Quarterly Greenhouse Gas Emissions
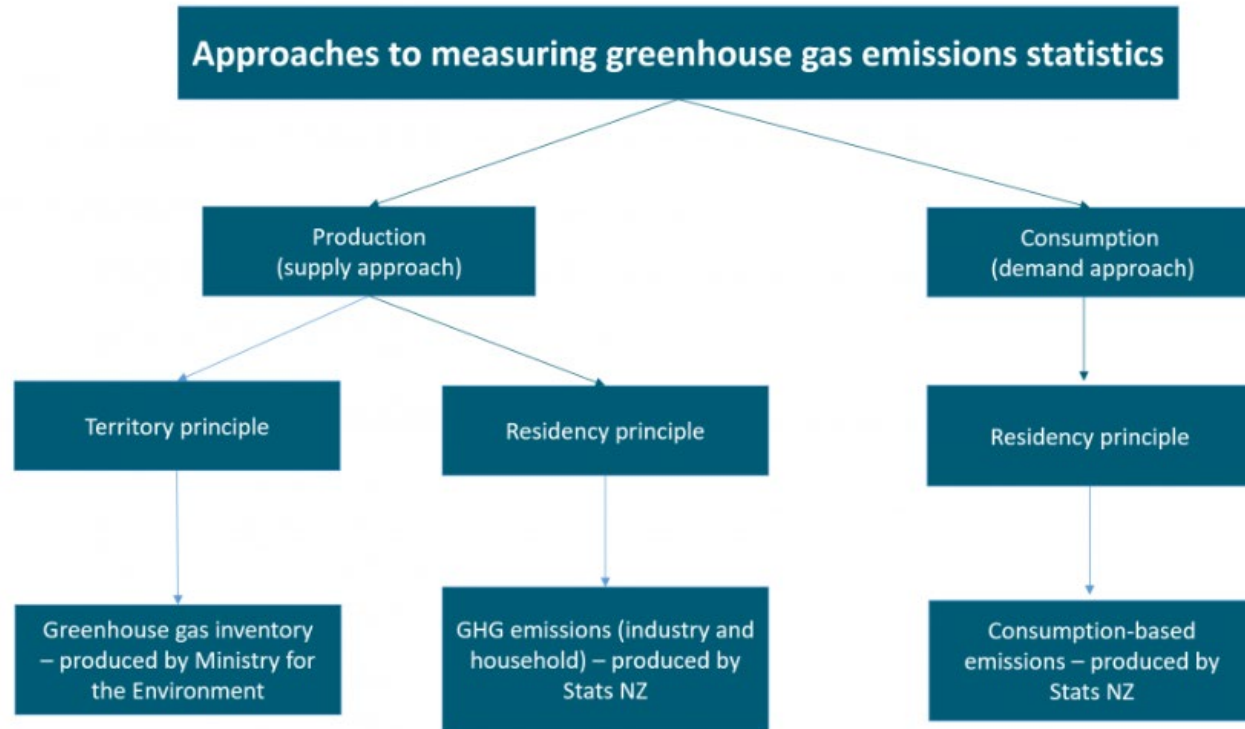
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The need for quarterly emissions statistics

- COVID-19 highlighted the need for timely information

- Emissions data subject to significant lags, but addressing climate change becoming increasingly important
  - National and regional scale needs for timely data

- Policy, upon implementation, based on significantly lagged data

- First official insights available 14 months before it would otherwise be reported
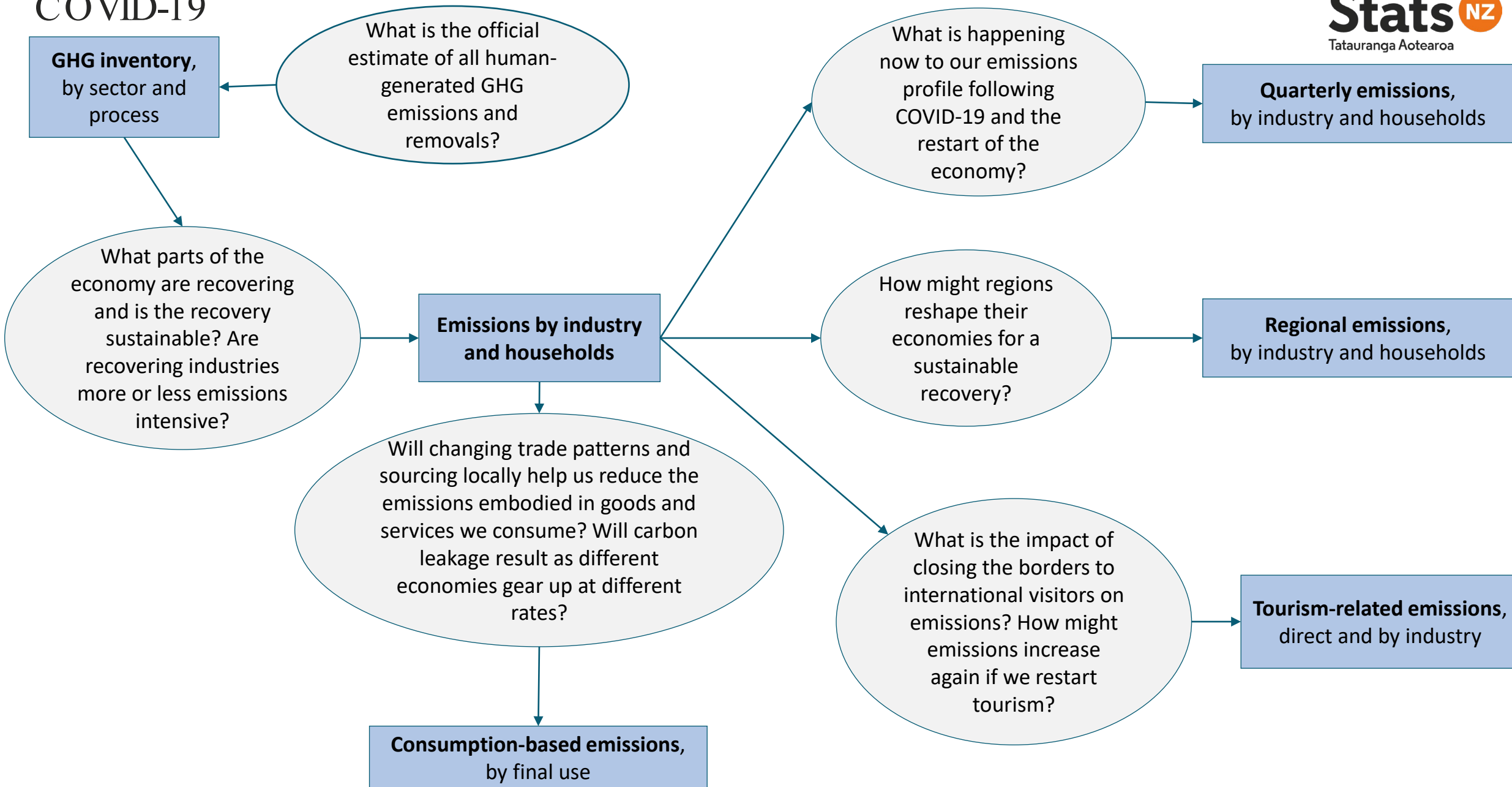
Choice of measurement framework

Approaches to measuring greenhouse gas emissions statistics

- Production (supply approach)
  - Territory principle
    - Greenhouse gas inventory – produced by Ministry for the Environment
  - Residency principle
    - GHG emissions (industry and household) – produced by Stats NZ
- Consumption (demand approach)
  - Residency principle
    - Consumption-based emissions – produced by Stats NZ

Source: Stats NZ

- Factors for considering which approach to adopt include:
  - Customer and policy needs
  - Institutional arrangements and mandates
  - Data availability and resourcing

- Dual approaches possible (eg Netherlands)

- New Zealand experience
  - Risk use of SEEA estimates for comparing to targets – communications needed to be clear on purpose
  - SEEA estimates generate demand for timely emissions data on a UNFCCC basis
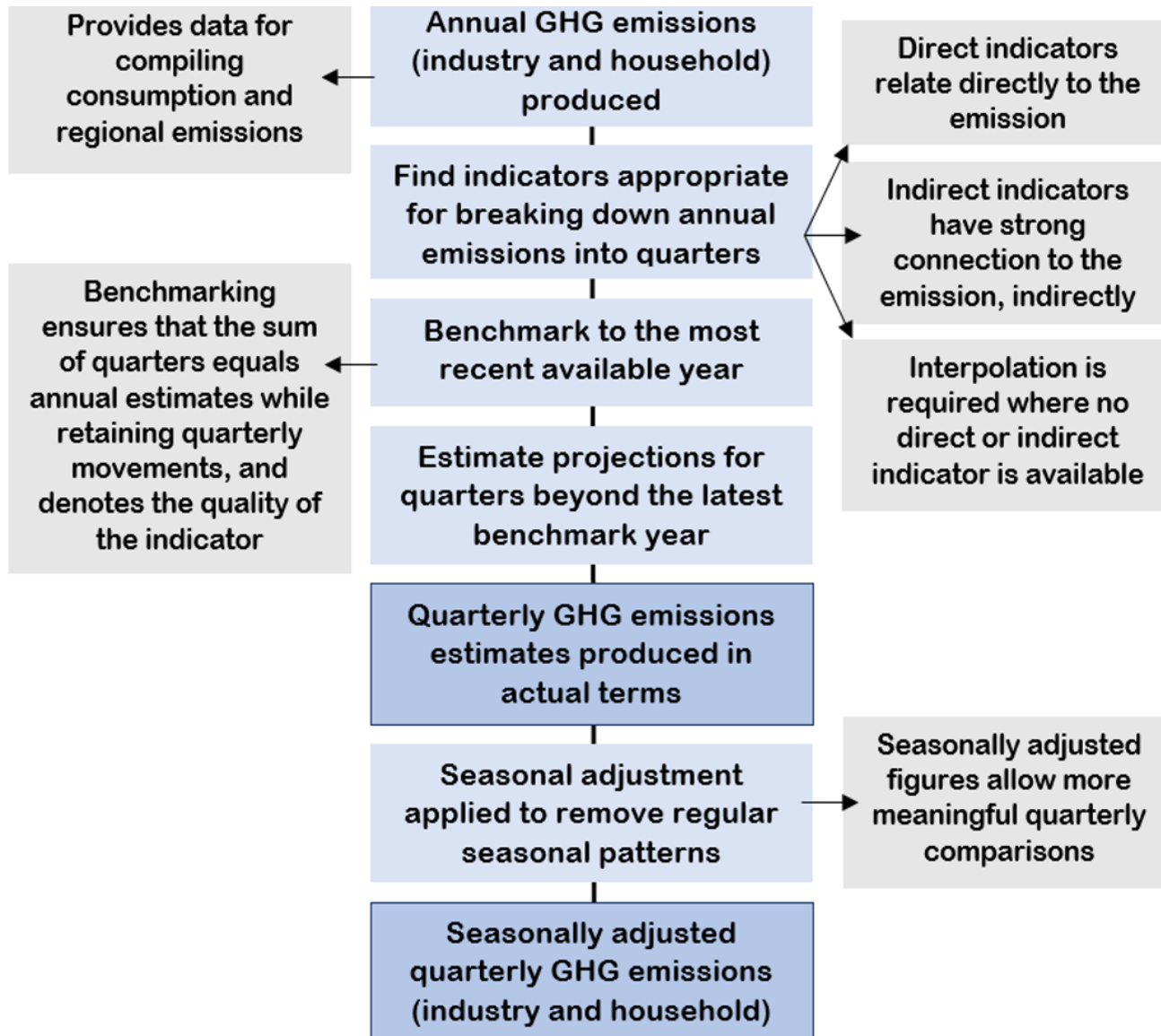 - Compiles on a dual basis but SEEA only for production

Understanding the transition to the low emissions economy following COVID-19

GHG inventory, by sector and process

What is the official estimate of all human-generated GHG emissions and removals?

What parts of the economy are recovering and is the recovery sustainable? Are recovering industries more or less emissions intensive?

Emissions by industry and households

What is happening now to our emissions profile following COVID-19 and the restart of the economy?

Quarterly emissions, by industry and households

How might regions reshape their economies for a sustainable recovery?

Regional emissions, by industry and households

Will changing trade patterns and sourcing locally help us reduce the emissions embodied in goods and services we consume? Will carbon leakage result as different economies gear up at different rates?

What is the impact of closing the borders to international visitors on emissions? How might emissions increase again if we restart tourism?

Tourism-related emissions, direct and by industry

Consumption-based emissions, by final use

About quarterly GHG statistics

- Enables a focus on reducing GHG emissions to be made every quarter

- Educates users of environmental accounts and on the connection between environmental and economic development
    - Track emissions performance as composition of economy changes
    - Track emissions change in relation to GDP and other economic statistics

- Provides an early signal of changes in emissions and provisional annual estimates

- Aligned to, but not an estimate of, GHG inventory emissions
    - SEEA estimates 2-3% higher than GHG inventory
    - SEEA estimates expected to show different impact of COVID than GHG Inventory
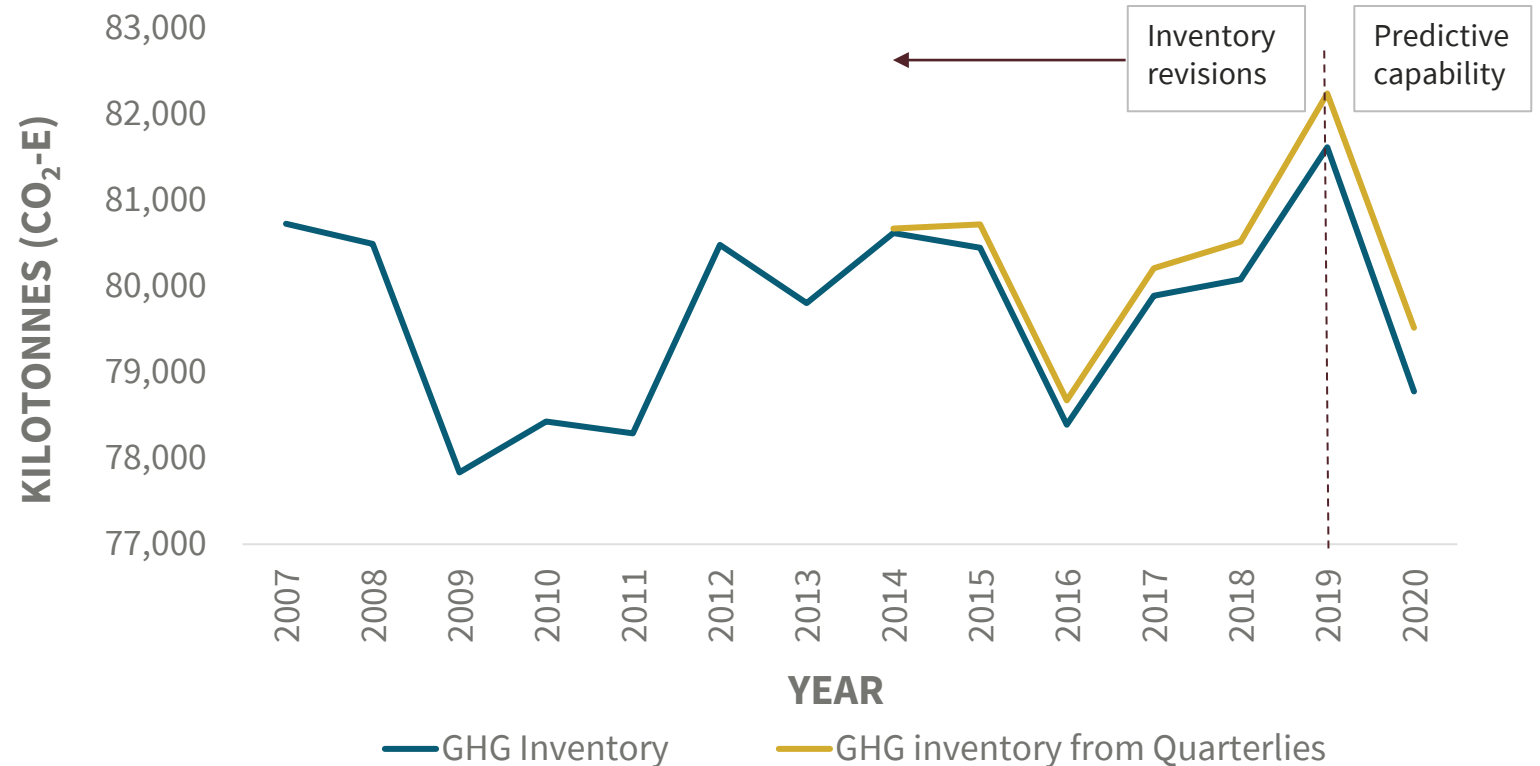
Process and sources

Provides data for compiling consumption and regional emissions

← Annual GHG emissions (industry and household) produced

Find indicators appropriate for breaking down annual emissions into quarters →

Direct indicators relate directly to the emission

Indirect indicators have strong connection to the emission, indirectly

Benchmarking ensures that the sum of quarters equals annual estimates while retaining quarterly movements, and denotes the quality of the indicator

← Benchmark to the most recent available year

Interpolation is required where no direct or indirect indicator is available

Estimate projections for quarters beyond the latest benchmark year

Quarterly GHG emissions estimates produced in actual terms

Seasonal adjustment applied to remove regular seasonal patterns →

Seasonally adjusted figures allow more meaningful quarterly comparisons

Seasonally adjusted quarterly GHG emissions (industry and household)

Data sources

- Energy statistics (coal, oil, gas, emissions)
- GDP
- Electronic card transaction data
- Prices
- Freight movements
- Agricultural research/projections

Quality assessment

- National level: Quality determined by predictive capability compared to latest GHG inventory

- Industry level: Individual indicators assessed using (Pearson) correlation coefficients between benchmark and indicator movements

GHG Inventory vs GHG Inventory inferred from Quarterly calculations

Legend: GHG Inventory — GHG inventory from Quarterlies

Y-axis: KILOTONNES (CO_2-E) — 77,000 / 78,000 / 79,000 / 80,000 / 81,000 / 82,000 / 83,000

X-axis: YEAR — 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020

Annotations: Inventory revisions; Predictive capability

Results – September 2021 quarter to December 2021 quarter

CO$_2$-e by industry:

Agriculture, forestry, fishing (up 0.4%)

Mining (up 7.9%)

Manufacturing (up 7.6%)

Electricity, gas, water, and waste services (down 29%)

Construction (up 11%)

Services excluding transport, postal, and warehousing (1.3%)

Transport, postal, and warehousing (down 3.7%)

CO$_2$-e by households:

Transport (up 2.1 %)

Heating/cooling (down 1.9%)

Other (down 0.3%)

PRIMARY INDUSTRIES
SEP 2021 10,887kt
DEC 2021 10,947kt

SERVICE INDUSTRIES
SEP 2021 1,757kt
DEC 2021 1,735kt

Total quarterly CO$_2$-e emissions
(seasonally adjusted values)
SEP 2021 18,864kt
DEC 2021 19,069kt

GOODS-PRODUCING INDUSTRIES
SEP 2021 4,560kt
DEC 2021 4,437kt

HOUSEHOLDS
SEP 2021 1,895kt
DEC 2021 1,926kt

Results – emissions and economic performance

- Quarterly SEEA emissions provides provisional indications of technology change and impact of other shocks
- Allows comparability to impact of shocks on GDP

GDP, emissions, and emissiosn intensity, seasonally adjusted, March 2014-December 2021 quarters
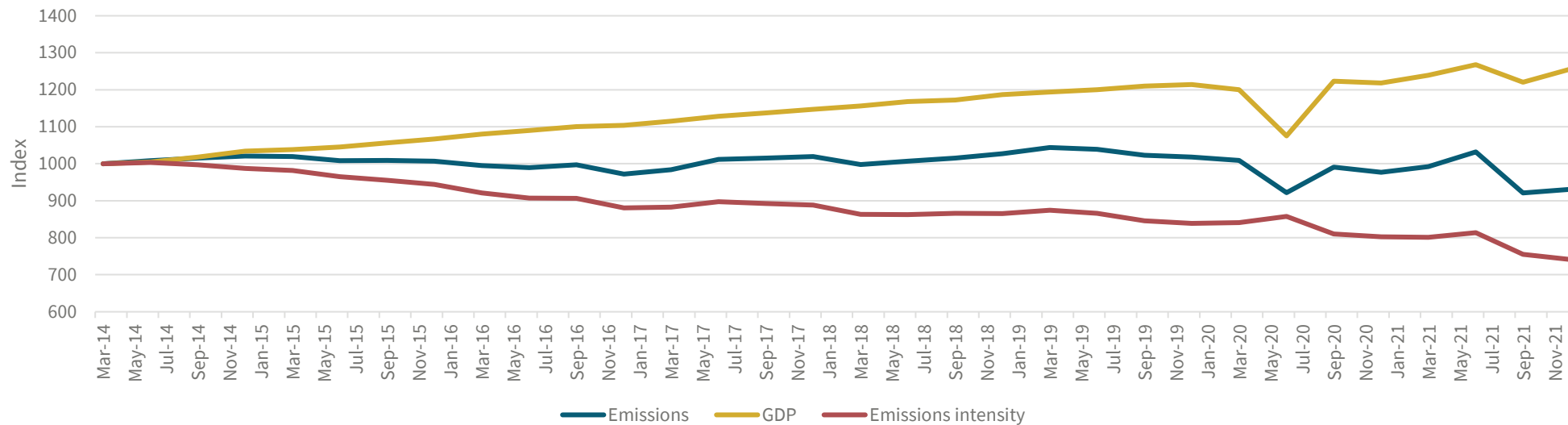
Improving regional emissions timeliness

- Regional emissions lag due to lagged national emissions data

- Regional allocation variables often more timely

- Extrapolate remaining emissions using indicator variables and balance
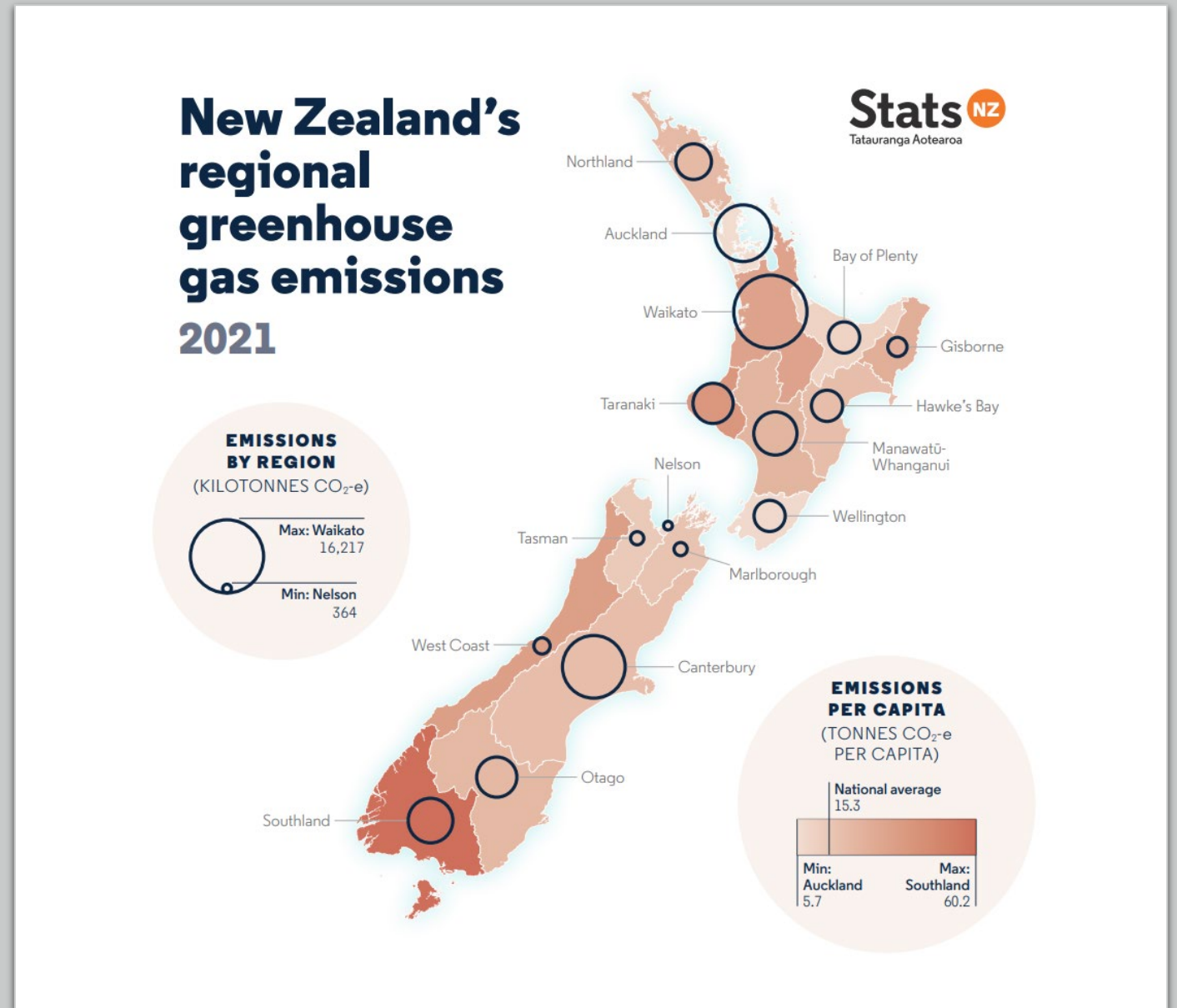
Reflections: Insights and policy relevance

- Quarterly GHG methods needs testing from several countries to determine appropriate methods, work through compilation issues, and to enable standards and guidance to be developed for others

- New Zealand's emissions profile (ie large agricultural contribution) is atypical - tests issues that may not be readily identifiable

- Dual compilation leaves open possibilities for future developments and meeting additional customer needs

- High-level industries plus households sufficient for timely insights, but demands often greater

- Consideration of policy and other customer applications essential early in development

Where to find our information

Quarterly greenhouse gas emissions (industry and household): Sources and methods

https://www.stats.govt.nz/methods/quarterly-greenhouse-gas-emissions-industry-and-household-sources-and-methods

Industry and households (annual) emissions

https://www.stats.govt.nz/information-releases/greenhouse-gas-emissions-industry-and-household-year-ended-2020

Industry and households (quarterly) emissions

https://www.stats.govt.nz/information-releases/greenhouse-gas-emissions-industry-and-household-december-2021-quarter

Consumption-based emissions

https://www.stats.govt.nz/information-releases/greenhouse-gas-emissions-consumption-based-year-ended-2019

Regional emissions

https://www.stats.govt.nz/information-releases/greenhouse-gas-emissions-by-region-industry-and-household-year-ended-2021/

Approaches to measuring New Zealand's greenhouse gas emissions

https://www.stats.govt.nz/methods/approaches-to-measuring-new-zealands-greenhouse-gas-emissions

Thank you for listening