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

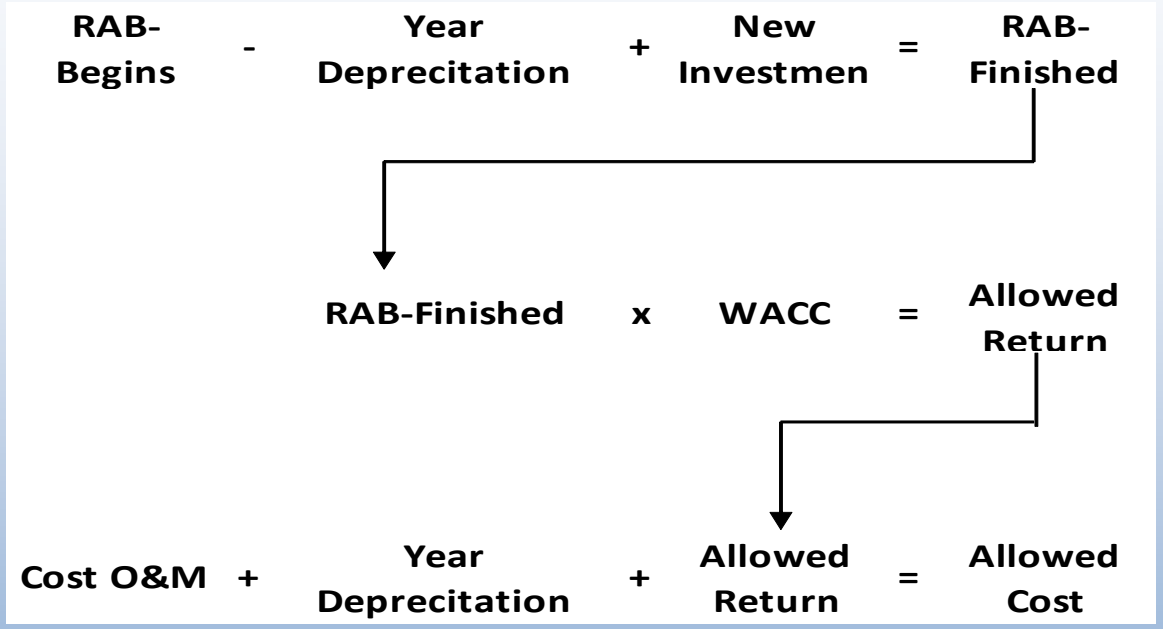
Third Partnership Activity

Regulatory modeling and pricing for electric distribution sector

Pricing and Tariffs Department

November 2009, Prishtinë

Allowed Cost for Distribution



- Depreciation (only for assets after 2005);
- Allowed return (only for assets after 2005 and those that have not been financed by donors);
- In the Tariff Methodology, the responsibility for commercial losses is the distribution system operator (DSO

Derivation of DUOS charges

4 Steps

- Determination of long run marginal cost (long run average incremental cost) of Distribution Network
- Derivation of Use of Network Charges for different voltage levels and time periods
- Determination of revenue requirements
- Reconciliation of revenue requirements and marginal cost based tariff

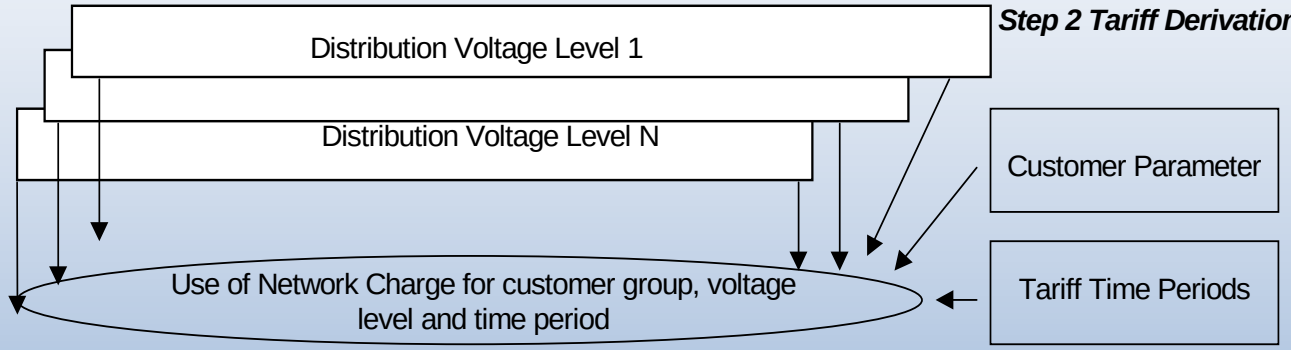
Derivation of DUOS charges

Overview of Derivation of Use of Network Charges

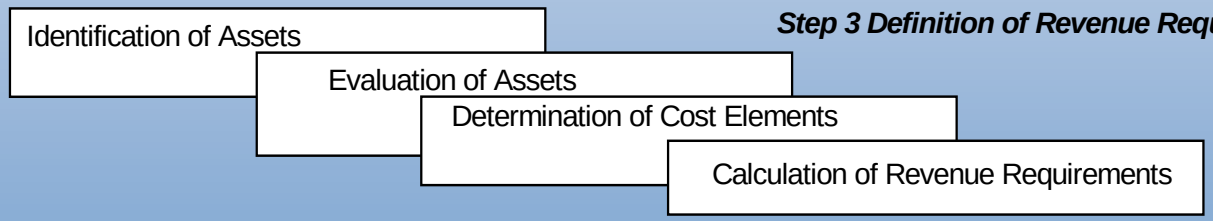
Step 1 Determination of LRAIC

LRAIC = Incremental Investment Cost / Incremental Load

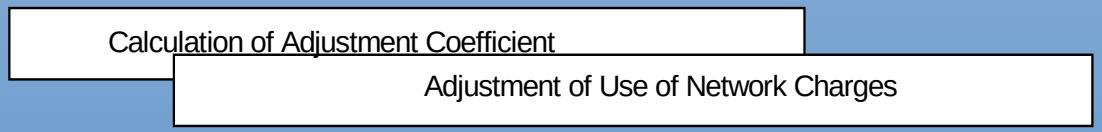
Step 2 Tariff Derivation



Step 3 Definition of Revenue Requirements



Step 4 Adjustment for Revenue Requirements



Calculation of LRMC per voltage level

- Determination of customer groups
- Determination of LRMC
  - Network Expansion Plan Approach
- Cascading the LRMC coefficients

Customer groups

- 35 kV network connections;
- 10 kV network connections;
- LV network connections for Category I non-Domestic/Household customers also subject to reactive power charges;
- LV network connections for Category II non-Domestic/Household customers not subject to reactive power charges;
- LV network connections for Household customers; and
- Public lighting.

Determination of LRMC

Tariff Methodology Kosovo:

approximate LRMC by the calculation of long-run average incremental cost (LRAIC) representing the present value (PV) of the additional investment and operating costs associated with meeting a sustained incremental increase in demand

LRAIC

$$AII = \left[\sum_{t=1}^{T} \frac{I_t}{(1+i)^t} \right] / \left[\sum_{t=1}^{T} \frac{\Delta MW_t}{(1+i)^t} \right]$$

AII= average incremental investments in €/kW (long run average incremental cost defined in €/kW);
It = incremental investments in the Distribution Network
Δ MWt = incremental load
i = discount rate.

LRAIC - Example

Year	Load Forecast (MW)	Load increment (MW)	Distribution Investement (Mio €)
1	7100		
2	7180	80	6,5
3	7400	220	6,5
4	7640	240	6,5
5	7870	230	6,5
6	8110	240	6,5
7	8360	250	6,5
8	8470	110	6,5
9	8580	110	6,5
10	8690	110	6,5
11	8800	110	6,5
12	8910	110	6,5
13	9020	110	6,5
14	9130	110	6,5
15	9240	110	6,5
16	9350	110	62
17	9450	100	18
Present Value		**1261,45**	**66,64 €**
Average Investment Cost (€/kW)			**52,83 €**

LRAIC – Tariff Methodology

- Time horizon of 5 years
- ´Discount rate for the calculation of PV: WACC (i.e. 13.8% as decided by ERO)
- Demand increment of approx. 10% of peak demand per year. (or estimations of KEK

Revenue Reconciliation

Example revenue scaling factor assuming revenue requirements of 50.000.000 €

Tariff Group	Cascaded LRMC Coeff €/kWyr	Peak Demand MW	Theortical (LRMC) Network Cost €	Revenue Scaling Factor	Scaled (LRMC) Network Cost €
2	15	250	€ 3.750.000	2,20	€ 8.254.457
3	29,5	200	€ 5.900.000	2,20	€ 12.987.013
4	43,55	75	€ 3.266.250	2,20	€ 7.189.632
5	43,55	75	€ 3.266.250	2,20	€ 7.189.632
6	43,55	100	€ 4.355.000	2,20	€ 9.586.177
7	43,55	50	€ 2.177.500	2,20	€ 4.793.088
Total		750	€ 22.715.000		€ 50.000.000

DUOS charge (Possible calculation)

Scaled (LRMC) Network Cost €	Demand % Component %	Demand dependent Costs €	Energy dependent Costs €	Capacity Connected (MW)	Annual Consumption (MWh)	Demand Component (€/kW/yr)	Energy Component (€/kWh)
€ 8.254.457	5%	€ 412.723	€ 7.841.735	300	1.333.000	€ 1,38	€ 0,00588
€ 12.987.013	7%	€ 909.091	€ 12.077.922	250	1.000.000	€ 3,64	€ 0,01208
€ 7.189.632	12%	€ 862.756	€ 6.326.877	90	350.000	€ 9,59	€ 0,01808
€ 7.189.632	10%	€ 718.963	€ 6.470.669	90	320.000	€ 7,99	€ 0,02022
€ 9.586.177	15%	€ 1.437.926	€ 8.148.250	120	350.000	€ 11,98	€ 0,02328
€ 4.793.088	7%	€ 335.516	€ 4.457.572	60	50.000	€ 5,59	€ 0,08915
€ 50.000.000		€ 4.676.976	€ 45.323.024	910	3.403.000		

Connection Charges

Deep connection approach:

- **Connection Charges cover network augmentation cost beyond the internal connection boundary between connection assets and core network assets. Connection charges are paid by generators, who do not pay DUOS charge, for a specified period of time.**

Shallow connection approach:

- **Connection Charges cover the costs of directly attributable connection assets**

Standard / Individual calculation: Boundary

Definition of customer groups for standard charges

Definition of standard connection for each customer groups

- **Configuration and assets needed**
- **Calculation of average cost of each component (including cost of labour etc.)**
- **Aggregated cost of components = Connection charges**

KEK Distribution OPEX

- Distribution network remains one of the main challanges in Kosovo system
- Emphasis is on improving reliability and security
- Support a small increase maintenance spend to move towards international standards (phased approach)
- Encourage KEK to improve efficiencies and reduce high technical losses on system
- Benchmarking suggests staff numbers are high but it is vital in short term to improve system and improve non-technical losses

CHALLENGES – Reduction of Energy Losses

- Require from energy enterprises to prepare and implement the plans for reduction of the energy losses
- Require from energy enterprises installation of meters to all customers and other unmeasured division points of the system.
- Approve the allowed revenues for incentives towards the reduction of the losses
- Approve only the reasonable and justified level of technical and commercial losses presented by KEK and KOSTT.
- Work with all stakeholders of energy sector to have a political will and support for reducing losses
- Lobbing to customers and customer organization for necessity to reduce the thefts and increase the collection rate.
- Participate actively in awareness campaign on reduction of the losses and improvement of collection rate

DUOS Charges

Tariff group	Voltage level of connection	Tariff elements	Unit	2009
1	35kV	Use of system (capacity) charge	€c/kW	92,27
		Use of system (energy) charge	€c/kWh	0,00
		Reactive power charge	€c/kVArh	0,66
2	10kV	Use of system (capacity) charge	€c/kW	113,00
		Use of system (energy) charge	€c/kWh	0,00
		Reactive power charge	€c/kVArh	0,66
3	0.4 kV	Use of system (capacity) charge	€c/kW	408,74
		Use of system (energy) charge	€c/kWh	0,00
		Reactive power charge	€c/kVArh	0,66
4 - 8	0.4kV	Use of system (capacity) charge	€c/kW	0,00
		Use of system (energy) charge	€c/kWh	2,87
		Reactive power charge	€c/kVArh	0,00

Differentiation type – by voltage level, no differentiation by time of use
Average price in 2009 – 2.8 EURc/kWh
Distribution tariff are made for KEK but not approved and published by ERO
Duos charges are calculated in RTM although internal price for KEK.

Thank You