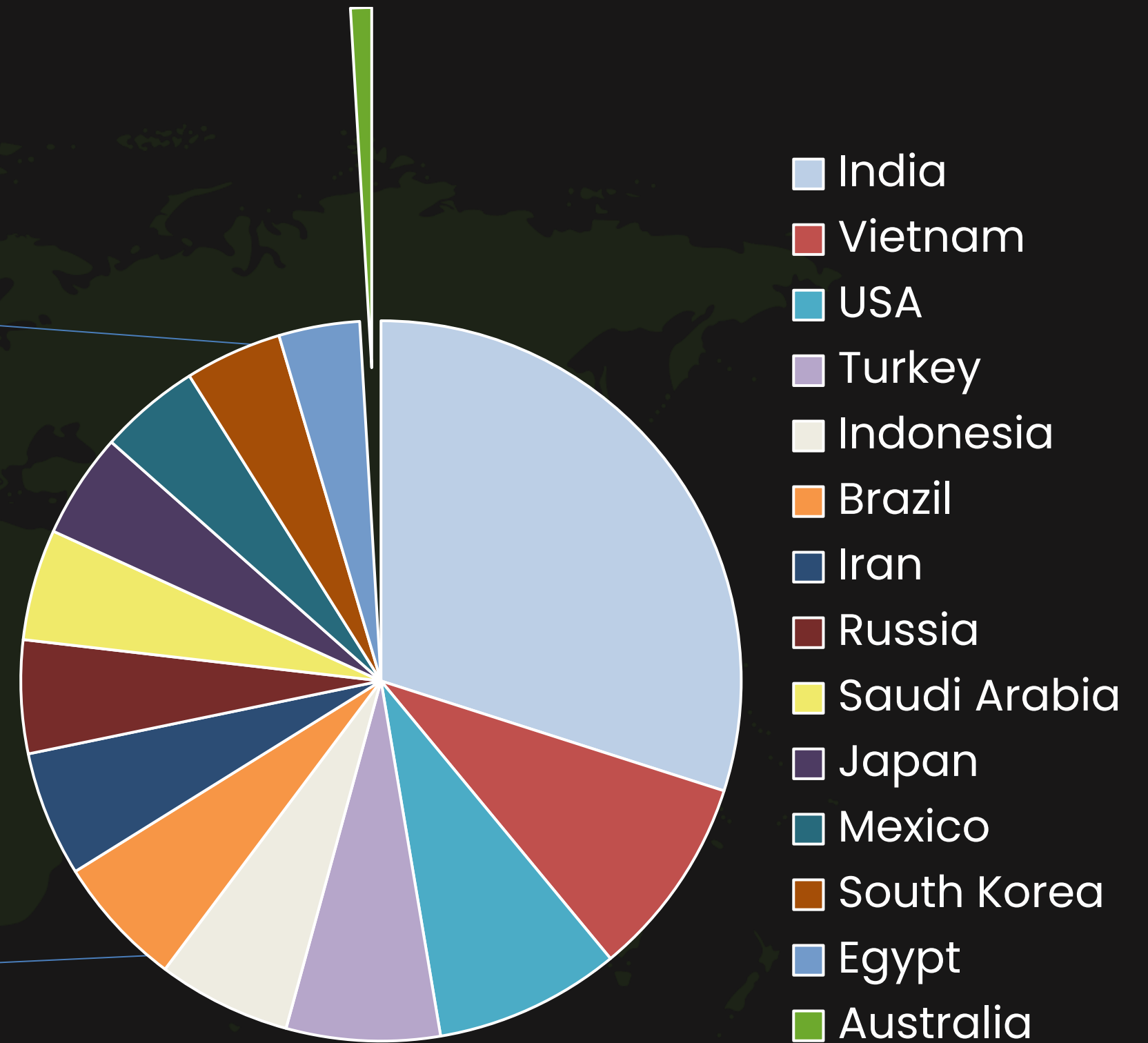
Source:
Department of Industry Science and Resources

Global Cement Industry

Major countries in worldwide cement production
(2020)



■ China ■ Rest of World



- India
- Vietnam
- USA
- Turkey
- Indonesia
- Brazil
- Iran
- Russia
- Saudi Arabia
- Japan
- Mexico
- South Korea
- Egypt
- Australia

Global commitments

European Union Carbon Border Adjustment Mechanism (CBAM)

Carbon tariff on **cement**, aluminium, fertilisers, electric energy production, iron and steel to reduce emissions to 55% by 2030 and zero net emissions by 2050.

United States Democratic members of Congress have proposed their own form of CBAM.

Net Zero Target

Country

2050

India, Japan, Vietnam, Brazil, South Korea, Europe, USA

2053

Turkey

2060

China & Indonesia

Australia's commitments

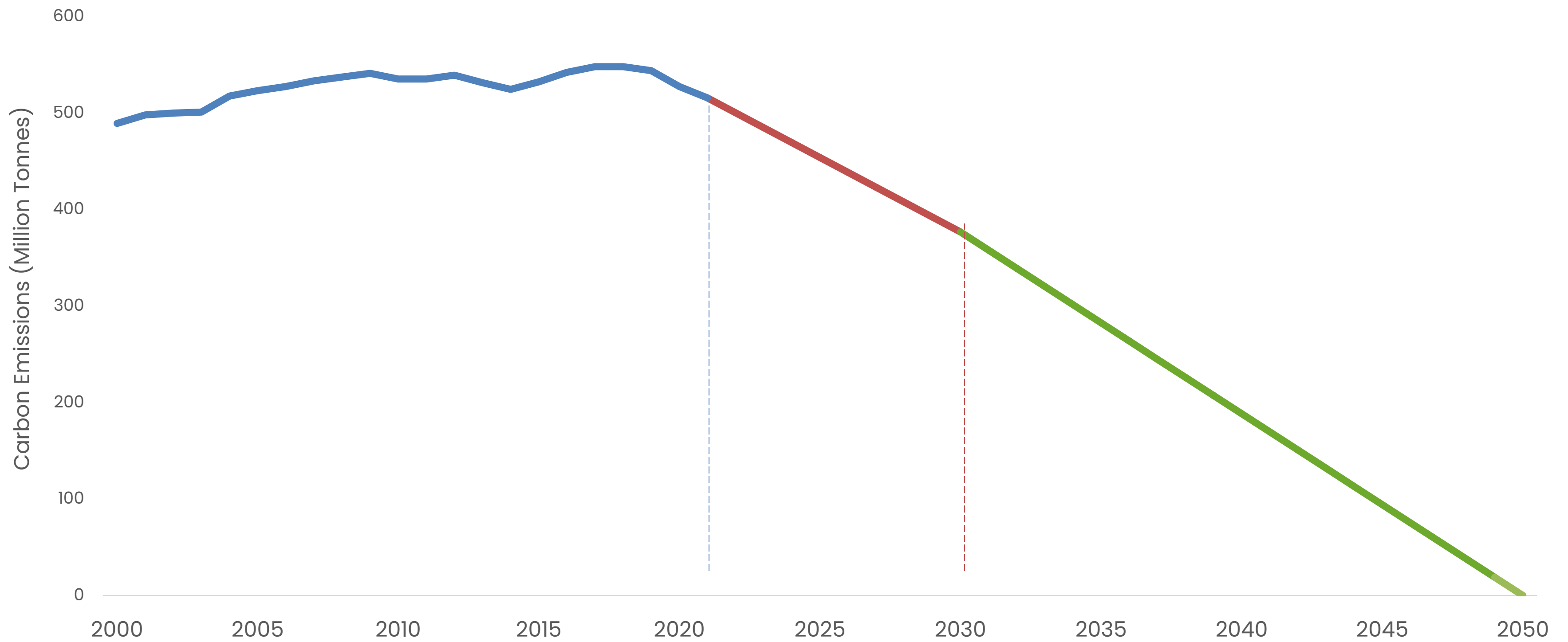
Targets are currently rated as highly insufficient

5% below 2000
levels by 2020
(under the
Kyoto Protocol)

26–28% below
2005 levels by
2030
(under the Paris
Agreement)

**Net zero by
2050**

Australia's climate commitments



Emission decline required to meet targets

Policy options to reduce emissions

Alternatives

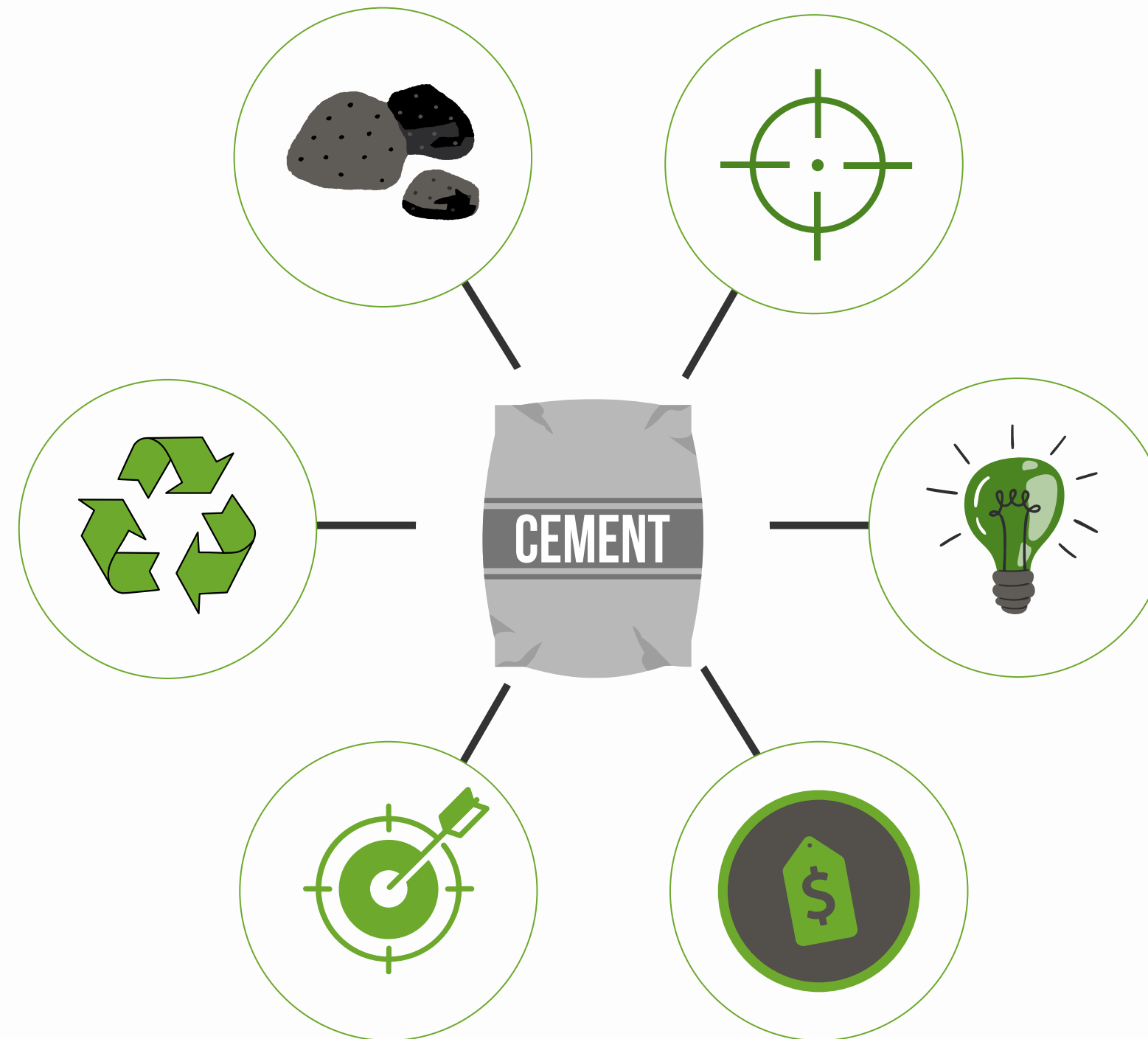
Cement can be replaced with Fly Ash, Silica Fume, and Wood Ash .

Incentive to use waste materials

Encourage use of fly ash, recovery of waste glass, red mud and ash for cement production.

Set procurement target

Targets for Portland cement replacement on government building and infrastructure projects.



Zero emission electricity

Move to zero emission electricity to reduce Scope 2 emissions

Research & Development

Funding R&D to develop innovative low emission production of cement

Put a price on cement emissions

Monetise carbon emissions to incentivise cement production to lower emissions

Cement Industry Initiatives

- **Zero emission electricity and transport**
- **Innovation through design and construction**
- **Increased use of supplementary cementitious materials**
- **Alternative fuels and green hydrogen**
- **New CO2 efficient cements**
- **Accounting for concrete to uptake CO2 (recarbonation)**

Australian Carbon Credit Unit's

The Safeguard Mechanism only applies to facilities with direct Scope 1 emissions of more than **100,000 tonnes** of carbon each year.

Baselines are calculated and set by regulators and can exceed 100,000 tonnes.

The scope 2 emissions that include electricity purchased and used in the production of cement is not captured in the 100,000 tonnes of carbon per year.

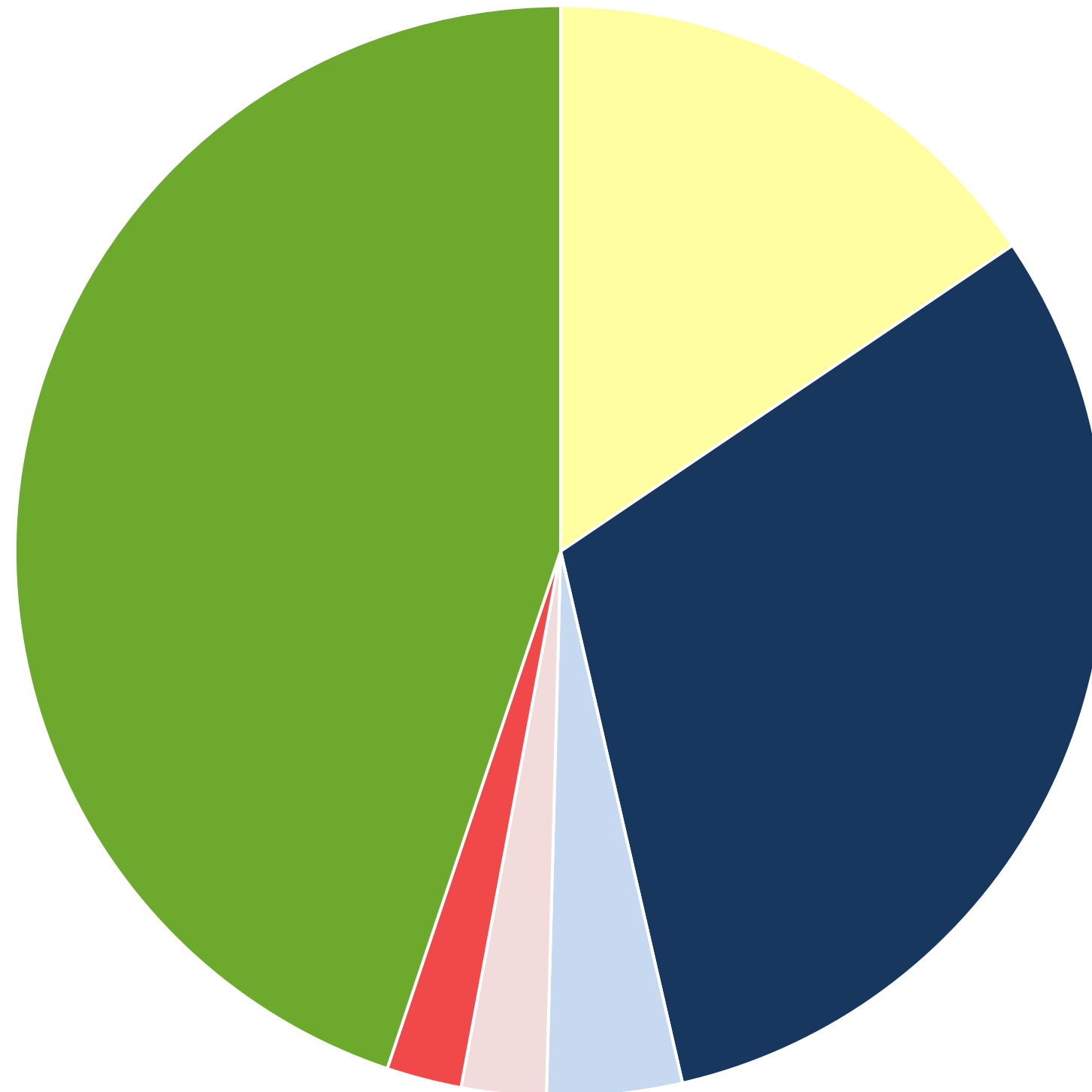


4%

KILN

4% of Global
Emissions from
cement kiln process

Calculating Scope 1 Emissions



BORAL LIMITED

CEMENT AUSTRALIA

HANSON AUSTRALIA

HOLCIM

BRICKWORKS LTD

Other

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Source:

National Greenhouse and Energy Reporting

Benefits and Challenges of ACCU's

The primary purpose of carbon credits are to lower emissions

Australia does not have strong climate policies and current climate goals are at highly insufficient levels

Carbon Tax failed in Australia in 2014 and were removed

Benefits

- Raises significant revenue for Emission Reduction Fund
- Control emissions in Australia while supporting the growth of clean energy technology
- Carbon price fluctuates in ACCU

Challenges

- Flexible emission baseline
- Market does not always operate in an efficient or entirely transparent way
- Are not accepted for offsetting avoidable scope 1 emissions for science-based-targets

Input - Output Analysis

ACCU Spot Price (July 2022)	Total Cost If ACCU is applied to every tonne of carbon	Cement Revenue (2021)	Total Revenue minus ACCU cost
\$37	\$347,697,510	\$4.7 Billion	\$4.4 Billion

Input - Output Analysis

Direct Effect	Indirect Effect	Induced Effect	Total Effect
-160 (\$M)	-341.7 (\$M)	-499.56 (\$M)	-1189.27 (\$M)
The output change across all industries of the economy and initial reduction of output	The output change across all industries of the economy and initial decrease of output and all the induced output	The change wage and salary earners will earn extra income which they will spend on commodities produced by all industries in the economy	The total amount of output induced from all industries demand and total amount of output induced by the spending of the extra wages and salaries earned

Understanding Input - Output Analysis

Total Effect

Initial shock to the economy with total effect cost

Cement Production Cost

Short-term increase in production cost and shrinkage in industry size

Redistribution of labour

Job growth in innovation technology to lower emissions

Low carbon Innovation in Cement

ACCU's funds return directly to cement industry

Key Takeaway

- Cement industry growth with increasing infrastructure projects
- High carbon emissions levels in the cement industry globally and in Australia
- Climate policy in Australia overlooks the cement industry
- EU climate target success could be accredited to the carbon tax – are ACCU'S too weak?
- Cement industry has identified lower carbon initiatives but not supported or incentivised to change
- Cement industry requires innovation upgrades to meet climate targets

The background features a low-angle, upward-looking perspective of a modern architectural structure. Thick, light-colored concrete beams curve and intersect, creating a series of triangular and polygonal openings. The sky is a clear, bright blue, visible through the gaps in the structure. The overall composition is dynamic and geometric.

Questions