Experience in Filling out the Energy Efficiency Template (Chinese Taipei)

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I. Data Coverage of EET
II. Collection of Energy Statistical Data
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I. Data Coverage of EET

**EET**

**Data required**
- Activity & Structure Indicators
- Gross Domestic Product
- GDP deflator
- Value-added
- Transport sector activity data

**Data Source**
- Directorate-General of Budget, Accounting and Statistics, Executive Yuan
- Department of Statistics, Ministry of Transportation and Communications

**ACTIVITY DATA**

- Commercial and Public Service Sector (by Equipment)
- Residential Sector (by Equipment)
- Transport Sector (by transportation type)
- Industrial Sector (by industry)

**Sectoral Energy Consumption**

**Energy Consumption by End-Use**

**Energy Consumption by sub-sectors**

**Energy Statistics**
- Residence & Service Sector Energy Consumption Survey
- Energy Statistics
II. Collection of Energy Statistical Data (1/8)

1. Data Collection Scheme

- Energy Supplier & Major Energy User
- Enterprise Level Energy Statistics
- Bureau of Energy, MOEA
- Planning Division
- Energy Statistics & International Cooperation Section
- Taiwan Research Institute
- Energy Statistics Group
- National Level Energy Statistics
- Data Submission
II. Collection of Energy Statistical Data (2/8)

2. legal Basis

- **Energy Administration Act**: § 7
  - Energy supply enterprise
  - Operation data, security stockpile (monthly)
  - See also: Regulations for Implementing the Energy Management Law § 4

- **Petroleum Administration Act**: § 27-28
  - Oil refinery operators, importers, exporters, and wholesalers
  - Production, import, export, and sales, security stockpile (monthly)

- **Natural Gas Business Act**: § 53
  - Natural gas utilities
  - Amount of sales, type of users, and number of installed households (monthly)

- **The Electricity Act**: § 80
  - Electricity utilities
  - Operation report (monthly)

- **Renewable Energy Development Act**: § 18
  - Renewable auto power producer
  - Operation report (monthly)

- **Energy Administration Act**: § 12
  - Major energy user
  - Type, amount of energy consumption, and its efficiency (annually)
II. Collection of Energy Statistical Data (3/8)

3. Data Coverage

Energy Data

- Coal and Coal Products (11 products)
- Crude Oil and Petroleum Products (23 products/categories)
- Natural Gas (2 products)
- Biomass and Waste (4 products/categories)
- Electricity and Heat (8 products/categories)

Energy Balance Sheet

- Production
- Import
- Export
- Stock
- Transformation input and Output
- Energy sector own use
- Total final Consumption: 5 sectors (by industries) and non-energy use

- Energy transformation equipment (capacity)
- Energy prices (import, wholesale, and retail)
II. Collection of Energy Statistical Data (4/8)

(1) Coal and Coal Products Data Collection

**Supply**
- **Indigenous Coal**: reported by the coal mine to the Bureau of Mine, but was not produced after 2000.
- **Imported Coal**:
  - Customs Administration: anthracite.
  - Coal Importers: provided by power companies, public CHP, and energy intensive industries.
- **Imported coke oven coke**: Customs Administration.

**Transformation**
- **Transformation Input**
  - Coal input:
    - Coke oven coke and coke oven gas: CSC, DSC.
    - Electricity: power plants, CHP plants.
  - Coke input to blast furnace gas: CSC, DSC.
  - Coke oven gas, blast furnace gas, and oxygen steel furnace gas input to produce electricity: CSC, DSC.
- **Transformation Output**: CSC, DSC

**Consumption**
- **End Use Data**: reported by energy Intensive Industries.
  - Textile, Wearing Apparel and Accessories
  - Pulp, Paper and Paper Products
  - Chemical Materials
  - Artificial Fibers
  - Resin, Plastics and Rubber
  - Cement and Cement Products
  - Iron and Steel
II. Collection of Energy Statistical Data (5/8)

(2) Crude Oil and Petroleum Products Data Collection

Supply
- Indigenous crude oil: CPC.
- Imported crude oil and oil products:
  - Customs Administration: lubricants, solvents, petroleum coke.
  - Refineries. (CPC, Formosa, etc.): crude oil and all petroleum products.

Transformation
- Transformation Input
  - Crude input to produce petroleum products: CPC, Formosa.
  - Petroleum product input to produce electricity and heat: power generation plants, CHP plants.
- Inter-product Transfer: CPC, CPC-Shell Lubricants (before 2014).

Consumption
- Sales Data: CPC, Formosa, LPG importers.
- End Use Data reported by:
  - Cement and cement product industry (8)
  - Iron and steel industry (2)
(3) Natural Gas Data Collection

Supply
- Indigenous Natural Gas: CPC.
- Imported LNG: CPC.

Transformation
- Transformation Input
  - LNG Gasification input: CPC.
  - Natural Gas input for electricity and heat generation: power generation plants, CHP plants.
- Transformation Output:
  - gasified LNG output: CPC.

Consumption
- Sales Data: CPC, natural gas utilities (27).
- End Use Data reported by:
  - Iron and steel industry (2)
II. Collection of Energy Statistical Data (7/8)

(4) Biomass and Waste Data Collection

Supply
- **Solid Biomass**: CHP plants.
- **Liquid Biomass**: bio-ethanol, biodiesel, bio-fuel oil producers.
- **Biogas**: CHP plants.
- **Waste**: Refuse Resource Recovery Plant, CHP plants.

Transformation
- **Transformation Input**
  - electricity and heat generation: CHP plants.
- **Inter-product Transfer**: bio-ethanol, biodiesel, bio-fuel oil producers.

Consumption
- **End Use Data**: estimated according to power generation and heat consumption.
(5) Electricity and Heat Data Collection

Supply

- **Electricity:**
  - Indigenous power
    - Production of hydro, wind, solar and geothermal power: Taipower and IPPs.
  - Nuclear power: Taipower.
- **Solar Thermal:** ITRI

Transformation

- **Transformation output of thermal power plants and pump storage hydro power:** Taipower, IPPs, CHP plants.
- **Transformation output of heat:** Public CHP plants.

Consumption

- **Electricity**
  - Own Use: Taipower, IPPs, CHP plants
  - Sales Data: Taipower.
  - End Use Data reported by: CHP power plants.
- **Solar Thermal:** estimated by ITRI
- **Heat:** sales data of public CHP plants
III. Collection of End-Use Data (1/2)

1. Purpose for Detailed Energy Consumption Data Collection

(1) Collect **end-use energy consumption data** for policy analysis;

(2) Build up **energy efficiency indicator database**;

(3) Establish **energy efficiency indicator statistics** for domestic & international reporting.

Recent Energy Surveys in Chinese Taipei

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Residence &amp; Service Sector</td>
<td>Transport Sector</td>
<td>Industry Sector</td>
<td>Agriculture Sector</td>
<td>Heat Value of Energy Products</td>
<td>Residence &amp; Service Sector</td>
<td>Transport Sector</td>
<td>Industry Sector</td>
<td>Agriculture Sector</td>
</tr>
</tbody>
</table>

Each sectoral survey is conducted **every 5 years**.
III. Collection of End-Use Data (2/2)

2. Take Residence Sector Energy Consumption Survey for example: the questionnaire includes

- (1) types and numbers of Energy Consuming Appliance
- (2) energy consumption (by energy type) of each appliance

=> As a basis for the allocation of energy consumption by equipment.

<table>
<thead>
<tr>
<th>Appliance Number</th>
<th>Frequency of Utilization (Summer/Non-Summer)</th>
<th>Duration of Utilization</th>
<th>Type of Energy Used</th>
<th>Using Years</th>
<th>Number of Appliances with Energy Label</th>
<th>Number of Planned Appliance Replacement within 1 Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Space Cooling/ Heating</td>
<td>Water Heating</td>
<td>Cooking</td>
<td>Entertaining/ICT</td>
<td>Transportation</td>
<td>Other</td>
<td></td>
</tr>
</tbody>
</table>

- **Space Cooling/ Heating**
  - Air-conditioner (Split, window, and package type)
  - Central air conditioning system
  - Fan/ventilator
  - Space heater

- **Water Heating**
  - Water dispenser
  - Electric hot water bottle
  - Water heater
  - Others

- **Cooking**
  - Induction cooker
  - Rice cooker
  - Microwave oven
  - Electric oven
  - Gas stove
  - Others

- **Entertaining/ICT**
  - Video player
  - Audio equipment
  - PDP/LCD TV
  - CRT TV
  - PC
  - Printer
  - Multi-function printer

- **Freezing**
  - Refrigerator
  - Freezer
  - Refrigerator/freezer combination

- **Lighting**
  - Incandescent light
  - Fluorescent light
  - PL fluorescent light
  - Compact Fluorescent Light Bulb
  - Halogen lamp
  - LED
  - HID
  - Others

- **Other**
  - Dish washer
  - Clothes washer
  - Clothes dryer
  - Dehumidifier
  - Smart phone
  - Tablet computer
  - WIFI

- **Transportation**
  - Car
  - Personal light truck
  - SUV
  - Motorcycle
  - Electric motorcycle
  - hybrid, electric vehicle
  - Electric bicycle
IV. Filling-out the Template (1/5)

1. Activity data form non-energy statistical official publications

Directorate-General of Budget, Accounting and Statistics, Executive Yuan.


=> Activity & Structure Indicators, Gross Domestic Product, GDP deflator, Value-added

Department of Statistics, Ministry of Transportation and Communications.

https://stat.motc.gov.tw/mocdb/stmain.jsp?sys=100&funid=emenu

=> Transport sector activity data

Note: Some detailed data is not collected by the authorities

=> Data is not available.
IV. Filling-out the Template (2/5)

2. Commercial and Public Services

(1) Total energy consumption of Service Sector from energy balance sheet

<table>
<thead>
<tr>
<th>Grand Total</th>
<th>Unit</th>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>5,493,757</td>
<td>toe</td>
<td>Service Sector</td>
</tr>
<tr>
<td>444,397</td>
<td>toe</td>
<td>Wholesale and Retail</td>
</tr>
<tr>
<td>1,063,358</td>
<td>toe</td>
<td>Hotels and Restaurants</td>
</tr>
<tr>
<td>136,149</td>
<td>toe</td>
<td>Transport Services</td>
</tr>
<tr>
<td>85,139</td>
<td>toe</td>
<td>Storage and Warehousing</td>
</tr>
<tr>
<td>126,049</td>
<td>toe</td>
<td>Communication</td>
</tr>
<tr>
<td>87,982</td>
<td>toe</td>
<td>Finance, Insurance and Real Estate</td>
</tr>
<tr>
<td>145,199</td>
<td>toe</td>
<td>Business Services</td>
</tr>
<tr>
<td>764,190</td>
<td>toe</td>
<td>Social and Personal Services</td>
</tr>
<tr>
<td>801,249</td>
<td>toe</td>
<td>Public Administration</td>
</tr>
<tr>
<td>1,840,044</td>
<td>toe</td>
<td>Activities Not Adequately Defined</td>
</tr>
</tbody>
</table>

(2) Energy consumption by equipment is estimated based on Residence & Service Sector survey

=> Calculate energy consumption ratio of each equipment by energy type.

=> Reported data is equal to total energy consumption × energy consumption ratio

<table>
<thead>
<tr>
<th>Energy Consumption Ratio</th>
<th>Oil</th>
<th>LPG</th>
<th>NG</th>
<th>Electricity</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heating</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.36</td>
<td>0.00</td>
</tr>
<tr>
<td>Cooling</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.11</td>
<td>0.36</td>
</tr>
<tr>
<td>Lighting</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.11</td>
<td>0.53</td>
</tr>
<tr>
<td>Other energy use</td>
<td>0.03</td>
<td>0.01</td>
<td>0.06</td>
<td>0.43</td>
<td>0.53</td>
</tr>
<tr>
<td>Total</td>
<td>0.03</td>
<td>0.01</td>
<td>0.06</td>
<td>0.90</td>
<td>1.00</td>
</tr>
</tbody>
</table>
IV. Filling-out the Template (3/5)

3. Residential

(1) The same logic of data processing with “Commercial and Public Services”

=> Total energy consumption of Residential Sector in energy balance sheet is cited.

(2) Classification of end-use energy consumption (by energy type) data is more detailed

=> Combined related equipment in reporting data.

<table>
<thead>
<tr>
<th>Reporting items</th>
<th>Oil</th>
<th>LPG</th>
<th>NG</th>
<th>Solar Thermal</th>
<th>Electricity</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Refrigerators &amp; Freezers</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.01</td>
<td>0.01</td>
</tr>
<tr>
<td>Freezer</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.18</td>
<td>0.18</td>
</tr>
<tr>
<td>Water Heating</td>
<td>0.00</td>
<td>0.04</td>
<td>0.00</td>
<td>0.00</td>
<td>0.11</td>
<td>0.18</td>
</tr>
<tr>
<td>Cooking</td>
<td>0.00</td>
<td>0.05</td>
<td>0.03</td>
<td>0.00</td>
<td>0.08</td>
<td>0.16</td>
</tr>
<tr>
<td>Lighting</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.12</td>
<td>0.12</td>
</tr>
<tr>
<td>Refrigerator</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.11</td>
<td>0.11</td>
</tr>
<tr>
<td>Freezer</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.01</td>
<td>0.01</td>
</tr>
<tr>
<td>dishwasher</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>washing machine</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.02</td>
<td>0.02</td>
</tr>
<tr>
<td>Clothes dryer</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>TV/home entertainment</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.05</td>
<td>0.05</td>
</tr>
<tr>
<td>Computer/communication equipment</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.05</td>
<td>0.05</td>
</tr>
<tr>
<td>Other electrical appliances</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.11</td>
<td>0.11</td>
</tr>
<tr>
<td>Other energy use</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Total</td>
<td>0.00</td>
<td>0.08</td>
<td>0.06</td>
<td>0.00</td>
<td>0.85</td>
<td>1.00</td>
</tr>
</tbody>
</table>
### IV. Filling-out the Template (4/5)

#### 4. Transport

There is complete data for **energy consumption by transportation usage** in our balance sheet.

> Simply fill in the corresponding number to the questionnaire.

<table>
<thead>
<tr>
<th>項目</th>
<th>22</th>
<th>28</th>
<th>18</th>
<th>29</th>
<th>37</th>
<th>51</th>
<th>1</th>
<th>54</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor Gasoline</td>
<td>7,986,164</td>
<td>4,048,944</td>
<td>35,715</td>
<td>89,367</td>
<td>122,377</td>
<td>12,380,286</td>
<td>97,719</td>
<td></td>
</tr>
<tr>
<td>Diesel Oil</td>
<td>7,986,164</td>
<td>3,948,081</td>
<td>35,715</td>
<td>11,969,960</td>
<td>139,330</td>
<td>173,277</td>
<td>Non-Specified</td>
<td></td>
</tr>
<tr>
<td>LPG</td>
<td>16,913</td>
<td>122,377</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fuel Oil</td>
<td>83,910</td>
<td>89,367</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Natural Gas</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electricity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coal &amp; Coal</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grand Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C38-C39</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>C2-C12</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Reporting items**

- Domestic aviation
- Road transport
- Railways
- Inland waterways
IV. Filling-out the Template (5/5)

5. Industry

There is also complete data for **industrial energy consumption** in our balance sheet

=> Report the data according to the industry reference table below.

<table>
<thead>
<tr>
<th>Balance sheet</th>
<th>Reporting items</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industrial Sector</td>
<td>Total Industry Use</td>
</tr>
<tr>
<td>Mining and Quarrying (excluding coal, oil and gas)</td>
<td>Mining and quarrying</td>
</tr>
<tr>
<td>Food, Beverage and Tobacco</td>
<td>Manufacture of food products, beverages, tobacco products</td>
</tr>
<tr>
<td>Textile, Wearing Apparel and Accessories</td>
<td>Manufacture of textiles, wearing apparel, leather and related products</td>
</tr>
<tr>
<td>Leather and Fur</td>
<td></td>
</tr>
<tr>
<td>Wood, Bamboo and Furniture</td>
<td>Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials</td>
</tr>
<tr>
<td>Pulp, Paper and Paper Products</td>
<td>Manufacture of paper and paper products</td>
</tr>
<tr>
<td>Printing</td>
<td></td>
</tr>
<tr>
<td>Chemical Materials</td>
<td></td>
</tr>
<tr>
<td>Chemical Products</td>
<td>Manufacture of chemicals and chemical products &amp; basic pharmaceutical products and pharmaceutical preparations including petro-chemicals</td>
</tr>
<tr>
<td>Rubber Products</td>
<td></td>
</tr>
<tr>
<td>Plastic Products</td>
<td></td>
</tr>
<tr>
<td>Non-metallic Mineral Products</td>
<td>Manufacture of non-metallic mineral products (including rubber and plastics products)</td>
</tr>
<tr>
<td>Basic Metal Industries</td>
<td>Manufacture of basic metals (Iron and steel)</td>
</tr>
<tr>
<td>Fabricated Metal Products</td>
<td></td>
</tr>
<tr>
<td>Machinery and Equipments</td>
<td>Manufacture of fabricated metal products, machinery and equipment</td>
</tr>
<tr>
<td>Electrical and Electronic Machinery</td>
<td></td>
</tr>
<tr>
<td>Precision Instruments</td>
<td></td>
</tr>
<tr>
<td>Transport Equipments</td>
<td>Manufacture of motor vehicles, trailers, other transport equipment</td>
</tr>
<tr>
<td>Construction</td>
<td>Construction</td>
</tr>
<tr>
<td>Miscellaneous Industries</td>
<td></td>
</tr>
<tr>
<td>Water Supply and Remediation Activities</td>
<td>Other Manufacturing and Industries Not Elsewhere Specified</td>
</tr>
<tr>
<td>Non-Specified</td>
<td></td>
</tr>
</tbody>
</table>
Thank you