ENERGY REGULATORY OFFICE

National Association of Regulatory Utility Commissioners
Energy Regulatory Partnership Program
Energy Regulatory Office and Illinois Commerce Commission

Third Partnership Activity

Cost Allocation in the Revenue and Tariffs Model

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Overall Approach

1. Determine allowed revenues for tariff year
2. Allocate between cost categories
   - customer-related costs
   - demand-related costs
     - demand-related power purchase costs
     - network-related costs
   - energy-related power purchase costs
   - reactive power-related costs

   TUOS and SMO charges are included in power purchase costs
3. Allocate cost categories between customer categories
4. Allocate costs by customer category between time of use

Cost Category Allocation Principles

- Customer-related costs are allocated in proportion to customer numbers and costs of serving customer types
- Demand-related power purchase costs are allocated in proportion to share in coincident peak demand (peak demand drives capacity requirements)
- Network-related costs are allocated in proportion to long-run marginal cost (LRMC) of expanding the network (efficient tariffs should equal marginal price)
- Energy-related costs are allocated in proportion to share in sales
- Reactive power-related costs not currently allocated due to lack of accepted methodology

Customer-Related Costs

- Costs associated with billing, metering and managing customer accounts
- Calculated as sum of
  - direct costs of KEK's Public Supply business (ie, excluding power purchase costs)
  - allowed retail margin is 3% cost power purchase costs
- Allocated between customer categories in proportion to weighted share of total customer numbers

Customer Weightings

- **Weightings provided by KEK (in 2008 tariff application). Expressed as cost of serving customer in each category relative to cost of serving a household customer**

Relative cost weighting	
0. Category - 110 kV	40.89
1. Category - 35 kV	5.40
2. Category - 10 kV (20 kV)	2.26
3. Category I - 0.4 kV - commercial with reactive power	1.26
4. Category II - 0.4 kV commercial no reactive power	1.17
5. Category 0.4 kV households 2 rate meter	1.00
6. Category 0.4 kV households 1 rate meter	1.00
7. Category 0.4 kV households without meter	1.00
8. Category - Public Lighting	1.00

Demand-Related Power Purchase Costs

- Costs associated with provision of generating and transmission capacity (not energy)
- Defined as sum of
  - capacity share of net power purchase (generation + import) costs recovered from regulated customers
  - revenues from TUOS charges (excluding losses) recovered from regulated customers
- Capacity share is set at 30% (KEMA ESTAP III assumption)

Allocation to Customer Categories

- Demand-related power purchase costs are allocated in proportion to share of each customer category in coincident peak demand at 110kV
- Total coincident peak demand and demand at coincident system peak for customer categories 0 to 3 is as reported by KEMA ESTAP III (using data provided by KEK to KEMA)
- Demand for customer categories 4 to 8 is calculated as residual peak demand, after deducting demand from categories 0 to 3, multiplied by share of each category in 'grossed up' sales at 110kV (see energy-related cost allocation)

Share in Coincident Peak Demand

110kV coincident peak demand		
110kV coincident peak demand (at entry to 110kV network)	MW	907
110kV coincident peak demand (at exit from 110kV network)	MW	815
0. Category - 110 kV	MW	22
1. Category - 35 kV	MW	7
2. Category - 10 kV (20 kV)	MW	34
3. Category I - 0.4 kV - commercial with reactive power	MW	34
4. Category II - 0.4 kV commercial no reactive power	MW	92
5. Category 0.4 kV households 2 rate meter	MW	538
6. Category 0.4 kV households 1 rate meter	MW	53
7. Category 0.4 kV households without meter	MW	31
8. Category - Public Lighting	MW	3
Total		***815***

Network-Related Costs

- Costs associated with KEK Distribution business, excluding losses and reactive power-related costs
- Allocated proportionally to share of each customer category in LRMC-based network revenues
- LRMC-based network revenues are calculated as LRMC at each distribution voltage level (35kV, 10kV, LV) multiplied by peak demand
- Share of each customer category in network-related costs is calculated as its share in these LRMC revenues, given its share of demand at each voltage level

Calculating LRMC Charges

- LRMC charges at each voltage level are calculated as the present value of planned investments to meet load growth divided by the present value of incremental load
- LRMC charges for each customer category are the sum of LRMC charges for the voltage level of service, plus LRMC charges at higher levels scaled up by a loss allocation factor (LAF) all multiplied by a concidence factor
- All data used is from KEMA ESTAP III based on KEK submissions. Updating is required

	LRMC (€/kW/yr)	LAF	Co-incidence factor	Cascaded LRMC (€/kW/yr)
1. Category - 35 kV	30.47	1.0332	1.00	31.49
2. Category - 10 kV (20 kV)	50.34	1.0617	0.35	65.27
3. Category I - 0.4 kV - commercial with reactive power	25.91	1.1842	0.95	104.11
4. Category II - 0.4 kV commercial no reactive power	25.91	1.1842	0.95	104.11
5. Category 0.4 kV households 2 rate meter	25.91	1.1842	0.95	104.11
6. Category 0.4 kV households 1 rate meter	25.91	1.1842	0.95	104.11
7. Category 0.4 kV households without meter	25.91	1.1842	0.95	104.11
8. Category - Public Lighting	25.91	1.1842	0.95	104.11

Energy-Related Costs

- Net costs of power purchases (from KEK Generation and imports) to supply regulated customers, less demand-related power purchase costs, plus SMO charges revenues
- Allocated in proportion to share of energy sales at 110kV
- For customers connected at voltages below 110kV, this requires 'grossing up' sales to 110kV, using the LAF matrix to adjust for losses incurred between 110kV and the voltage level of supply

Reactive Power-Related Costs

- No methodology is currently in place to allocate reactive power costs
- The methodology developed by the KEMA ESTAP III team
  - assumed a given proportion of network-related costs were associated with reactive power at each voltage level
  - these allocated costs were then divided by metered reactive power at each voltage level
- This methodology was rejected as
  - Proportion of reactive power costs (2%) in total network costs was determined. KEMA ESTAP III team obtained this data from KEK
  - it led to excessive reactive power prices at LV, where only one customer category has reactive power metering and, therefore, was charged all the reactive power costs (2% of LV network costs were allocated to a customer category representing only 1% of sales)
  - Currently, a common reactive power charge is set. ERO is investigating alternative methodologies to be applied in future

Cost Allocation Matrix

- This shows the share of total allowed revenues allocated to each cost category and customer category
- These allocated shares are then further allocated by period (time of use) to obtain final tariffs

By share		Customer-related	Demand-related	Energy-related	Total
0. Category - 110 kV		0.0%	0.7%	1.5%	**2.2%**
1. Category - 35 kV		0.0%	0.3%	0.8%	**1.0%**
2. Category - 10 kV (20 kV)		0.0%	1.7%	3.3%	**5.0%**
3. Category I - 0.4 kV - commercial with reactive power		0.6%	3.0%	4.3%	**7.9%**
4. Category II - 0.4 kV commercial no reactive power		0.9%	5.3%	5.0%	**11.1%**
5. Category 0.4 kV households 2 rate meter		5.6%	27.5%	29.0%	**62.1%**
6. Category 0.4 kV households 1 rate meter		1.2%	2.7%	2.9%	**6.8%**
7. Category 0.4 kV households without meter		0.2%	1.6%	1.6%	**3.4%**
8. Category - Public Lighting		0.0%	0.2%	0.2%	**0.4%**
Total		**8.5%**	**43.0%**	**48.5%**	**100.0%**
By revenue		**Customer-related**	**Demand-related**	**Energy-related**	**Total**
0. Category - 110 kV	€000s	2	979	2,087	**3,069**
1. Category - 35 kV	€000s	3	387	1,056	**1,447**
2. Category - 10 kV (20 kV)	€000s	16	2,345	4,640	**7,001**
3. Category I - 0.4 kV - commercial with reactive power	€000s	829	4,201	5,952	**10,982**
4. Category II - 0.4 kV commercial no reactive power	€000s	1,209	7,430	6,943	**15,583**
5. Category 0.4 kV households 2 rate meter	€000s	7,851	38,485	40,488	**86,825**
6. Category 0.4 kV households 1 rate meter	€000s	1,633	3,825	4,024	**9,483**
7. Category 0.4 kV households without meter	€000s	330	2,188	2,302	**4,820**
8. Category - Public Lighting	€000s	15	328	236	**579**
Total	**€000s**	**11,890**	**60,168**	**67,729**	**139,787**

Time of Use Allocation Principles

- Customer-related costs do not have a time-of-use element
- Allocation of demand-related costs depends on metering
  - for customers with demand metering, demand-related costs are divided by cumulative demand in year

    for customers without demand metering, demand-related costs are allocated to winter periods (highest demand) and included in energy tariffs. Split between high and low winter periods is in proportion to sales in each period
- Energy-related costs are allocated in proportion to short-run marginal cost (SRMC) of supply in each period
- Reactive power-related costs do not have a time-of-use element

Allocation of Energy-Related Costs

- The proportion of energy-related costs to be recovered in each period is determined as the share of SRMC-based revenues recovered in each period
- SRMC-based revenues are determined as sales in each period for each customer category multiplied by the SRMC applied to each period

		Winter high	Winter low	Summer high	Summer low
Energy cost	€/MWh	55.00	22.08	15.39	12.50
Ratio		4.40	1.77	1.23	1.00

- Thank You