



Utility Regulatory
Authority



Ministry of Climate Change,
Environment and Energy

Training on Energy Statistics and Energy Balance

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CBIT Maldives

Capacity Building for Improved Transparency of Climate
Change Mitigation and Adaptation Actions in the Maldives



Data Collection and Validation

Amila Wickramasinghe PhD



Data Required for Maldives Energy Balance

Energy Supply Data

- Energy supplied by renewable resources
- Energy supplied by petroleum products
- Energy supplied for bunkering and foreign aviation

Energy Conversion Data – (Petroleum and RE to Electricity)

- Inhabited islands – STELCO and FENAKA converts diesel/solar power to electricity.
- Resorts – own diesel generators and to convert diesel into electricity. In addition, some resorts have solar PV systems to convert solar power into electricity.

End Use Data

- Industries including Water Supply – Electricity
- Transport – Petrol and Diesel
- Other
 - Households, Businesses, and Government Entities – Electricity and LPG
 - Resorts – Electricity
 - Fisheries – Petrol and Diesel

From Where to Collect Data?

Following sources are available for collection of data required for the energy balance

1. Administrative Sources
 - Maldives Custom Service (MCS)
 - Maldives Bureau of Statistics (MBS)
 - Utility Regulatory Authority (URA)
 - Utilities such as STELCO, FENAKA, MWSC
2. Statistical Surveys
 - Census
 - Sample surveys
3. Modelling
 - Room occupancy-based modelling to estimate resort energy
 - Fish catch-based modelling to estimate fishing industry energy
4. Measurements
 - Electricity meters in RO plants and solar PV systems

How to Collect Data?

Following types of data collection options are available.

1. Paper based – fill the printed data collection form and send to the collecting entity/URA
2. Digital forms – spreadsheet-based data collection forms which filled and emailed to the collecting entity/URA
3. Online portal – enter data directly by the recording entity to an online portal maintained by the data collecting entity/URA
4. Automatic data acquisition – information recorded and shared through a real-time data acquisition systems and automatically saved in the central database maintained by the data collecting entity/URA

Data Accuracy

- National energy balance shall contain accurate data
- Shall only use primary data or data published by the original entity supplying/converting/consuming energy
- In the absence of actual data, estimates can be done, but following a standardized method.
- To improve accuracy of data collected through forms, following measures can be adopted
 - Notes to clarify the required data
 - Options to select the data (such as from down lists, radio buttons, check boxes) instead of allowing to type-in data.
 - Format checking/Value range checking
 - Default values
 - Examples/previous years' data
 - Embedded functions for automatic calculations.

Techniques for Data Validation

Following types of data validation techniques can be used to Ensure Accuracy and Consistency of Data used in the Energy Balance.

- a. Cross-check between data/estimates from different sources.
- b. Cross-check with historical data and historical trends.
- c. Cross-check derivatives of the data (for example monthly value of a commodity).
- d. Cross-check against extreme values/limits/boundaries.
- e. Sample validation.

Reporting and Visualizing Energy Data

a. Data tables

- i. table rows presenting data pertaining to different types of the element
- ii. table columns presenting same data of different years

b. Graphs and charts

- i. Area (or bar) graphs - to present historical growth/decline of the energy data element
- ii. Pie chart - to present break-up of the energy data between different categories of the data element within a particular year
- iii. Doughnut graph – to present the break-ups within break-ups.

c. Sanki diagram

- i. To present the flow of energy between different supply/conversion/consumption categories from entry point to end-use

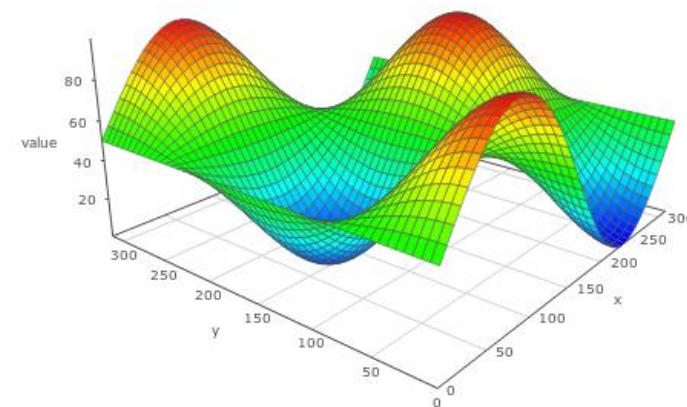
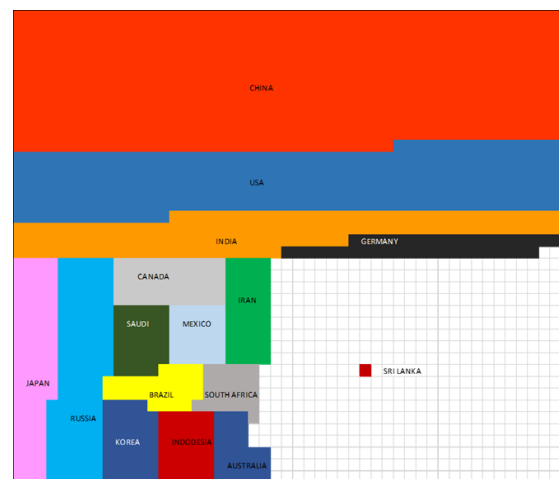
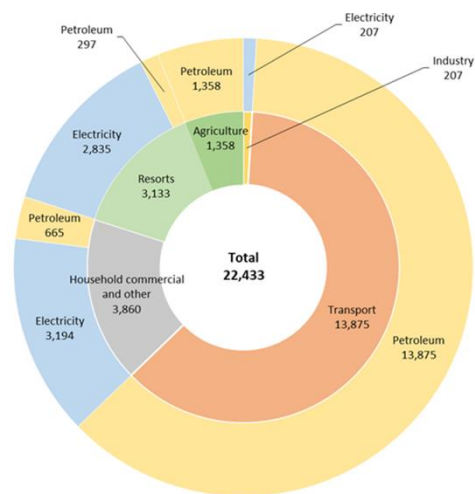
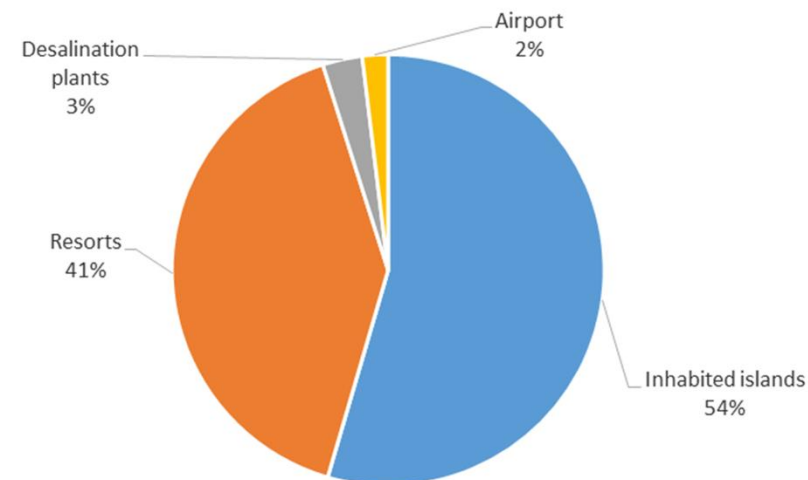
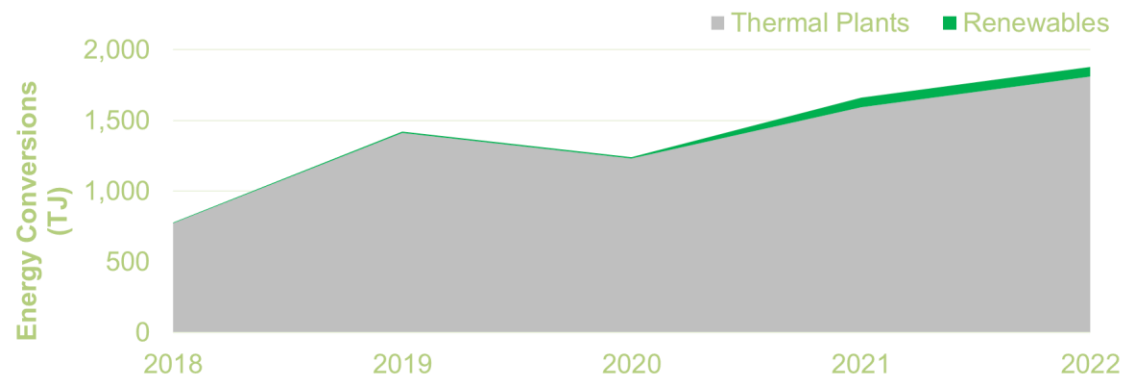
d. Live dashboards

- i. Updated online with the latest data

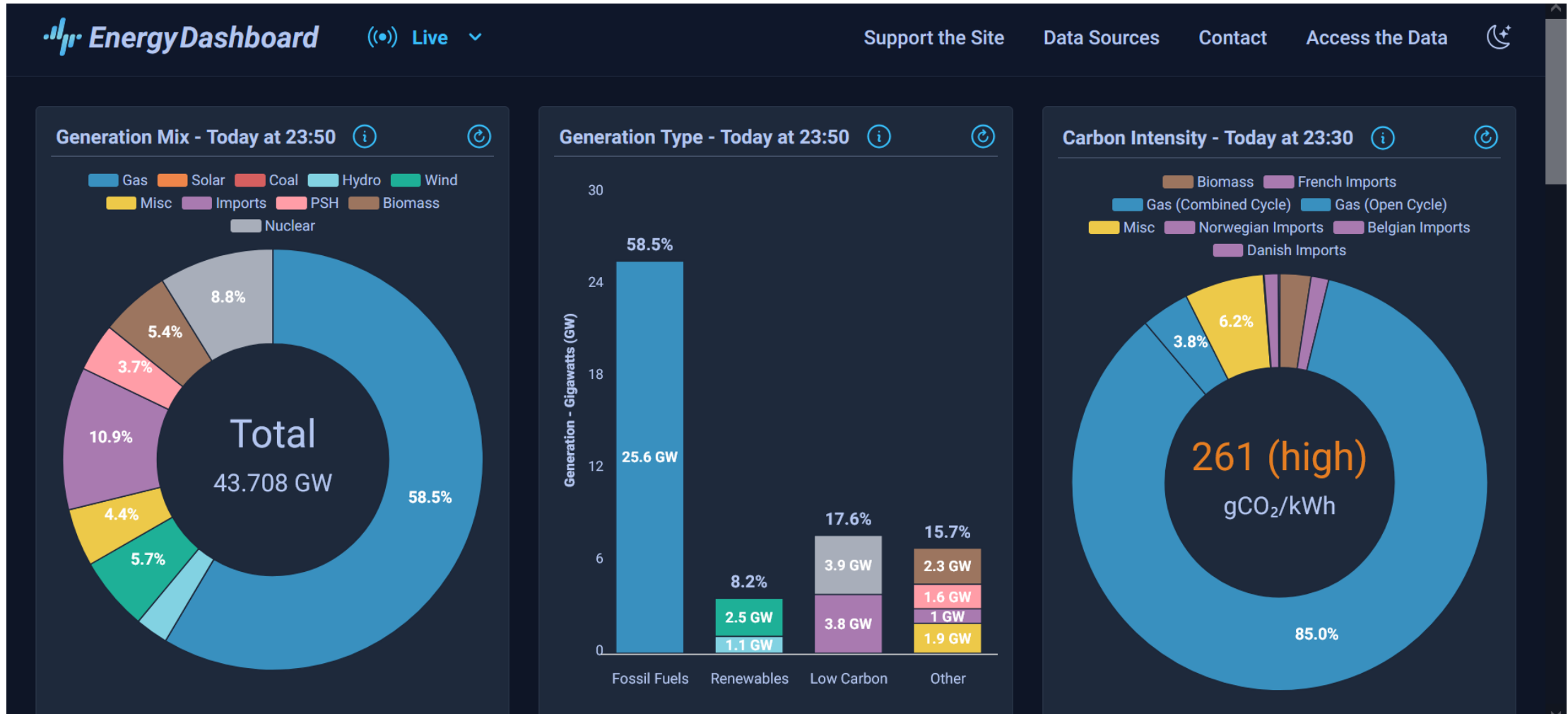
Data Tables

Singapore 2012 (ktoe)	Coal	Peat	Oilshale and Oil Sands	Crude Oil	Oil Products	Natural Gas	Nuclear	Hydro	Geothermal	Solar, Wind, Others	Biofuels & Waste	Electricity	Heat	Heat Output from non-specified comb fuels	Total
Production	-	-	-	-	-	-	-	-	-	1.12	602.21	-	-	-	603.32
Imports	7.41	-	-	49,780.68	97,249.69	7,325.98	-	-	-	-	-	-	-	-	154,363.77
Exports	-	-	-	-300.90	-83,326.50	-	-	-	-	-	-	-	-	-	-83,627.40
International marine bunkers	-	-	-	-	-41,092.26	-	-	-	-	-	-	-	-	-	-41,092.26
International aviation bunkers	-	-	-	-	-6,849.58	-	-	-	-	-	-	-	-	-	-6,849.58
Stock changes	-	-	-	-	1,655.62	-	-	-	-	-	-	-	-	-	1,655.62
Total primary energy supply	7.41	-	-	49,479.78	-32,363.03	7,325.98	-	-	-	1.12	602.21	-	-	-	25,053.47
Transfers	-	-	-	6,844.20	-6,844.25	-	-	-	-	-	-	-	-	-	-0.05
Statistical differences	-	-	-	-0.00	-782.46	548.40	-	-	-	-	-	-	-	-	-234.06
Main activity producer electricity plants	-	-	-	-	-1,278.28	-6,397.53	-	-	-	-1.12	-602.21	3,887.11	-	-	-4,392.02
Autoproducer electricity plants	-	-	-	-	-341.38	-337.22	-	-	-	-	-	147.66	-	-	-530.93
Main activity producer CHP plants	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Autoproducer CHP plants	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Main activity producer heat plants	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Autoproducer heat plants	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Heat pumps	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Electric boilers	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chemical heat for electricity production	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gas works	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Oil refineries	-	-	-	-56,323.98	54,761.94	-	-	-	-	-	-	-	-	-	-1,562.03
Coal transformation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Liquefaction plants	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Non-specified (transformation)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Energy industry own use	-	-	-	-	-2,089.67	-9.99	-	-	-	-	-	-161.42	-	-	-2,261.08
Losses	-	-	-	-	-	-	-	-	-	-	-	-64.76	-	-	-64.76
Final consumption	7.41	-	-	-	11,062.88	1,129.64	-	-	-	-	-	3,808.60	-	-	16,008.53
Industry	7.41	-	-	-	2,669.92	978.57	-	-	-	-	-	1,513.17	-	-	5,169.06
Iron and steel	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

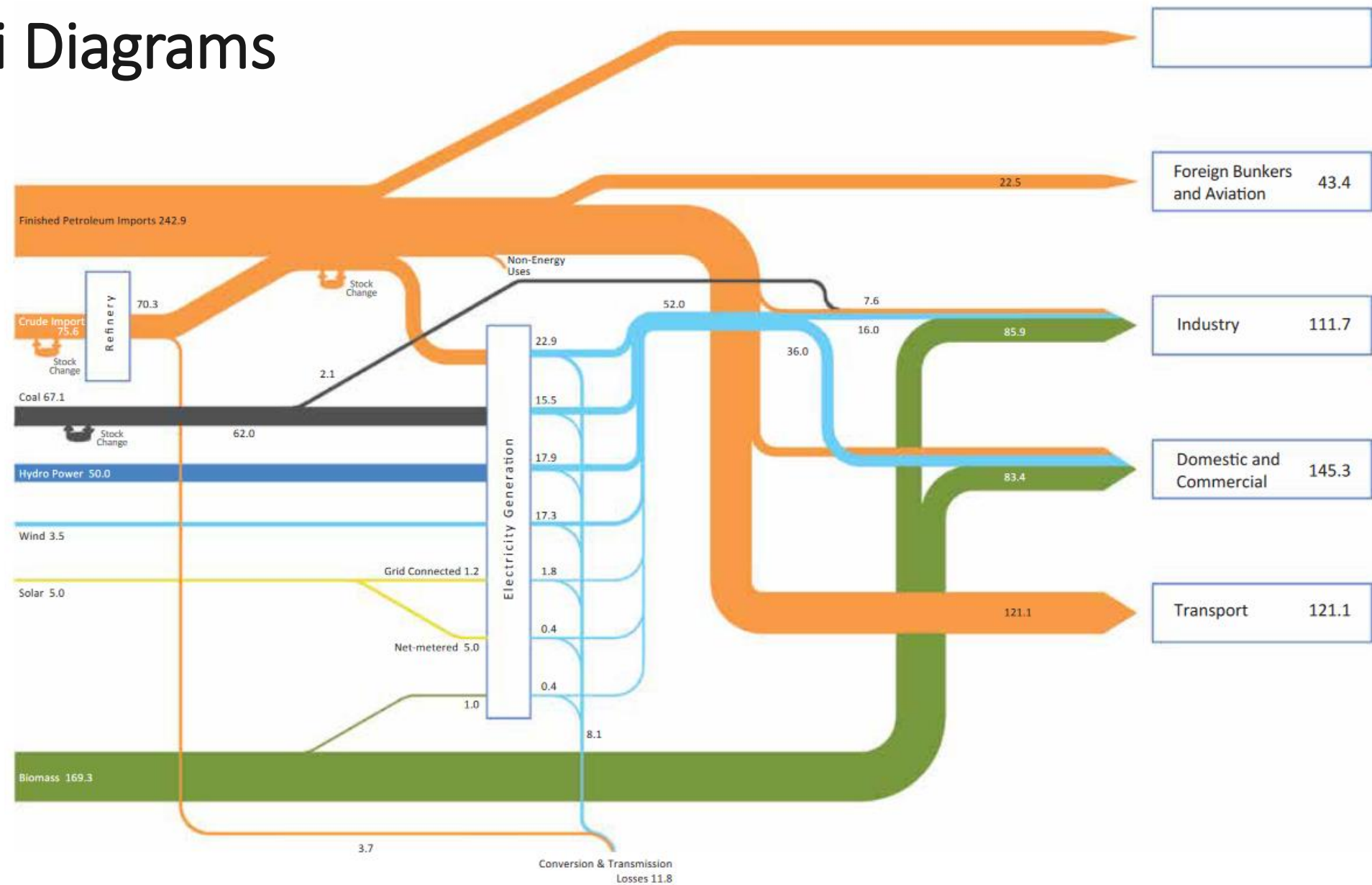
Graphs and Charts



Sanky Diagrams



Sanki Diagrams



A national Energy Information Management System (EIMS)

- The EIMS will collect, validate, and record in a central repository key energy data, allowing relevant stakeholders to access and use required energy data for different purposes. Preparation of the energy balance will be one of such uses of EIMS.
- In addition to recording data, the EIMS will identify a set of standard statistical indicators for Maldives which can be directly used by stakeholders.
- Essential indicators can be chosen by the due authorities from among a longer list of indicators
- These indicators require data from both the energy sector and the national statistics
- Some indicators proposed and how these can be computed are given in the next deck of slides.

Petroleum Imports

1	Parameter Code	En 1
2	Parameter Name	Imports of LP gas, Jet A1, petrol and diesel
3	Definition / Description	The total quantity of each fuel imported to the country
4	Method of Computation	Summation of the total fuel qty imported
5	Unit of Measurement	kt
6	Method of Data Collection	Maldives Customs records
7	Level of Disaggregation	National
8	Authorised Institution	Maldives Customs
9	Related Institution	N/A
10	Data Collection Frequency	Annual
11	Dissemination Frequency	Annual

Foreign Bunkering

1	Parameter Code	En 2
2	Parameter Name	Diesel usage in foreign aviation and bunkering
3	Definition / Description	Diesel usage in foreign bunkering
4	Method of Computation	Fuel qty pumped into vessels leaving Maldives
5	Unit of Measurement	kt
6	Method of Data Collection	Annual data collection from relevant institutes
7	Level of Disaggregation	National
8	Authorised Institution	FSM
9	Related Institution	N/A
10	Data Collection Frequency	Annual
11	Dissemination Frequency	Annual

Thank You!