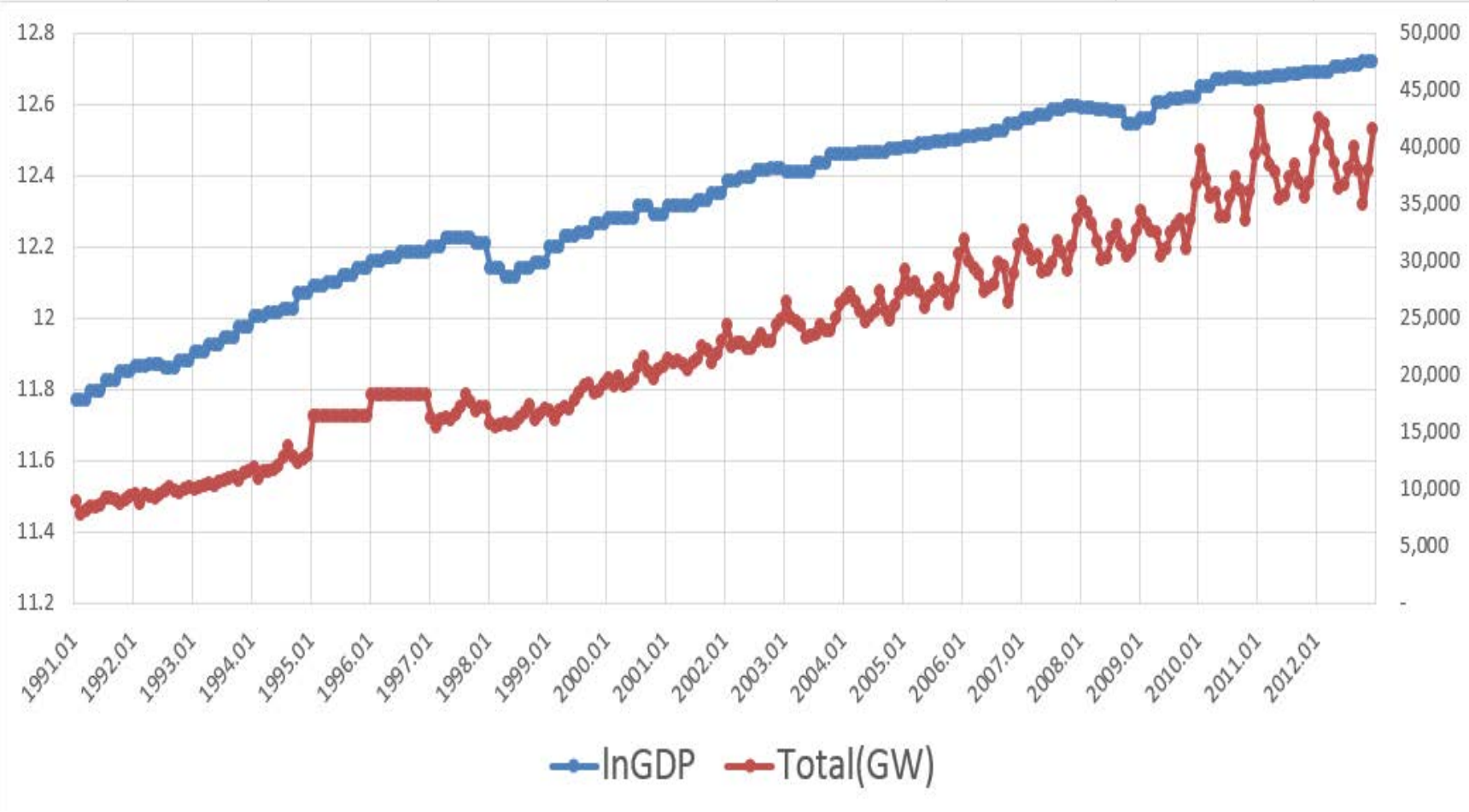


Implementing ETS with a regulated power sector: Korea's case

2016.03.10

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Electricity Consumption During 1991-2012



Source: Kim, J., Choi, K. and Oh, H. (2016), Why the Peak Load Is Observed During the Winter Months in Korea?

GHG Emissions & Electricity Consumption

- ▶ The proportion of GHG emissions from power generation > 40%.
- ▶ More than 80% of GHG emissions from the power sector ← Coal-fired generators.

< Annual Growth Rates (1991-2012) >

Variables	Year-wise	Summer	Winter
GHG(Total)	3.74		
GHG(Energy Sector)	4.08		
GDP	4.23		
Electricity Consumption (Total)	7.39	7.17	7.83
Electricity Consumption (Industry Sector)	5.79	6.51	6.76
Electricity Consumption (Commercial Sector)	10.48	9.80	11.57
Electricity Consumption (Residential Sector)	6.60	5.83	5.93

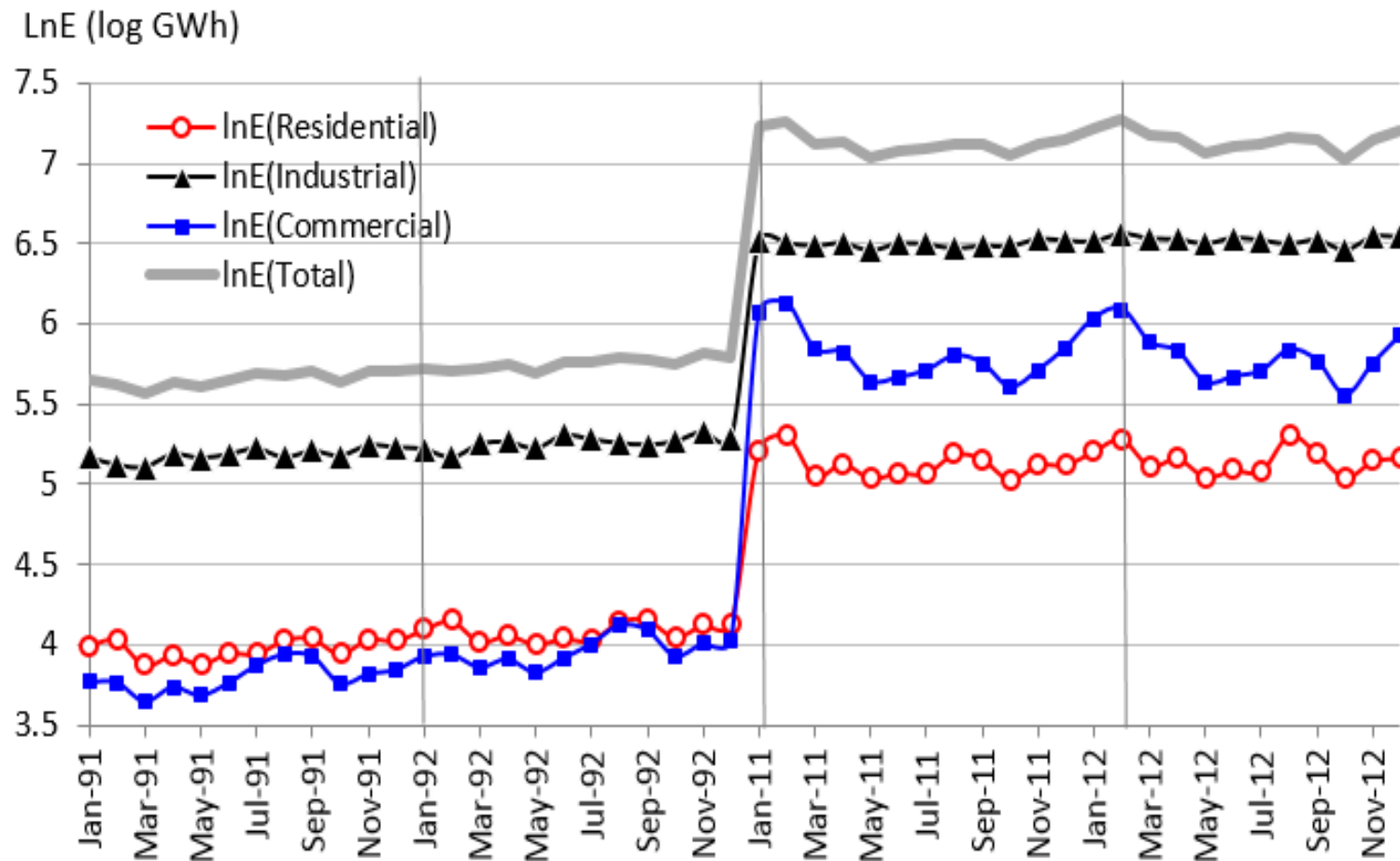
Source: Kim, Choi and Oh (2016),

Annual growth rates of electricity consumption is larger than that of GDP.

Electricity consumption growth rates are larger for winter months than for summer months.

Unique Seasonal Patterns

► Annual peaks observed during winter months since 2002



Source: Kim, Choi and Oh (2016)

Treatment for Electricity Consumption in KETS

- ▶ Inclusion of both direct and indirect emissions
 - Measurement & Free Allocation Method
 - Direct emissions: Actual emissions and mostly Grand-fathering
 - Indirect emissions: Intensity *electricity consumption

- ▶ Why?
 - Low end-user electricity prices

Treatment for Electricity Consumption in KETS (cont.)

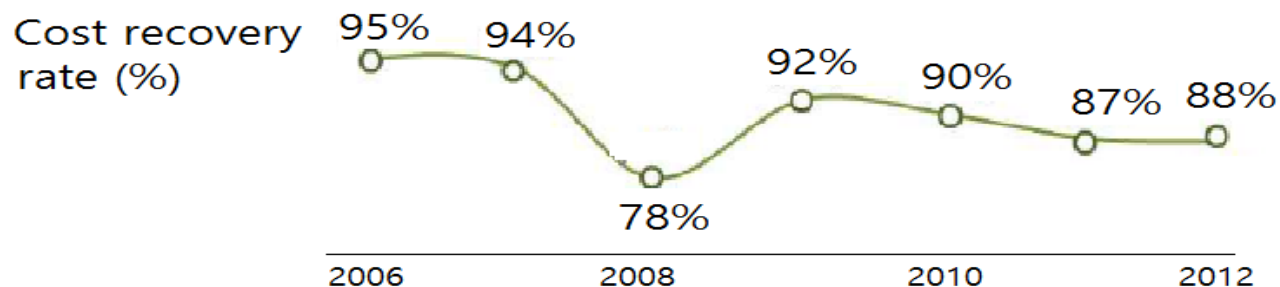
► Electricity pricing mechanism in Korea

Wholesale market

- Costs-based dispatch
- Wholesale prices have increased as LNG generators set the market price more often than before.
- The national electricity supply plan → the proportion of nuclear power generation will increase → may hinder electricity prices from rising

Retail market

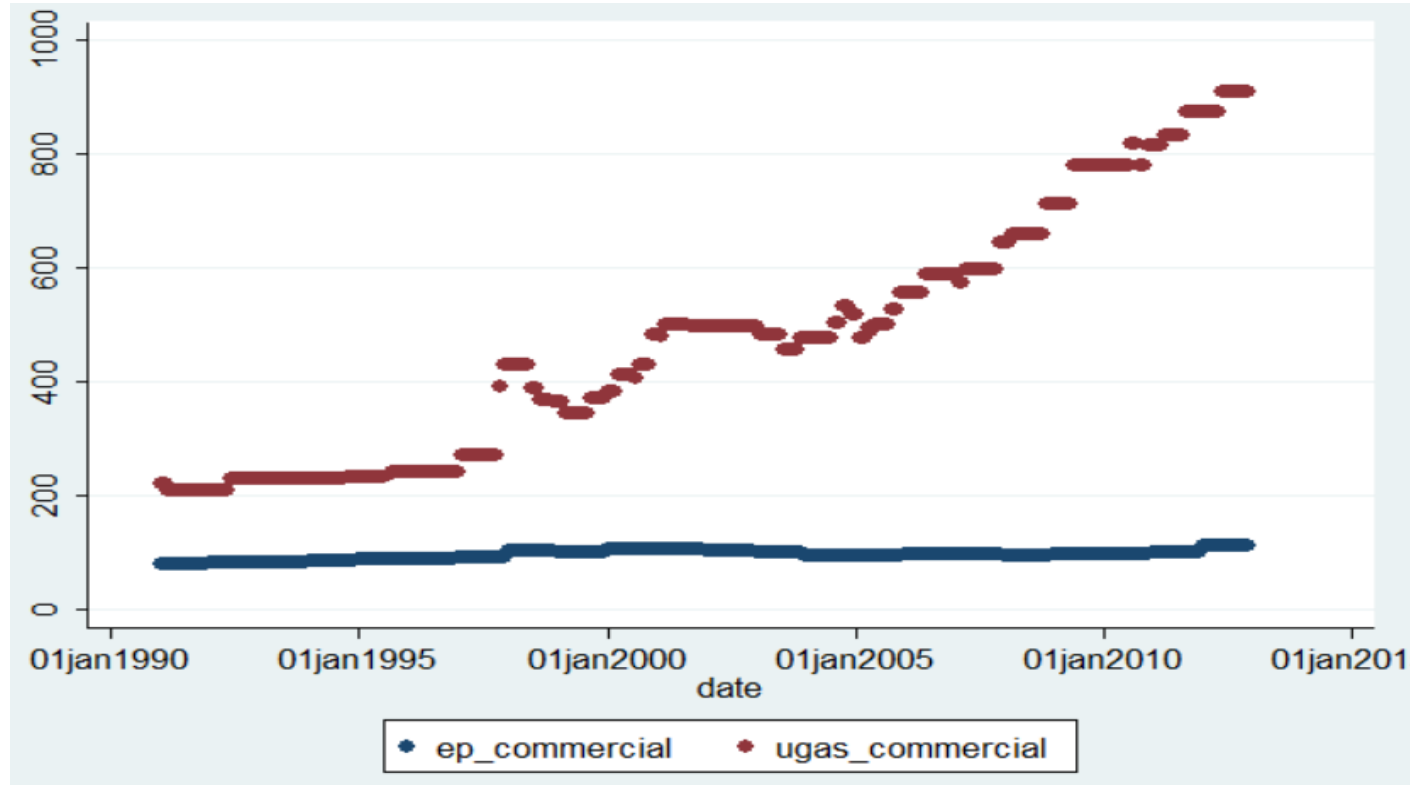
- Regulated.
- Retail electricity prices have been lower than generation costs.



- Recently, the electricity price has increased and its cost recovery rate is close to 1.
- However, its the relative price to alternative fuels (like, LNG) is getting lower over time → contributes a sharp rise in winter loads.

Treatment for Electricity Consumption in KETS (cont.)

► Prices of Urban gas and Electricity



- Prices of urban gases will increase due to the KETS but it is unlikely for electricity prices to rise (assuming that regulated retail electricity prices do not reflect a change in production costs of buying allowances) → Electricity consumption may rise → GHG emissions from the electricity sector will rise.

Treatment for Electricity Consumption in KETS (cont.)

▶ However, the reduction target is set for the manufacturing sector at 12% or less (Korea's INDC).

- INDC: reduce 37% under the BAU scenario in 2030
 - domestic emissions – 26% / international offsets –11%
- Burden sharing of the non-ETS sector should increase.
- Electricity sector & Transportation → Significant sources of non-ETS sector mitigation

▶ Mitigation instruments in the power generation sector

- Increase the proportion of nuclear power plants (from 22.5% in 2015 to 29% by 2035)
 - Renewable sources (limited)
 - Improving energy efficiency (may be possible but still limited)
 - CCS (limited)
 - An increase in electricity prices (it is also a way to share the burden between ETS and non-ETS sectors) seems to be unavoidable.
- Then, inclusion of indirect emissions becomes a challenging task

Thanks