DYNO NOBEL

Scenario Analysis in Reporting

Best practice approaches and how to avoid the pitfalls

Agenda

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05 AVOIDING COMMON PITFALLS

SUSTAINABILITY 2026

Who we are

Dyno Nobel is a leading technology supplier to the resources sector committed to helping create a sustainable and decarbonised world

With a team of just over 5,500 dedicated employees, we have a **strong safety culture** that we're committed to building on. With iconic brands, **leading technology solutions** and great customers, we operate in the resilient markets of mining, quarry and construction. **We are committed to a sustainable and decarbonised world**, with an ambition to reach **Net Zero** operational emissions by 2050, or sooner if practicable.

Our growth strategy is to expand in low-risk growth markets, including the copper and metals required for new technologies and the energy transition.

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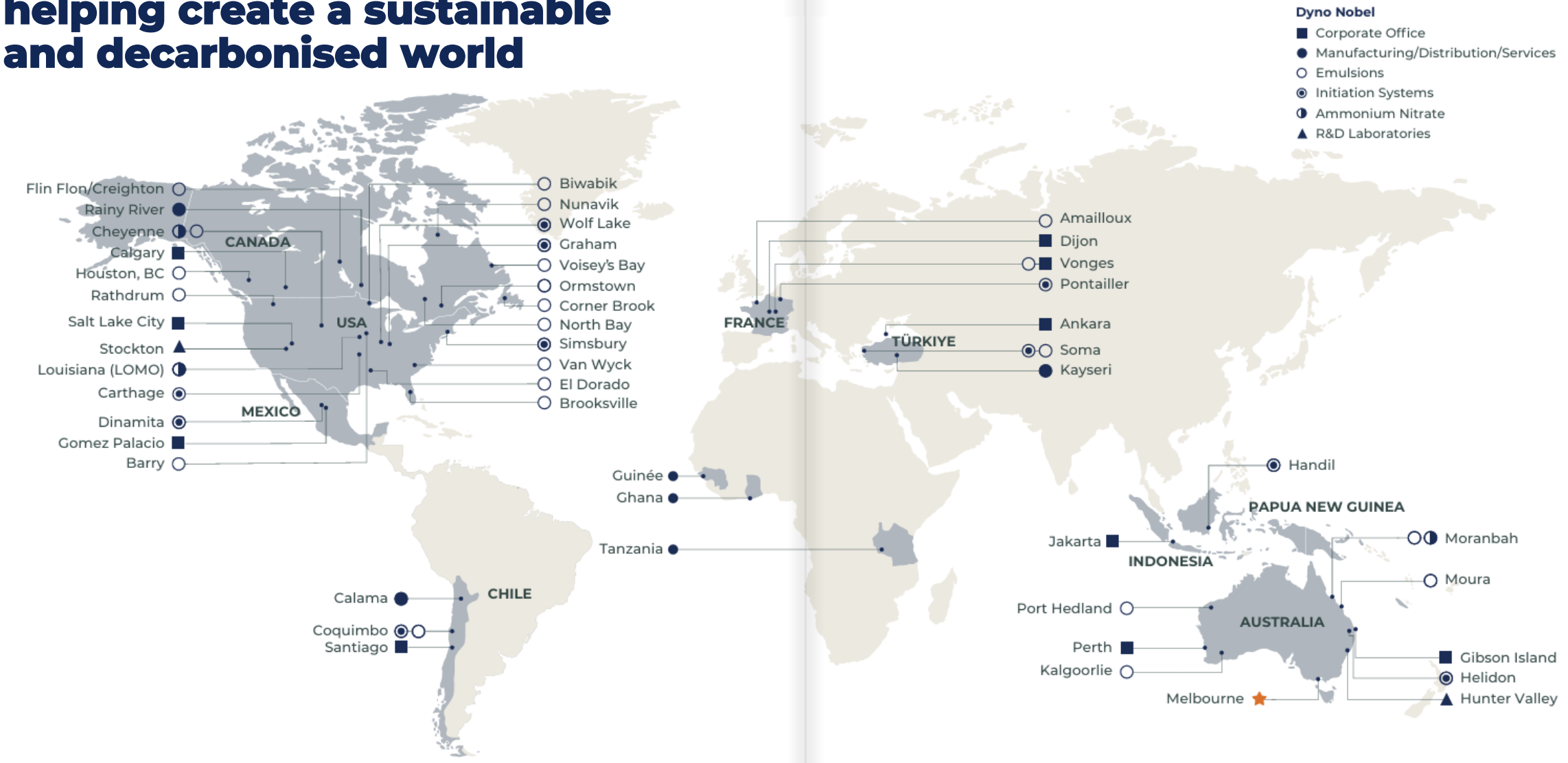


SUSTAINABILITY 2025

Value creation for the transition

In 2025 our products unlocked:

COPPER
628
kilotonnes

GOLD
11.5
million ounces

DIAMONDS
1.5
million carats

IRON ORE
513
million tonnes

MET COAL
71
million tonnes

QUARRY & CONSTRUCTION MATERIALS
928
million tonnes

THERMAL COAL
147
million tonnes

ZINC & MANGANESE
580
kilotonnes

Our growth strategy is to expand in Latin America and Africa through capital-light investments, targeting supply gaps in low-risk growth markets, such as the copper and new world metals required for the energy transition.

DYNO NOBEL

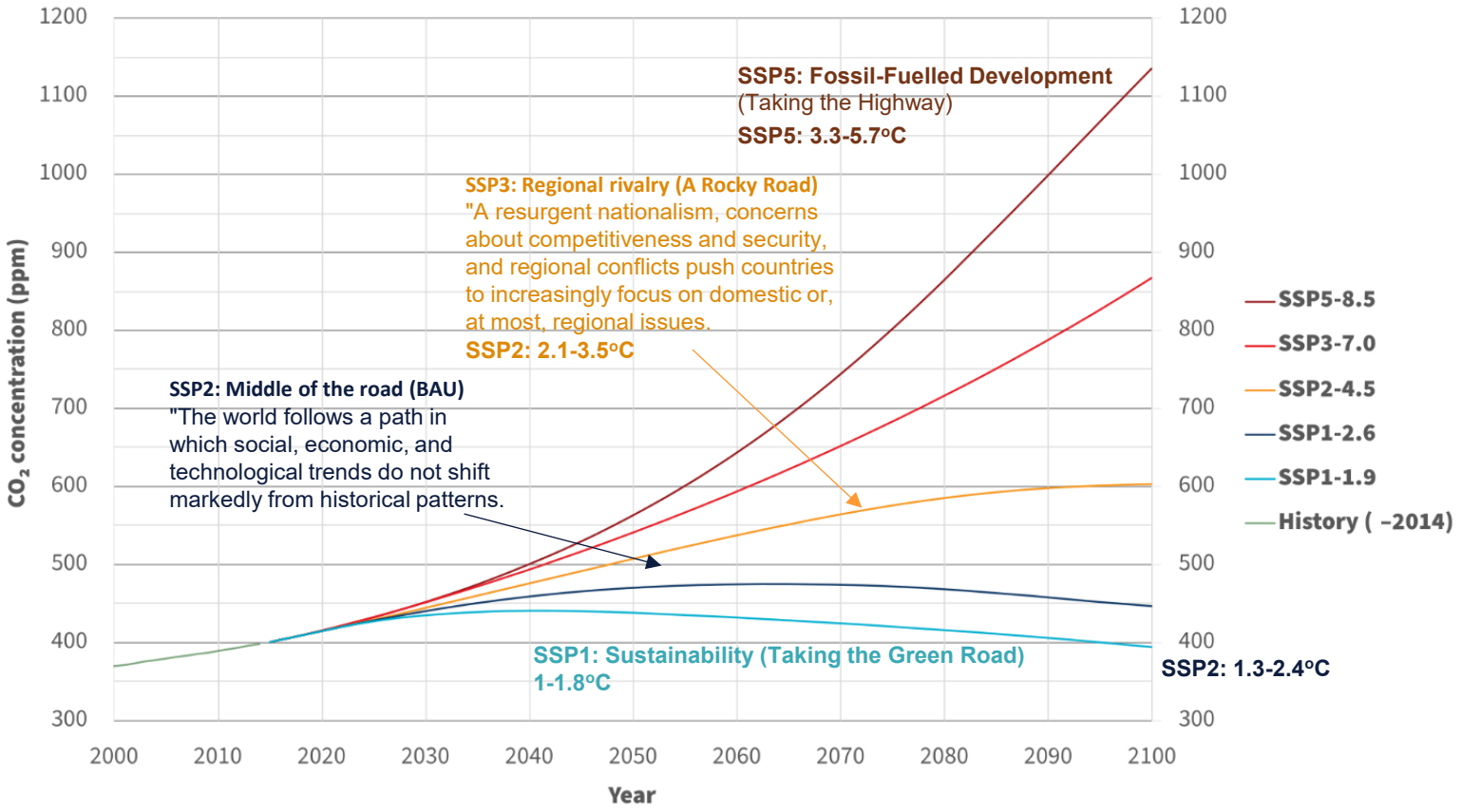
Using defensible Scientific Pathways to construct scenarios: The Why

Why must we use scenarios?

- First proposed by the Bloomberg Financial Stability Board's Taskforce on Climate-related Financial Disclosures (**TCFD**) to provide a clear 'how'
- We use a range of scenarios because:
  - We do not know exactly what is going to happen – likelihood is uncertain
  - The time frames are longer than risk teams usually assess
  - We are trying to limit warming to well under 2°C - we use 1.5°C for companies, investors and governments to know what they should aim for, as well as the risks associated with those actions
  - They are based on the latest science and economic information

Using defensible Scientific Pathways to construct scenarios: The What

- **Shared Socioeconomic Pathways** (SSPs) are scenarios developed by an international team of climate scientists, economists and energy systems to carry out integrated, multi-disciplinary analysis.
- They describe plausible major global developments (as defined in the IPCC Sixth Assessment Report on climate change: 2021-2023) that together would lead to different future challenges for mitigation and adaptation to climate change, *depending on the degree of warming.*



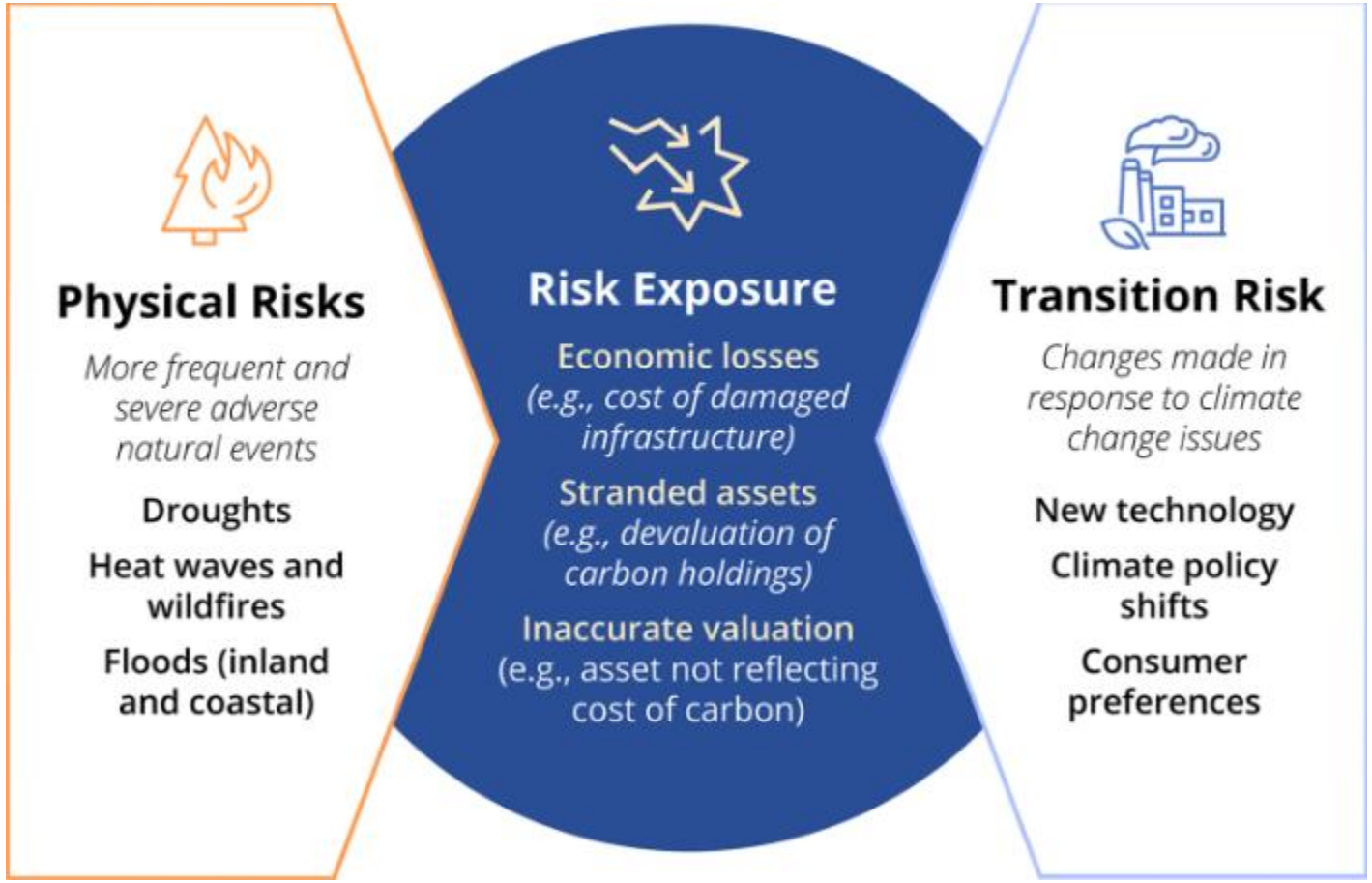
1. https://unece.org/fileadmin/DAM/energy/se/pdfs/CSE/PATHWAYS/2019/ws_Consult_14_15.May.2019/supp_doc/SSP2_Overview.pdf
2. Understanding Shared Socio-economic Pathways (SSPs) – ClimateData.ca

Why we use a *range* of scenarios

Physical risks are greater in the higher warming scenarios because greater warming will change regional climates faster.

Risk management through **mitigation** reduces warming (and therefore, physical impact event likelihood)

Risk management through **adaptation** aims to reduce damages.



Transition risks are greater in the lower warming scenarios because a more rapid transition, with higher carbon prices and rapid market changes are required to limit warming.

Using defensible Scientific Pathways to construct scenarios: The What

- **The IEA (International Energy Agency)** produces key scenarios in its World Energy Outlook to explore future *energy* pathways:
- **Key IEA Scenarios**
  - **Net Zero Emissions by 2050 (NZE) Scenario**: A normative scenario that sets a strict pathway to limit global warming to . The 2025 update notes that while it remains the goal, global warming may exceed this for several decades, likely peaking just below around 2040 before dropping.
  - **Stated Policies Scenario (STEPS):** An exploratory scenario based on a detailed review of current policy landscapes, including both implemented policies and declared goals.
  - **Current Policies Scenario (CPS):** This scenario provides a cautious, baseline, or "business-as-usual", trajectory, taking into account only policies that are already in place.
  - **Announced Pledges Scenario (APS):** Assumes all climate-related commitments made by governments are met in full and on time.
- **Other Focus Areas**
  - **Technology and Sectoral Pathways:** The IEA provides analysis on specific technology deployment, such as the rapid rise of solar PV, which is projected to dominate new, renewable energy capacity.

1. https://unece.org/fileadmin/DAM/energy/se/pdfs/CSE/PATHWAYS/2019/ws_Consult_14_15.May.2019/supp_doc/SSP2_Overview.pdf

Current Policies Scenario

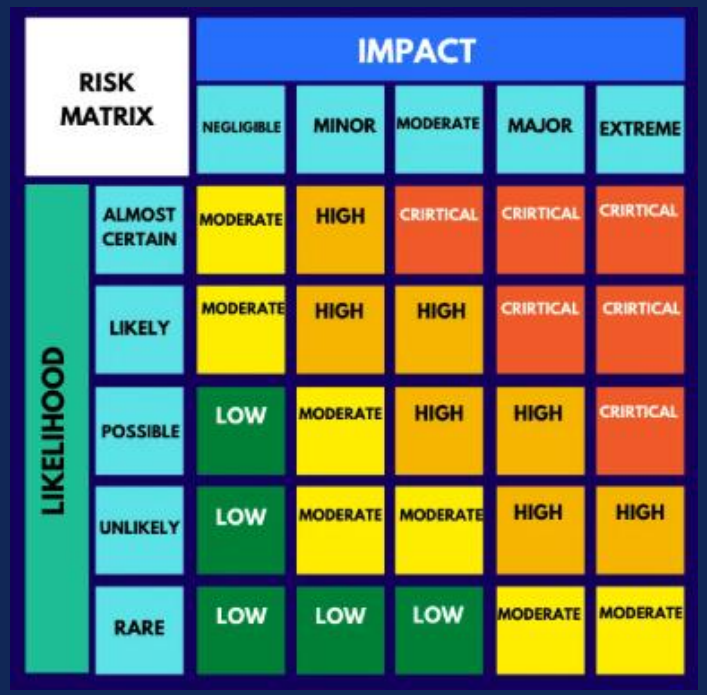
Expanding the world we know

- Total final consumption rises in the Current Policies Scenario (CPS) by around 1.3% each year over the next decade, similar to the average annual increase over the last decade: global industrial output, appliance ownership and demands for mobility all increase, while energy efficiency gains are modest.
- Demand for oil rises to 113 million barrels per day by 2050, mainly due to its increased use in emerging market and developing economies for road transport, petrochemical feedstocks, and aviation. Electric vehicle (EV) uptake stalls in regions lacking strong policy support: China and Europe are the main exceptions, and they see continued growth in EV sales. Global natural gas demand rises to 5 600 billion cubic metres by 2050: demand in the Middle East increases strongly, but developing economies in Asia are the largest source of demand growth, and their rising supply needs are met by new pipelines from Russia to China and by increased flows of liquefied natural gas.
- Oil and gas prices rise to 2050 in the CPS. The United States remains the world's largest oil and gas producer through to 2050, but oil production of the OPEC+ in 2050 is 15% higher than at any point in history. The CPS assumes that, by the latter part of the projection period, constraints on oil production and trade in countries currently subject to sanctions ease, so their output is determined by the underlying economics. If this is not the case, and

Useful scenario resources and tools

- Climate Futures Tool
- Climate Risk Map of Australia
- Consistent Climate Scenarios - Dataset - Open Data Portal | Queensland Government
- Victoria's Future Climate Tool VCP24
- Climate Risk Ready NSW Guide | AdaptNSW
  - Appendix C_Climate Risk Assessment Tool_2021.xlsx
- Coastal Flood Mapping Viewer Home (SA)
- How to access climate change scenarios | CoastAdapt (SA)
- Access WA Climate Projections

Assessing risks & opportunities and defining materiality & Impacts: The How



How do we use scenarios?

- You start with the scenario, rather than a list of risks
- You can assess for risks and opportunities:
  - Against SSPs;
  - Using a range of online tools which have adapted these to your local region; or
  - Against your own bespoke scenarios, created using the relevant aspects of the SSPs, IEAs and local/regional resources where you have assets
- You must use at least two scenarios, with one being a 1.5°C scenario (Paris-aligned).
- The scenarios inform the *likelihood axis* of your risk matrix:
  - **This scenario describes** a carbon price of $X by 2028 (i.e., in this scenario, the likelihood is 100%).
  - **Would the future event described** in this scenario **impact on the business**?
  - **Would the impact be 'material'**?

GLOBAL SCENARIO ANALYSIS

SSP1-1.9

GLOBAL GHG IN 2050

2.4 Gt CO_2-e/yr

GLOBAL TEMP. INCREASE BY 2100

1.0-1.8°C

KEY CHARACTERISTICS

- **Global coordinated action, strong government policies and incentives**
- **Complete reliance on renewable energy and the phasing out of fossil fuels by 2050**
- **Customer preference shift and stakeholder pressure**

GLOBAL TRENDS

This Fast Action scenario describes rapid and immediate climate action and a shift to cleaner industrial processes and renewable energy sources. A shift away from fossil fuels, including coal mining, and more sustainable customer and supplier behaviour and global policies to reduce GHG results in global warming limited to just 1.5°C above pre-industrial levels, thereby mitigating the most severe physical impacts of climate change. Nevertheless, the frequency of climate-related natural disasters is anticipated to slightly increase, especially in areas affected by extreme weather patterns that have implications for agriculture and aspects of Dyno Nobel's supply chains[1].

MACRO-ECONOMIC TRENDS

In line with limiting warming to 1.5°C, this scenario describes coal production – Australia's main source of economic activity – being reduced significantly which, in turn, impacts the Gross Domestic Product (GDP). The GDP of Australia falls by 4.4%[20]. Due to a slight increase in frequency and intensity of extreme weather events there is also a slight increase in the annual average cost of natural disasters on the Australian economy rising to $61bn by 2050[21]. In the US, similar economic decline is described in this scenario, with US GDP decreasing to US$22.89 trillion by 2050[20].

US TRENDS

This 1.5°C scenario describes the US successfully fulfilling its net zero policy commitment through shifting towards renewable energy, increased energy efficiency, and the adoption of sustainable practices in industries such as agriculture and manufacturing. The US' net zero commitments are achieved by reducing emissions from existing facilities, decarbonising transport, shifting from coal to natural gas for electricity generation and the increased uptake of wind generation[3,74].

In the 1.5°C trajectory, US businesses are supported to transition by favourable policies which assist them in remaining globally competitive, and they improve climate-related reporting to comply with current and emerging disclosure requirements[4].

AUSTRALIAN TRENDS

The 1.5°C scenario describes Australia achieving its net zero policy commitments by 2050, driven by its commitment to the goals of the Paris Agreement and policies that support a rapid, early transition from fossil fuels to renewable energy sources.

Whilst less than in other scenarios, the nation still anticipates notable shifts in climate patterns, including an escalation in the duration, frequency and intensity of heatwaves across terrestrial and aquatic environments.

This scenario describes Australia continuing to experience a decrease in the overall number of tropical cyclones. However, rising ocean surface temperatures and a warmer, wetter atmosphere provide a larger source of energy for cyclones once they form, indicating that those that do occur are expected to result in higher-intensity events, with significant variability from year to year[2]. Short-duration heavy rainfall events increase, amplifying the risks associated with flooding and erosion in affected regions[2].

AGRICULTURE

This scenario describes an increased focus on sustainable land management, biodiversity, and sustainable intensive farming, resulting in a reduced need for agricultural land clearing. Cropland land cover will decrease by 0.1% by 2050 from the 2023 baseline due to increased food productivity and a focus on reducing food waste. In this scenario, improved cropland management[8] results in a 12% increase in crop yields by 2050 compared to 2024[58]. Land use is strongly regulated, however global forest area is described as declining by 4% by 2050 from 4.06bn ha[40]. This scenario also describes more efficient farming processes resulting in a decline in total applied nitrogen by 2030[9]. GHG emissions from the agricultural sector are expected to decrease by 17% by 2050 on 2024 levels[58]. In this scenario the demand for plant-based products increases as the world shifts away from meat consumption[30].

ENERGY AND POWER

This scenario describes global renewable energy uptake growing very quickly and almost replacing fossil fuels by 2050[10]. In Australia, the [illegible] of renewable energy for electricity generation increases to 99% by 2050, compared to the current renewable market share of 32%[14]. The US renewable energy percentage increases to 80% by 2050 from the current 21% renewable market share[10], with other currently used low GHG technologies, such as nuclear, continuing to contribute their share of grid decarbonisation. Concurrently, annual global bioenergy generation is described as increasing, rising to [illegible] TWh by 2050, while natural gas supply declines by 83% by 2050[11].

Electric vehicle sales in Australia rise to 100% of market share by 2050[7]. Under this scenario, the widespread adoption of decarbonisation technologies drives low-carbon innovations.

MINING

This Fast Action scenario describes the global use of thermal coal for electricity generation decreasing from 10,427 TWh in 2024 to zero by 2050[11] due to coordinated action to limit warming to 1.5°C. The global production of both thermal coal and metallurgical (MET) coal are significantly reduced, by 92% and 90% respectively, by 2050[19]. The entire coal-powered fleet in the Australian National Electricity Market (NEM) is retired by 2035[14]. In this scenario, an early and orderly transition to a clean energy system increases demand for minerals, including lithium, copper, cobalt, nickel and neodymium. In this scenario, lithium mineral has the greatest demand for use in clean technologies, increasing by 1,514% by 2050 from 73kt in 2024[13].

CARBON MARKETS

This scenario describes carbon credit prices in Australia meeting the price ceiling set by the Australian Government from 2024 to 2031, beginning at $75 in 2024 and reaching approximately $100 in 2031. In the US carbon prices meet the cost containment price ceiling set by the California Emissions Trading Scheme (ETS) every year to 2031, reaching approximately US$150 in 2031.

Post 2031 in this scenario, prices continue to grow, in order to meet net zero commitments, until they align with global carbon pricing by 2050. The global carbon price established in this 1.5°C scenario by 2050 is US$750-900[37].

SOCIAL

This scenario describes the limiting of global warming to 1.5°C, resulting in the proportion of the world population exposed to climate-induced physical risks being significantly less than that described in other scenarios. While the global population in this scenario grows to 8.53bn by 2050 (compared to 9.17bn under Scenario B), systemic transitioning of economies and employment across urban and rural areas supports a stable economy. Coupled with strengthened governance, and changes to both human behaviour and lifestyles, this enables a faster, more orderly transition to net zero with effective adaptation and adoption of new technologies.

INDUSTRY

Under the 1.5°C scenario, industries that continue to rely on fossil fuels for their revenue are at risk as the energy sector diversifies into renewable energy. This scenario describes global demand for MET coal reducing by 85% by 2050 against 1,530 million tonnes of coal in 2024[19]. Conversely, the annual global demand for hydrogen increases substantially by 237% to [illegible] Mt tH_2 by 2050[27].

In this scenario, policies, and funding to develop new, low emitting gaseous fuels such as hydrogen increases, resulting in annual production exceeding 30 million tonnes by the year 2030. While a considerable portion of this is produced close to its point of use, there is increasing government support for hydrogen and hydrogen-based fuels[38] and by 2050 there are hydrogen trade links established around the globe.

2025-dyno-nobel-climate-change-report.pdf

GLOBAL SCENARIO ANALYSIS

SSP2-4.5

GLOBAL GHG IN 2050

43.9 Gt CO_2-e/yr

GLOBAL TEMP. INCREASE BY 2100

2.1-3.5°C

KEY CHARACTERISTICS

- **Delayed government support required for decarbonisation**
- **Slower transition to low-carbon technologies**
- **Mitigation efforts may face obstacles such as technological constraints**

GLOBAL TRENDS

This scenario is characterised by a lack of coordinated global action and timely government support for the transition. This results in the Paris Agreement's target of limiting global warming to well below 2°C not being achieved. This scenario describes a delayed shift away from fossil fuels due to a lack of government policy to drive the transition to renewable energy sources, implement energy efficiency, or implement carbon capture and storage technologies. This results in global temperatures rising by 2-3°C above pre-industrial levels by 2100. Under these conditions, the frequency and intensity of extreme weather events are significantly heightened, which results in physical impacts on Dyno Nobel's operations, and customers in the mining and agricultural sectors and supply chains[1].

MACRO-ECONOMIC TRENDS

The frequency and intensity of extreme weather events described in this scenario poses a threat to infrastructure, costing the Australian economy up to US$66bn by 2050[21]. The annual damage estimate in the US due to climate change in this scenario is US$273bn by 2050.

Australian GDP decreases by 27% by 2050 from US$2 trillion dollars in 2024[20]. GDP in the US decreases by 32% by 2050 from US$32bn in 2024[20].

US TRENDS

This scenario describes shifts to renewable energy and improved energy efficiency stalling, and the US failing to decarbonise the electricity grid by 2050. The US' current policies remain unchanged and there is no increased ambition to achieve the country's net zero targets. Insufficient policies[40] result in a lack of investment in low carbon technologies from the private sector.

The US is projected to experience higher average temperatures under this scenario. Climate change is expected to intensify existing regional rainfall patterns with the Southeast US becoming wetter and the Northwest drier[56]. Total annual precipitation is expected to decrease, however there will be an increase in heavy precipitation events. These changes will have significant impact on the average crop yield in the US[33]. This scenario describes a significant increase in winter flood hazards across the southwest region, while the northwest is projected to have more frequent droughts[60].

AUSTRALIAN TRENDS

In this scenario, Australia does not reach net zero by 2050. While this scenario describes some efforts to decarbonise the electricity grid, the shift from fossil fuels to renewables progresses slowly due to a lack of substantial government policies and inadequate private-sector funding.

Under this scenario, Australia experiences an increase in the frequency and intensity of heatwaves, an increase in rainfall variability and heightened periods of drought across Australia, leading to diminished water resources, increasing baseline water stress and increased water restrictions[47]. Agricultural areas which depend on surface waters for irrigation are also impacted.

There is a sustained rise in the occurrence of hazardous fire weather conditions and an extended fire season, particularly affecting regions in southern and eastern Australia[2].

By 2090, there will be increases in the intensity of 1-in-20-year extreme rainfall events in most regions, particularly Northern Australia[2].

AGRICULTURE

In this scenario, crop yields increase to some degree, although this is not sufficient to meet growing food demand, due to expected population growth[25]. As a result, agricultural land is expanded at the expense of forests and other natural assets[42]. Due to the impacts of increasingly severe weather events and chronic adverse weather conditions on agricultural yields, greater cropland area is required to maintain agricultural outputs[3], resulting in an increase of 8% in global land area under crops by 2050 against a 2023 baseline[8]. As a result, global forested areas decrease by 5% by 2050 from 4.06bn hectares in 2024[40].

ENERGY AND POWER

This scenario describes the decarbonisation of electricity grids occurring at a slower rate relative to scenarios A and B. However, there is a large shift to bioenergy with the global supply increasing by 35% from 2024 to 2050[19], while coal powered electricity generation decreases by 53% from 2024 to 2050[12]. Under this scenario, by 2050 the percentage of renewable energy in Australia and the US climbs to 92% and 71%, respectively. Additionally, electric vehicles account for 69% and 65% of fleet share by 2050 in Australia and the US, respectively[7].

MINING

This 2.7°C Current Trajectory scenario describes a slow and disrupted transition from fossil fuels to renewable energy sources, resulting in warming of 2.7°C.

Under this scenario, global production of thermal and MET still occurs, but declines 45% and 30% respectively by 2050[12,19]. The gradual shift to renewable energy technologies leads to a slower but growing demand for 'new world minerals' than in the 1.8°C scenario, including neodymium and lithium. Lithium demand is described as increasing by 571% by 2050 from 73kt in 2024[12].

CARBON MARKETS

This scenario describes the demand for carbon credits to address a significant portion of unabated emissions growing more rapidly than supply from 2024 to 2031. This drives growth in Australian carbon credit prices, but not enough to meet the carbon price ceiling set by the Australian Government. In the US, carbon prices continue to fluctuate between California's regulated floor and ceiling prices.

Post 2031 in this scenario, there is no global carbon price established. However, by 2050 Australian carbon credit prices are described as reaching $390. In the US, prices track in alignment with a 3°C trajectory, reaching $71 by 2050[43].

SOCIAL

There is also substantial growth in population described in this 2.7°C scenario, with the global population described as increasing by 14% by 2050 from 8.04bn in 2024[23].

Societal development remains steady, with general improvement in living standards, education and healthcare. However, progress will be uneven across regions, leading to social inequalities, and the implementation of policies to promote social equity.

The physical impacts of climate change create unfavourable living conditions and impact the ability to grow crops in some regions, leading to some population migration.

INDUSTRY

This Current Trajectory scenario describes companies facing increasing pressure from investors to decarbonise but without coordinated government support. This results in significant challenges for businesses with a lack of investment also resulting in a delayed transition to low carbon energy, and therefore, manufacturing.

In this scenario, hydrogen production will increase by 101% by 2050 from 64 mtH^{2}t in 2024[27]. A large proportion of this hydrogen is still produced using natural gas, with blue and green hydrogen accounting for less than 50%.

Defining materiality and quantifying impacts : The How

- **Your company's risk matrix / risk appetite statement is likely to define a financially material risk**
  - This will be different depending on the size of the business and the risk appetite statement
- IFRS asks for stakeholder materiality as well, but ASRS focuses on financial materiality
- Once you have workshopped risk identification against scenarios and arrived at a list of risks and opportunities, **you will find that your finance team can likely quantify them *provided the relevant team can provide a clear risk event description*.**
  - A carbon price of $X applied to annual GHG emissions of XXX,XXX = XXm
  - A flood event that stopped production for 6 weeks at this plant would cost $XXm in lost earnings + clean up
  - These have different impacts in the 1.5 to the 2.7 Policy forecast scenario, therefore the range is XX-XX
  - The assumptions made in this quantification are listed in appendix X

Combining qualitative and quantitative data: Engaging finance teams

Some tips to engage finance teams

- **Use the same risk language that the company uses**
  - These are '*enterprise*' or '*operational*' risks with a climate cause, not a whole new category of risks
  - Emphasise that these are financial risks (not environmental risks)
  - Have workshop participants rate the risks on the company's risk matrix during the risk & op workshops
- **Provide clear top risks and risk event statements**
  - *Rail line x is flooded for 6 weeks: what would the financial impact be?*
  - *(They may say "I think the likelihood of that is low"*
  - *Say: The scenario describes this – what would the impact be?)*
- **Quantify unmitigated and mitigated risk impact**
- **Impact during a reporting year must be quantified, e.g.**
  - Quantify carbon pricing if any (easy)
  - Quantify impact from any physical climate events
  - Quantifying impact due to rises in insurance premium (a %?) or due to market shifts may require guidance of a specialist third party
- **Remind the CFO that it will be audited**

Avoiding common pitfalls

- **Take the scenarios at face value**
  - They are tools that teams of global experts have created so we don't have to question them
- **Avoid predictive statements**
  - Keep language in the 'theoretical' (scenarios are not predictions)
  - Make no statement in reporting that could be interpreted as the organisation indicting it thinks one scenario is more likely than another
    - present the findings as risks, describe assumptions made in determining materiality and let the reader decide likelihood
- **Avoid discussions on likelihood** (unless it's a friend who wants your personal opinion)
  - Focus on the fact that the task is required, regardless
- **Refresh scenarios every 3 years or so** – the science is changing rapidly (and so are governments)

Questions

DYNO NOBEL®

Further information:

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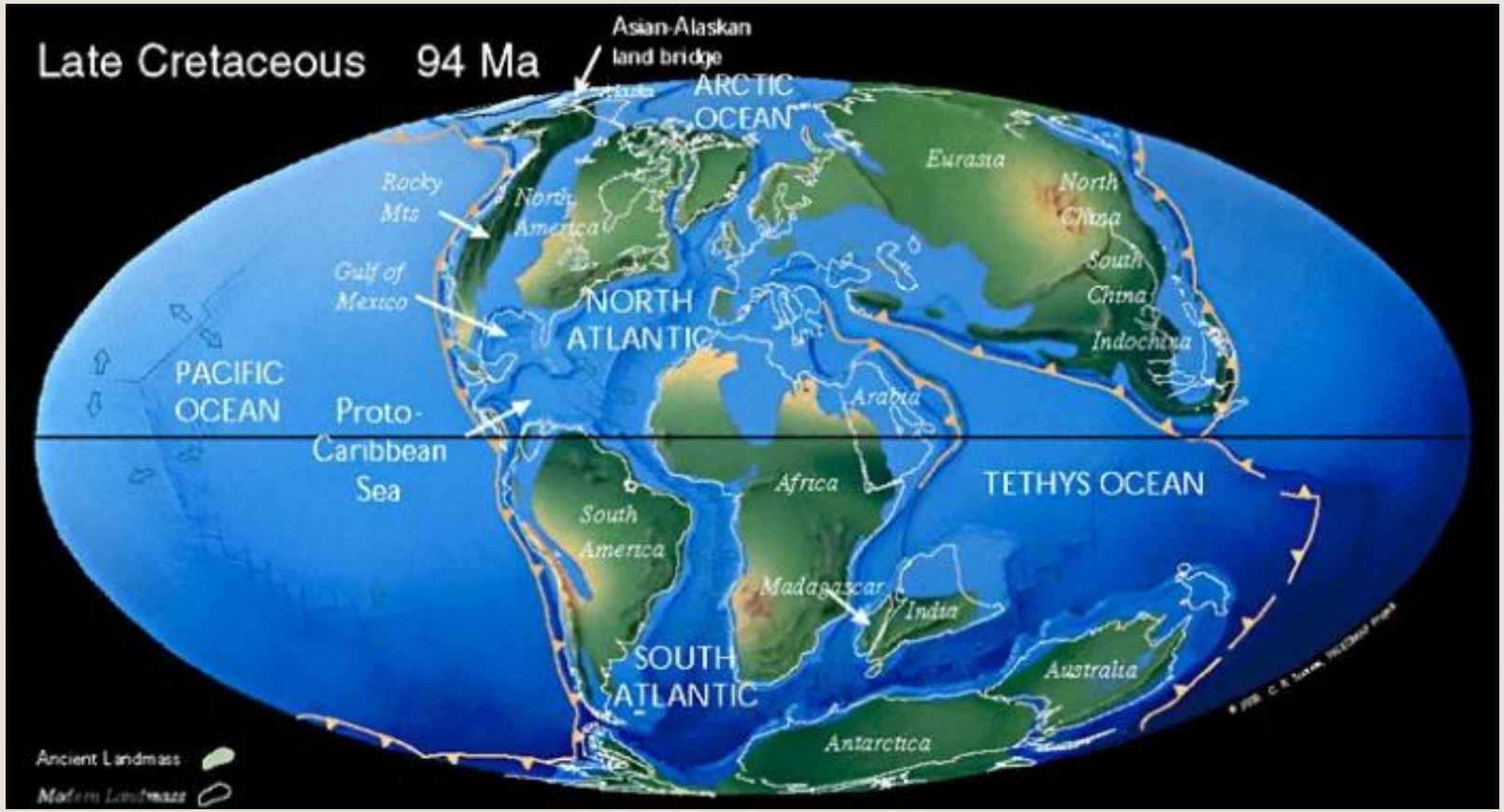
  GM Sustainability

Appendix

Earth during the Cretaceous period



The Cretaceous Period - ScienceDirect