




Presentation on data collection methods and modelling: **INDUSTRY**

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Consultant

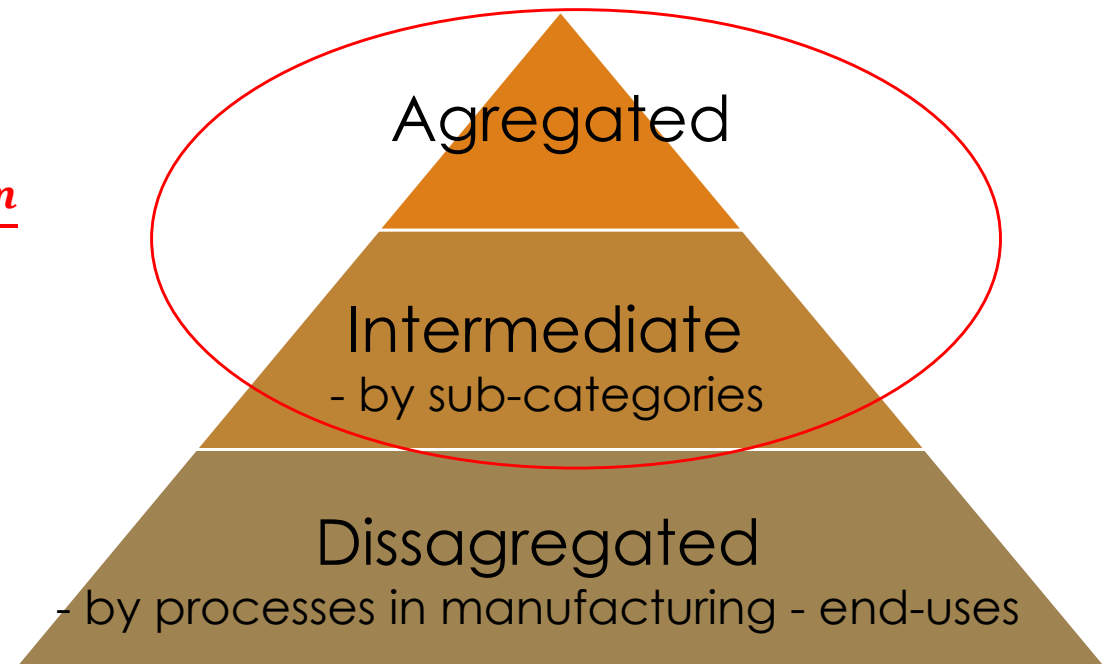
16 November 2022

Content

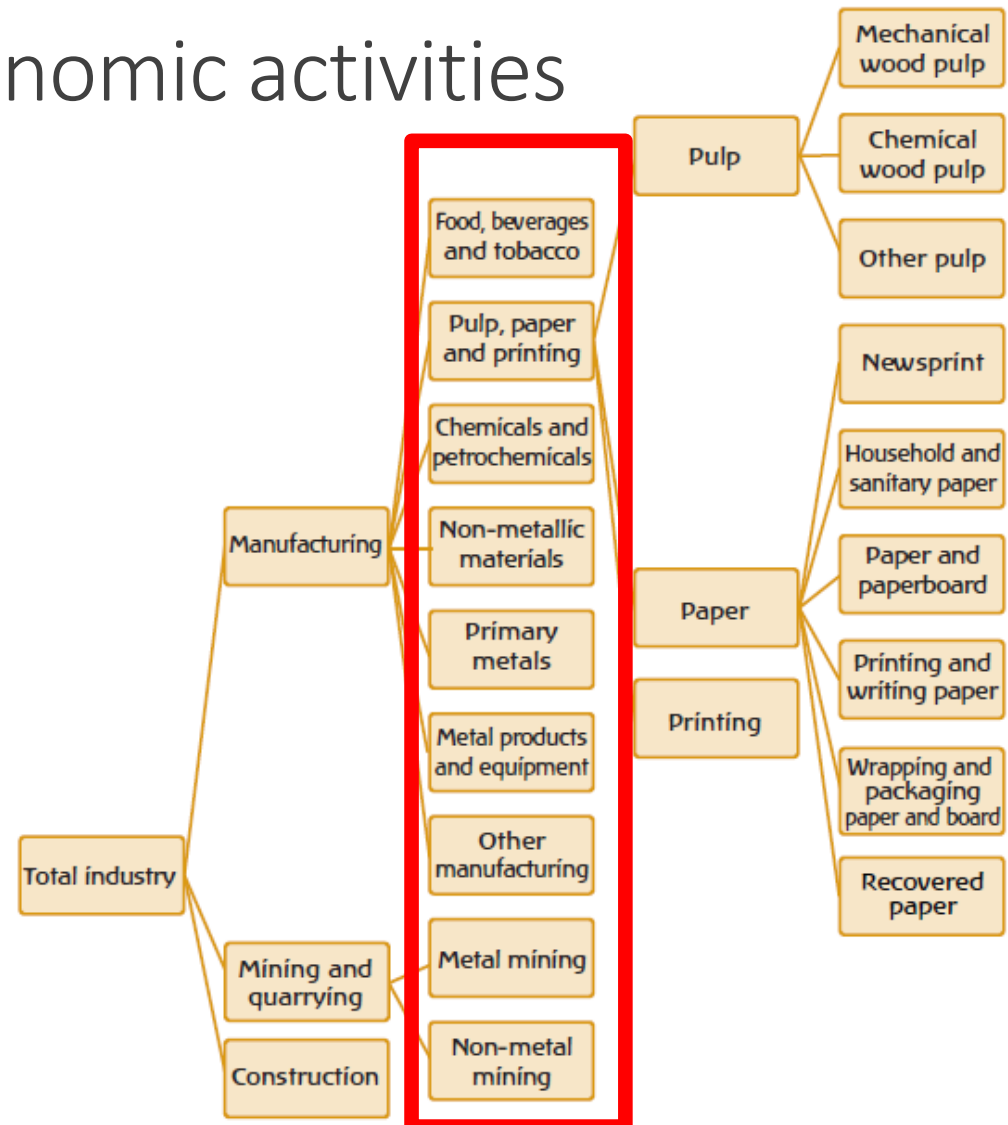
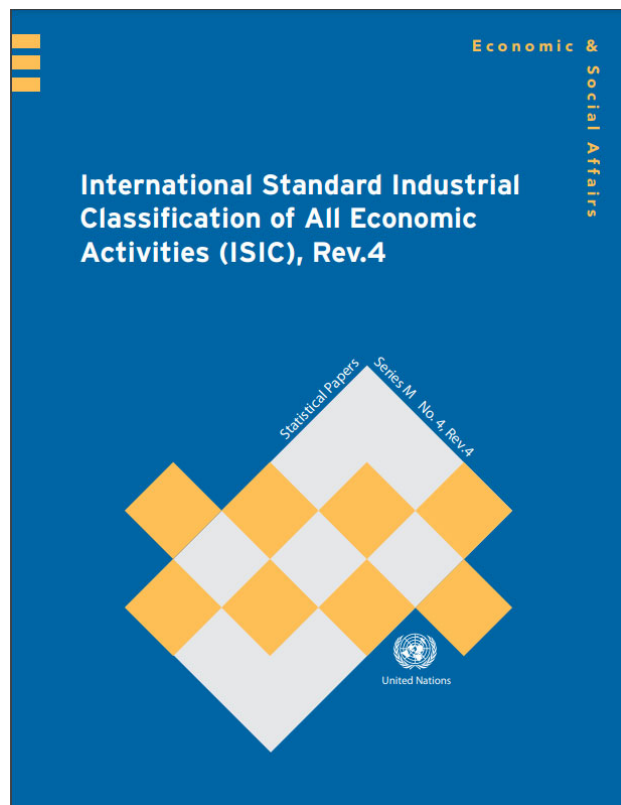
1. Introduction
 2. Structure of indicators
 3. Data collection, processing and EEI indicators calculation
 4. Advanced statistics in manufacturing industry
 5. Conclusions
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Structure of the indicators in manufacturing industry

$$\text{ENERGY INTENSITY} = \frac{\text{energy consumption}}{\text{value added}}$$



Categorisation of economic activities

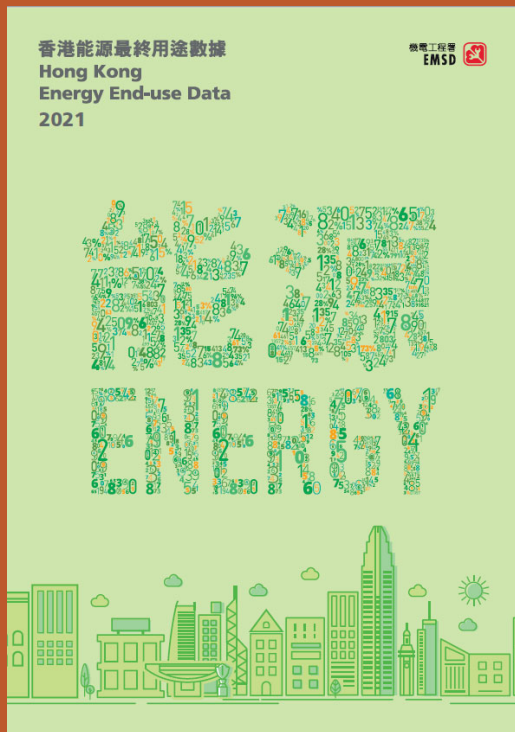


Data for estimating EE indicators - IEA template

Data sources:

- **Energy Balance** - final annual energy consumption in manufacturing by sub-categories as defined by international standards and recommendations; additional disaggregation requested
- **National Accounts** – value-added by manufacturing industries subcategories (current LCU, constant 2015USD, PPP 2017USD)

Example: HONG KONG



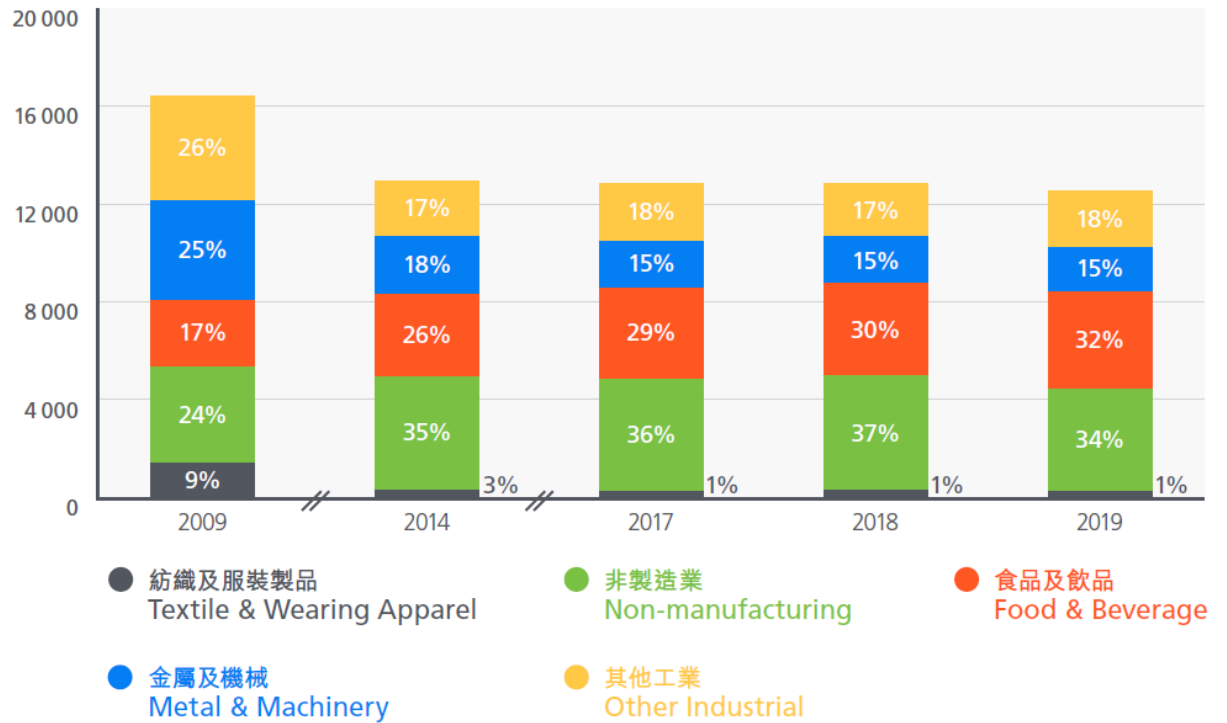
4.3 工業類別 Industrial Sector

圖表 Chart 40

工業類別所有能源使用按組別劃分

Total Energy Consumption in Industrial Sector by Segment

參考表格 Refer Table 45
單位 Unit: 太焦耳 Terajoule



Example – PRC

Value – added in manufacturing

Energy consumption in manufacturing industry

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
	PJ	PJ	PJ	PJ	PJ	PJ	PJ	PJ	PJ	PJ	PJ	PJ
10 - 32: Manufacturing	31.710,1	36.649,5	39.329,7	37.706,3	36.733,6	36.396,8	34.861,3	34.858,0	35.353,0	33.756,6	0,0	0,0
10 - 12: Manufacture of food products, beverages, tobacco products	1.595,6	1.625,8	1.631,3	1.668,9	1.852,0	1.810,6	1.775,7	1.679,9	1.599,7	1.623,2	0,0	0,0
13 - 15: Manufacture of textiles, wearing apparel, leather and related products	1.504,6	1.563,1	1.579,2	1.540,3	1.468,1	1.496,1	1.511,3	1.513,0	1.451,6	1.470,6	0,0	0,0
16: Manufacture of wood and of products of wood and cork, except furniture;...	324,4	342,6	352,6	336,7	334,4	324,8	280,5	246,3	226,4	216,3	0,0	0,0
17: Manufacture of paper and paper products	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
18: Printing and reproduction of recorded media	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
17 - 18: Paper & Printing	1.015,9	1.050,2	975,6	938,8	1.041,9	1.009,8	990,3	1.025,2	1.004,9	931,2	0,0	0,0
19: Manufacture of coke and refined petroleum products	1.047,5	1.234,4	1.359,0	1.582,9	1.904,5	1.873,9	2.021,2	2.361,3	2.887,5	3.066,4	0,0	0,0
20 - 21: Manufacture of chemicals and chemical products & ...	5.785,2	6.504,9	6.626,8	6.612,3	10.375,3	10.970,5	10.250,1	10.375,9	10.682,5	11.096,6	0,0	0,0
22: Manufacture of rubber and plastics products	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
23: Manufacture of other non-metallic mineral products	7.754,5	9.227,7	9.104,8	8.549,9	9.149,9	8.705,9	8.507,6	7.818,1	7.523,5	5.736,0	0,0	0,0
24: Manufacture of basic metals	6.812,6	7.845,1	8.071,1	8.317,7	9.032,4	8.655,0	8.016,4	8.450,0	8.774,7	8.685,2	0,0	0,0
25 - 28: Manufacture of fabricated metal products, machinery and equipment	1.870,5	2.051,6	1.770,5	1.768,5	2.456,5	2.400,2	2.441,8	2.540,6	2.884,2	3.042,6	0,0	0,0
29 - 30: Manufacture of motor vehicles, trailers, other transport equipment	626,0	663,9	679,7	705,7	701,9	678,7	678,5	725,4	989,2	713,3	0,0	0,0
31 - 32: Manufacture of furniture & Other manufacturing	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Other manufacturing non elsewhere specified	4.420,8	5.774,6	8.538,2	7.267,6	321,3	345,3	409,1	483,6	216,3	241,5	0,0	0,0
CONTROL	1,0330	1,0337	1,0346	1,0420	1,0518	1,0515	1,0580	1,0677	1,0817	1,0908	-	-

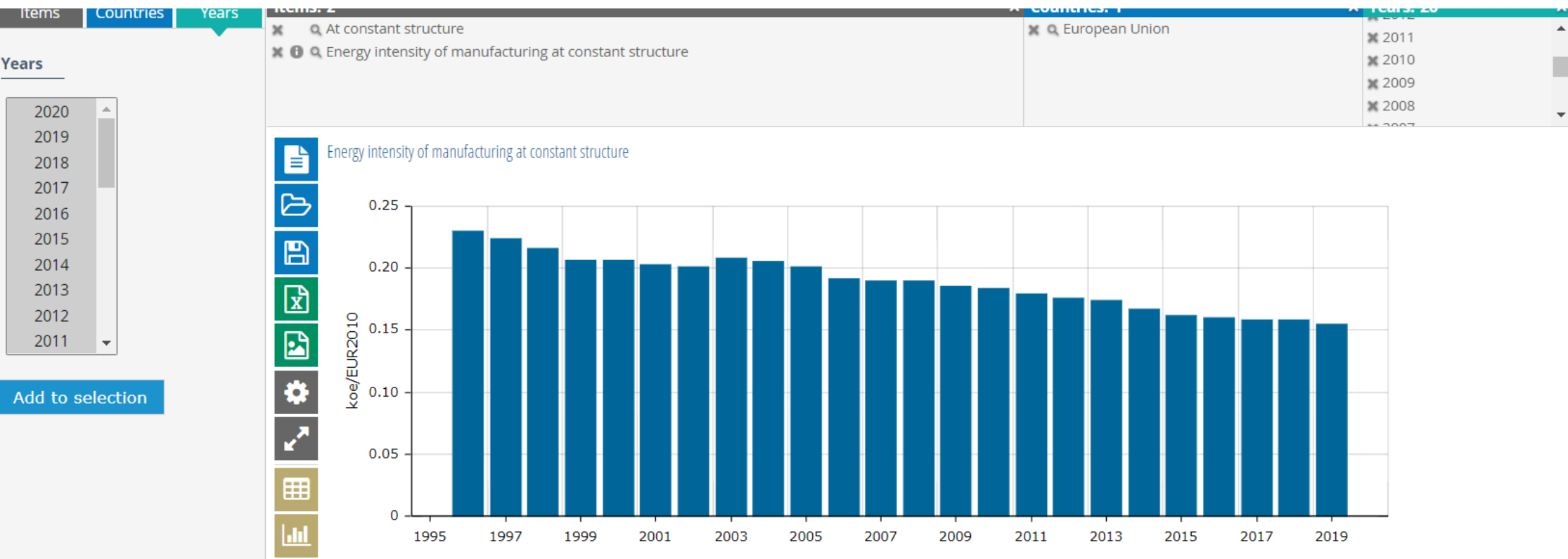
*check if aggregation of whole economies is equal to the total manufacturing

Example – PRC

Energy intensities = energy consumption/value added

Energy intensities in Manufacturing industry

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
	MJ/USD2017	MJ/USD2017	MJ/USD2017	MJ/USD2017	MJ/USD2017	MJ/USD2017	MJ/USD2017	MJ/USD2017	MJ/USD2017	MJ/USD2017	MJ/USD2017	MJ/USD2017
10 - 32: Manufacturing	10,4766	11,0735	11,3592	11,1259	10,2891	9,6923	9,3086	9,2566	8,6536	7,6333	-	-
10 - 12: Manufacture of food products, beverages, tobacco products	-	-	-	-	-	-	-	-	-	-	-	-
13 - 15: Manufacture of textiles, wearing apparel, leather and related products	-	-	-	-	-	-	-	-	-	-	-	-
16: Manufacture of wood and of products of wood and cork, except furniture;...	-	-	-	-	-	-	-	-	-	-	-	-
17: Manufacture of paper and paper products	-	-	-	-	-	-	-	-	-	-	-	-
18: Printing and reproduction of recorded media	-	-	-	-	-	-	-	-	-	-	-	-
17 - 18: Paper & Printing	-	-	-	-	-	-	-	-	-	-	-	-
19: Manufacture of coke and refined petroleum products	-	-	-	-	-	-	-	-	-	-	-	-
20 - 21: Manufacture of chemicals and chemical products & ...	-	-	-	-	-	-	-	-	-	-	-	-
22: Manufacture of rubber and plastics products	-	-	-	-	-	-	-	-	-	-	-	-
23: Manufacture of other non-metallic mineral products	-	-	-	-	-	-	-	-	-	-	-	-
24: Manufacture of basic metals	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-
25 - 28: Manufacture of fabricated metal products, machinery and equipment	-	-	-	-	-	-	-	-	-	-	-	-
29 - 30: Manufacture of motor vehicles, trailers, other transport equipment	-	-	-	-	-	-	-	-	-	-	-	-
31 - 32: Manufacture of furniture & Other manufacturing	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL, MJ/USD2015	10,92	10,92	10,92	10,92	10,92	10,92	10,92	10,09	10,27	10,39	0,00	0,00
TOTAL, koe/USD 2015	0,26	0,26	0,26	0,26	0,26	0,26	0,26	0,24	0,25	0,25	0,00	0,00



Energy intensities in EU

SOURCE: ODYSSEE DATABASE

Energy intensities – OECD

Source: IEA online data service



Reports Table Chart Download Beyond 20/20 Browser

EEI INDUSTRY

Other: ENDUSE - Manufacturing [ISIC 10-18, 20-32] PRODUCT/FLOW - Per value added energy int

COUNTRY	Australia	Austria	Belgium	Canada	Denmark	Japan	Korea	Mexico	New Zealand	Norway	Spain
TIME	↑↓	↑↓	↑↓	↑↓	↑↓	↑↓	↑↓	↑↓	↑↓	↑↓	↑↓
2010	13.15	6.17	8.53	14.24	3.14	4.89	5.35	4.23	11.60	12.96	5.06
2011	13.26	5.89	8.26	14.18	3.26	4.96	5.57	4.42	11.61	12.73	5.09
2012	13.12	5.78	8.31	13.84	3.03	4.82	5.49	4.26	11.72	11.97	5.11
2013	13.19	5.51	8.54	14.09	2.71	5.01	5.30	4.38	11.96	11.61	4.96
2014	13.25	5.28	8.21	13.59	2.32	4.73	5.33	3.90	12.38	11.12	4.69
2015	12.68	5.30	8.08	13.06	2.36	4.36	5.16	4.03	12.07	11.80	4.55
2016	12.95	5.22	8.32	12.79	2.29	4.29	5.13	3.91	11.77	12.32	4.82
2017	12.68	5.05	8.04	12.75	2.18	4.09	4.95	4.01	11.52	12.56	4.58
2018	12.37	4.58	8.15	12.17	2.13	3.97	4.83	3.87	11.11	12.50	4.58
2019	12.09	4.56	7.68	12.10	1.93	3.93	4.63	3.56	9.54	11.25	4.44
2020	11.72	..	7.18	3.83	4.51	3.31	9.04	..	4.40

Data subscription

Energy Efficiency Indicators

Expires: 15 Jun 2023

Released 13.09.2022

View data sets Access on WDS ↗

⋮

Energy consumption in manufacturing

How to collect data?

INCLUDES:

1. Electricity, gas and heat supplied from network
2. Purchases of energy at an market (coal, oil, petroleum products, solid biomass...)
3. Energy taken from own stocks
4. Own energy produced for direct use (solar heat, waste...)
5. Own energy produced in transformation processes (electricity, heat).

EXCLUDES: energy used for transportation, non-energy use, other purposes



Reporting on energy consumption from manufacturing industry

- **Responsibility:** National statistics offices
- **Questionnaire:** similar structure applied in many countries
- **Reporting period:** calendar year, Y-1 year
- **Sample design:** all large and medium size enterprises, sampling of the small size enterprise
- **Implementation:** January – May, Y-0 year

Exercise

EXAMPLE 1: Food processing industry – sunflor oil industry

Factory uses natural gas and gas/diesel oil in boiler plant to produce steam and hot water.

Annual energy consumption:

- 49258 GJ of steam and hot water used in processing
- 42 TJ of steam and hot water produced in boiler in enterprise
- 201 tis m3 natural gas
- 40 t residual fuel oil
- 300000 kWh electricity

Define type of enterprise: autoproducer.

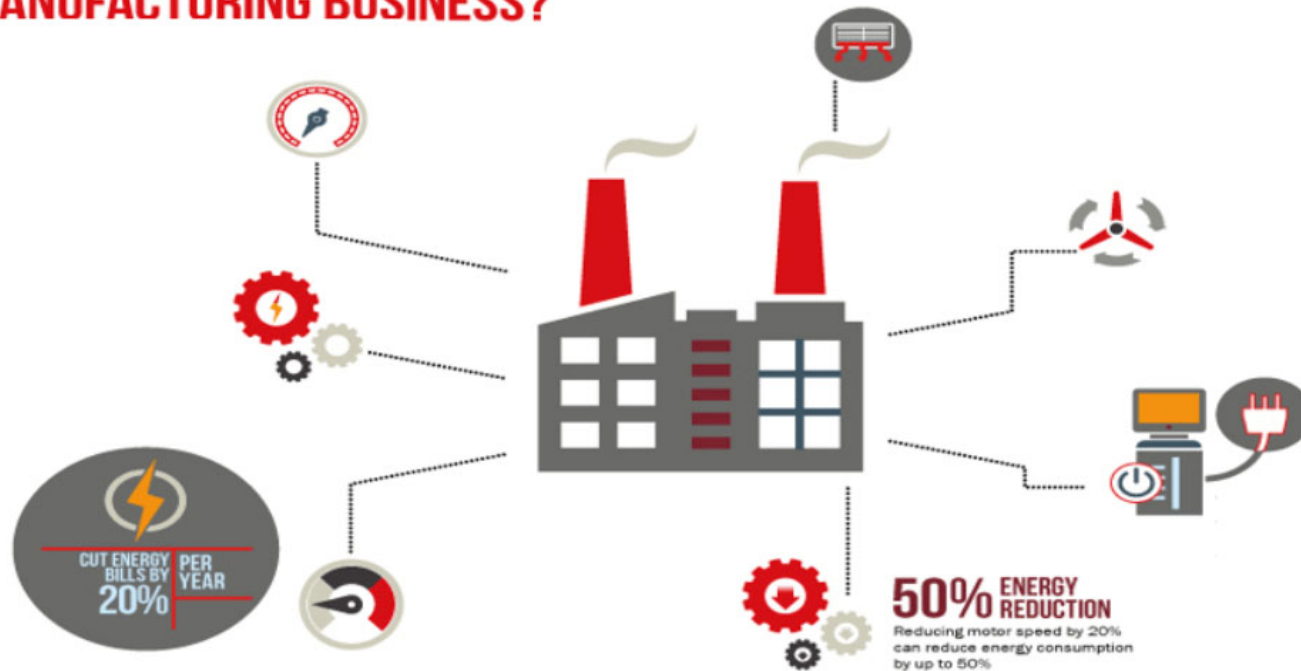
Prepare and apply controls of input data.

Prepare correctons of input data, or request for data provider for clarification.

Prepare appropriate outputs for energy balance.

Advanced statistics in manufacturing industry

HOW ENERGY EFFICIENT IS YOUR MANUFACTURING BUSINESS?

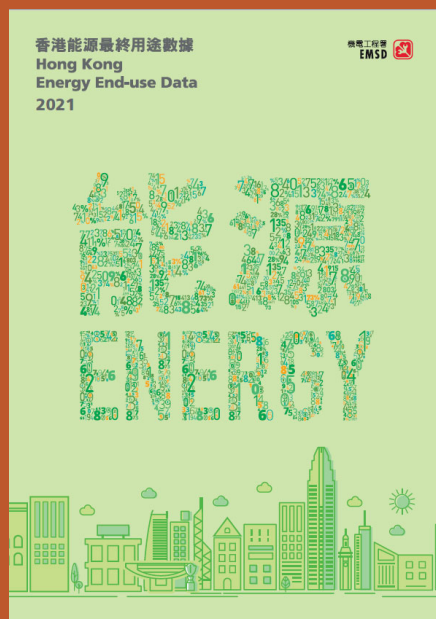


New indicators in EU

Since 2018, EU member states are requested to amend energy statistics in manufacturing with the following indicators in manufacturing:

- ✓ heat production needed for production processes,
- ✓ space heating, space cooling, water heating in administrative offices, energy consumption for cooling in production process,
- ✓ energy consumption (electricity) for electrical motors, electro chemical use, electricity consumption for appliances and lighting,
- ✓ other uses.

Example: HONG KONG



4.3 工業類別 Industrial Sector

表格 Table 48

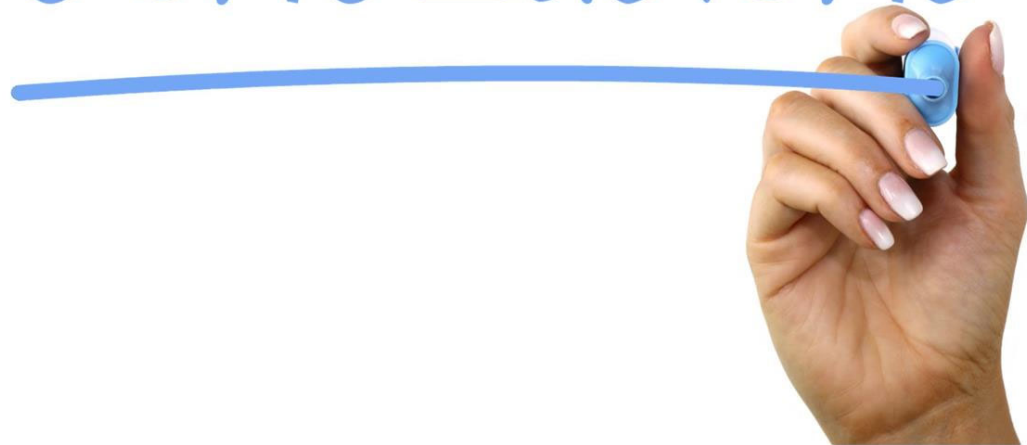
食品及飲品組別所有能源使用按最終用途劃分

Total Energy Consumption in Food & Beverage Segment by End-use

單位 Unit : 太焦耳 Terajoule

	工業生產 / 設備 Industrial Process /Equipment	照明 Lighting	空氣調節 Air Conditioning	垂直運輸 Vertical Transport	煮食 Cooking	其他 Others	總計 Total
2009	1,775	125	399	-	-	397	2,695
2010	1,793	125	400	-	-	399	2,718
2011	1,781	89	321	-	-	351	2,542
2012	2,012	85	347	-	-	402	2,846
2013	2,163	79	360	-	-	444	3,046
2014	2,345	80	413	-	-	530	3,368
2015	2,427	75	429	-	-	583	3,514
2016	2,365	70	436	-	-	644	3,515
2017	2,477	66	457	45	593	82	3,719
2018	2,568	66	456	49	599	82	3,819
2019	2,634	69	479	47	621	86	3,936

CONCLUSIONS

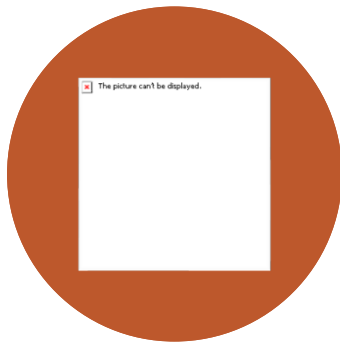


....and
recommendations

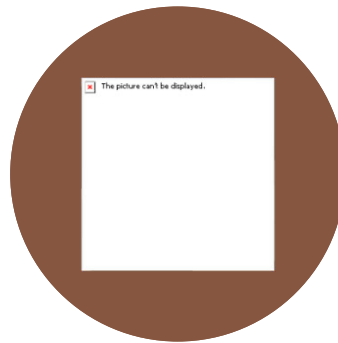
Conclusions and recommendations

1. Final energy consumption in manufacturing industry should be grounded on regular annual surveys in manufacturing enterprise;
2. Manufacturing industry is the only consumption group **whose consumption cannot be estimated in the years between surveys!**
3. Surveying concept (questionnaire) is simple in comparison to other consumers' groups. It is recommended to include in the sample all large and medium-size enterprises, while small enterprises should be randomly selected.
4. Calculation of energy intensities requires value-added by sectors.
5. It is recommended to analyse further possibilities for producing more disaggregated data.
6. It is suggested to develop benchmarks with other country and compare development processes.

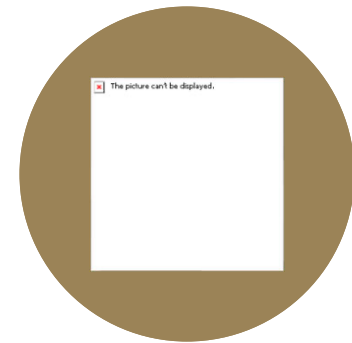
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LOREM IPSUM DOLOR SIT AMET,
CONSECTETUER ADIPISCING ELIT.



NUNC VIVERRA IMPERDIET ENIM.
FUSCE EST. VIVAMUS A TELLUS.



PELLENESQUE HABITANT MORBI
TRISTIQUE SENECTUS ET NETUS.