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Asistencija regulativi i reformi energetskog sektora

Data Transfer -District Brcko-

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BiH REAP

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To be covered:

- **Why Data Transfer and Obstacles**
- **Methods of transferring Load Data**
 - **Mean-Per-Unit /Number of Customers**
 - **Load Factor**
 - **Class-Load Curve Buildup by Stratum**
- **Conclusions**



Why Data Transfer and Obstacles

- **Collecting and processing of load research requires financial and human resources**
- **Time consuming process**
- **Alternative solution is to transfer load research data that was gathered by some other company**
- **Obstacles may preclude success-customer loads very**

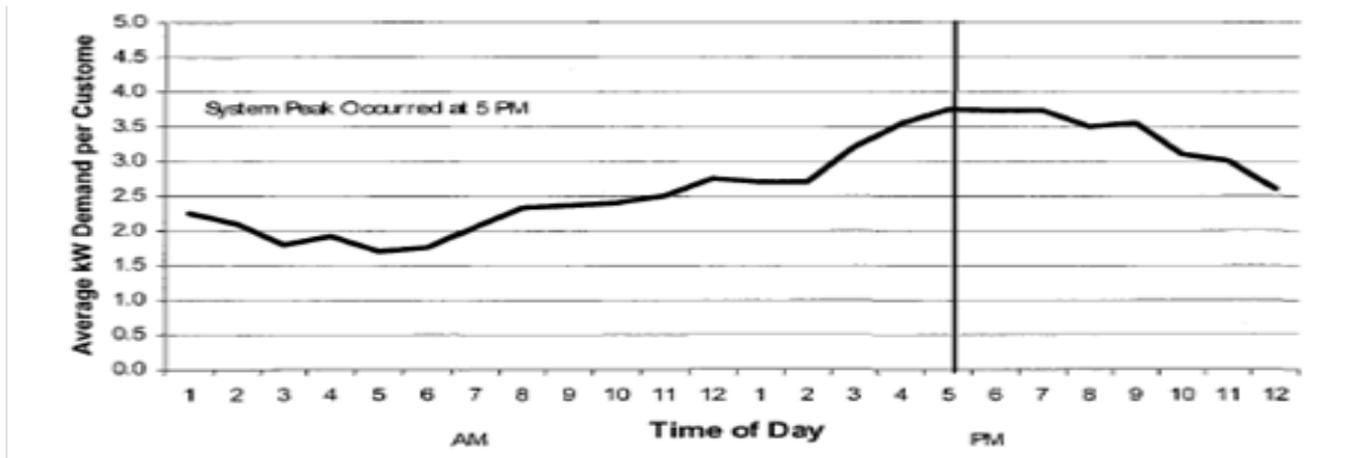
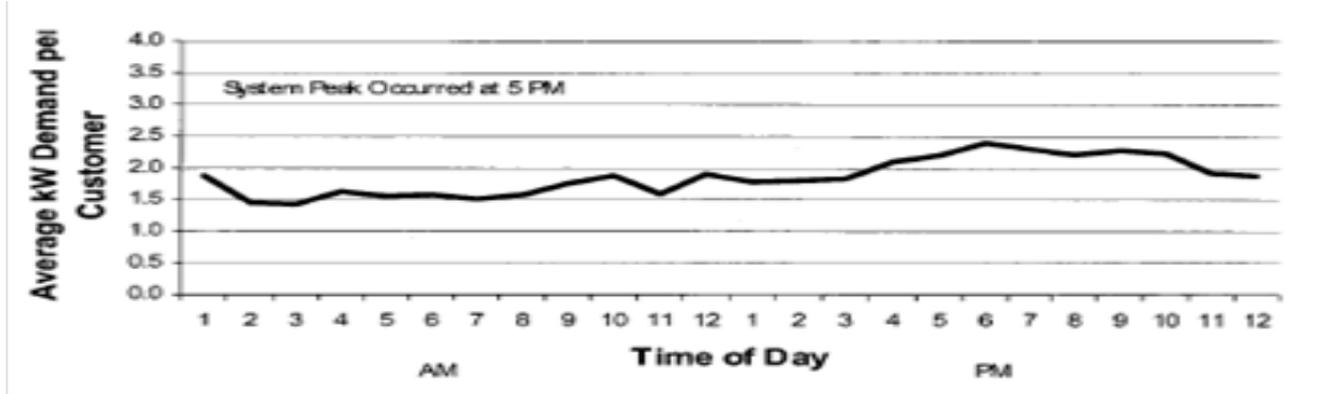


Why Data Transfer and Obstacles (cont'd)

- **Factors which could make transfer difficult.**
 - customer sociodemographic characteristics
 - weather
 - type of business activity
 - industrial process
- **The following major factors to be considered**
 - households appliances
 - general economic conditions
 - demographic data
 - industry types
 - price of electricity and alternate sources of energy
 - climate



Difference of Load Curves for the residential class between two utilities





Methods of **transferring** Load Data

Mean-Per-Unit /Number of Customers

- The simplest method of transferring load data is to transfer the LR data of **B** to the number of customers in the population of **A**
- Total estimated load of **B**:

$$T_B = N_B kW_B$$

- N_B - total number of customers of the class
- kW_B - estimated load in kW per customers for the class



Methods of **transferring** Load Data

Mean-Per-Unit /Number of Customers

- Total estimated load of A:

$$T_A = N_A kW_B$$

- N_B - total number of customers of the class



Methods of **transferring** of Load Data (cont'd)

Example

- **Company B:** the total number of customers in the class was 25.912
- **Average demand at the system peak was 37,6 kW.**
- **The estimated total demand was**

$$25.912 \text{ kupaca} \times 37,6 \text{ kW/kupac} = 974.291 \text{ kW.}$$

- **The total number of customers in the Company A for the same category was 27.273. Updating estimates, the total demand for the category in A, was**
- **27.273 customers · 37,6 kW/customers = 1.025.465 kW**



Methods of **transferring** of Load Data (cont'd)

Load Factor

- Method uses the load factor calculated in the company **B** to transfer the data to the company **A**
- Load Factor in **B**:

$$LF_B = kWh_B / (T_B \times HR_B)$$

- kWh_B - total kWh for Class at **B** **over designated period**
- T_B -total demand for the class in specific hour at **B**
- HR_B - hours during measurement period



Methods of **transferring** of Load Data (cont'd)

Load Factor

- **Total demand of the class at A:**

$$T_A = \text{kWh}_A / (\text{LF}_B \times \text{HR}_A)$$

- kWh_A - total kWh of Class at A
- HR_A - hours during measurement period



Methods of transferring of Load Data (cont'd)

Example

- In a load study for B:
 - the household sample kW at time of system peak was: 3,2 kW
 - sample kWh for that month was: 1.284 kWh (the number of hours in the month is 744)
- The estimated load factor based on system peak demand was:

$$LF = \frac{1.284\text{kWh}}{3,2\text{kW} \cdot 744\text{h}} = 0,539$$



Methods of transferring of Load Data (cont'd)

Example

- The total kWh for category B was 137.862.534 so the total estimated kW for the category was

$$\frac{137.862.534\text{kWh}}{0,539 \cdot 744\text{h}} = 343,783\text{kW}$$

- In the company A, kWh for the household category was 150.378.291. To transfer the estimated category kW at system peak

$$\frac{150.378.291\text{kWh}}{0,539 \cdot 744\text{h}} = 374.993\text{kW}$$



Methods of updating Load Data(cont'd)

Class-Load Curve Buildup by Stratum

- This approach adjusts the transferred data for differences in the size distribution of customers between the borrower's and the lender's service territories
- If the donor utility's average load per customer for a particular class is calculated by:

$$\overline{kW} = \sum_{h=1}^H W_h \overline{KW}_h$$

- $W_h = N_h/N$ weight of stratum h in the donor utility
- \overline{KW}_h = average demand per customer in stratum h



Methods of updating Load Data(cont'd)

Class-Load Curve Buildup by Stratum

- **Load curve at the recipient:**
$$\overline{kW}_R = \sum_{h=1}^H W_{hR} \overline{kW}_h$$
- $W_{hR} = N_{hR}/N_R$ weight of stratum h in the recipient utility
- N_{hR} - number of customers in stratum h for the observed recipient category
- N_R - total number of customers at donor company category
- \overline{kW}_h average demand per customer in stratum h in donor company



Methods of transferring of Load Data(cont'd)

Stratum	W'_s	\overline{kW}_s	$W'_s \times \overline{kW}_s$
Donor Utility			
1	0.53	1.2	0.636
2	0.38	2.0	0.760
3	0.09	3.8	0.342
Total			1.738 = \overline{kW}
Recipient Utility			
1	0.43	1.2	0.516
2	0.45	2.0	0.900
3	0.12	3.8	0.456
Total			1.872 = \overline{kW}

The class load data by stratum from the donor utility are combined with the stratum weights of the recipient utility to produce an estimate of class loads in the recipient utility $\left[\overline{kW}_s \right]$.



Cautions on the methodologies

- **Mean-Per-Unit/Number of Customers Method**
 - easy to implement, it adjusts the total loads between the two companies only for changes in the number of customers.
 - The method can be implemented separately for each stratum of a class for which the load study is made.
 - However, changes in average customer behavior are not captured,
- **Load Factor Method**
 - With a constant load factor, this method adjusts for changes in weather and customer characteristics to the extent that they are reflected in changes in class sales over time
 - Caution should be used with this method, also, because the load factor often changes over time
- **Class-Load Curve Buildup by Stratum**
 - methodology assumes that the average demand or kilowatt per customer within a stratum is constant between the donor and recipient utility
 - this assumption may not be valid in all cases



Conclusions

- **It is possible to transfer load research data by using one of the above described methods**
- **When transferring data one should have in mind the adequacy and complexity of the data to be used by the recipient**
- **If possible, it is useful for a company to use data from more than one company for development of their own load curve**
- **JKP Brcko must establish the LR Team**
- **JKP Brko should start negotiation with other two EPs to transfer LR data**



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