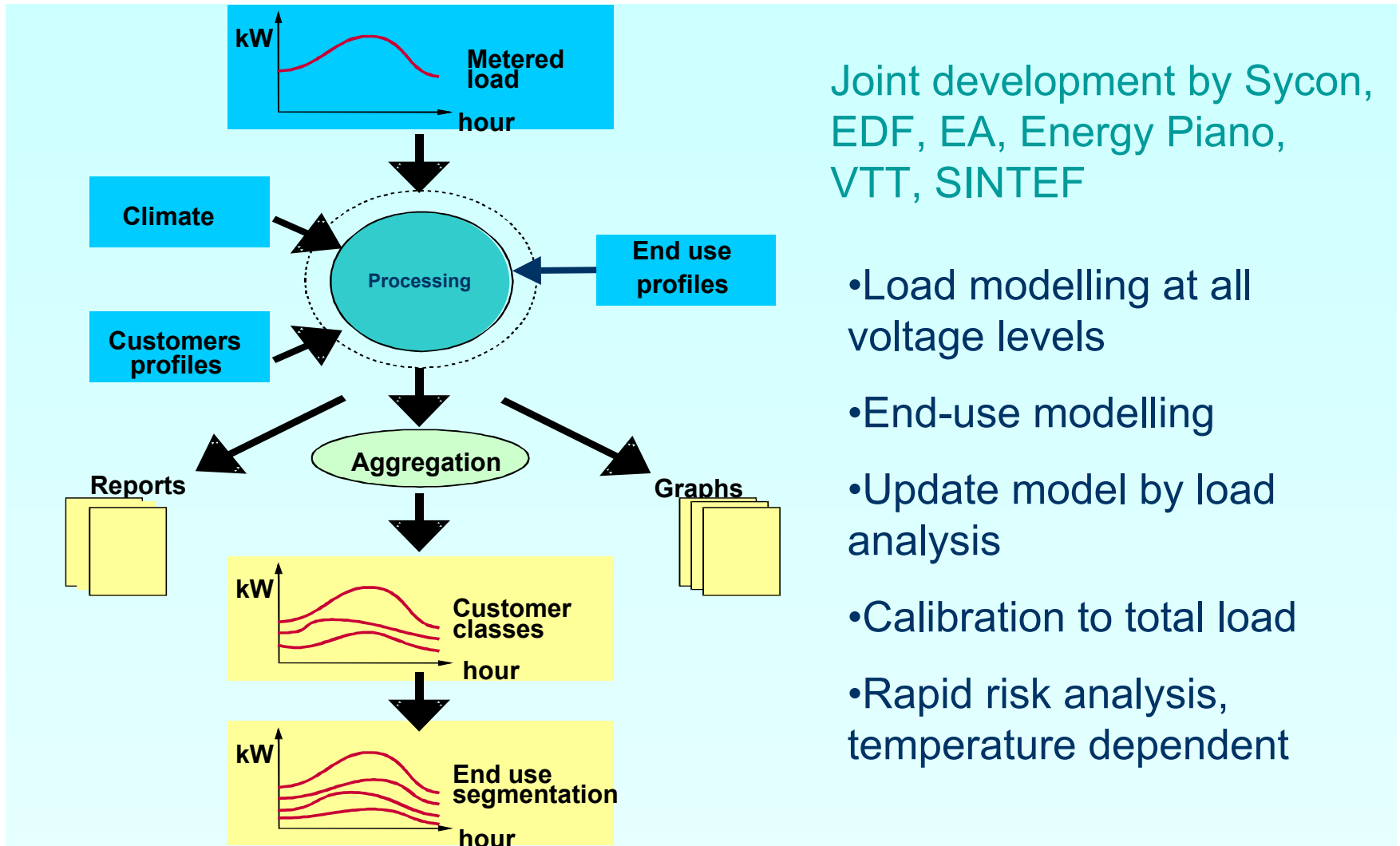


Segmentation of customer types under different tariff structures

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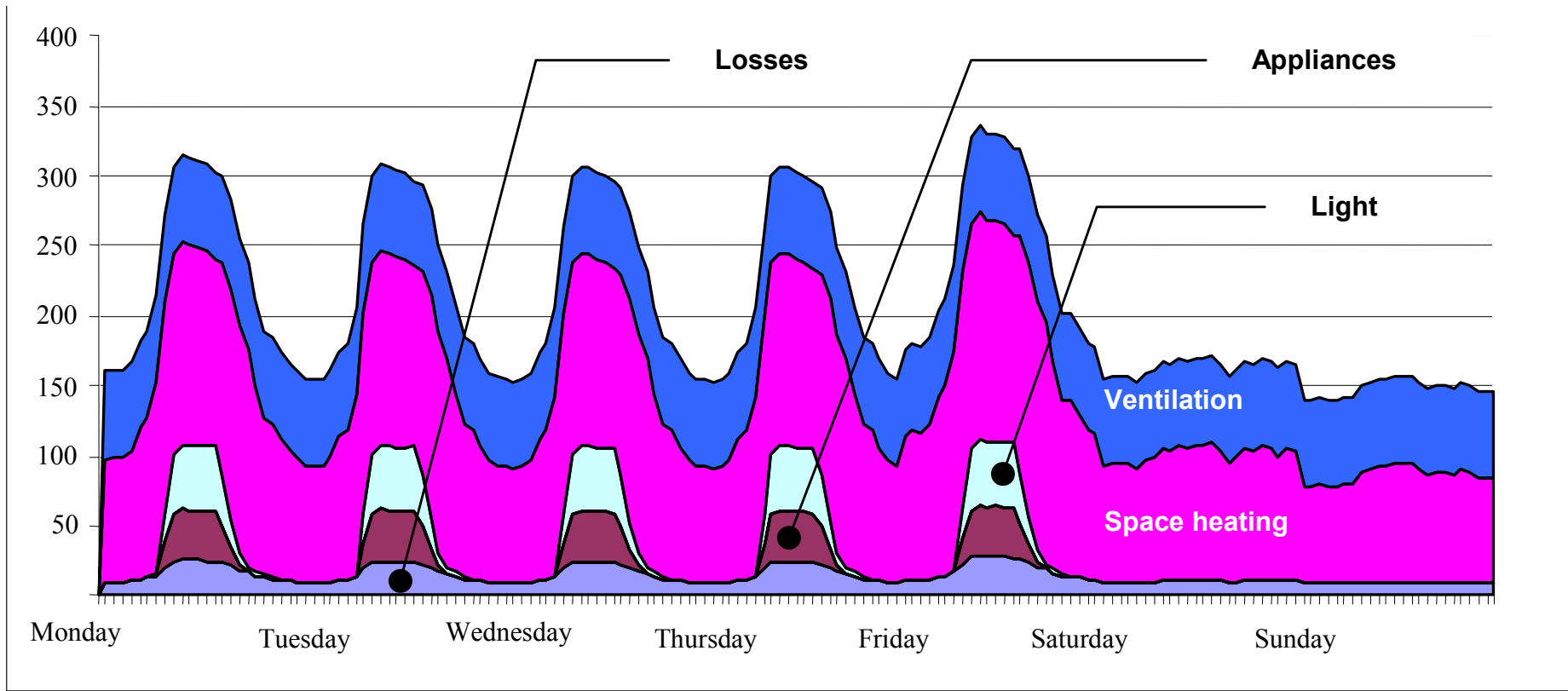
Useload



Joint development by Sycon, EDF, EA, Energy Piano, VTT, SINTEF

- Load modelling at all voltage levels
- End-use modelling
- Update model by load analysis
- Calibration to total load
- Rapid risk analysis, temperature dependent

End-use segmentation estimated by Useload



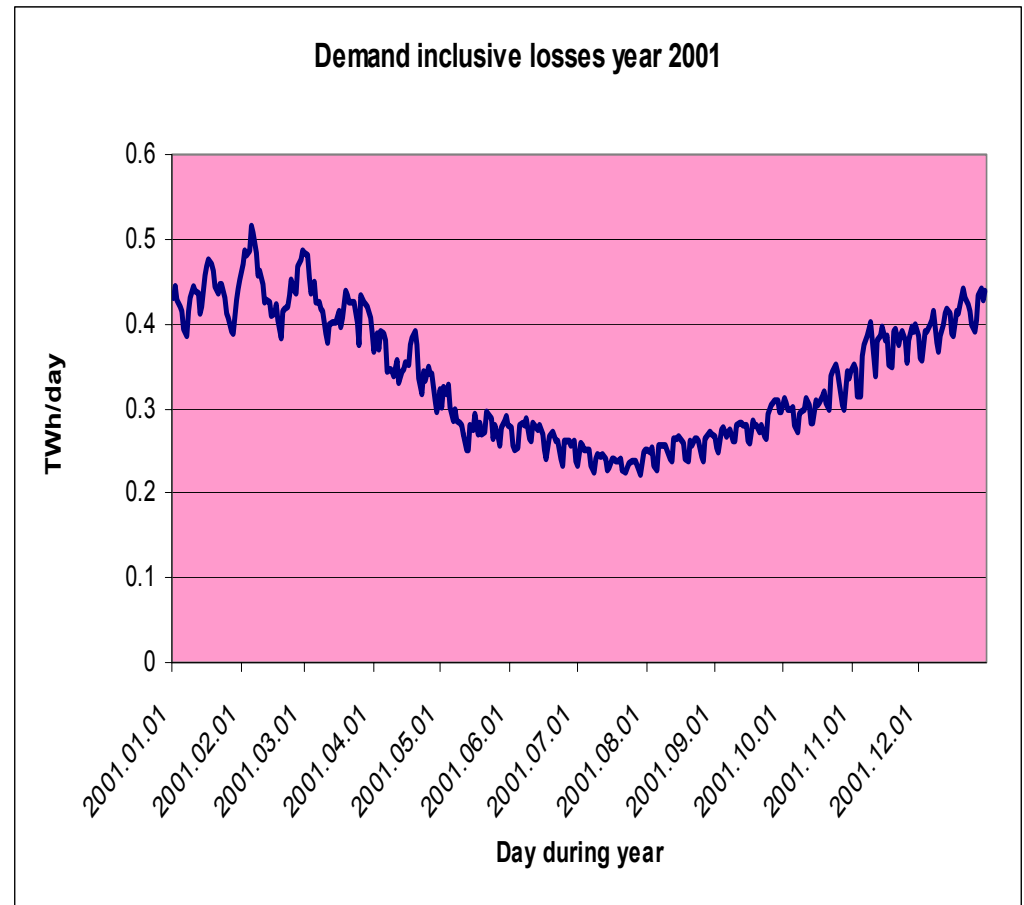
(One-week load profile for an Office)

Load profiling:

- Deregulation of the power markets in many Countries:
 - Customers are free to select a power supplier
 - Power has a different price for every interval (15, 30 or 60 minutes)
 - Reading the meter every price interval is too expensive as the sales are too small.
 - Small customers (profiled customers) meters are read every 1, 3 or 6 months or more seldom.
- The load at every interval must be estimated for profiled customers
 - In Norway the network owner is responsible for the estimations.
 - The tariff and climate (and more) will influence on the demand.

Load estimation

- For **profiled** customers the following information is known as a basis for estimation:
 - The total infed energy every interval of the network during the settlement period.
 - Let's consider the total electricity consumption of Norway for the year 2001 as an example.
 - The sum consumption calculates to 122,86 TWh inclusive losses.



The period sum consumption is known for the different customers

- From the customer meters the sum consumption are known as shown in the table. Total is 112,56 TWh, the rest is losses.
- 10.3 TWh is lost during the year, which is 8.4% of infed energy.

Customer type	Tariff	Energy demand GWh	Network voltage level
Industry	T3	46000	High
Offices	T3	21500	Medium
Detached houses	H4	27747	Low
Row houses	H4	6652	Low
Apartments	H4	1235	Low
El. boilers	T3	8000	Medium
Agriculture	H4	1425	Low

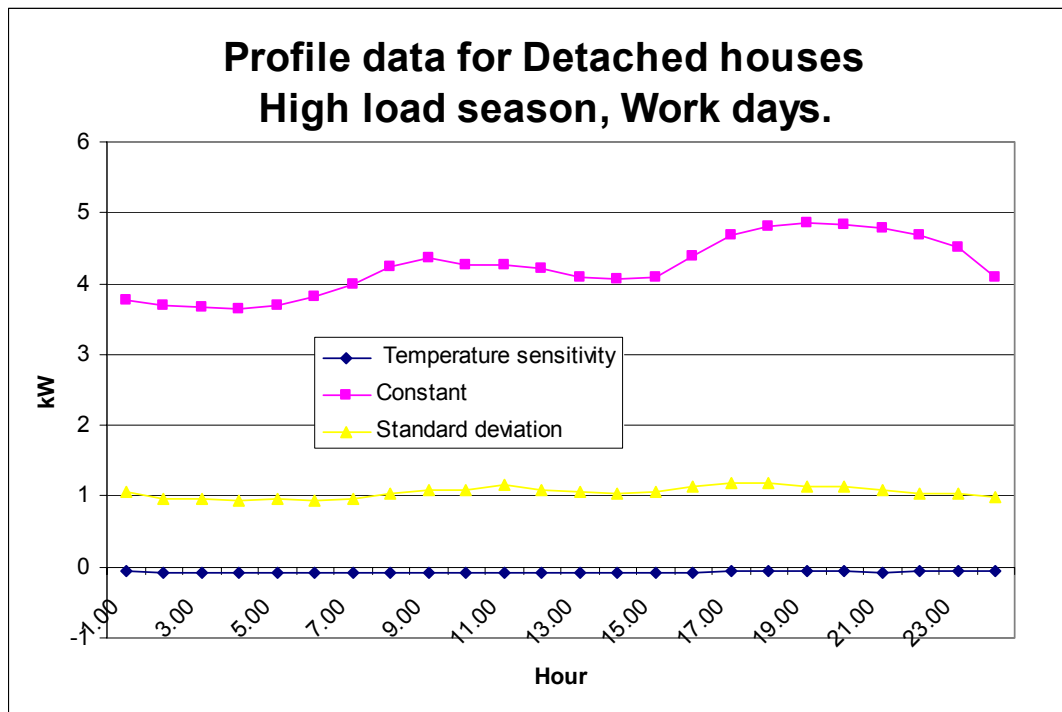
Network description

- In order to estimate the losses dependent on the customers voltage level, we must know the percent losses in different parts of the network.

Network voltage level	Variable loss	Constant loss
Central	3	0
High	0	1
Medium	1.5	0
Medium transformer	0	1
Low voltage	5	0

Load profiles

- The load profiles of the profiled customer types must be known.

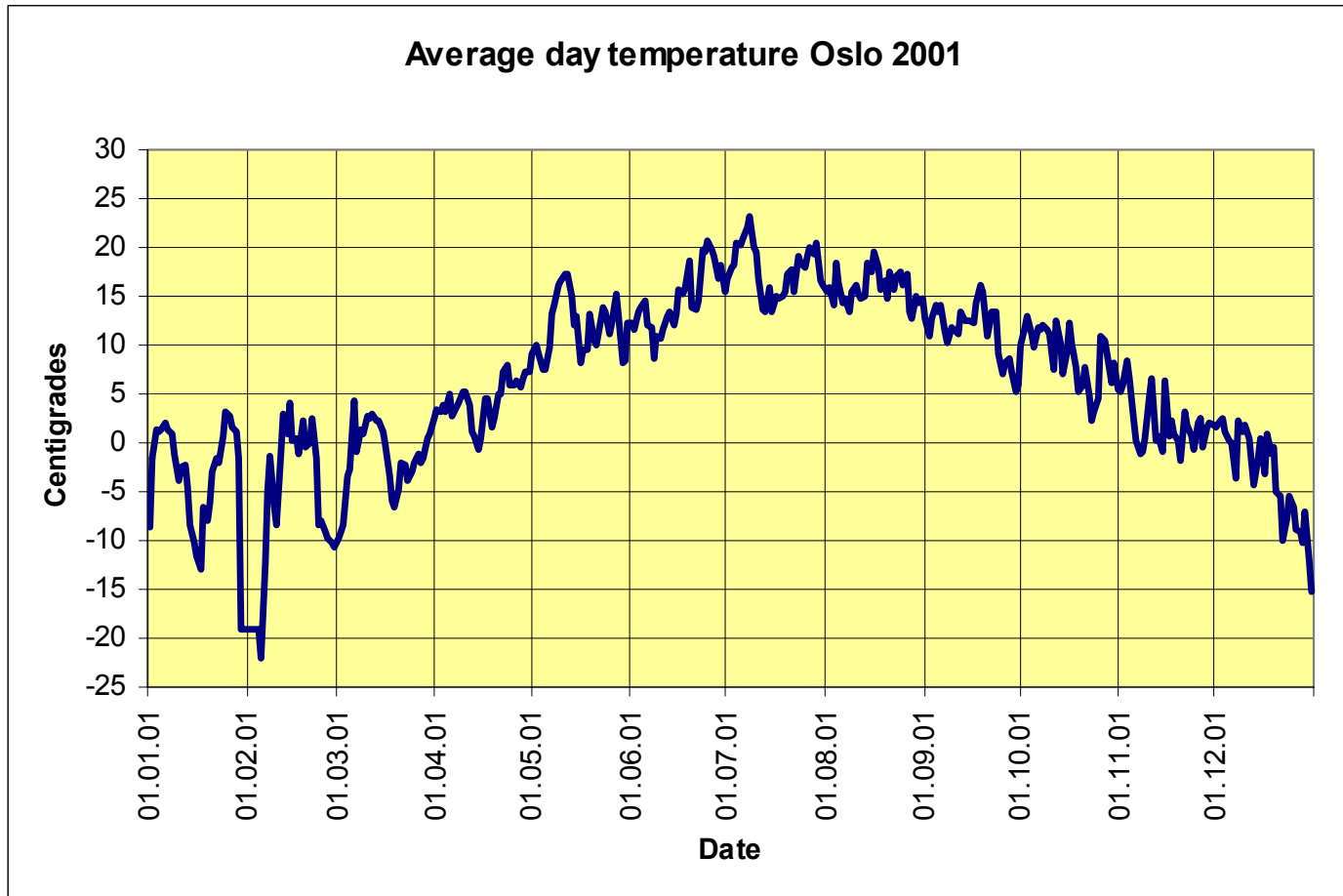


■ The profiles are defined dependent on:

- Season
- Daytype

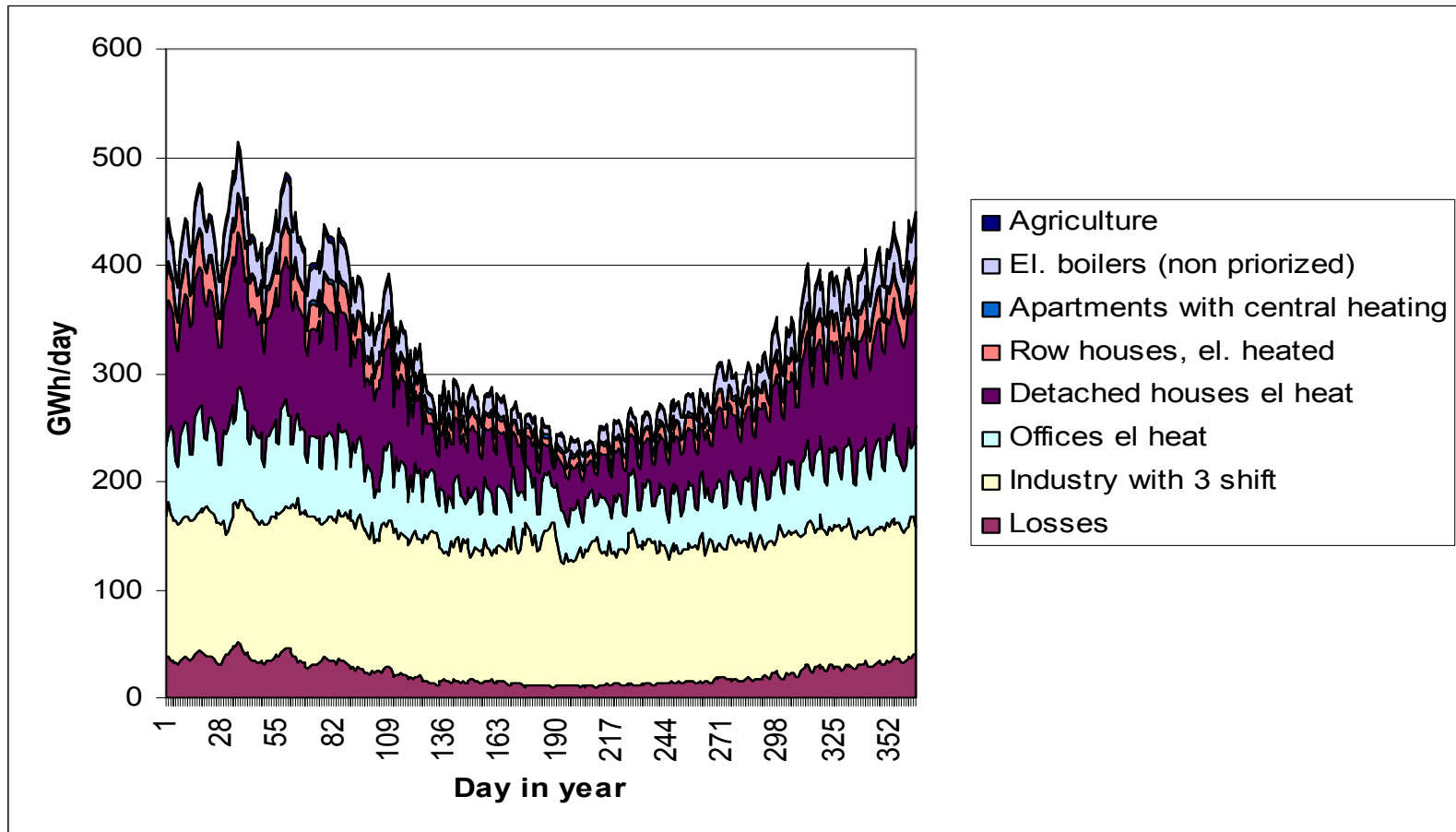
Temperature data

- Temperature data for the period is needed



Result of estimation with Useload

Customer segmentation of metered total demand



Changes needed in Useload

- In order to enable load profiling in Useload, some changes are needed:
 - **For Profiled customers: seasonal meter reading data**

Meters are read every month or more seldom, and when the customer have changed supplier. A table defining meter reading and date of reading must be known for every customer. If a customers meter is not read, an estimate can be made dependent on tariff type.
 - **For Profiled customers: climate, supplier and tariff type**

The climate normally will be similar for all customers under a network owner.

Supplier status must be known for all customers

Tariff type indicates the customer type, and must be known

Data Interchange

- Customer segmentation of metered load can be performed by Useload
- *Metered load of non profile customers must be imported from MDMS – Metered Data Management System. Hourly or smaller intervals must be enabled.*
- CIS data: CustomerID, Tariff, Seasonal meter reading
- Export of results:
 - *Estimates of hourly demand for all profiled customers.*
 - *Estimate of power cost (demand*price for all hours) for all customers in the network area*
 - *Estimate of loss for all hours.*