



SCIENCE
BASED
TARGETS

Technical overview of Science Based Targets

NBI, WWF & CDP workshop
Johannesburg, Wednesday 19 October 2016

Susie Wood

Senior Manager – Science Based Targets, CDP

An initiative by



Adopting a science-based target | Overview of the process

Getting started

Make the business case

Understand the available methodologies

Setting the target

Develop your science-based target

Announcing & implementing

Gain internal buy-in

Report & communicate

Implement

SBT setting methods | What is a science-based target?

Targets adopted to reduce greenhouse gas (GHG) emissions are considered 'science-based' if they are in line with the level of decarbonization required to keep global temperature increase well below 2 degrees Celsius compared to pre-industrial temperatures, as described in the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC AR5).

SBT setting methods | What is a science-based target setting method?

Science-based target setting methods are procedures that companies can follow to set corporate GHG emission reduction targets in line with the level of decarbonization required to keep global temperature increase well below 2°C compared to pre-industrial temperatures.

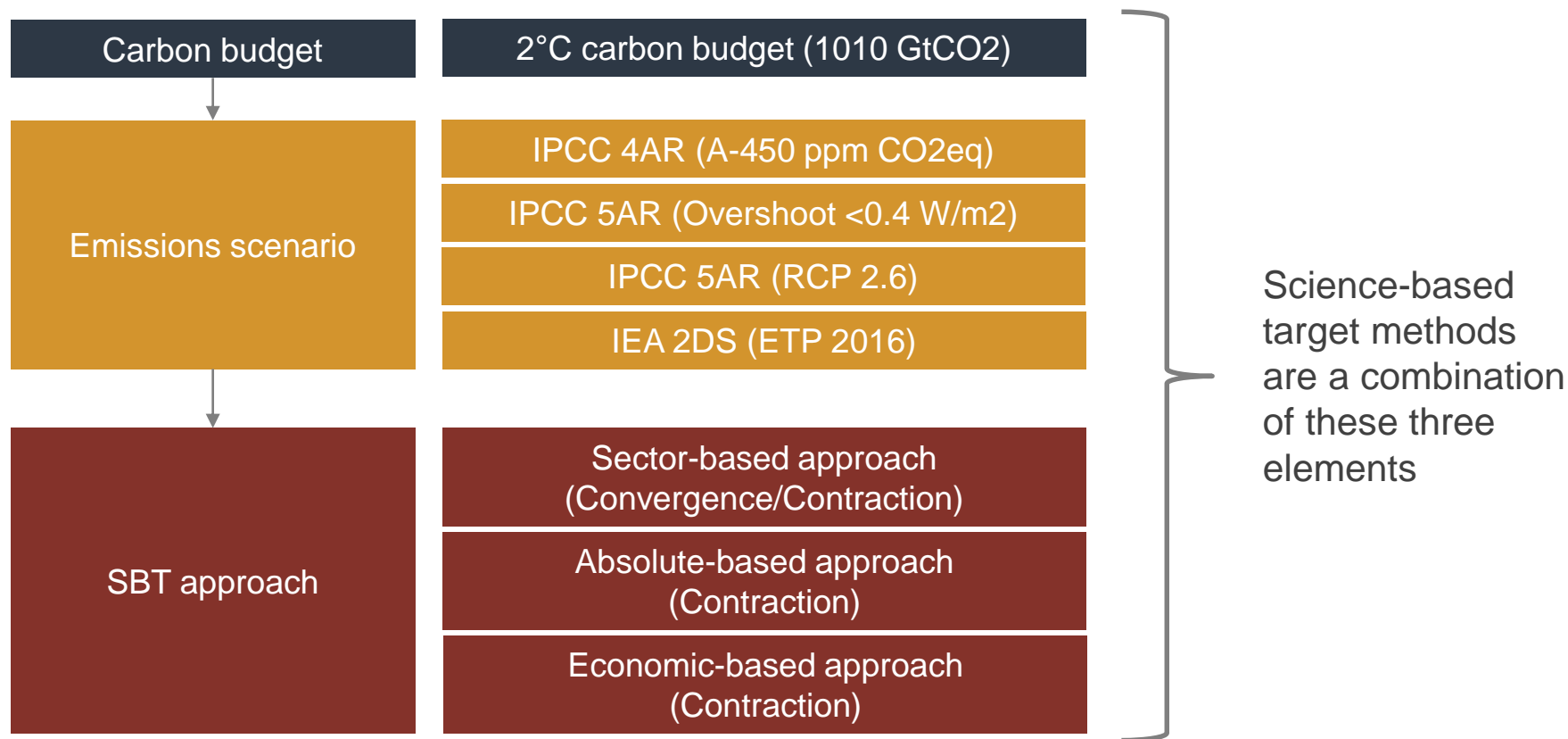
SBT setting methods can be described by three main elements

Carbon budget

Emissions scenario

SBT approach

SBT setting methods | Key components of an SBT setting method



SBT setting methods | A note on terminology

What is a science-based target *approach* ?

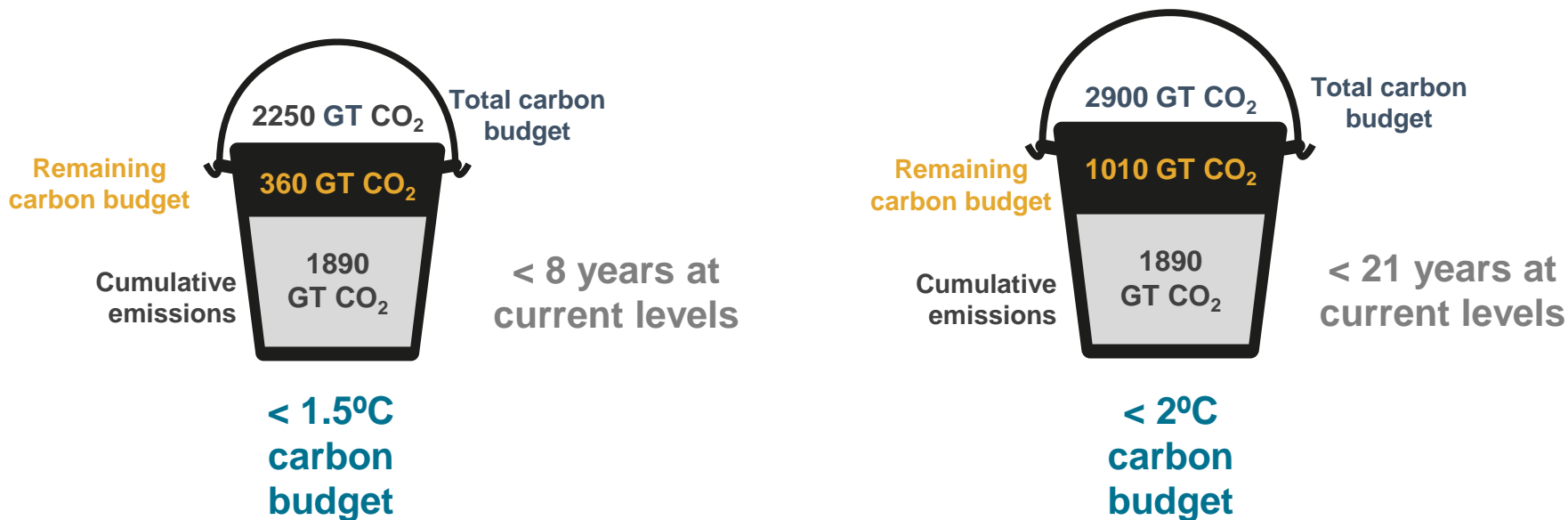
A science-based target *approach* refers to the way the carbon budget in a chosen emission scenario is allocated among companies with the same level of disaggregation (e.g. in a region, in a sector, or globally).

What is a science-based target *method* ?

A science-based target setting *method* refers to a procedure that companies can follow in order to determine a level of de-carbonization that is consistent with the goal of keeping global temperature increase well below 2°C compared to pre-industrial temperatures.

SBT setting methods | Carbon budget

49 GT CO₂ / yr

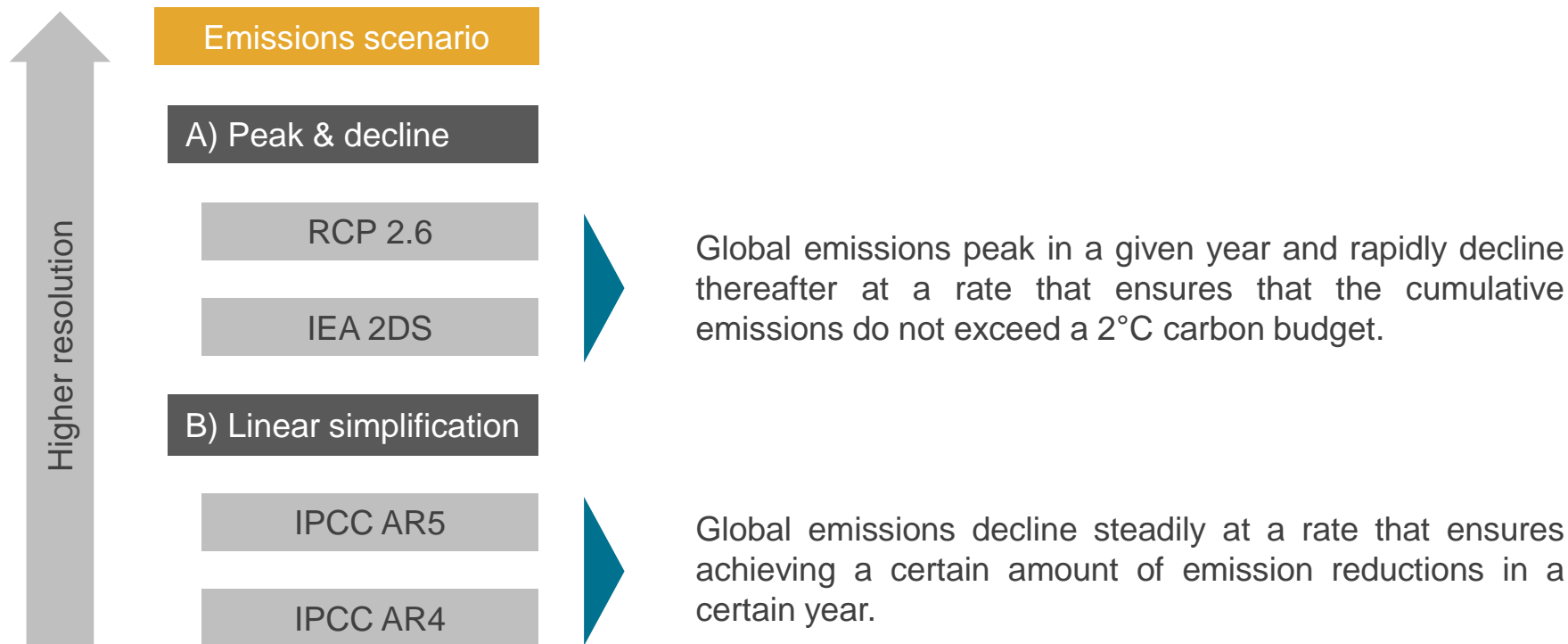


Introduction | Emissions scenario

Understanding 1.5°C and 2°C emissions trajectories

	< 1.5°C	< 2°C
Remaining carbon budget	360 GT CO ₂	1010 GT CO ₂
Global emissions peak	Before 2020	Before 2020
Global GHG emissions by 2050	70 to 95% below 2010 levels	49 to 70% below 2010 levels
Phase out of global energy and industry CO₂ emissions	Between 2045 and 2055	Between 2060 and 2075

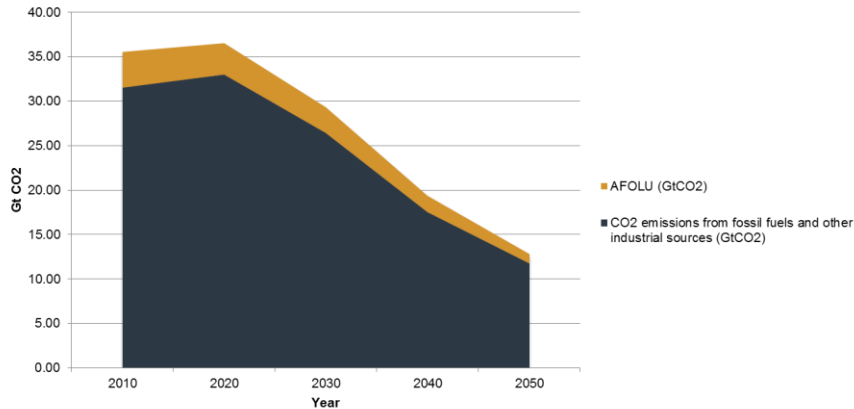
SBT setting methods | Emissions scenario



SBT setting methods | Emissions scenario

Peak & decline

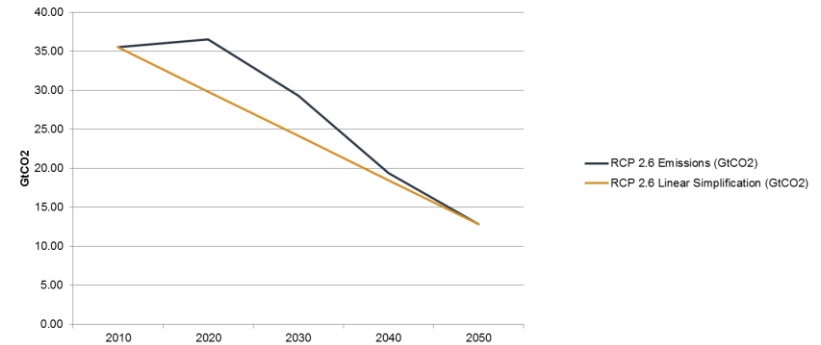
RCP 2.6 - Anthropogenic CO₂ emissions



- Global emissions peak in a given year and rapidly decline thereafter at a rate that ensures that the cumulative emissions do not exceed a 2°C carbon budget.
- Under a 'peak and decline' model, the peak is usually to accommodate growth in developing countries (i.e. developed countries are assumed to be already on a reduction pathway).

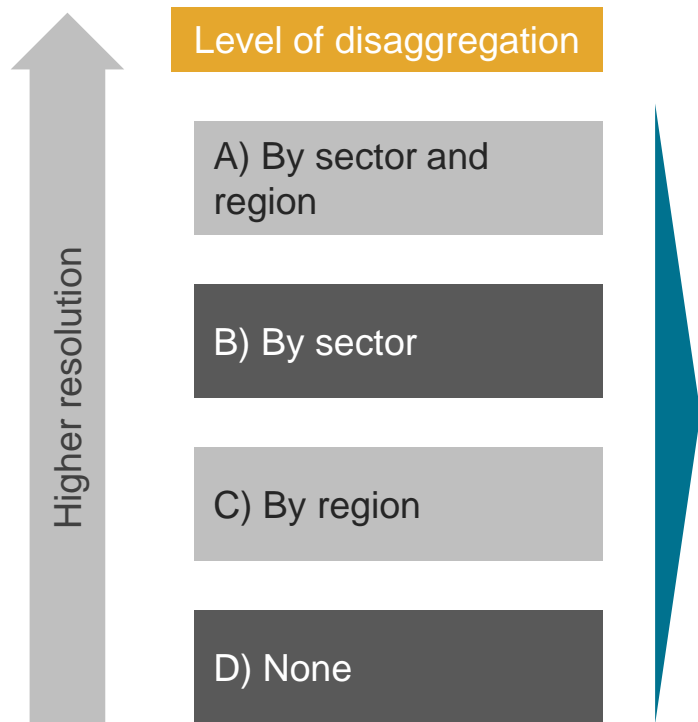
Linear simplification

RCP 2.6: Actual emissions vs Linear simplification



Global emissions decline steadily at a rate that ensures achieving a certain amount of emission reductions in a certain year.

SBT setting methods | Regional & sectoral disaggregation



Emission scenarios can disaggregate GHG emissions at a macro-level based on a number of criteria or a combination of them. The most common disaggregation criteria include:

- Mitigation costs
- Mitigation benefits
- Mitigation potential / capacity
- Historic responsibility

SBT setting methods | SBT approach

SBT approach

A) Sector-based approach



Based on sector-specific carbon budgets determined by mitigation/technology options and activity projections.

B) Absolute-based approach



Based on absolute emissions reductions determined in climate reports (e.g. 49-72% reduction in IPCC AR5).

C) Economic-based approach



Based on the average emissions reductions determined in climate reports per projected economic output.

SBT setting methods | Allocation mechanisms

Current SBT approaches use two main mechanisms for allocating emissions at a company level:

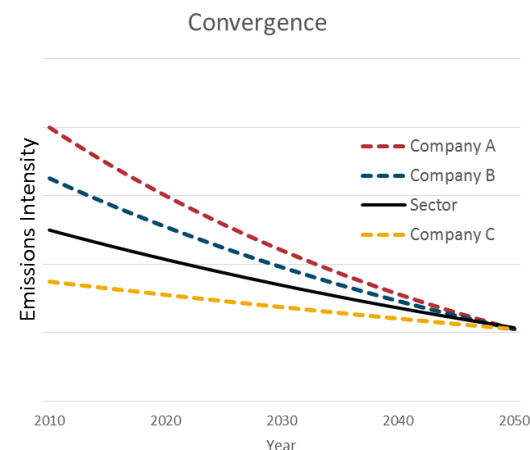
Convergence is appropriate to project the **carbon intensity** of companies in sectors where the sector pathways assure emission reductions for the sectors as a whole.

Contraction can be applied to both **absolute emissions** or **carbon intensity**.

SBT setting methods | Allocation mechanisms

Convergence of *carbon intensity*

- In this allocation mechanism, it is assumed that the carbon intensity of a company converges towards the 2°C carbon intensity of the sector at a rate that ensures not exceeding the sectoral 2°C carbon budget.
- The rate of convergence of a company is a function of the initial carbon intensity of the company, the 2°C carbon intensity of the sector, and the growth of the company relative to the growth of the sector.
- This method can only be used with emissions scenarios that disaggregate emissions at the sector level.



SBT setting methods | Allocation mechanisms

Contraction of *carbon intensity*

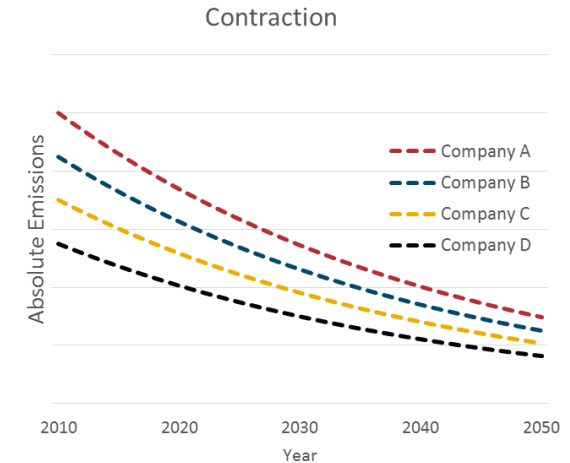
- In this allocation mechanism, it is assumed that all companies within the same level of disaggregation (i.e. sector, region or globally) reduce their carbon intensity at a uniform rate that would ensure not exceeding their respective 2°C carbon budget.
- The rate of contraction in this mechanism is a function of a decreasing carbon budget and the expected level of activity for the sector or region.
- Activity can be expressed using
 - **economic indicators** (e.g. value added); or
 - **physical indicators** (e.g. tonne of product).



SBT setting methods | Allocation mechanisms

Contraction of *absolute emissions*

- In this allocation mechanism, it is assumed that all companies within the same within the same level of disaggregation (i.e. sector, region or globally) reduce their absolute emissions at a uniform rate.



SBT setting methods | Overview of existing methods

The Science Based Targets initiative currently recognizes seven existing SBT setting methods, all of which are free and publicly available:

- **Absolute Emission Contraction** (*also referred to as the “Mars method”*)
- BT’s Climate Stabilization Intensity (**CSI**) Targets
- **CSO**’s Context-based Carbon Metric (*known as “the CSO method”*)
- Autodesk’s Corporate Finance Approach to Climate-stabilizing Targets (**C-FACT**)
- Greenhouse Gas Emissions per unit of Value Added (**GEVA**)
- Sectoral Decarbonization Approach (**SDA**)
- **3% Solution** (*US only*)

SBT setting methods | Classification of existing methods

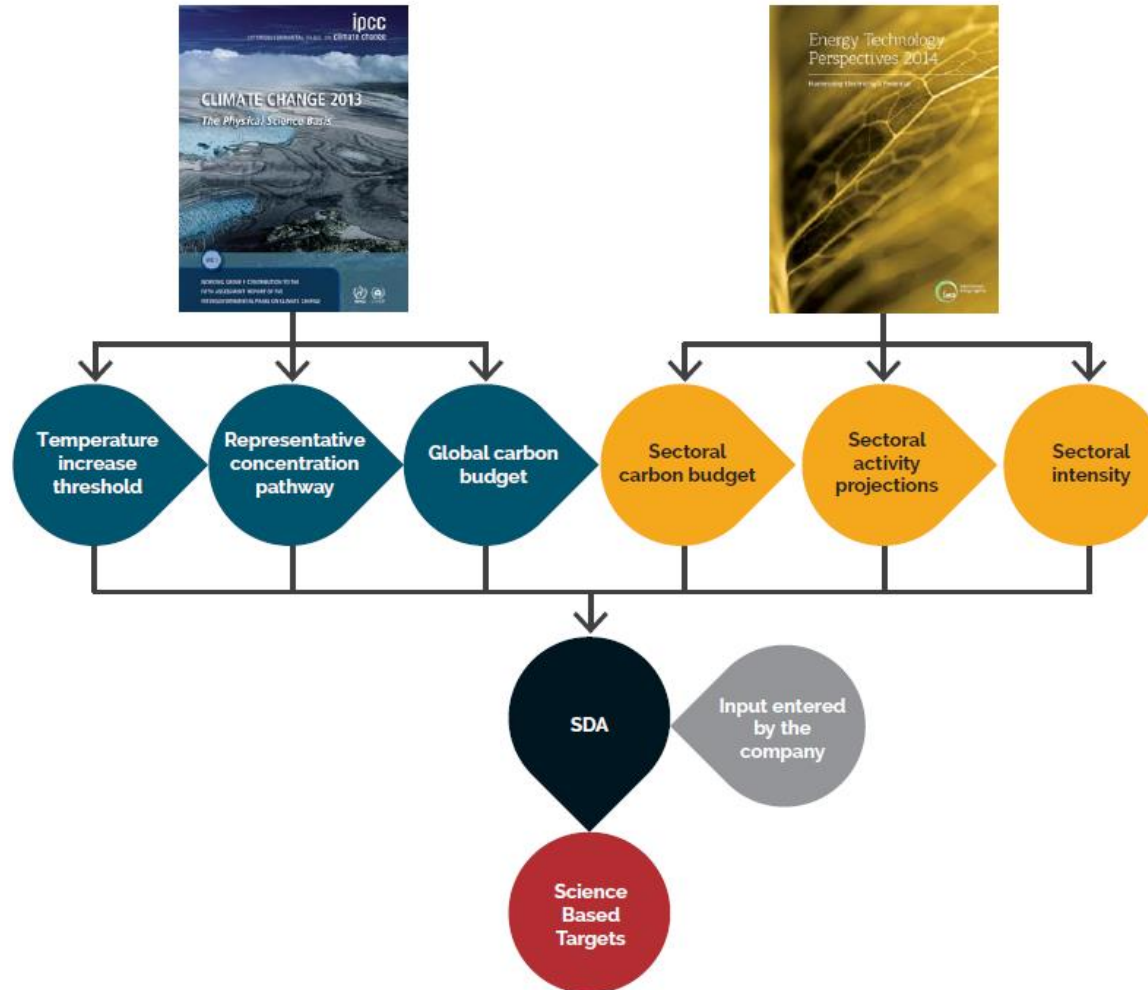
Method	Approach	Allocation mechanism	
		Convergence	Contraction
SDA	Sector-based	X (Homogeneous)	X (Heterogeneous)
3% Solution	Sector-based		X
Absolute contraction	Absolute-based		X
C-Fact	Economic-based		X
GEVA	Economic-based		X
CSI	Economic-based		X
CSO	Economic-based		X

Sectoral Decarbonization Approach | Introduction



The **Sectoral Decarbonization Approach (SDA)** is a freely available open-source methodology developed by the Science Based Targets initiative that allows companies to set emission reduction targets in line with a 2°C decarbonization scenario. It is based on the 2°C scenario (2DS) developed by the International Energy Agency (IEA) as part of its Energy Technology Perspectives publication.

Sectoral Decarbonization Approach | Overview



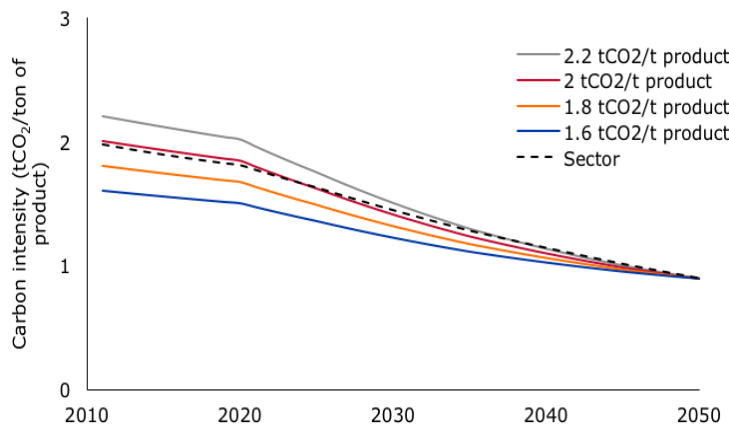
Sectoral Decarbonization Approach | Sectoral coverage

- Sectors currently covered by the SDA account for around two thirds of current greenhouse gas emissions and include
 - Power generation
 - Iron & steel
 - Aluminium
 - Cement
 - Pulp & paper
 - Passenger transport
 - Commercial buildings
- Key sectors still to be added include
 - Agriculture, forestry & other land-use
 - Oil & gas production
 - Freight transport
 - Residential buildings



Sectoral Decarbonization Approach | Allocation mechanisms

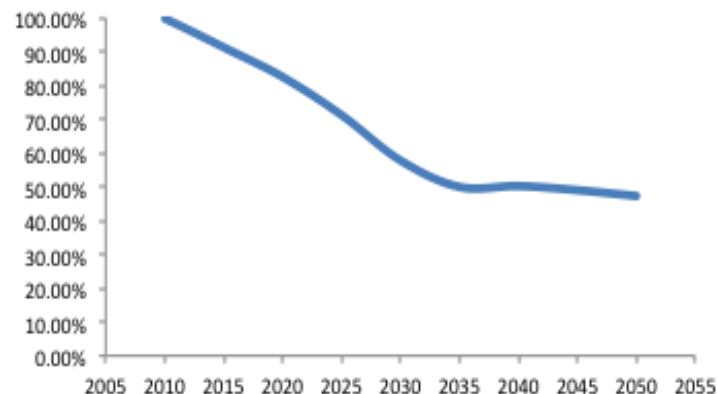
Emissions intensity *convergence*



Homogeneous sectors

- Power generation
- Iron & steel
- Aluminium
- Cement
- Pulp & paper
- Transport (some sectors)
- Commercial buildings

Absolute emissions *contraction*



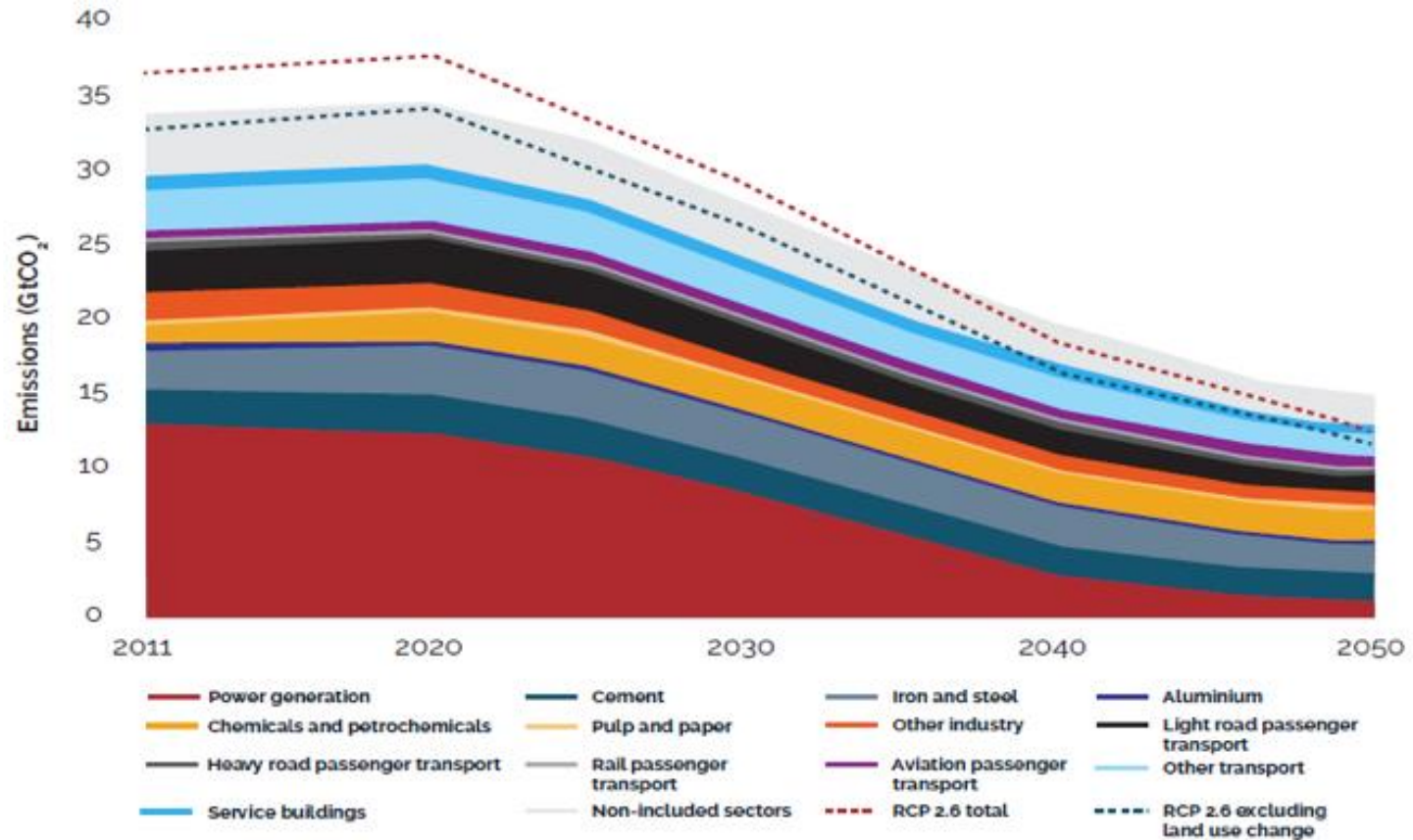
Heterogeneous sectors

- Chemicals
- Other industries
- Other transport

Sectoral Decarbonization Approach | Physical indicators

Sector	Subsector	Activity Indicator
Power Generation	N/A	Kilowatt-hour
Industry	Iron & steel	Tonnes steel
	Cement	Tonnes cement
	Aluminum	Tonnes aluminum
	Pulp & paper	Tonnes paper and cardboard
Transport services	Passenger transport - Air	Revenue passenger kilometer
	Passenger transport – Light road	Revenue passenger kilometer
	Passenger transport – Heavy road	Revenue passenger kilometer
	Passenger transport - Rail	Revenue passenger kilometer
Services / Commercial buildings	Trade / retail	Square meter
	Finance	
	Real estate	
	Public administration	

Sectoral Decarbonization Approach | Sectoral emissions reductions



Setting an SBT | Science Based Targets initiative eligibility criteria

- **Boundary:** The target must cover company-wide Scope 1 and Scope 2 emissions and all relevant GHGs as required in the GHG Protocol Corporate Standard.
- **Timeframe:** The target must cover a minimum of 5 years and a maximum of 15 years from the date the target is submitted to the SBT initiative for an official quality check.
- **Level of ambition:** At a minimum, the target must be consistent with the level of decarbonization required to keep global temperatures within a 2°C increase compared to pre-industrial temperatures, though we encourage companies to pursue greater efforts towards a 1.5°C trajectory.

Intensity targets are only eligible when they lead to absolute emission reductions in line with climate science or when they are modelled using an approved sector pathway or method (e.g. the Sectoral Decarbonization Approach).

- **Scope 3:** Companies must complete a scope 3 screening for all relevant scope 3 categories in order to determine their significance.

An ambitious and measurable Scope 3 target with a clear time-frame is required when Scope 3 emissions cover a significant portion (greater than 40% of total scope 1, 2 and 3 emissions) of a company's overall emissions. The target boundary must include the majority of value chain emissions as defined by the GHG Protocol Scope 3 Standard.

- **Reporting:** The company must disclose company-wide GHG emissions inventory on an annual basis.

Setting an SBT | Modelling overview

Inputs

- Emissions scenario
- Sector
- Geography
- Target period
 - Base year
 - Target year
- Emissions scope
 - Scope 1
 - Scope 2
 - Scope 3 (if relevant)
- Base year emissions
- Base year activity
- Target year activity
- Activity growth model
 - Linear
 - CAGR

SBT approach

Selection of appropriate SBT approach(s) / application of specific method(s) based on inputs

Outputs

- For each SBT approach selected
 - Target year emissions
 - Target year emissions intensity
 - Emissions reduction (%)
 - Emissions intensity reduction (%)
 - Emissions trajectory
 - Emissions intensity trajectory

Setting an SBT | SBT approach selection

The Science Based Targets initiative recommends the following prioritization:

- If available, use a **sector-based approach**.
- If sector-based methods are not available, use an **absolute-based approach**.
- **Economic-based approaches** are only recommended when they lead to absolute emission reduction targets consistent with the goal of keeping global temperature increase well below 2°C compared to pre-industrial temperatures.

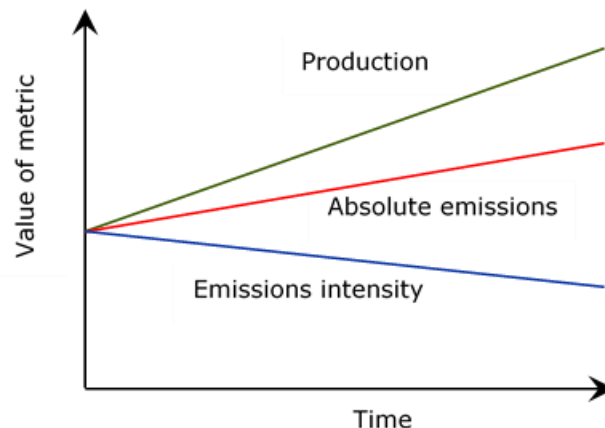
Setting an SBT | Consideration of company attributes

Defining the company's key attributes will assist a company in determining which methods may be appropriate for them. The questions below can help assess those key attributes.

- In which sector(s) does the company operate?
- Does the company operate in homogeneous or heterogeneous sector(s)?
- Does the company's projected growth rate, in physical or economic output, exceed that of the sector or the global average?
- In which geographic regions or countries does the company operate?

Setting an SBT | Consideration of absolute & intensity targets

- An **absolute target** is defined in terms of an overall reduction in the amount of GHGs emitted to the atmosphere by the target year relative to the base e.g. “reduce annual CO₂e emissions by 25% below 2000 levels by 2020”.
- An **intensity target** is defined by a reduction in emissions relative to a specific business metric, such as the output or financial performance of the company (e.g., tonne CO₂e per tonne product produced or value added).
 - Intensity targets do not necessarily lead to reductions in absolute emissions, because increases in business activity can cause absolute emissions to rise even if efficiency on a per unit basis improves
 - It can be difficult to come up with a single, meaningful intensity target that covers all of a company’s operations, particularly when those operations span a diverse product mix.
- We recommend that companies express targets in both intensity and absolute terms, in order to track both real reductions in emissions and efficiency performance.



Adopting a science-based target | Resources & tools available



Sectoral Decarbonization Approach (SDA) methodology



Article in Nature Climate Change



Mind the Science report



Science Based Target Setting manual (draft)



Science Based Target Setting tool (coming soon)



Guidance on scoring in CDP's Climate Change Questionnaire

Adopting a science-based target | A note on geography

- Global emissions scenarios are sometimes disaggregated by region before being used for the determination of science-based emission reduction targets.
- The mechanism to disaggregate emissions responds to equity criteria that are incorporated in the climate models
- Generally speaking, the use of a regionally disaggregated emissions scenario represents a more specific and potentially more equitable trajectory that a company would have to follow.
- The Paris Agreement does not define particular emissions allocation processes for developed, developing, and least-developed parties to the agreement; rather countries agreed on the principle of equity and common but differentiated responsibilities (CBDR) and respective capabilities, in the light of different national circumstances.
- In the absence of internationally-agreed-upon geographic target differentiation, current SBT methods use simplifying assumptions for addressing performance differences among countries.
- Additional scenarios with geographical disaggregation considering equity issues would be useful to inform SBT methods.



SCIENCE BASED TARGETS

info@sciencebasedtargets.org
www.sciencebasedtargets.org



An initiative by

