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CLIMATE TRANSPARENCY

Tracking NDC mitigation commitments under the ETF Webinar Series

-22-23-24 July 2024-

Workshop 3: Reporting on NDC projections under ETF and messing data

July 24, 2024

Executed by: UN environment programme | copenhagen climate centre

Funded by: gef

Implemented by: UN environment programme

Agenda

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Time	Session
10 min	**Opening and Welcoming Remarks & Group Photo** **Speaker:** Khetsiwe Khumalo, Advisor on Climate Transparency, UNEP CCC
20 min	**Elements on Projections of GHG emissions and removals**
05 min	**Interaction and Q&A**
15 min	**Inroduction and explanation of Tables 6 to 9**: GHG emissions and removals, Projections with WM, WEM, WAM Scenarios
15 min	**Introduction and explanation of Tables 10, 11, 12**
10 min	**Interaction and Q&A**
20 min	**Missing data| What to do in case of missing data**
10 min	**Interaction and Q&A**
10 min	**Feedback Mentimeter Survey**
05 min	**Wrap-up and Closing Remarks**

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Missing data| What to do in case of missing data

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Situation resulting in data gaps:

- Inconsistency of data
- Incomplete Data
- Changes in activity data, in emission rates
- The changes and gaps in data availability
- Lack of institutional framework
- Lack of ownership by stakeholders (lack of sharing or calculation of data)

Types of data and gaps

	Input Data Type	Examples of Input Data	Typical Sources of Data	Typical Gaps
Historical Data	- Economic indicators	GDP, unemployment rates, inflation rates	National statistical offices, World Bank, IMF	Inconsistent time series, Missing data for certain years
	- Demographic data	Population size, age distribution, urbanization rates	National census bureaus, UN Department of Economic & Social Affairs	Incomplete datasets, Lack of granular data (regional, age-group)
	- Energy usage trends	Energy consumption by sector, renewable energy usage	National energy agencies, IEA	Insufficient granularity, Under-reported sectors
	- Changes in land use	Land use changes, deforestation rates, urban expansion	National environmental agencies, remote sensing databases	Time-lags in reporting, Uncertainty in measurement techniques
Historical Emissions	- Activity data	Energy production and consumption, industrial activities	National environmental agencies, industry reports	Lack of source-specific data, Inconsistent methodologies
	- Emission factors	GHG emission factors for various sectors and activities	IPCC guidelines, national research institutions	Use of default factors, Lack of country-specific data
Non-emissions Data	- Environmental data	Deforestation rates, air and water quality data	National environmental agencies, satellite imagery	Sporadic data collection, Methodological inconsistencies
	- Socio-economic data	Income levels, educational attainment, health indicators	National statistical offices, World Bank	Insufficient data on vulnerable groups, Lag in data reporting
Projected Data	- Drivers	Predicted economic growth, demographic changes, energy price fluctuations	National economic agencies, international financial institutions	Uncertainties in projections, Over-reliance on historical trends
	- Policies	Upcoming government policies, industry standards for emission reductions	Government policy documents, industry reports	Uncertainty in policy implementation, Lack of detailed policies

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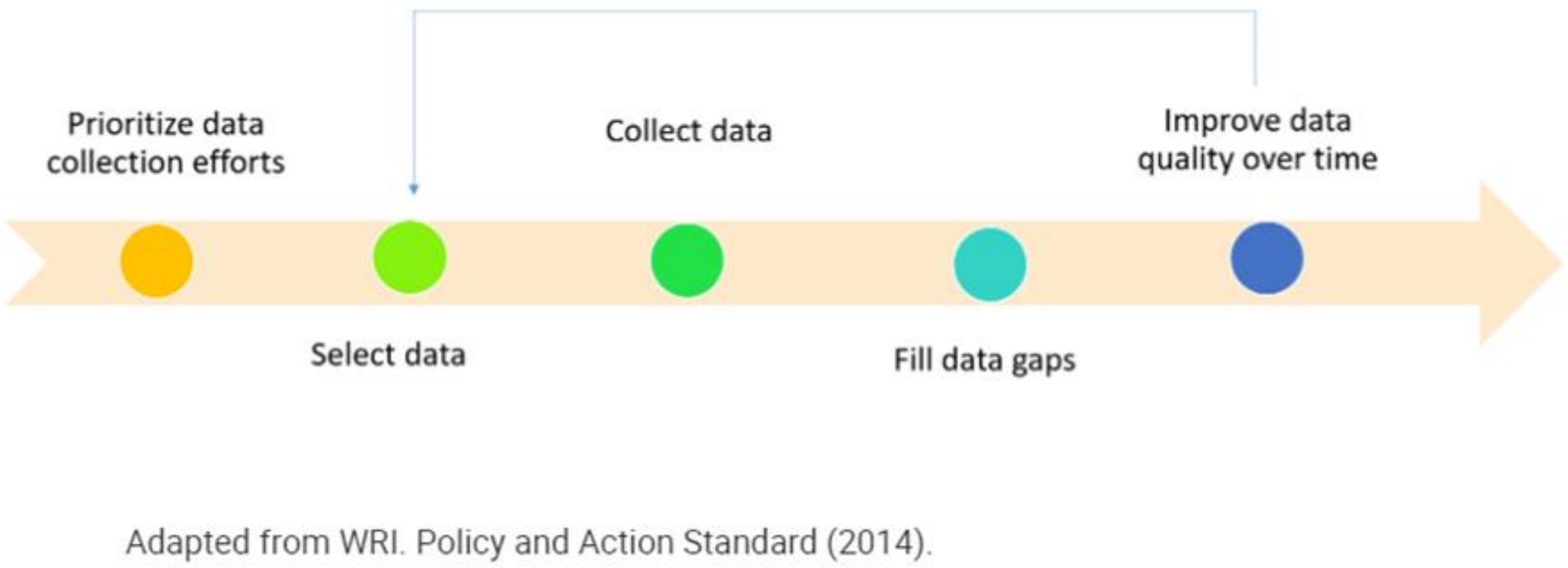
Data Types

Type	Description	Example of GHG Emission Projections
Measured Data	Data obtained through direct measurement, such as emissions directly measured from a smokestack.	Using sensors to directly measure CO2 emissions from a power plant smokestack.
Modelled Data	Data derived from quantitative models, representing processes like emissions from landfills or livestock.	Using simulation models to project methane emissions from a landfill site in the next 10 years.
Calculated Data	Data obtained by multiplying activity data by an emission factor.	Calculating future vehicle emissions by multiplying the projected number of vehicles by the emission factor per vehicle.
Estimated Data	Proxy or alternative data sources used to fill data gaps when more accurate or representative data is lacking.	Estimating agricultural GHG emissions based on land use patterns and applying emission factors from similar regions.

Relevance/Quality of data

Regardless of the approach adopted, the need for **good quality data** is paramount for transparent and valuable mitigation/adaptation assessments.

Data management cycle to perform mitigation assessments:



Source: adapted from WRI. Policy and Action Standard (2014).

Quality of data

- **assured quality**
  - Reliable and peer-reviewed data sets
- **Credible**
  - Recognised, credible and verifiable sources
- **Comprehensive**
- **Relevant and complete**
  - Takes account of fluctuations in the data (seasonal, annual variations).

❑ The quality of the data used to prepare the projections is essential

❑ **poor data yields poor results.**

❑ Invest in the implementation of online transparency systems (MRV).

❑ Invest in Quality Assurance and Quality Control (QA/QC).

❑Establish the necessary institutional arrangements (SNI-GES).

Data Sources

Bottom-up data

measured, monitored, or collected at the source, facility, and entity or project level.

Energy used at a facility (by fuel type) and the output of the facilities production.

Top-Down Data

may be macroeconomic statistics

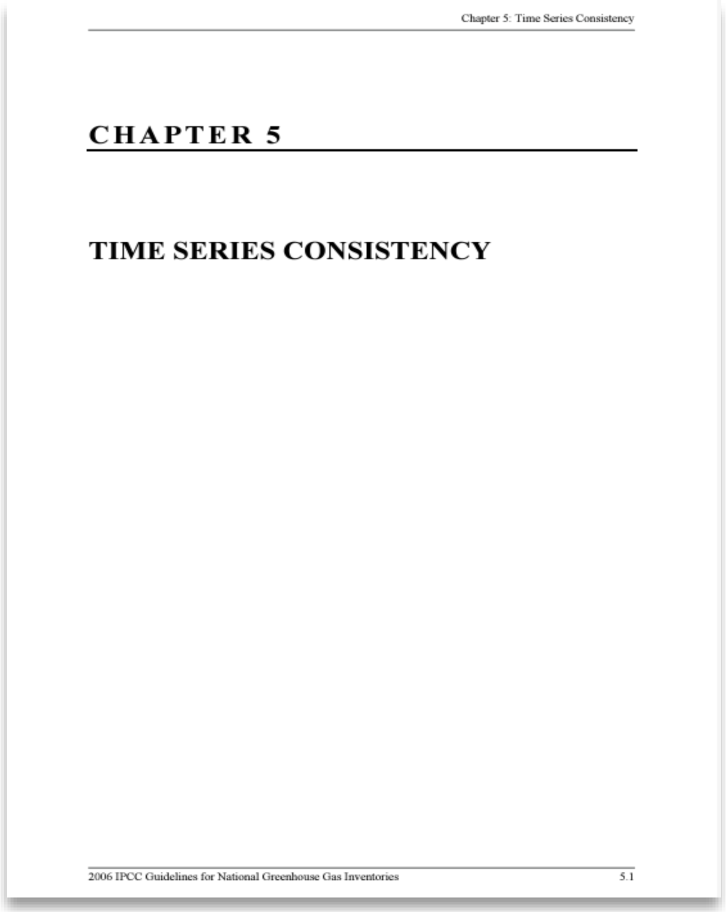
national energy use, population data, GDP, sectoral production and fuel prices.

Overcoming non-availability of data in a time series:

Techniques to fill data gaps: Splicing Techniques

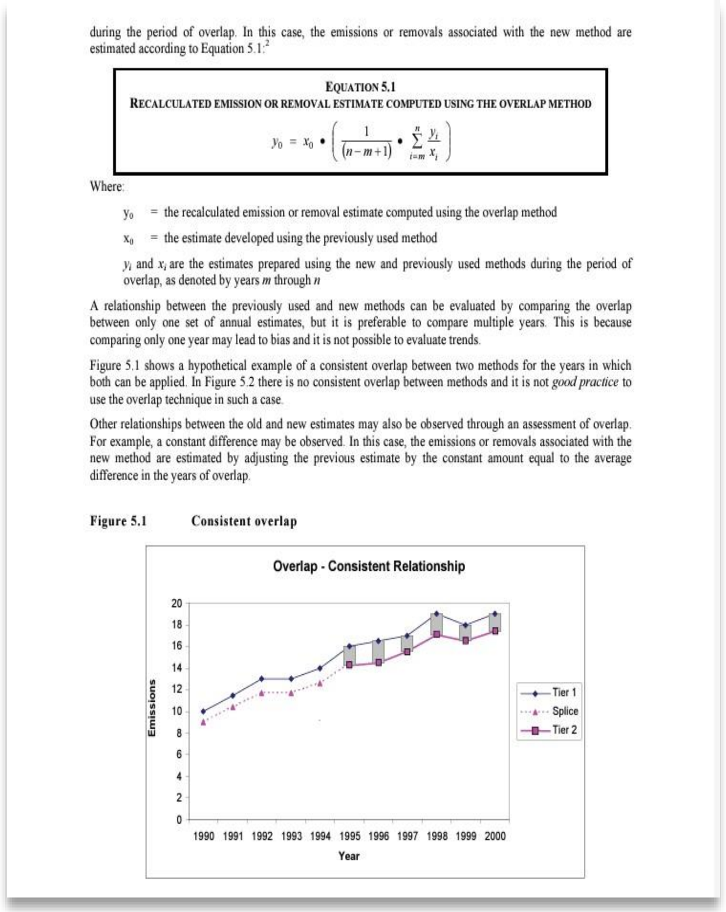
Splicing techniques

- Overlap
- Surrogate
- Interpolation
- Extrapolation



CHAPTER 5

TIME SERIES CONSISTENCY


during the period of overlap. In this case, the emissions or removals associated with the new method are estimated according to Equation 5.1:[2]

EQUATION 5.1
RECALCULATED EMISSION OR REMOVAL ESTIMATE COMPUTED USING THE OVERLAP METHOD

$$y_0 = x_0 \bullet \left(\frac{1}{(n-m+1)} \bullet \sum_{i=m}^{n} \frac{y_i}{x_i} \right)$$

Where:

y_0 = the recalculated emission or removal estimate computed using the overlap method

x_0 = the estimate developed using the previously used method

y_i and x_i are the estimates prepared using the new and previously used methods during the period of overlap, as denoted by years m through n

A relationship between the previously used and new methods can be evaluated by comparing the overlap between only one set of annual estimates, but it is preferable to compare multiple years. This is because comparing only one year may lead to bias and it is not possible to evaluate trends.

Figure 5.1 shows a hypothetical example of a consistent overlap between two methods for the years in which both can be applied. In Figure 5.2 there is no consistent overlap between methods and it is not *good practice* to use the overlap technique in such a case.

Other relationships between the old and new estimates may also be observed through an assessment of overlap. For example, a constant difference may be observed. In this case, the emissions or removals associated with the new method are estimated by adjusting the previous estimate by the constant amount equal to the average difference in the years of overlap.

Figure 5.1 Consistent overlap

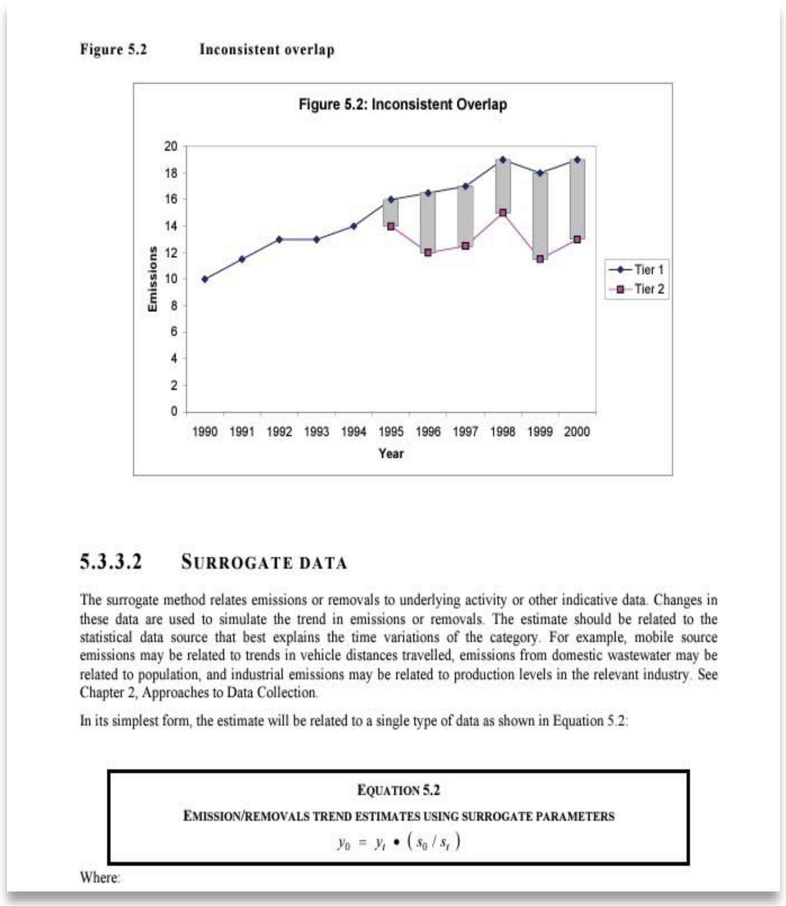


Figure 5.2 Inconsistent overlap

5.3.3.2 SURROGATE DATA

The surrogate method relates emissions or removals to underlying activity or other indicative data. Changes in these data are used to simulate the trend in emissions or removals. The estimate should be related to the statistical data source that best explains the time variations of the category. For example, mobile source emissions may be related to trends in vehicle distances travelled, emissions from domestic wastewater may be related to population, and industrial emissions may be related to production levels in the relevant industry. See Chapter 2, Approaches to Data Collection.

In its simplest form, the estimate will be related to a single type of data as shown in Equation 5.2:

EQUATION 5.2
EMISSION/REMOVALS TREND ESTIMATES USING SURROGATE PARAMETERS

$$y_0 = y_t \bullet (s_0 / s_t)$$

Where:

Presented in the IPCC's Guidelines for National GHG Inventories 2006

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1. Splicing technique: Overlap

$$y_0 = x_0 \bullet \left(\frac{1}{n-m+1} \bullet \sum_{i=m}^{n} \frac{y_i}{x_i} \right)$$

y_0 = the recalculated emission or removal estimate computed using the overlap method

x_0 = the estimate developed using the previously used method

Use Cases

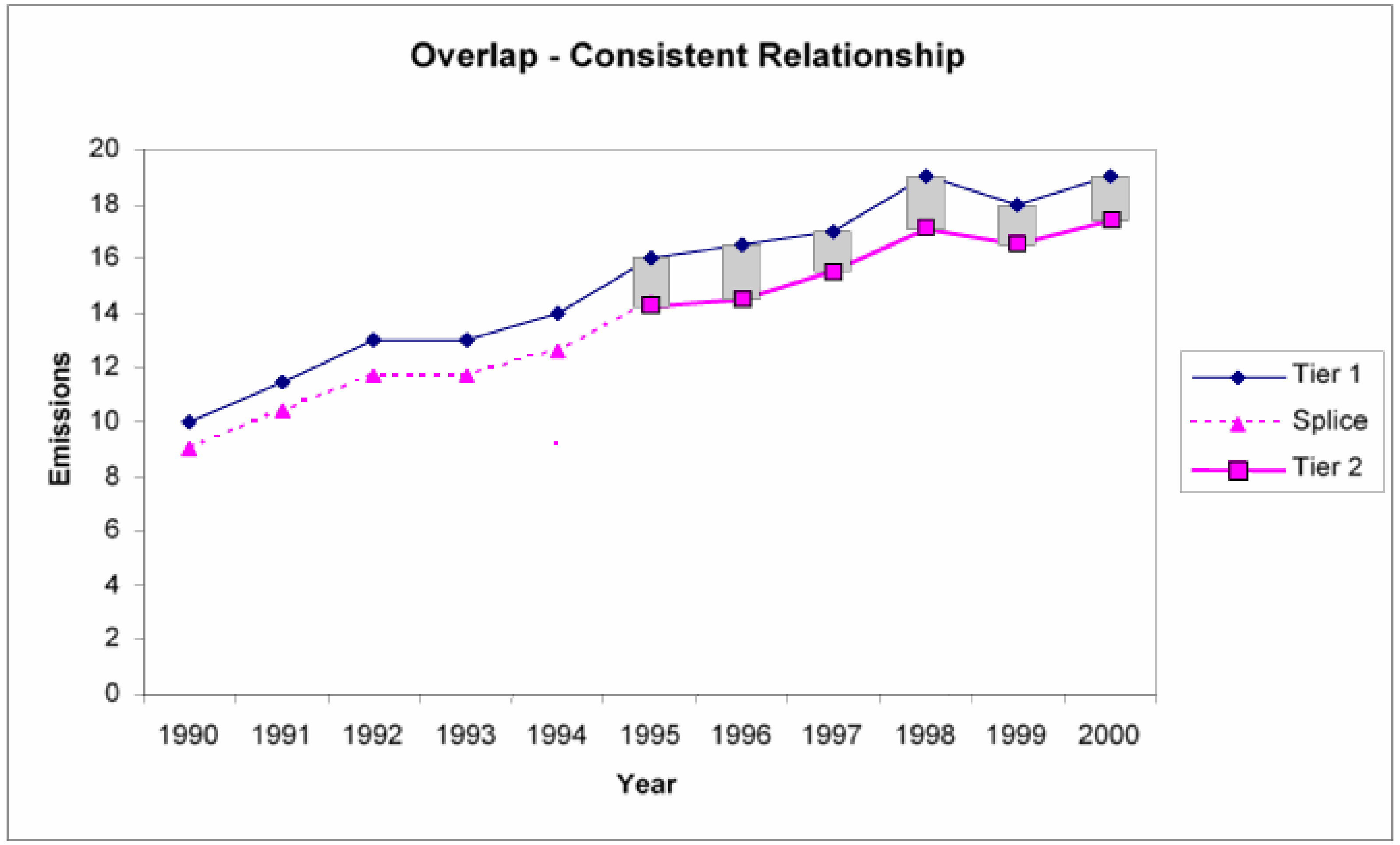
- used to implement a **new data collection method** for which no historical data exists.

Method

- creates a **consistent time series** by aligning the older estimates with the new methods.

Outcome

- The adjusted series ensures a smooth transition to the new method without losing the historical continuity.



The formula adjusts the original emission estimates to align them with a new method by averaging the ratios of the new to the old estimates over the years when the two data sets overlap.

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2. Splicing technique: Surrogate

$$y_0 = y_t \bullet (s_0 / s_t)$$

y : estimated emissions/removals for years 0 and t
S : the statistical substitution parameter for years 0 and t

Use Cases

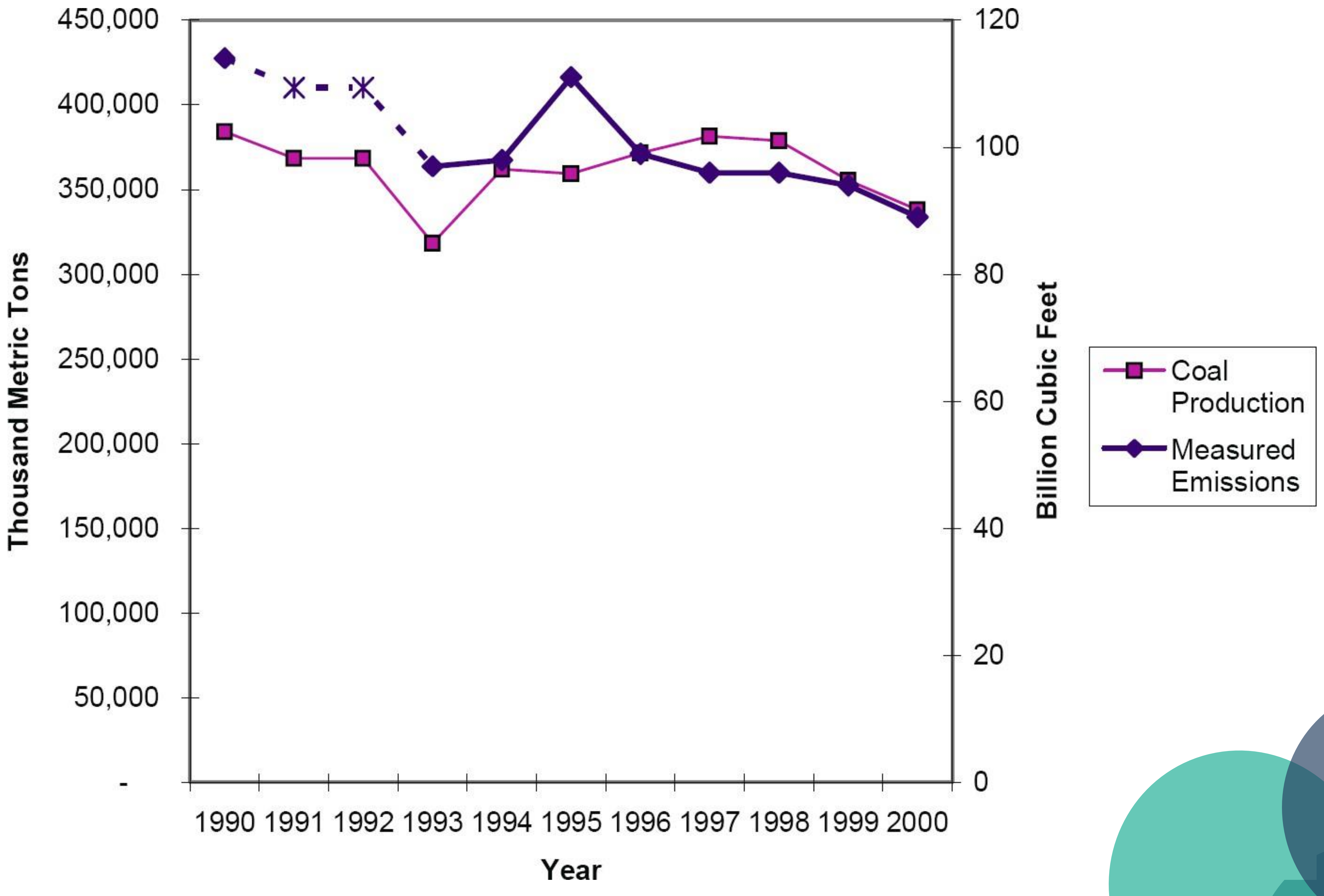
- applied when **direct data is unavailable**.

Method

- It uses **the related activity** or indicators to estimate emissions, relying on statistical correlations to fill the data gaps.

Outcome

- The approach improves the reliability of time series by allowing more accurate estimates without direct data.



3. Splicing technique: Interpolation

$$Y_t = Y_{start} + \frac{(T_t - T_{start})}{(T_{end} - T_{start})} * (Y_{end} - Y_{start})$$

Use Cases

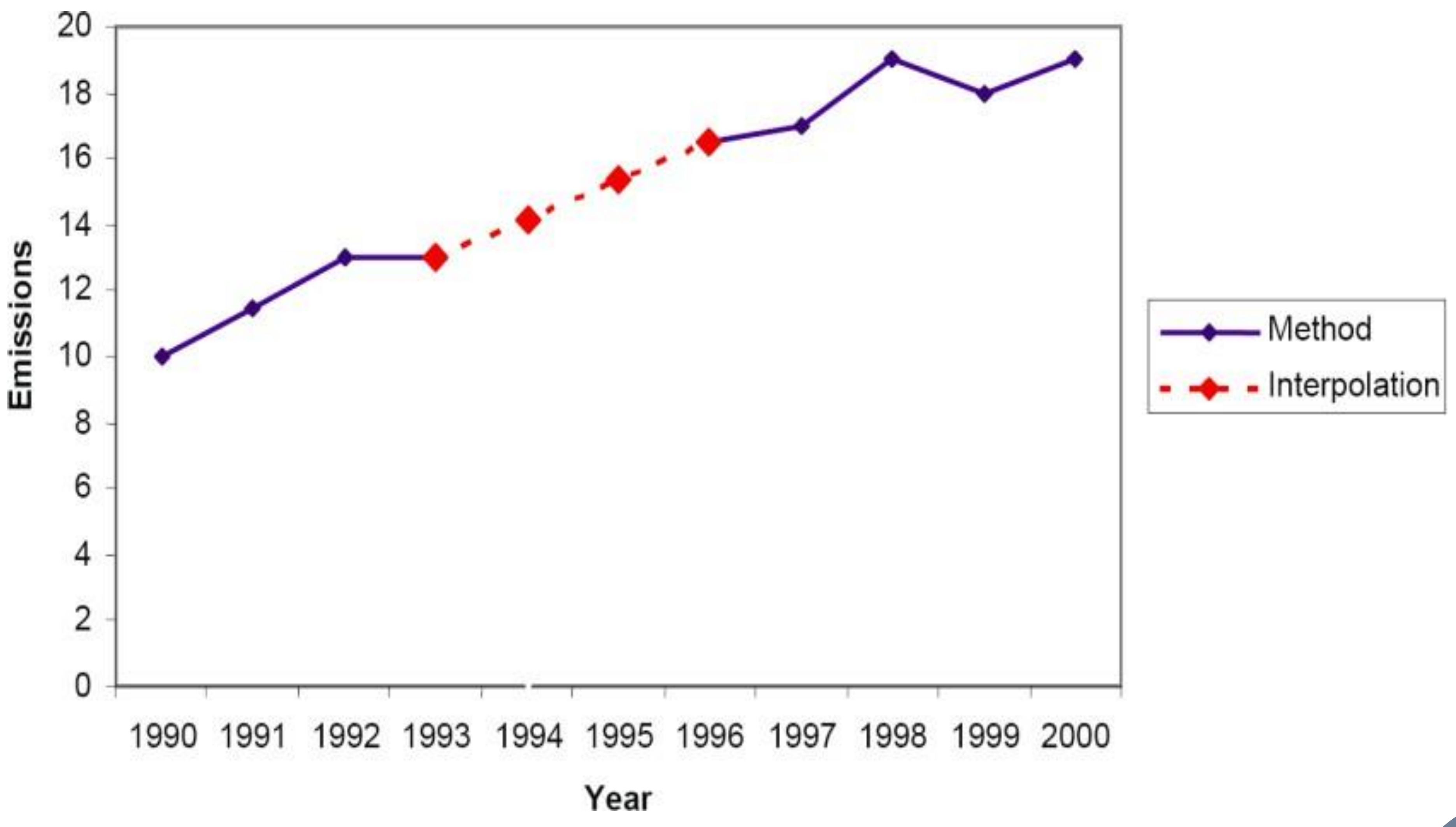
- Used when you have **emission data for some years but not for others**.

Method

- Drawing a straight line from known data points, **assuming emissions change at a constant rate**.

Outcome

- Help create a smoother and more comprehensive emissions trend line.



4. Splicing technique: Extrapolation

Use Cases

- Used when data at the **beginning or end of a series is missing.**

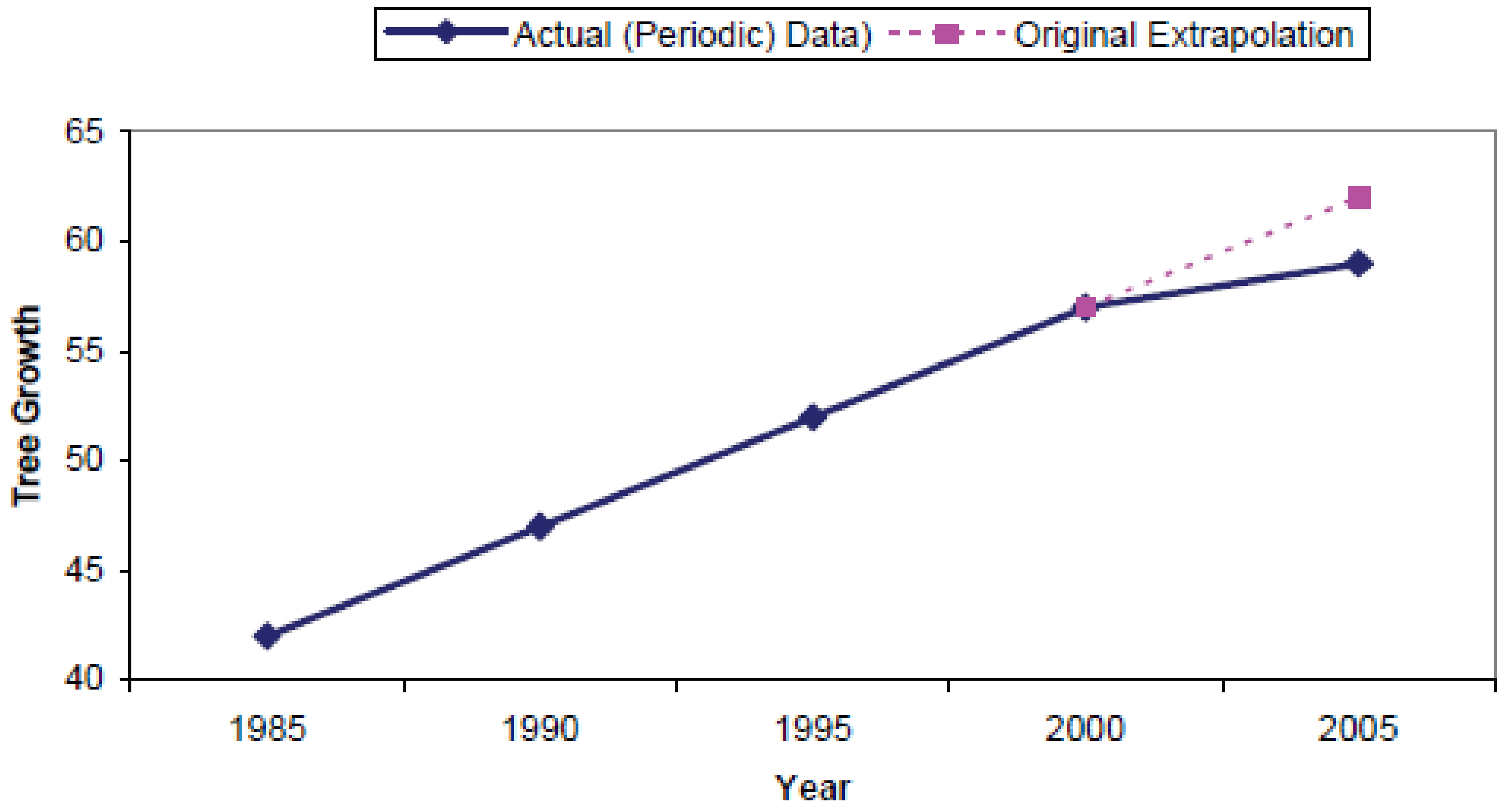
Method

- **It** extends the trend from known data to estimate these points, using a consistent model seen in the data.

Outcome

- Temporarily closes gaps, recognising that these estimates become less certain the wider they become from known data.

$$Y_t = Y_{t-1} + (Y_{t-1} - Y_{t-2})$$



It is best to update them when the information becomes available.

Summary of Splicing Techniques

Approach	Applicability	Comments
Overlap	Data necessary to apply both the previously used and the new method must be available for at least one year, preferably more.	• Most reliable when the overlap between two or more sets of annual estimates can be assessed. • If the trends observed using the previously used and new methods are inconsistent, this approach is not good practice.
Surrogate Data	Emission factors, activity data or other estimation parameters used in the new method are strongly correlated with other well-known and more readily available indicative data.	• Multiple indicative data sets (singly or in combination) should be tested in order • Should not be done for long periods.
Interpolation	Data needed for recalculation using the new method are available for intermittent years during the time series.	• Estimates can be linearly interpolated for the periods when the new method cannot be applied. • The method is not applicable in the case of large annual fluctuations.
Trend Extrapolation	Data for the new method are not collected annually and are not available at the beginning or the end of the time series.	• Most reliable if the trend over time is constant. • Should not be used if the trend is changing (in this case, the surrogate method may be more appropriate). • Should not be done for long periods.
Other Techniques	The standard alternatives are not valid when technical conditions are changing throughout the time series (e.g., due to the introduction of mitigation technology).	• Document customised approaches thoroughly. • Compare results with standard techniques.

Data collection and filling steps

1. Availability of data

Assess the availability of data over time.

2. Identification of data availability gaps

Identify annual data or missing emission factors for certain years.

3. Selection of splicing technique

Overlap, Surrogate, Intrapolation, Extrapolation

4. Implementation

Apply the technical selection

5. Validation and adjustment

Validate estimates with known data or indicators, adjust methods as needed

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Thank you for your attention!

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