Japan's country-specific EFs for the CO_2 emissions from fuel combustion

Energy Breakout Group
#3 WGIA: Workshop for GHGs Inventories in Asia
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1. The Most Important GHGs Source in Japan (1)

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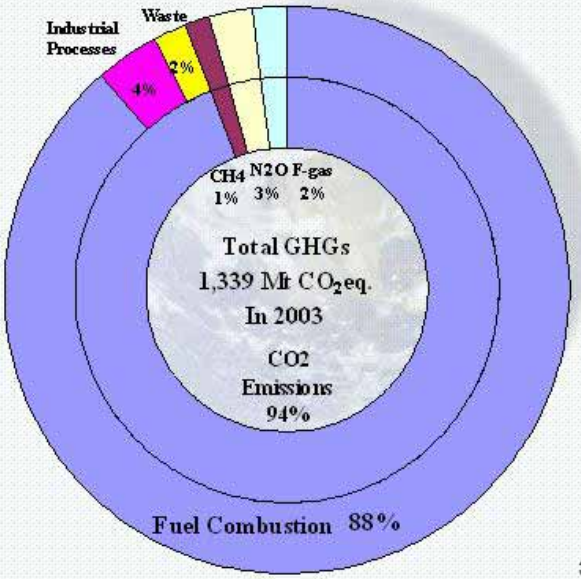
- Japan's GHGs Emissions in 2003
- CO_2 is the largest GHGs
- Regarding to CO_2 , the largest source is Fuel Combustion



1. The Most Important GHGs Source in Japan (2)

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- CO_2 from fuel combustion is only one increasing source

	Base Year of KP	2003	vs B.Y.
Total	1,237.0	1,339.1	(+8.3%)
CO_2 Fuel Combustion	1,048.3	1,188.1	(+13.3%)
other than F.C.	73.9	71.3	(-3.5%)
CH_4	24.8	19.3	(-22.3%)
N_2O	40.2	34.6	(-13.9%)
HFCs	20.2	12.3	(-39.2%)
PFSs	12.6	9.0	(-28.2%)
SF_6	16.9	4.5	(-73.6%)

1. The Most Important GHGs Source in Japan (3)

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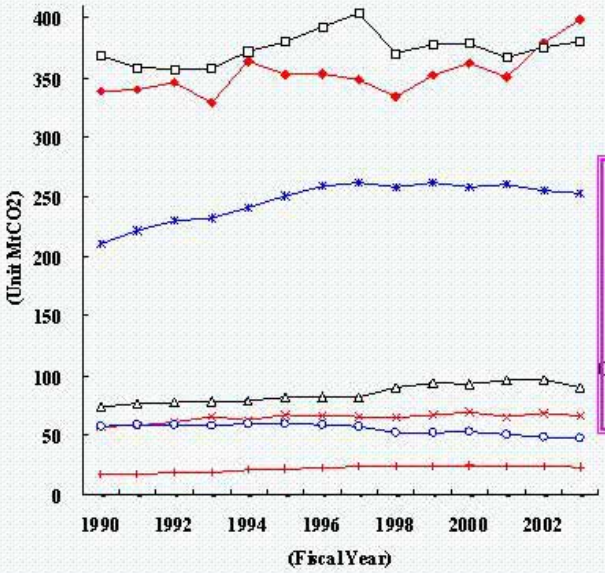
- CO_2 emissions by sector



Energy Industries	339 Mt → 399 Mt	(+17.8%)
Industries	368 Mt → 381 Mt	(+3.3%)
Transportation	211 Mt → 253 Mt	(+20.1%)
Commercial and other sector	73 Mt → 90 Mt	(+22.(
Residential	57 Mt → 66 Mt	(+15.1%)
Industrial Processes	57 Mt → 48 Mt	(-15.8%)
Waste	17 Mt → 23 Mt	(+37.8%)

1. The Most Important GHGs Source in Japan (4)

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- CO_2 Emissions from Fuel Combustion is the most important source
- Accurate and Transparent Inventory is needed
  - Accurate estimation
    - knowing effect of each counter measure
    - reviewing the effort of each stakeholder
  - Making with Transparent manner
    - having Accountability
    - establishing the basis of burden sharing among domestic stakeholders

2. History of Methods Development 1A CO_2

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Year	Event	EF	Activity Data		Uncertainty	
			Calorific Value	Energy Stats	Total	Sector
1992	MOE study on CO_2 emissions	EF ver'92	CV ver'75	former EB	3%	over 10%
1994	#1 National Communications	↓	↓	↓	↓	↓
1997	#2 National Communications	↓	↓	↓	↓	↓
	COP3+KP	↓	↓	↓	↓	↓
2000	Revision of CV by Energy Agency	↓	CV ver'00	↓	↓	↓
2001	Revision of Energy Stats by EA	↓	↓	new EB ver.00	1%	under 10%
2002	(MOE study on EF)	(EF ver'02)*not to be addopted		↓	↓	↓
	Japan's acception of the KP	↓	↓	↓	↓	↓
2003	In Country Visit (Review)	EF ver'92	CV ver'00	↓	↓	↓
2004	Revision of Energy Stats by EA	↓	annual CV	new EB ver.11	↓	under 5%
2006	EA & MOE study on EF	EF ver'06	↓	↓	↓	↓

3. Difficulties of Methodology Development in CO_2 from Fuel Combustion

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- **EF (Emission Factor)**
  - Representativeness: difficulties of sampling (especially coal)
- **AD (Activity Data)**
  - Resolution of Statistics
  - Mass Balance, Energy Balance, Carbon Balance
  - Off gas, by-product gas
    in Japan, many kind of by-products are used as fuel or feedstocks for effective use of natural resources,
    so called *CASCADE ENERGY USE*
- **Estimation**
  - Sectoral Approach vs. Reference Approach

4. Collaboration between Energy Agency and Inventory Agency

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- In 2002 MOE's study,
  Unbalance of Energy Balance Table was found.
- These unbalance was observed in 2 processes;
  1. Oil Refinery, 2. Solid Fuel Transformation.
  This assessment was based on material balance.

5. Case of Oil Refinery (1)

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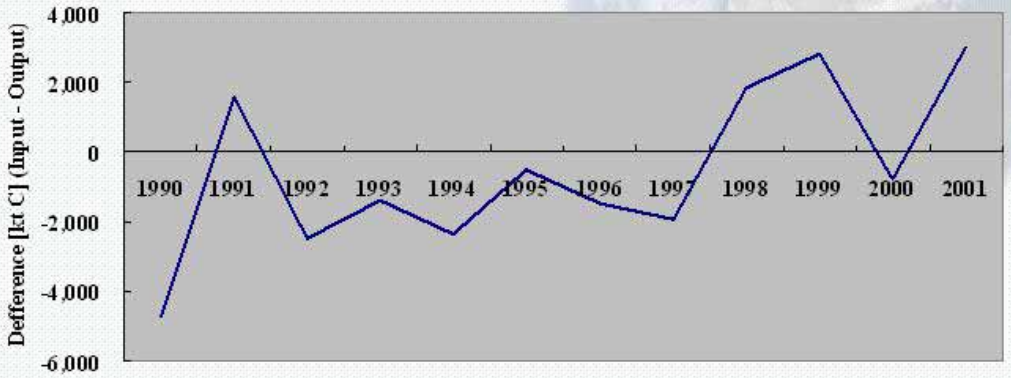
- In Oil Refinery sector of new EB ver.0,
  yield ratio (Products / Feedstocks) was fluctuated.
- Positive value means carbon production more than carbon contained in crude oil input.



5. Case of Oil Refinery (2)

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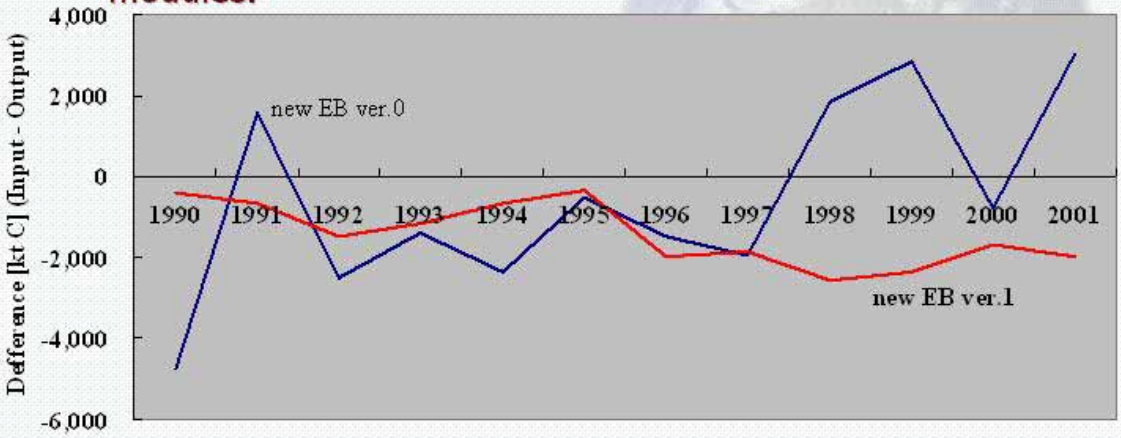
- Committee of MOE pointed out this point, and Energy Agency revised their stats to new EB ver.1.
- EA modified their model from 1 module to 4 deferent modules.



5. Case of Oil Refinery (2)

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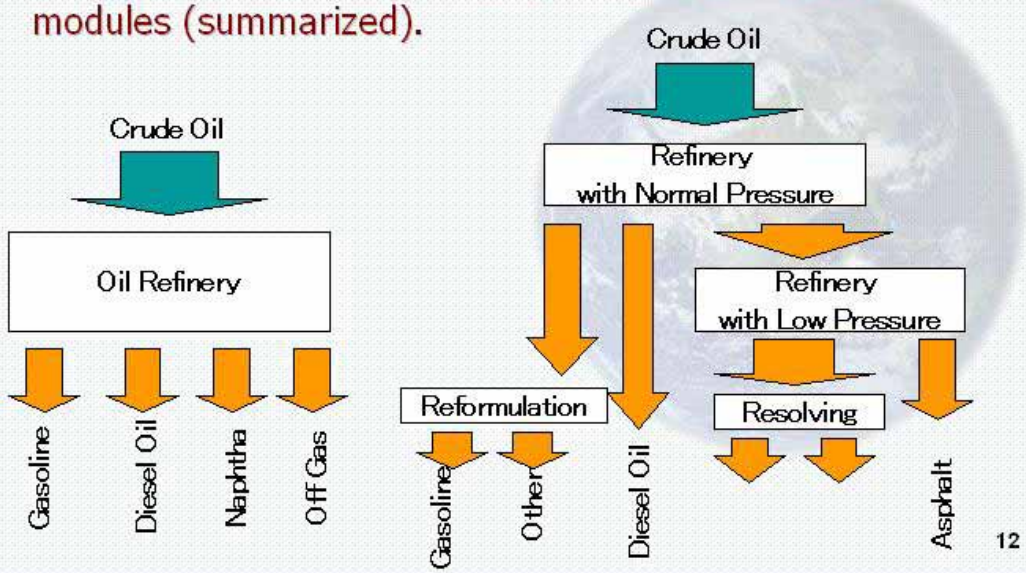
- EA modified their model from 1 module to 4 deferent modules (summarized).



6. Case of Iron & Steel (1)

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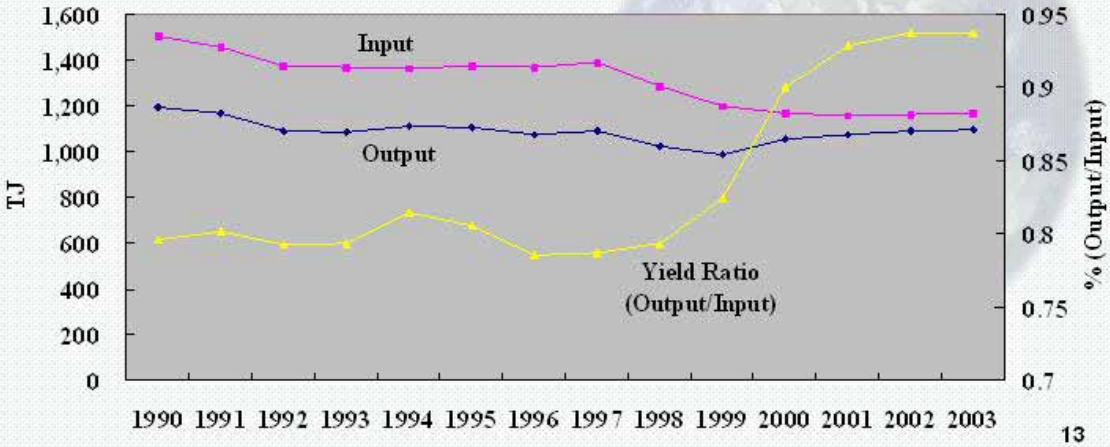
- In Iron & Steel sector (coke production & BFG production) of new EB ver.0, yield ratio was too low in early years.



6. Case of Iron & Steel (2)

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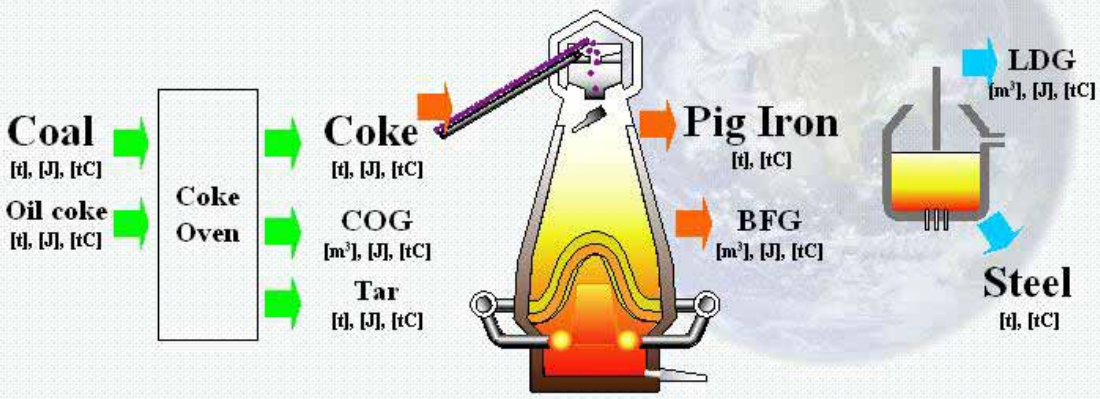
- In Iron & Steel sector, Fate of Carbon is complicated.
- This issue is still under consideration.



7. Summary of the cases

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- Assessment by deferent entities are effective
- Based on balance approach,
  1. Mass should be balanced
  2. Carbon should be balanced
  3. Energy almost be balanced ex. Energy-losses.

7. Conclusion

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- In the sector "CO_2 from fuel combustion", methodology development EF and AD, one after the other
- Assessment by deferent entities are effective
- These processes enhanced understanding scientific aspects of GHG inventories.
- These processes made good and strong relationship among stakeholders.

Thank you for your attention !!

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