



Climate Policy Forum Cum Workshops

GHG Reduction Solutions for a Low Carbon Hong Kong

30 September, 2010

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WWF_Climate Policy Forum

Changing Energy Mix

An approaches for GHG Reduction in HK

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30 Sept. 2010



Changing Energy Mix

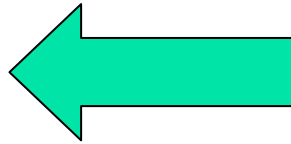
- Overview of energy demand and supply in HK
- Threats or Opportunities
- Feasibility/Timeframe/Tariff implication
- Decomposition Analysis



Energy Demand Side

Four sectors:

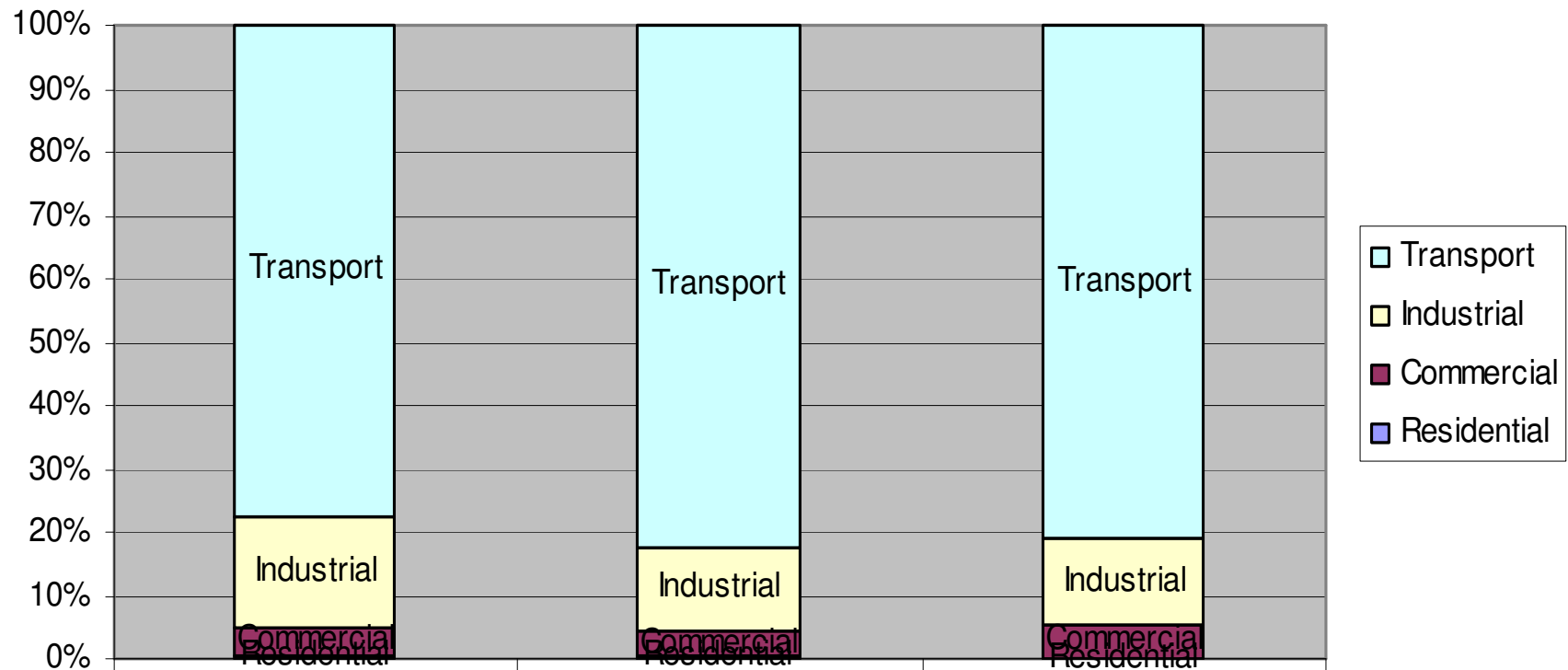
- Residential
- Commercial
- Industrial
- Transport



Three main energy end-use:

- Gas (Town Gas and LPG)
- Oil and Coal
- Electricity

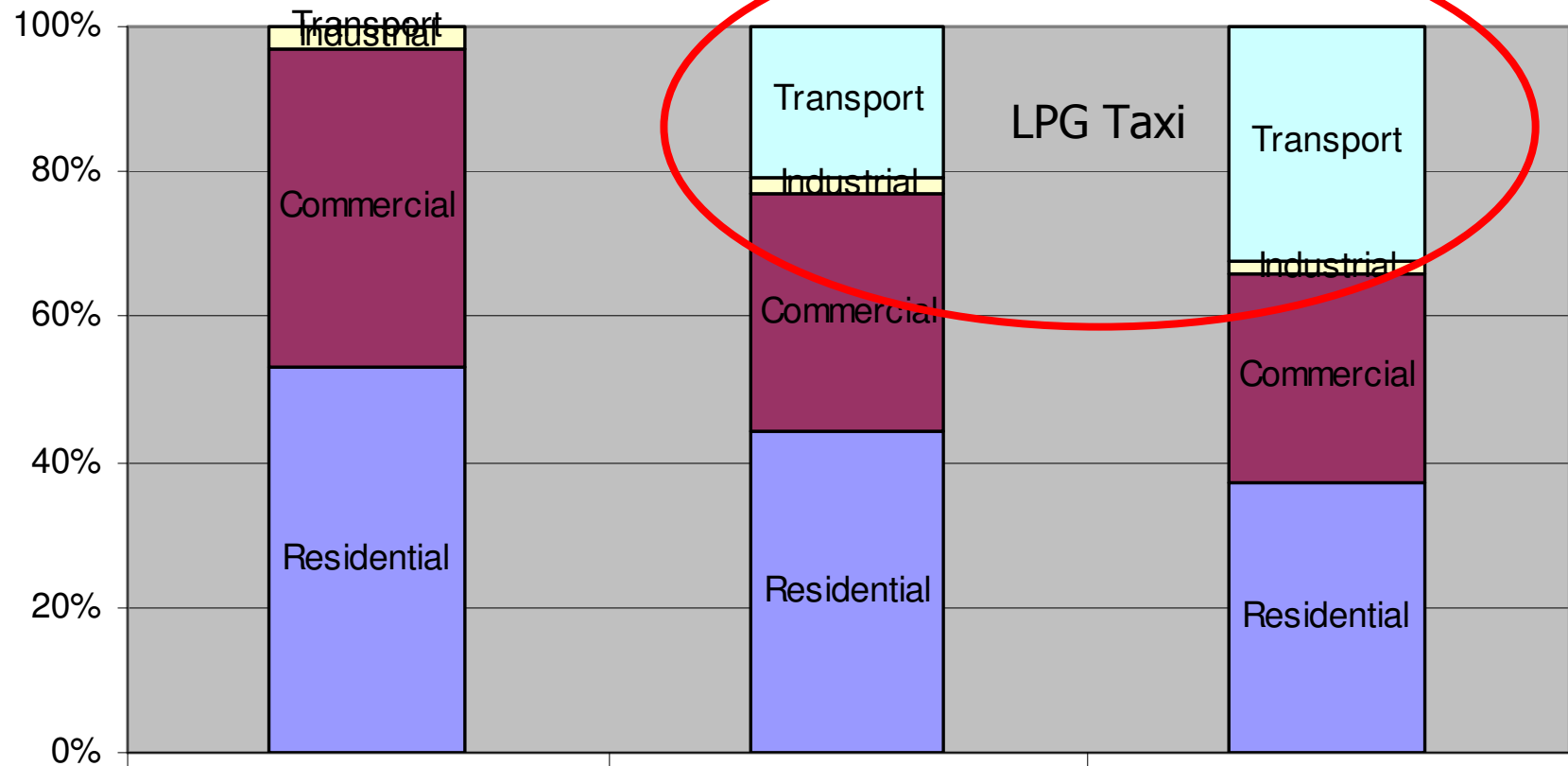
Oil and Coal End-use (TJ) by Sector



Transport	91733	88797	77992
Industrial	21036	14336	13463
Commercial	5106	4192	4964
Residential	527	292	57

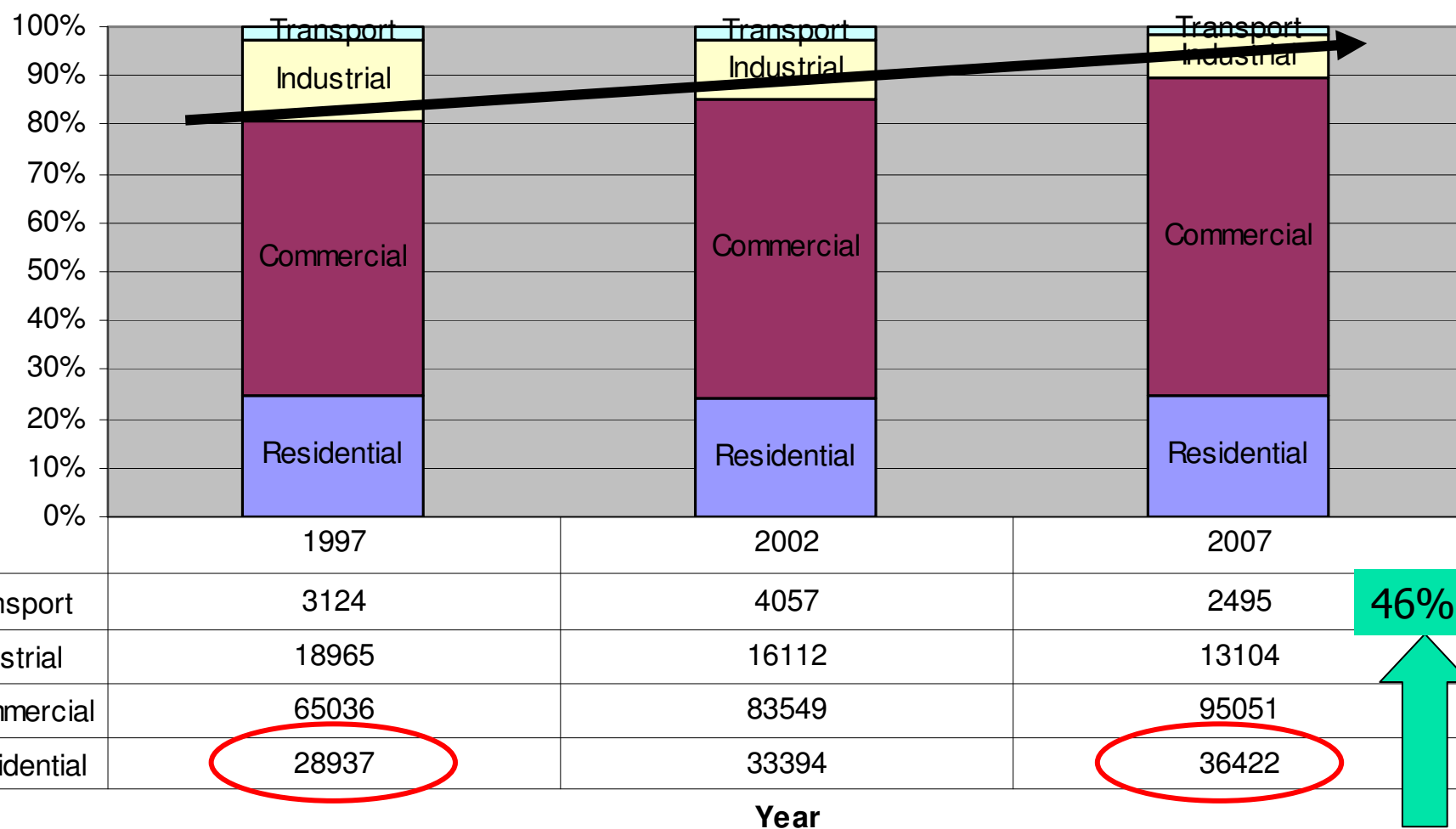
Year

Town Gas and LPG end-use (TJ) by Sector

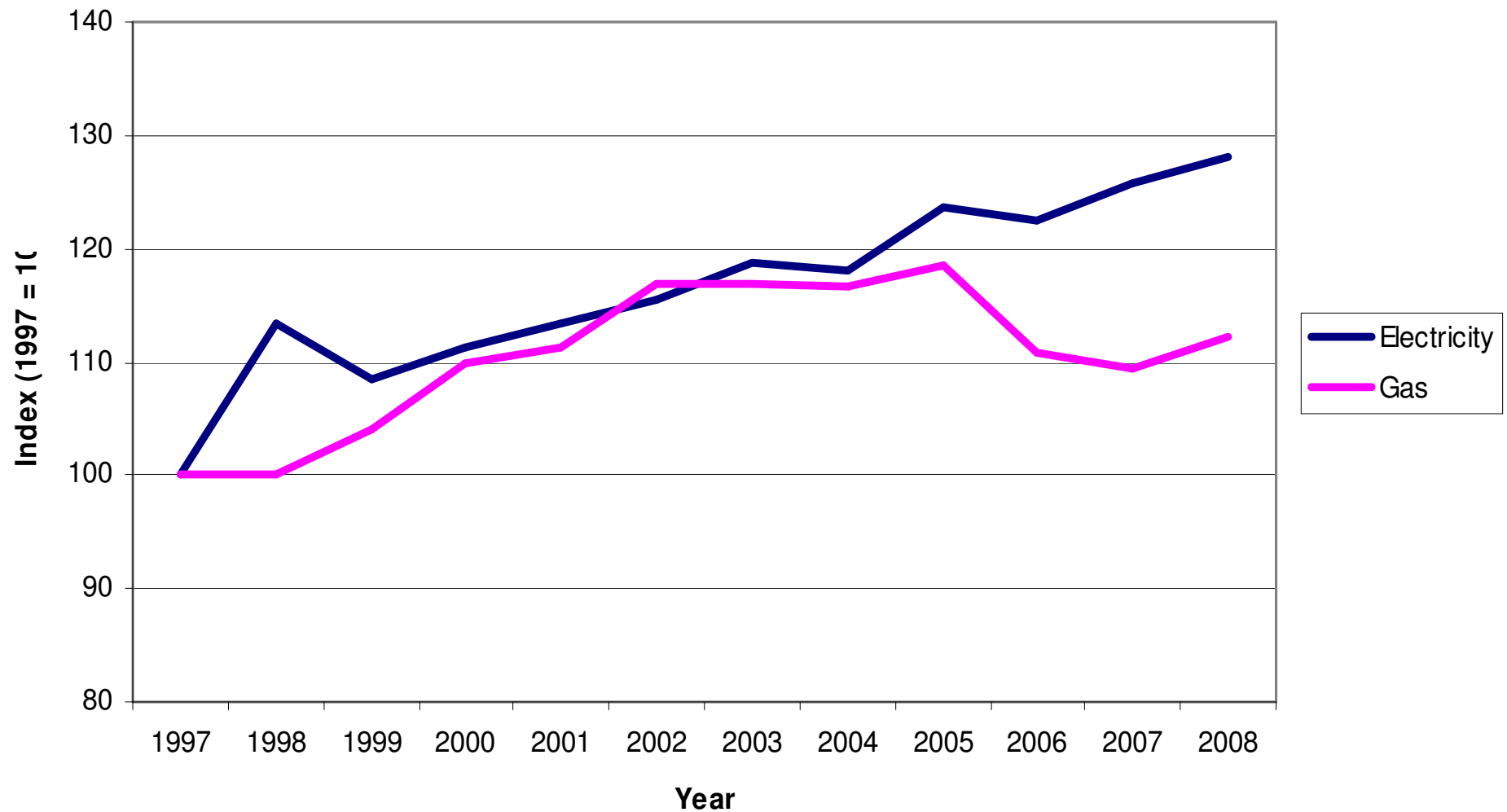


Transport	1	8194	14034
Industrial	807	874	793
Commercial	12243	12833	12347
Residential	14791	17293	16189

Electricity End-use (TJ) by Sector - 67% GHG emissions



Competition between Electricity and Gas in Residential Sector, 1997-2008

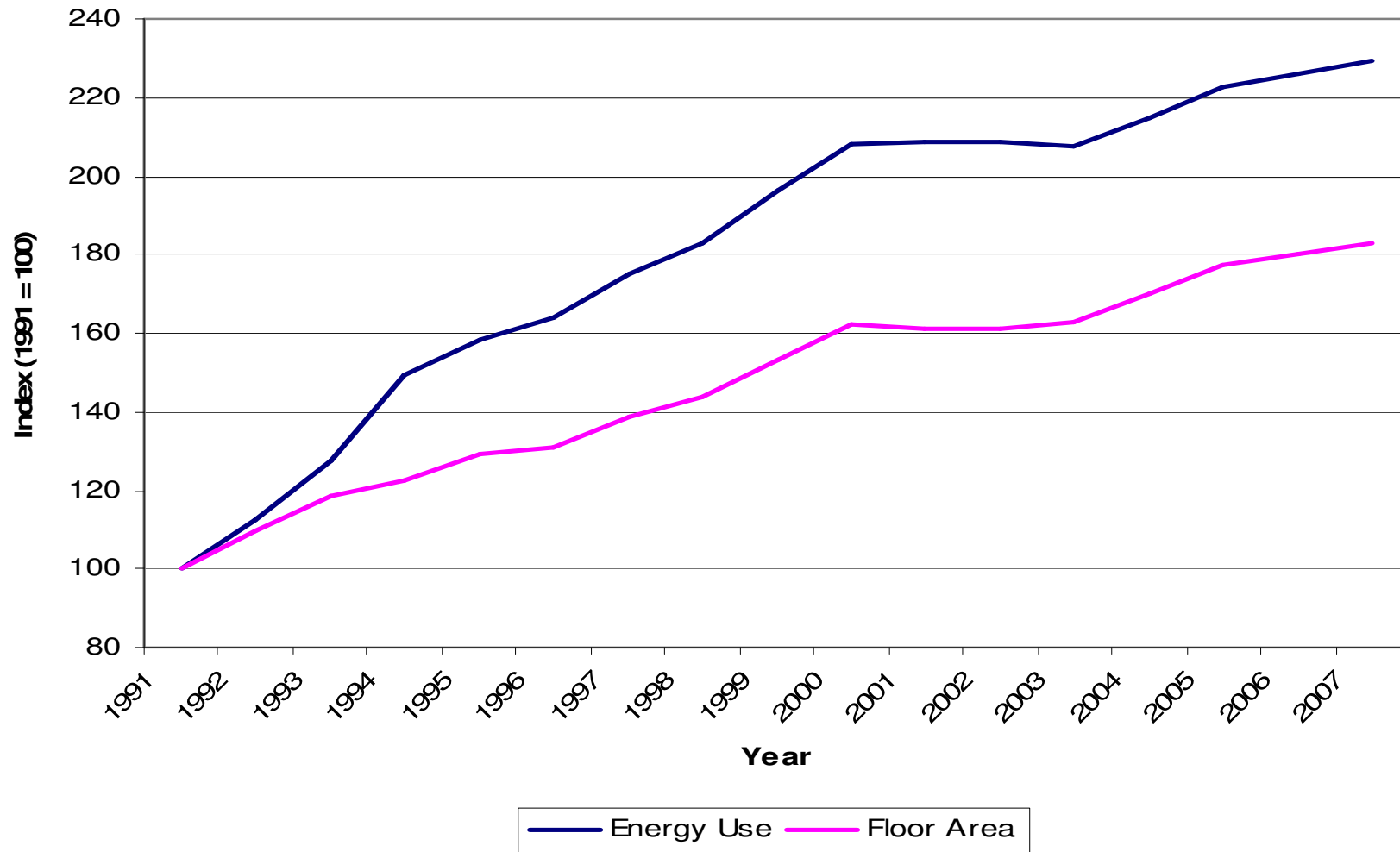


Energy end-use in 2005

Energy type	Major Sectors	% in use		
<i>Oil & Coal</i>	Transport	84%		
	Industrial	5%		
<i>Gas</i>	Residential	40%		
	Transport	29%		7.48MtCO2-e
	Commercial	29%		
	Industrial	2%		
<i>Electricity</i>	Commercial	64%		28.6MtCO2-e
	Residential	24%		
	Industrial	10%		
	Transport	2%		

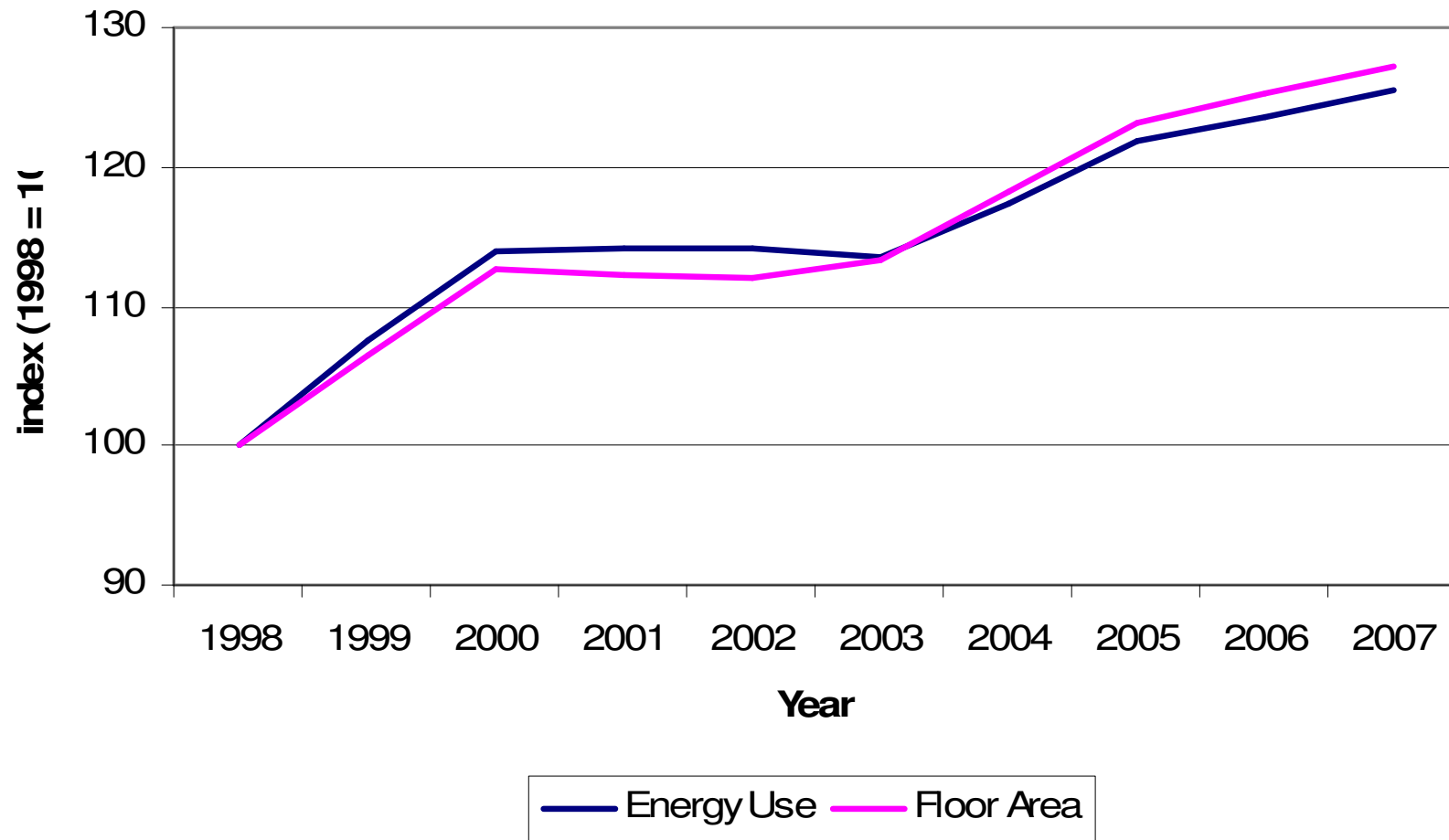
Total Electricity demand: 144,171 TJ
Office buildings: 14,858 TJ (over 10%)

Decoupling of Energy Use and Floor Area of Office Segment, 1991 - 2007



Does BEC really help?

Decoupling Energy Use and Floor Area of Office Buildings



Does BEC really help?

YES, but not enough.

Energy Demand & Supply Side

Four sectors:

- Residential
- Commercial
- Industrial
- Transport

Three main energy end-use:

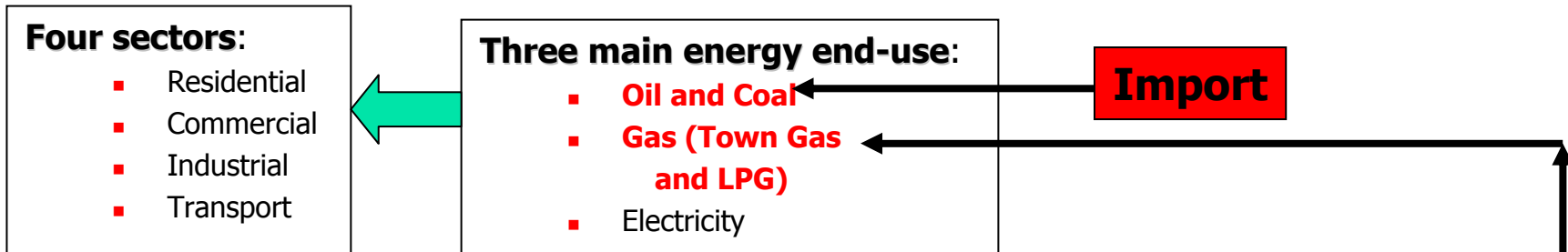
- Gas (Town Gas and LPG)
- Oil and Coal
- **Electricity**

Transformed to Electricity		2005
Coal	287,249	
Natural Gas	85,751	
Diesel Oil Industrial (IDO)	267	
Fuel Oil	1,323	
Electricity Generation Inputs		374,590
Electricity Generation Loss	236,176	
Annual Production		138,414
Network Loss and Utility Consumption	17,654	
Electricity Import	39,604	
Electricity Export	16,192	
Final Electricity Requirement		144,172

?? CO2-e

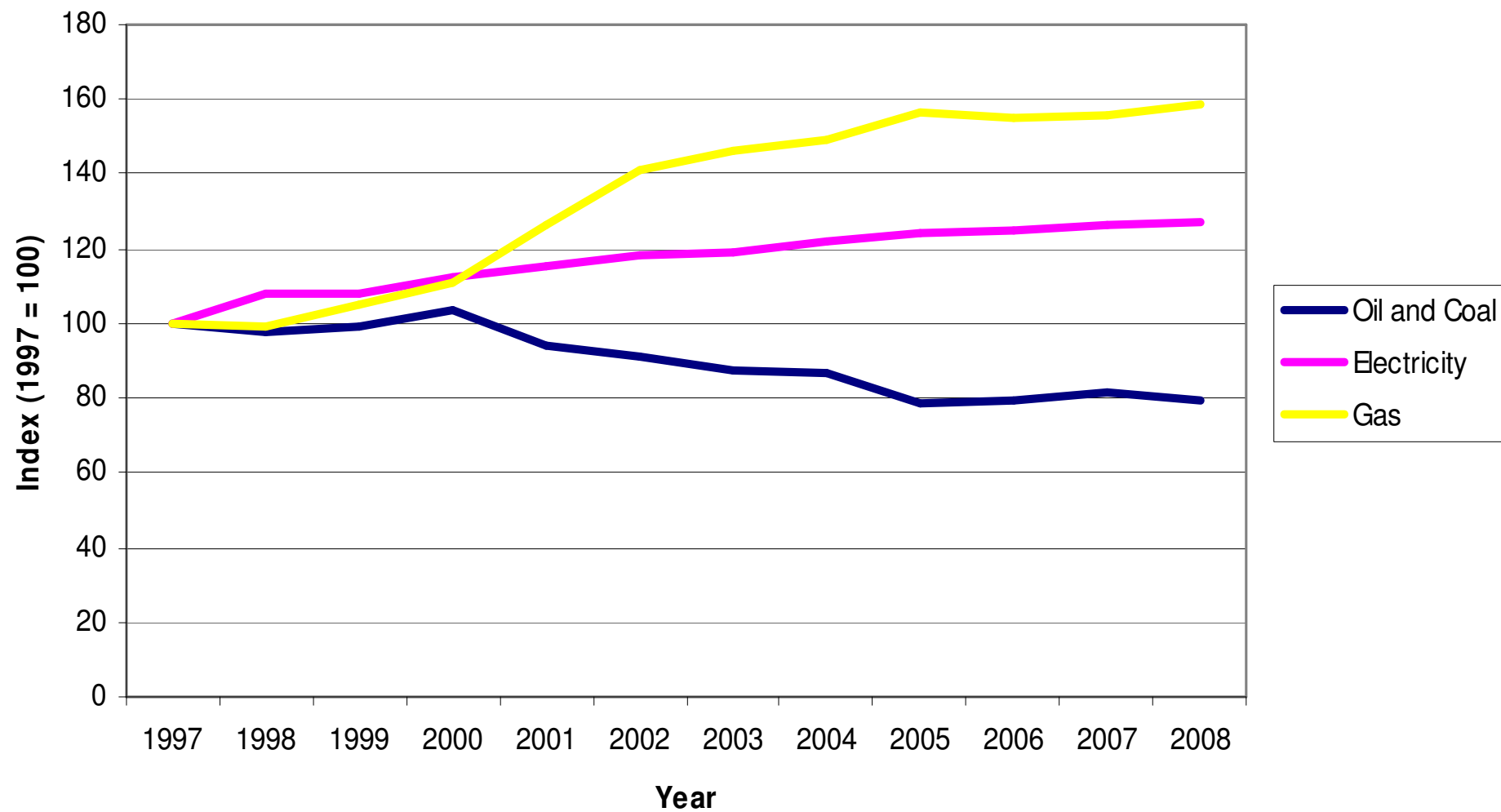
-37%

Energy Demand & Supply Side



Transformed to Town Gas	2005	
<i>Percentage Loss based on NCV</i>	85.2%	?? CO2-e
Naphtha	30,078	
Natural Gas		
Gas Plant Losses	5,927	-10%
Final Town Gas Requirement(NCV)	24,151	
Final Town Gas Requirement(GCV)	27,261	

% changes by energy end-use, 1997 - 2008



Decoupling of Electricity Consumption from GDP, 1990-2007

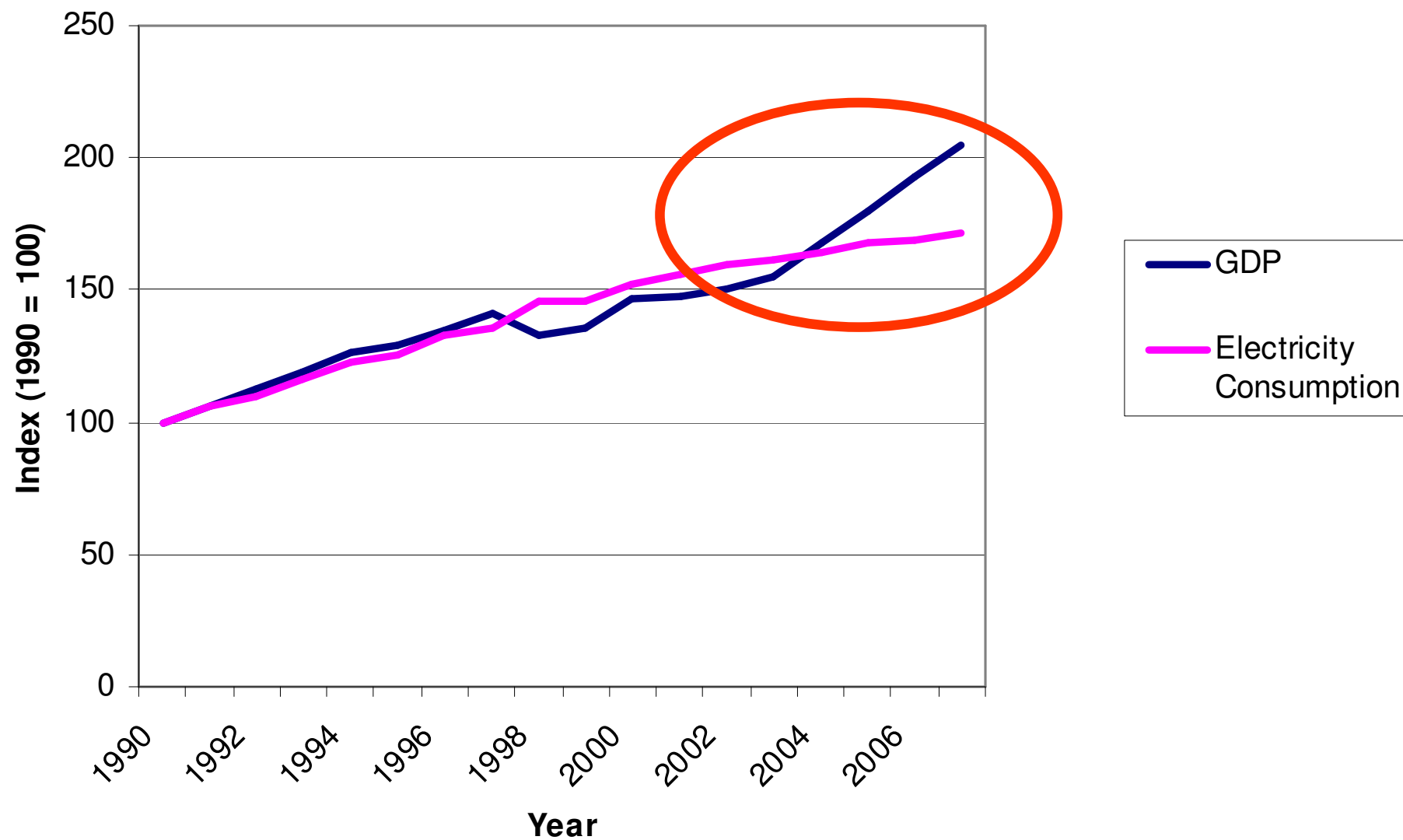


Figure 5 : Past and Future GHG Emission Trends of Hong Kong under the business-as-usual scenario (1990-2020)

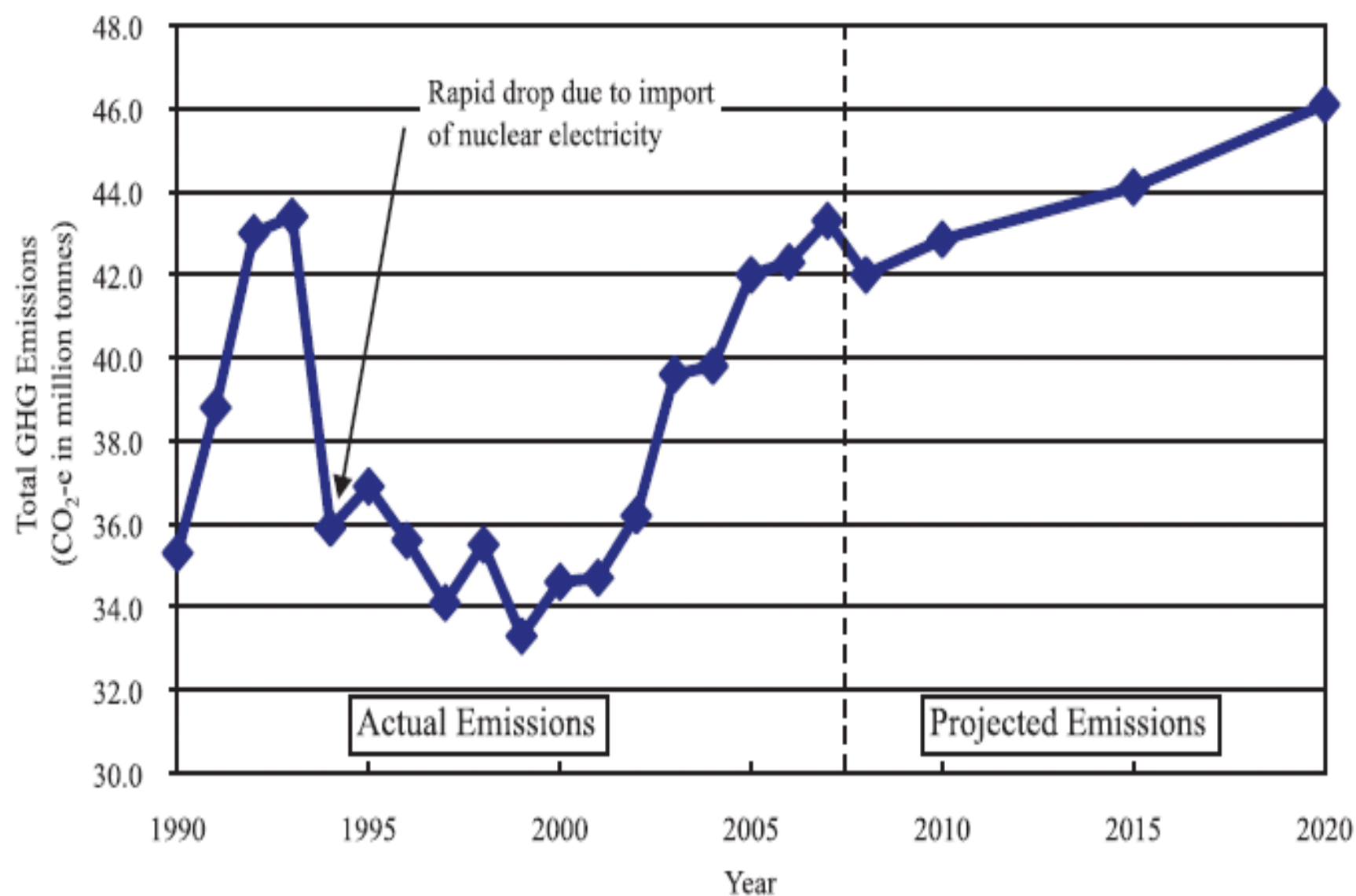
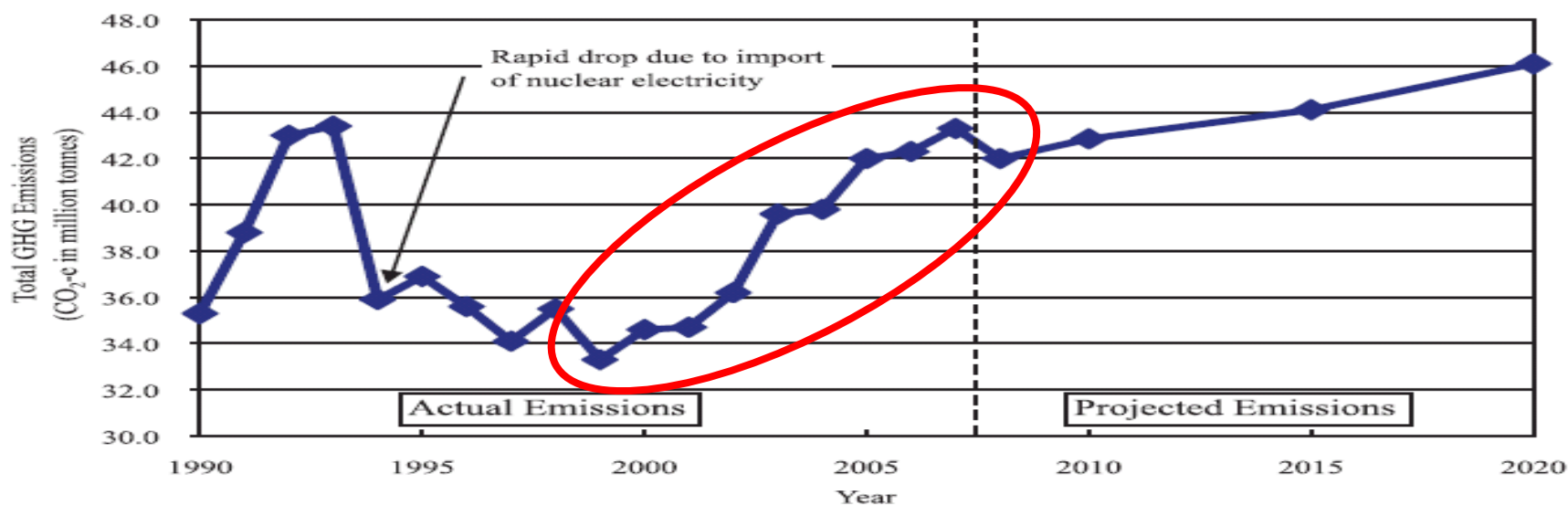
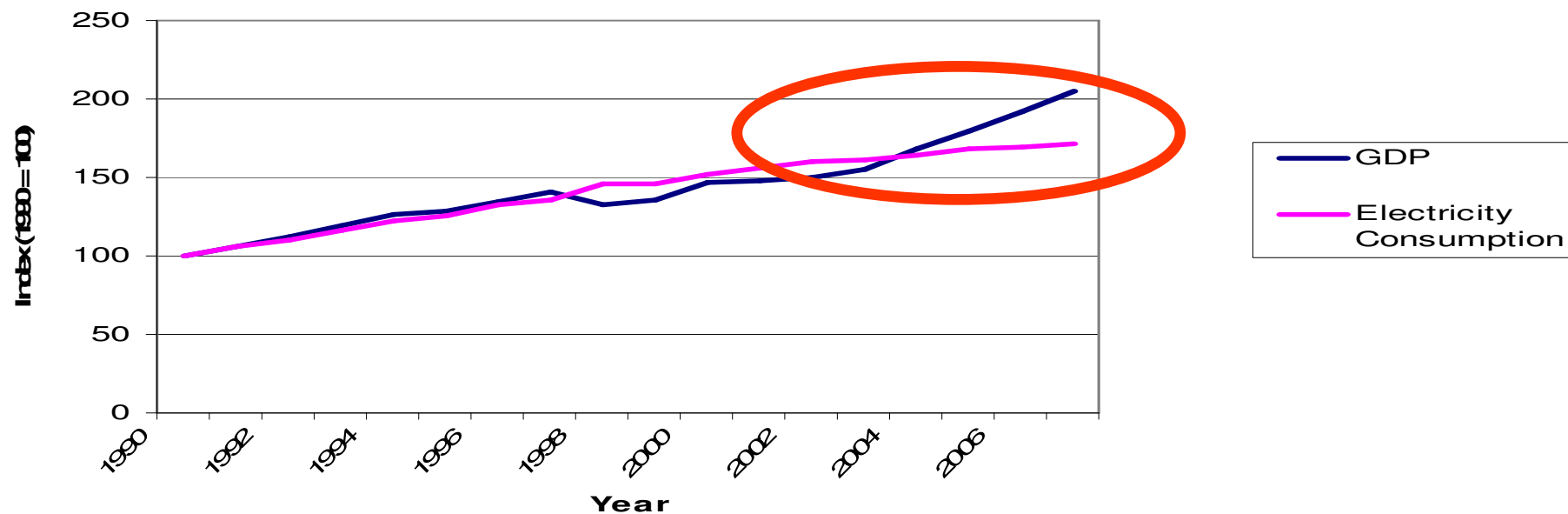


Figure 5 : Past and Future GHG Emission Trends of Hong Kong under the business-as-usual scenario (1990-2020)

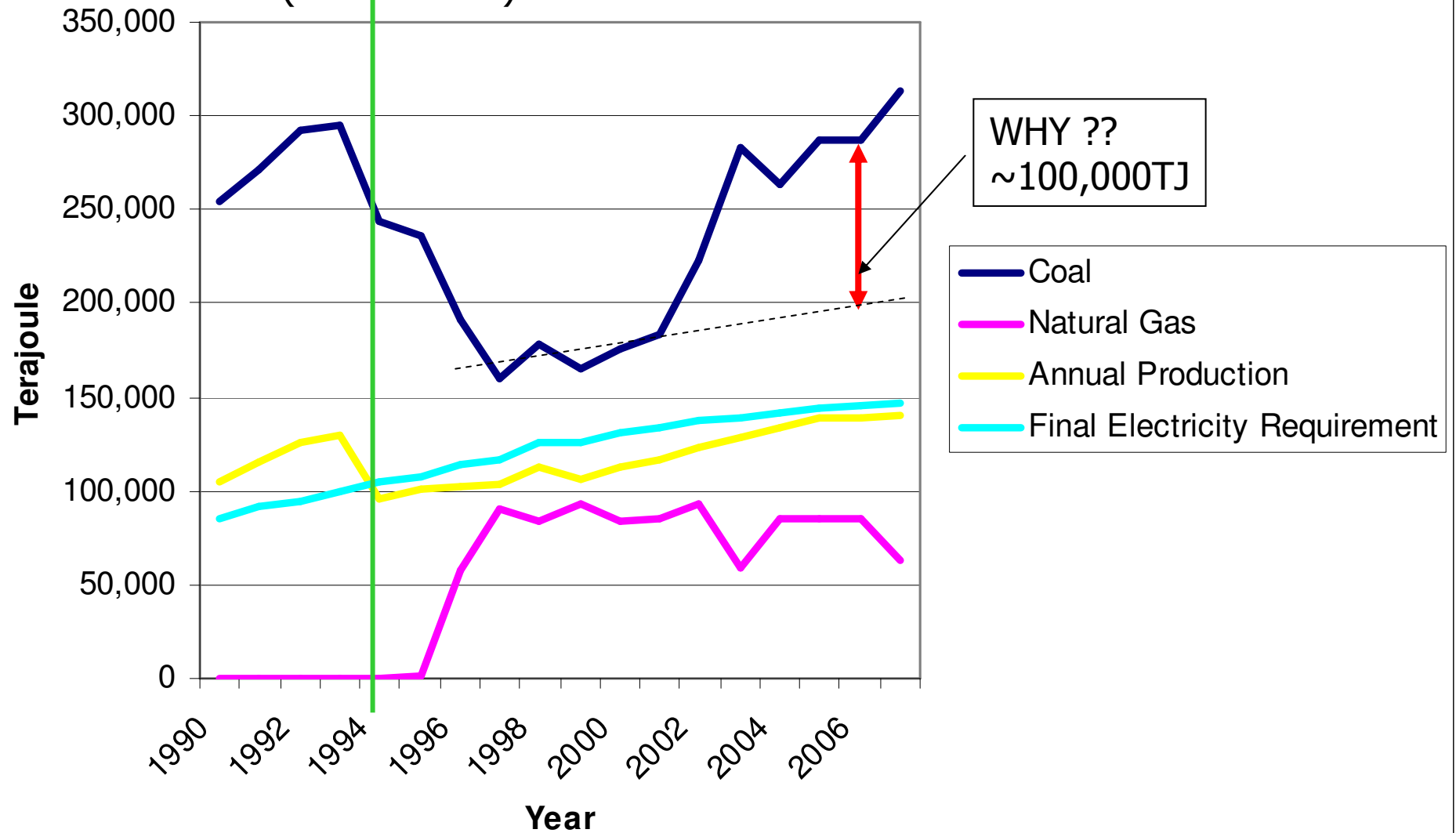


Decoupling of Electricity Consumption from GDP, 1990-2007



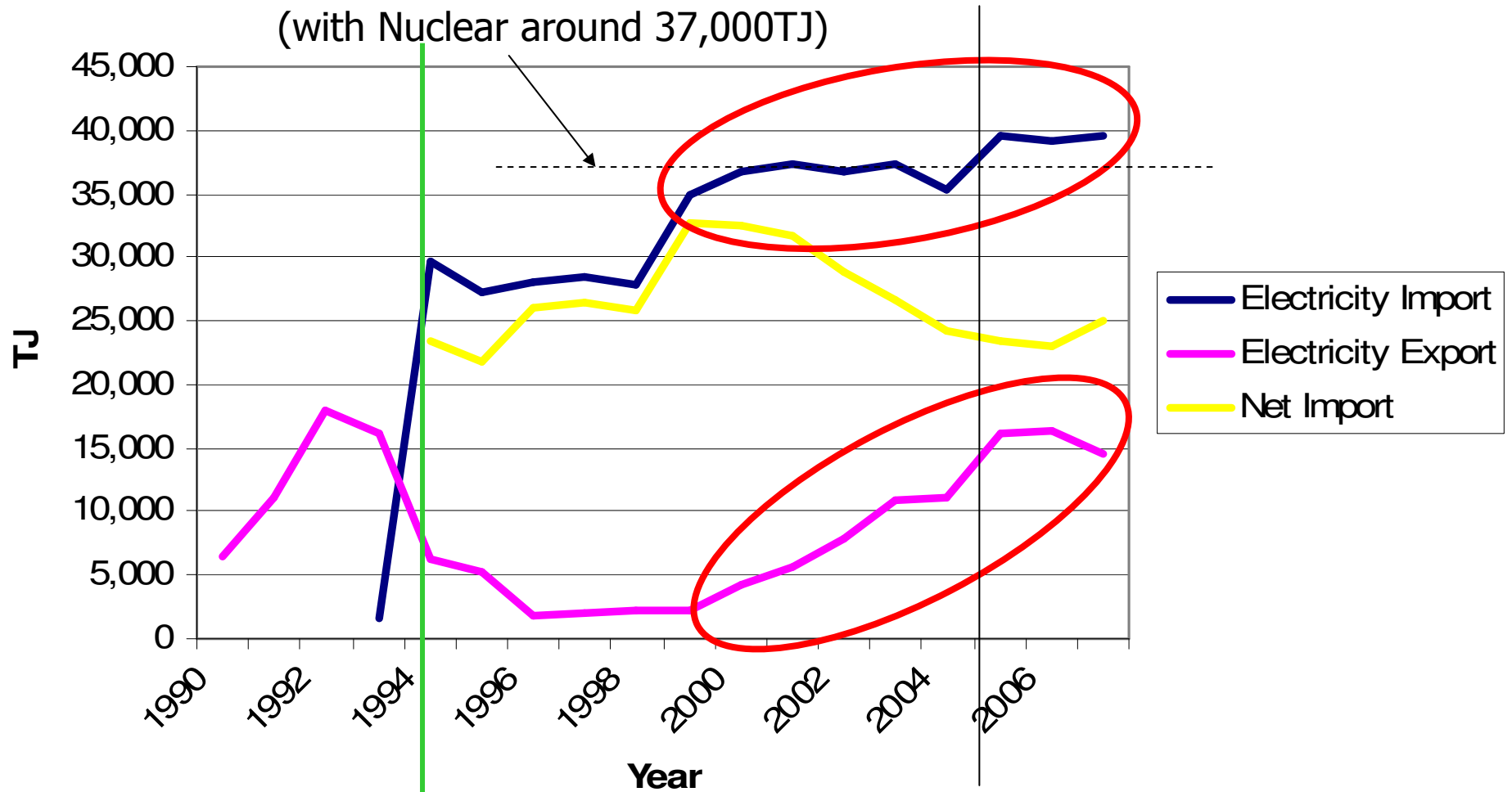
Coal and Natural Gas for Electricity Generation

(with Nuclear)



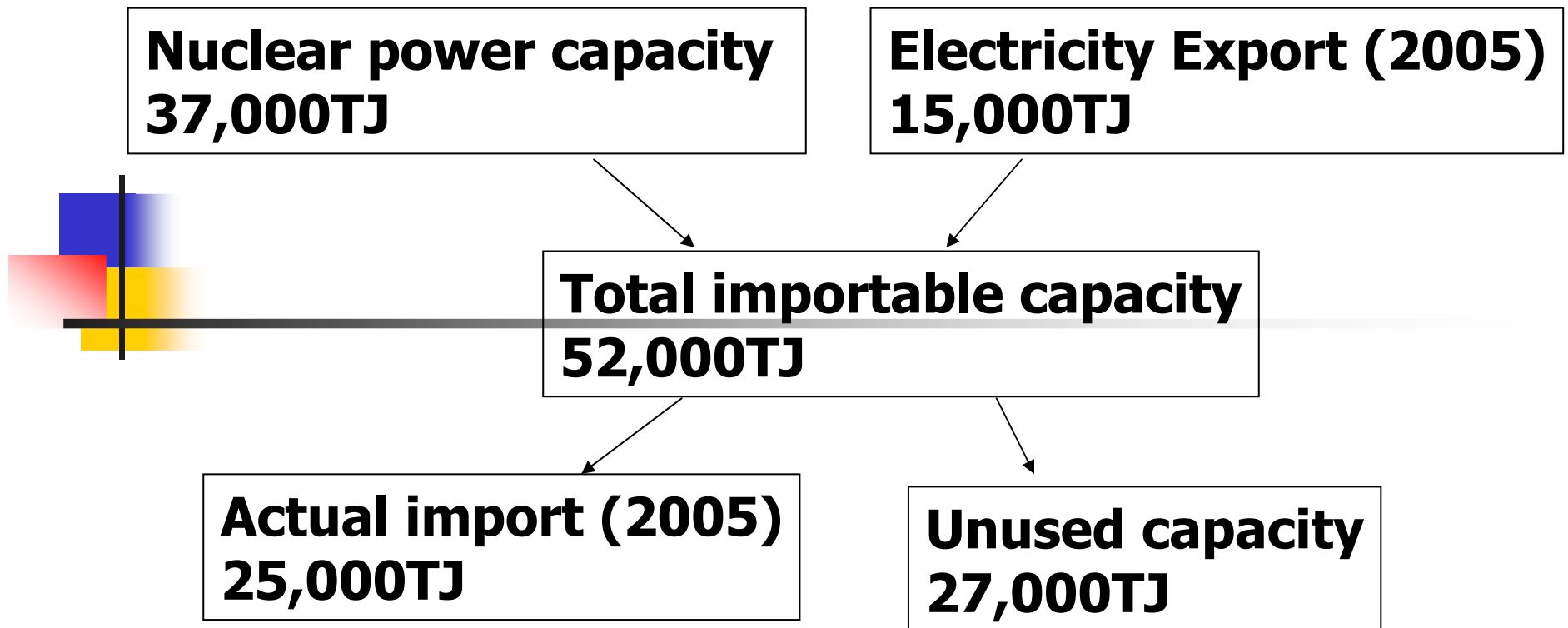
Electricity Import/Export

(with Nuclear around 37,000TJ)

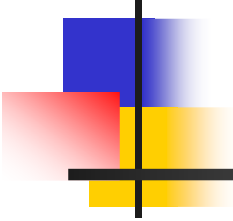


Pumped storage/Nuclear

Simple calculation (2005):



Do we pay the high cost (in terms of GHG emissions) in the process of Electricity Import/Export?



kg CO₂-e/HK\$ Vs Total GHG emission?

- setting for Hong Kong a target to reduce carbon intensity by 50-60 % by 2020 when compared with 2005;

p.7

reduction targets. This notwithstanding, the CPG announced on 26 November 2009 a voluntary national target (the National Target) to reduce the CO₂ produced for each yuan of national income by 40% - 45% by 2020 as compared with the 2005 level. The National Target will mainly

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Table 6 : Expected GHG emissions reduction in Hong Kong from 2005 to 2020

	2005	2020	Reduction
Carbon intensity (kg CO ₂ -e/HK dollar)	0.029	0.012 - 0.015	↓ 50-60%
Total GHG emissions (million tonnes)	42	28-34	↓ 19-33%
Per capita GHG emissions (tonnes)	6.2	3.6-4.5	↓ 27-42%

GDP assumption?

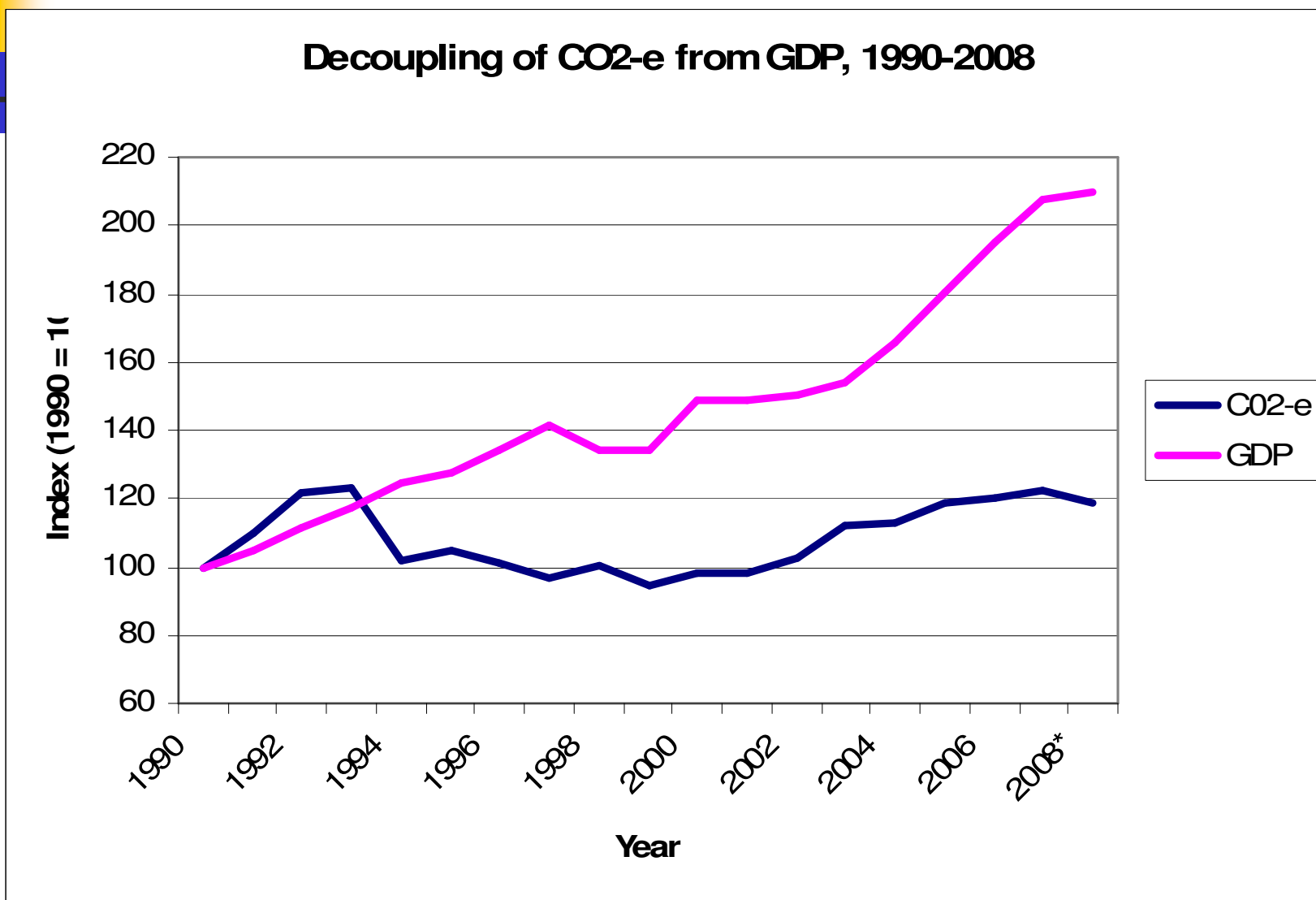
GDP assumption's estimation

Scenario	GHG emissions (Given) kg CO2-e/HK\$	GDP growth rate
Low	28,000	0.012
	28,000	0.014
	28,000	0.015
Average	31,000	0.012
	31,000	0.014
	31,000	0.015
High	34000	0.012
	34000	0.014
	34000	0.015

Higher GDP growth rate => Higher GHG emissions

However

Does HK's GDP growth rate depend upon energy consumption?



Questions:

Do we ignore the decoupling effect?

The growth rate of GDP is much higher than that of GHG emissions.

Is the target set too high in terms of emissions intensity kgCO₂-e/HK\$?



Other issues

- Will we impose high competition in getting “Green” energy from nearest regions?
- Will the overall GHG emissions be reduced with this high competition? If not, GHG is transferred from HK to other “poor” regions near HK.
- Importing more Nuclear energy
 - enlarge electricity grid ← Do we need to “collect” more land from our “farmers”?



Thank you.
