



Regulation of Electricity Supply Quality in Norway

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Incentive-based regulation

- n Fixed revenues or prices
 - n Reduced costs => increased profits
- n May result in a poor quality of supply
 - n => Quality of supply should be regulated
- n The absence of incentive-based regulation may cause too high quality of supply

How do we regulate?

- n Incentive schemes
 - n the CENS arrangement
- n Regulator decisions authorised through the Energy Act
 - n customer complaint or other reasons
 - n often based on European Standard EN 50160
- n The issue of regulations - forthcoming
 - n general rules
 - n standards
- n Customer contracts
 - n commercial quality

Customer contracts

- n Standard contracts
- n Negotiated between:
 - n the Consumer Ombudsman
 - n the Electricity Association
- n Concerns metering, reading, billing, enquiry response etc.
- n Some explicit standards
 - n metering $\pm 3\%$
 - n voltage 230/400 V $\pm 10\%$
- n Advisory decisions by the Consumer Complaint Committee

The CENS arrangement

- n Cost of Energy Not Supplied
- n Introduced in 2001
- n Incentives to socio-economic optimisation by internalisation of customer specific cost
 - n No single standard fits all due to differences in
 - climate
 - geography
 - structure
 - n Decentralised decisions
 - The regulated company has more information than the regulator

Climatic and geographical differences

County	ENS/Energy supplied [%]	County	ENS/Energy supplied [%]
Finnmark	0,178	Nord-Trøndelag	0,046
Troms	0,114	Telemark	0,045
Nordland	0,099	Aust-Agder	0,045
Sogn og Fjordane	0,054	Hedmark	0,040
Sør-Trøndelag	0,054	Rogaland	0,033
Hordaland	0,051	Vestfold	0,033
Møre og Romsdal	0,050	Østfold	0,023
Oppland	0,050	Vest-Agder	0,022
Buskerud	0,047	Akershus / Oslo	0,019

ENS and CENS

- n Actual energy not supplied, ENS, calculated for:
 - n All incidents in all grids ≥ 22 kV
 - n Interruption duration > 3 minutes
- n Expected energy not supplied E(ENS)
 - n Regression model - various structural variables
 - n ENS - data from 1996 to 1999
- n Multiply ENS with customer specific interruption cost =>
 - n Cost of energy not supplied, CENS
 - n Expected cost of energy not supplied, E(CENS)

Specific interruption costs

Customer category	Notified interruption	Non-notified interruption
Residential and agricultural	0,38	0,50
Industrial and commercial	4,38	6,25

Effect on revenues, cost and profit

n $E(\text{CENS}) - \text{CENS}$

n + the company's revenues will increase

n - the company's revenues will decrease

n Cost savings will not always give a higher profit

n must be weighted against decrease in revenues

- if sosio-economic costs increases, the profit will decrease
- if sosio-economic costs decreases, the profit will increase

Summary

- n Use incentives whenever applicable
 - n Decentralised decisions are more favourable than centralised
 - Minimise the need for information for the regulator
- n Regulate as little as possible
 - n Leave as much as possible to the consumers
 - Different needs for different customers
- n Incentive schemes and contracts do not solve all problems
 - n Explicit regulations and decisions will always be needed
 - General rules
 - Minimum standards