

# Resource Assessment and Implementation of DLC Programs for Large Customer

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An aerial photograph of the KERI campus, showing several large industrial buildings and greenery. The text 'KERI 한국화학연구원' is visible on one of the buildings. The image is split vertically down the middle.

# Outlook for demand - Demand forecasting

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## □ Demand forecast and DSM projection

- Increase by average 8.4% per year last decade
- Consumption per person : 5,800kWh in 2002
- DSM deduced 3,130MW of peak demand in 2002
- DSM projection reach 10% of system peak in 2015

### < Demand Forecast (unit 10 MW) >

Year	Baseline demand (including DSM)		Baseline demand (excluding DSM)		Upper scenario (including DSM)		Upper scenario (excluding DSM)	
	Peak load	Annual increasing rate	Peak load	Annual increasing rate	Peak load	Annual increasing rate	Peak load	Annual increasing rate
1992	2,044		-		-		-	
2002	4,577	8.4%	-		-		-	
2006	5,374	4.1%	5,684	5.6%	6,123	7.5%	6,559	9.4%
2011	6,220	3.0%	6,781	3.6%	7,647	4.5%	8,507	5.3%
Net increase	1,642		2,204		3,069		3,929	

\* Source : 1<sup>st</sup> power demand/supply baseline plan

# Outlook for Supply

## □ Capacity expansion plan

- New capacity Need : 35,000MW by 2015
- New expected capacity : 25,250 MW by 2011 (base on generator's plan)
- Generator's plan classified by status
- In case of capacity plan delayed, decrease in reserve margin below 10% after 2008

### < Long-term power demand/supply outlook >

	Demand (10MW)	capacity (10 MW)						Reserve margin
		Nuclear	Coal	LNG	Oil	Hydro	Total	
2002 (actual)	4,577	1,572	1,593	1,399	428	388	5,381	15.3%
2006	5,374	1,772	1,867	1,864	467	556	6,527	17.8%
2011	6,220	2,452	2,377	2,044	395	639	7,906	24.9%

- ❑ Programs at present
  - ✓ Peak cutting : Special rate and Remote A/C
  - ✓ Energy efficiency : lighting, motor, inverter
  - ✓ Load Shift : Cooling/heat storage, Vending machine
  - ✓ PR and ME&V system development
- ❑ Direction after deregulation (2001)
  - ✓ Administration : Utility (KEPCO) → Government (MOCIE)
  - ✓ Funding : Utility cost → Public Goods Charge
  - ✓ Programs : introduction of DLC, DR
  - ✓ M&V : Resource Assessment, Monitoring, Verification etc.
  - ✓ Investment : increase up to 1% of total revenue

## ❑ Remote controlled A/C Program

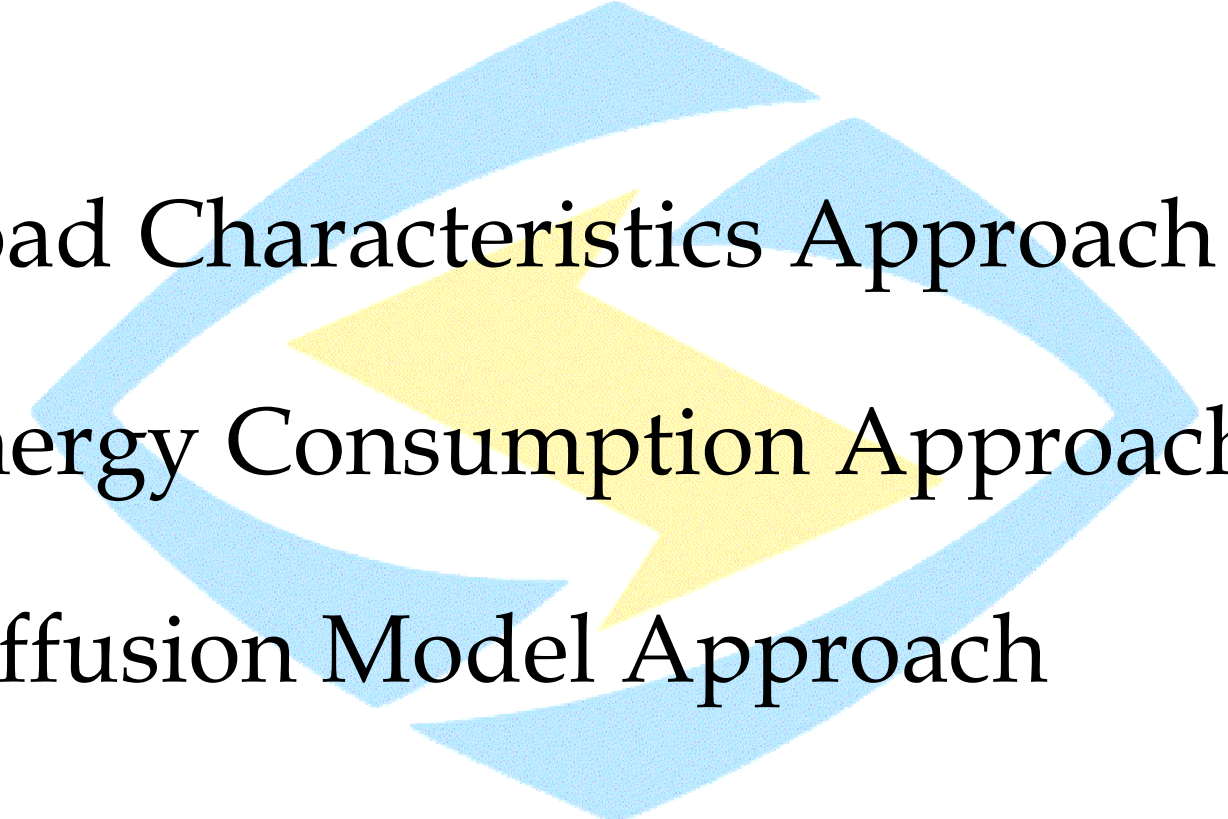
- start year : 2000
- subject : KEPCO
- target customer : residential, small commercial
- target measure : air conditioner (package type)

## ❑ Direct Load Control Program

- start year : 2002
- subject : KEPCO, KEMCO
- target customer : large customer of commercial & industrial
- target measure : electric furnace, Pump, HVAC, etc.

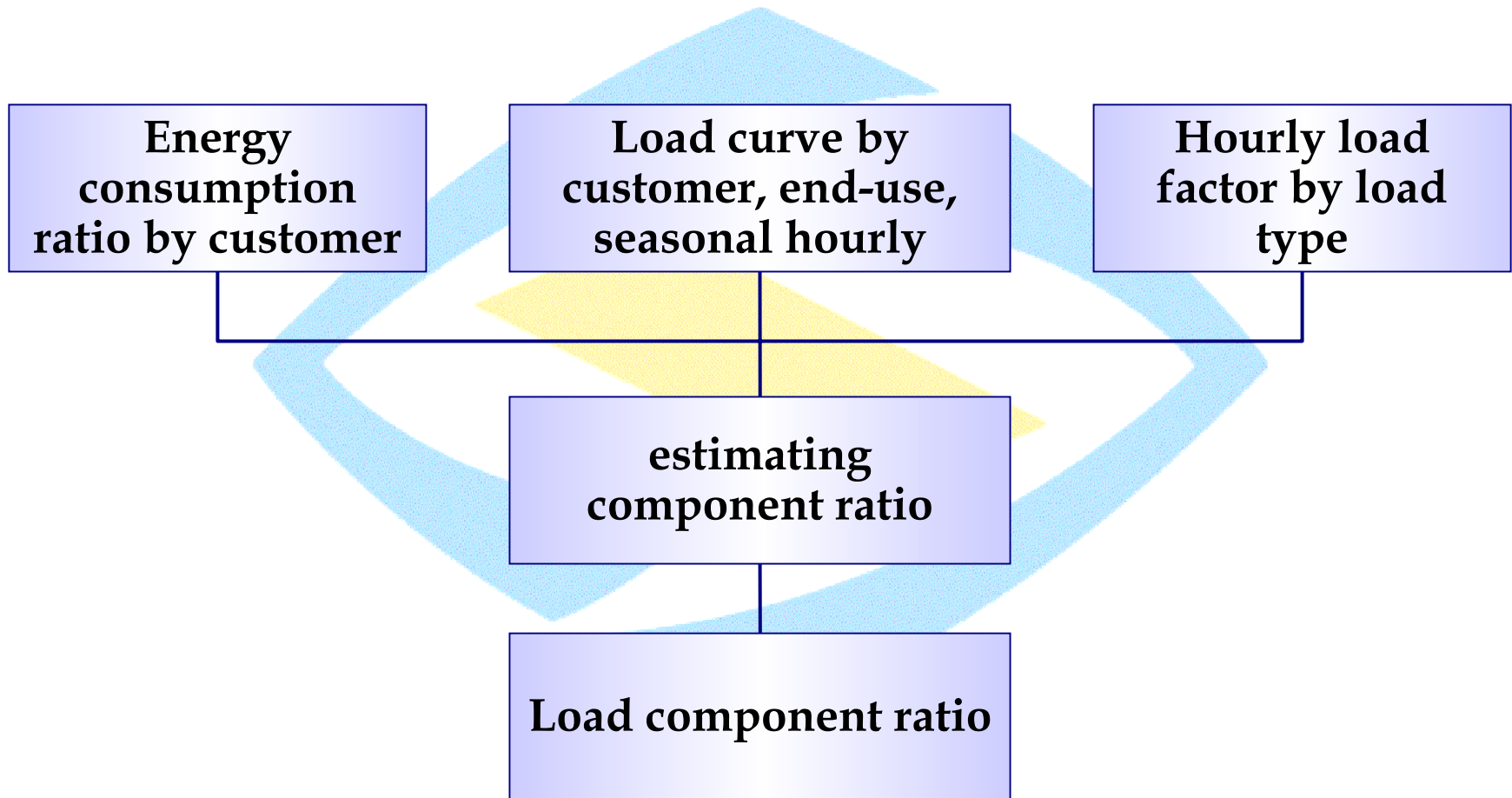
# Methodology for forecasting DLC Potential

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- Load Characteristics Approach
  - Energy Consumption Approach
  - Diffusion Model Approach

# Load Characteristics Approach

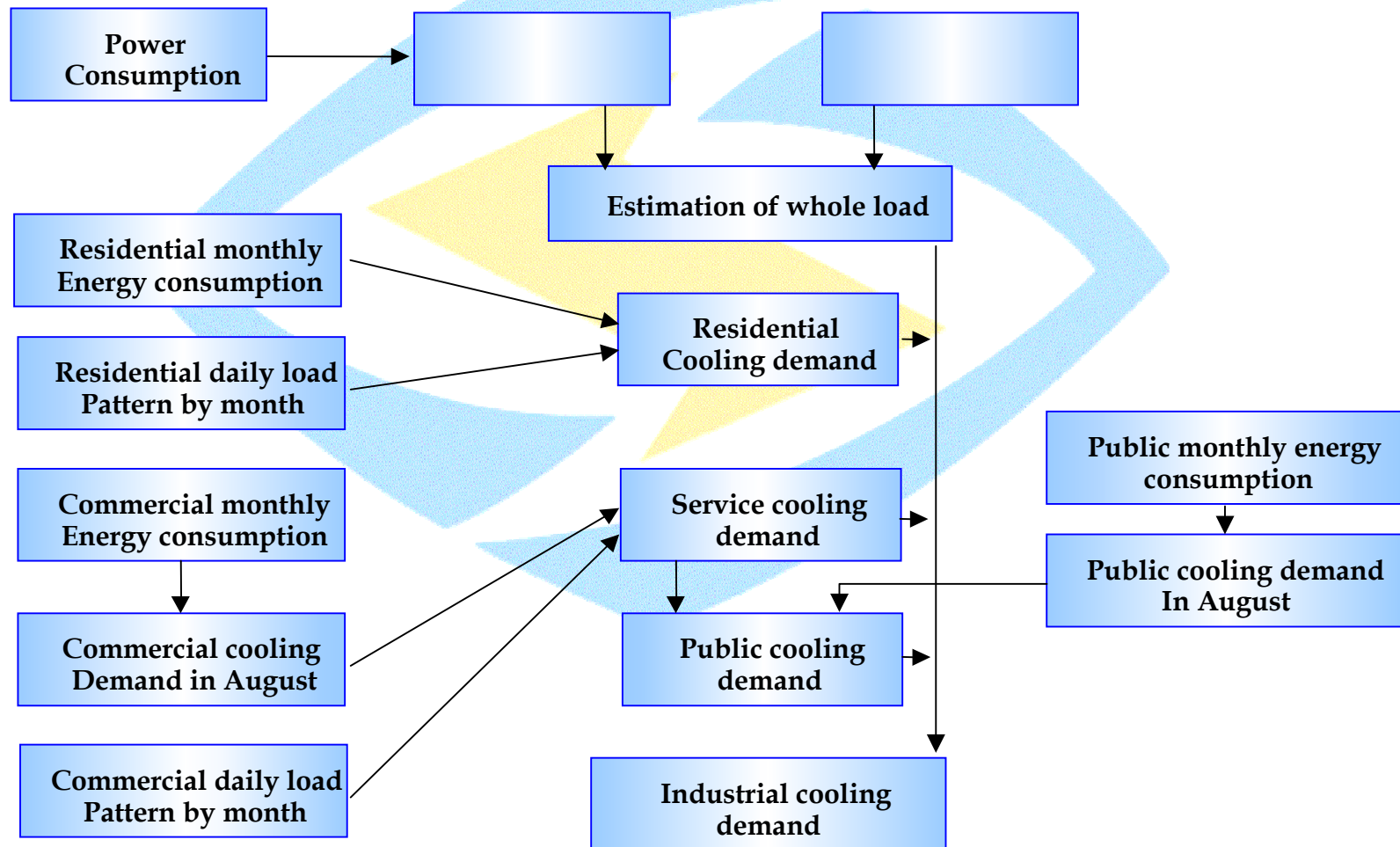
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# Energy Consumption Approach

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## □ Estimating cooling demand through the load difference between system load by season



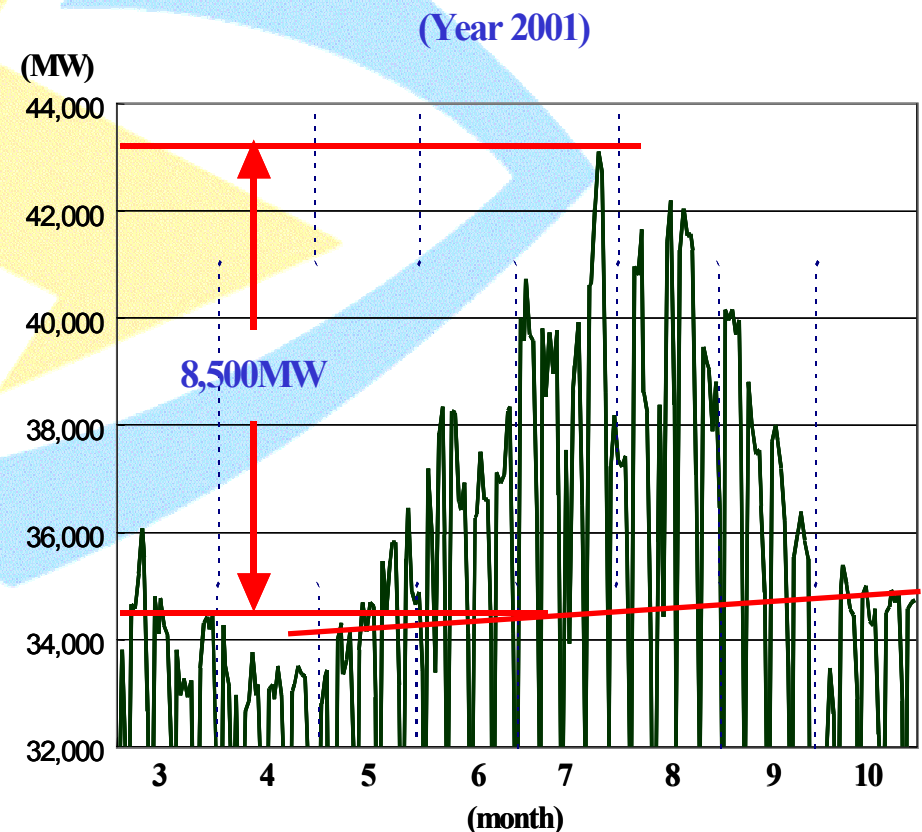
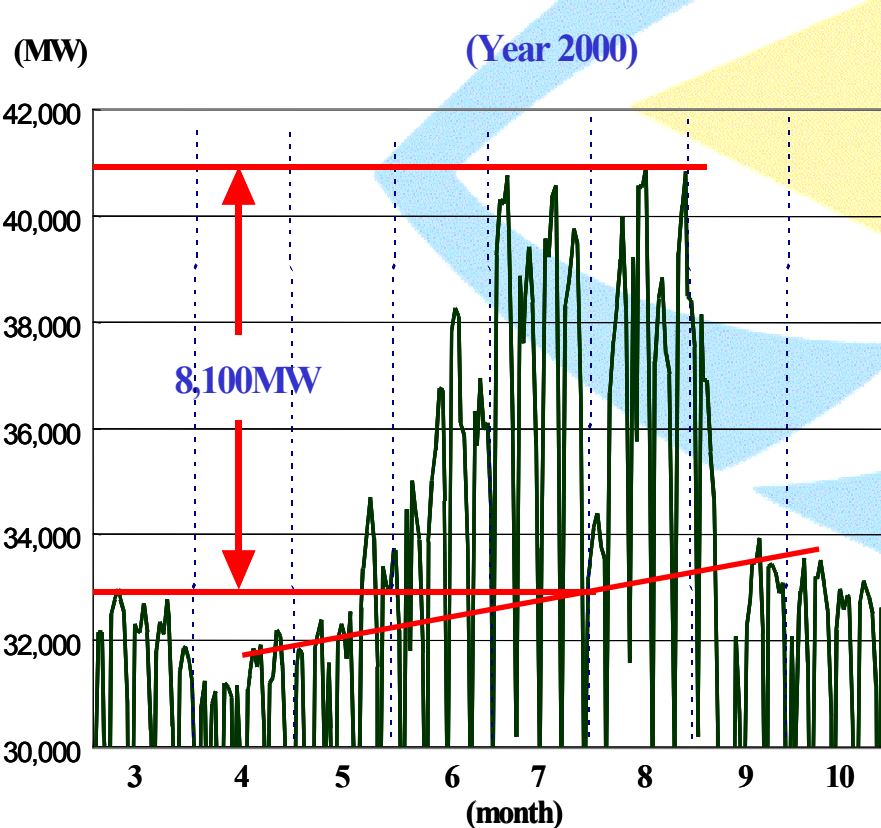


# Energy Consumption Approach (cont'd)

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## □ Applicable to cooling load

- the difference between peak load and base load
- peak load : load at 15:00 in July, or August
- base load : average load of April and October



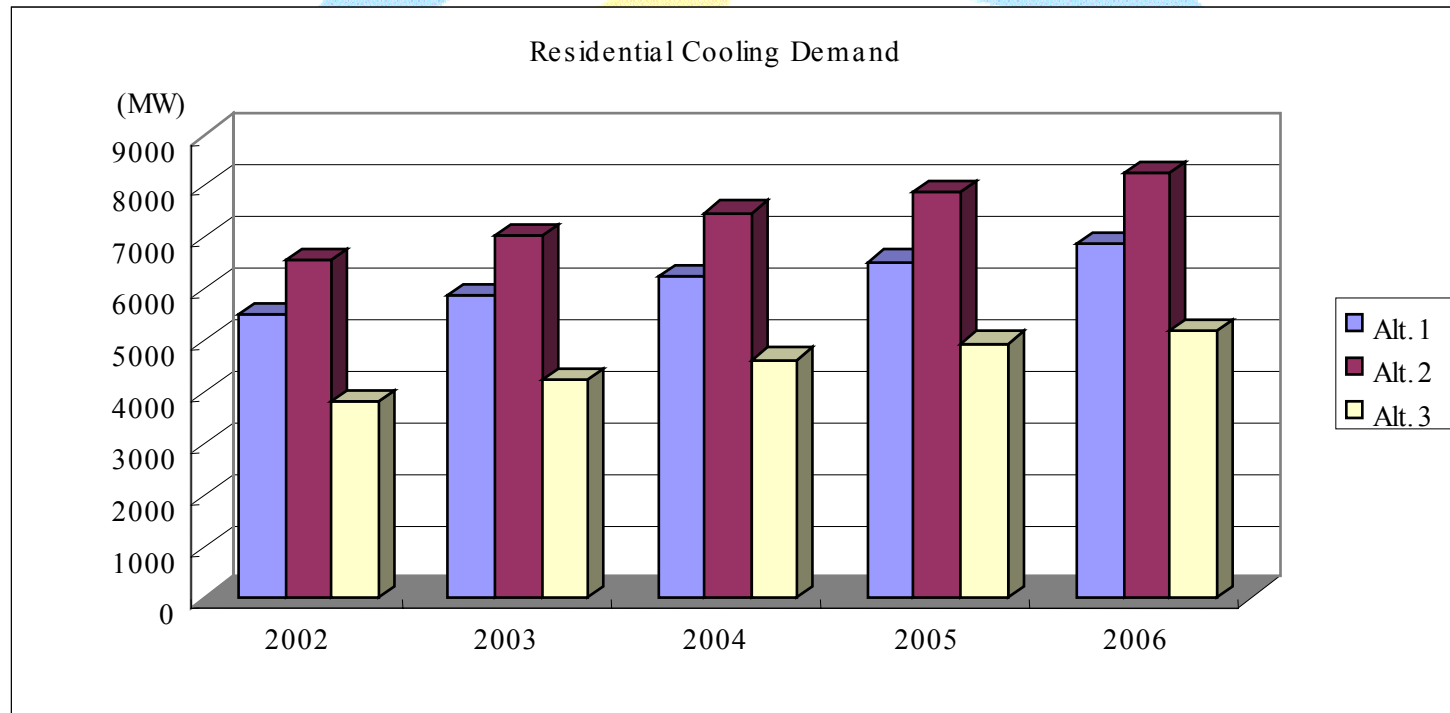
## ❑ Available DLC Resources in Korea

- ❑ Cooling
- ❑ Ventilating
- ❑ Heating
- ❑ Pumping
- ❑ Electric Furnace, etc

# DLC Potential estimation- commercial

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- ❑ Analysis 1 and 2 used top-down approach, but analysis 3 used bottom-up approach
- ❑ There are some variations in results by approaches



# Incentive level in DLC program

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Classification	Process	Incentives
Alternative 1	<ul style="list-style-type: none"><li>• Estimating real time MCP when DLC starts</li><li>• Average SMP in Korea 45 won/kWh</li><li>• Spike rate when the supply was shortened : 20 times</li></ul>	900 Won/kWh
Alternative 2	<ul style="list-style-type: none"><li>• Fixed cost of GT (Capital + O&amp;M Cost) : 58,000 won/kWh</li><li>• Setting the standard of LOLP: 0.7 - 1 day</li></ul>	<ul style="list-style-type: none"><li>- LOLP 1.0 day: 2,440 Won/kWh</li><li>- LOLP 0.7 day: 3,480 Won/kWh</li></ul>
Alternative 3	<ul style="list-style-type: none"><li>• Applying a compensation payment which satisfies RIM test.</li><li>• Estimating the level of incentive corresponding to basic B/C (applying basic B/C as 1.0 - 3.0)</li></ul>	<ul style="list-style-type: none"><li>- RIM 2.0: 2,615 Won/kWh</li></ul>

# Goal and Subjects of DLC Program

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- ❑ Types of DLC Program
  - Normal load reduction
  - Emergency interruption Load
  - Secured system load
  - Peak load reduction
  - Demand Reserve
  
- ❑ Objects of DLC Program
  - System Availability
  - Market Price Stability
  - System Security
  - Profit model

- ❑ This Paper investigate three approaches to evaluate potential of DLC effects
- ❑ Demand estimation should be added to reflect component ratio by consumer
- ❑ We could apply market price or avoided cost in peak periods as criteria for incentive