
NORDIC GRID DISTURBANCE STATISTICS 2011

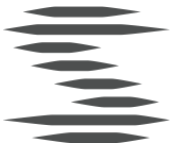
Utarbetad av DISTAC-gruppen under RGN inom ENTSO-E



SVENSKA
KRAFTNÄT

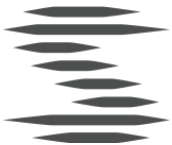
Korta bakgrundsfakta

- > 1999 - 2000 utarbetades ”Riktlinjer för klassificering av driftstörningar” inom dåvarande Nordel
- > Statistiken omfattar spänningsnivåerna 100 – 400 kV
- > DISTAC-gruppen sorterar under System Operations Committee / Regional Group Nordic
- > Sedan 2006 skrivs rapporten på engelska
- > SvK begär in underlag från regionnäten
- > Rapporten redigeras av konsult (nu Aalto University)



Innehåll

- > Driftstörningar – antal, orsaker, fördelning över tid
- > Störningar med ILE
- > Felfrekvens för kraftsystemkomponenter
- > Avbrott – antal, tidsutsträckning, per komponent
- > HVDC-förbindelser



Grid disturbances

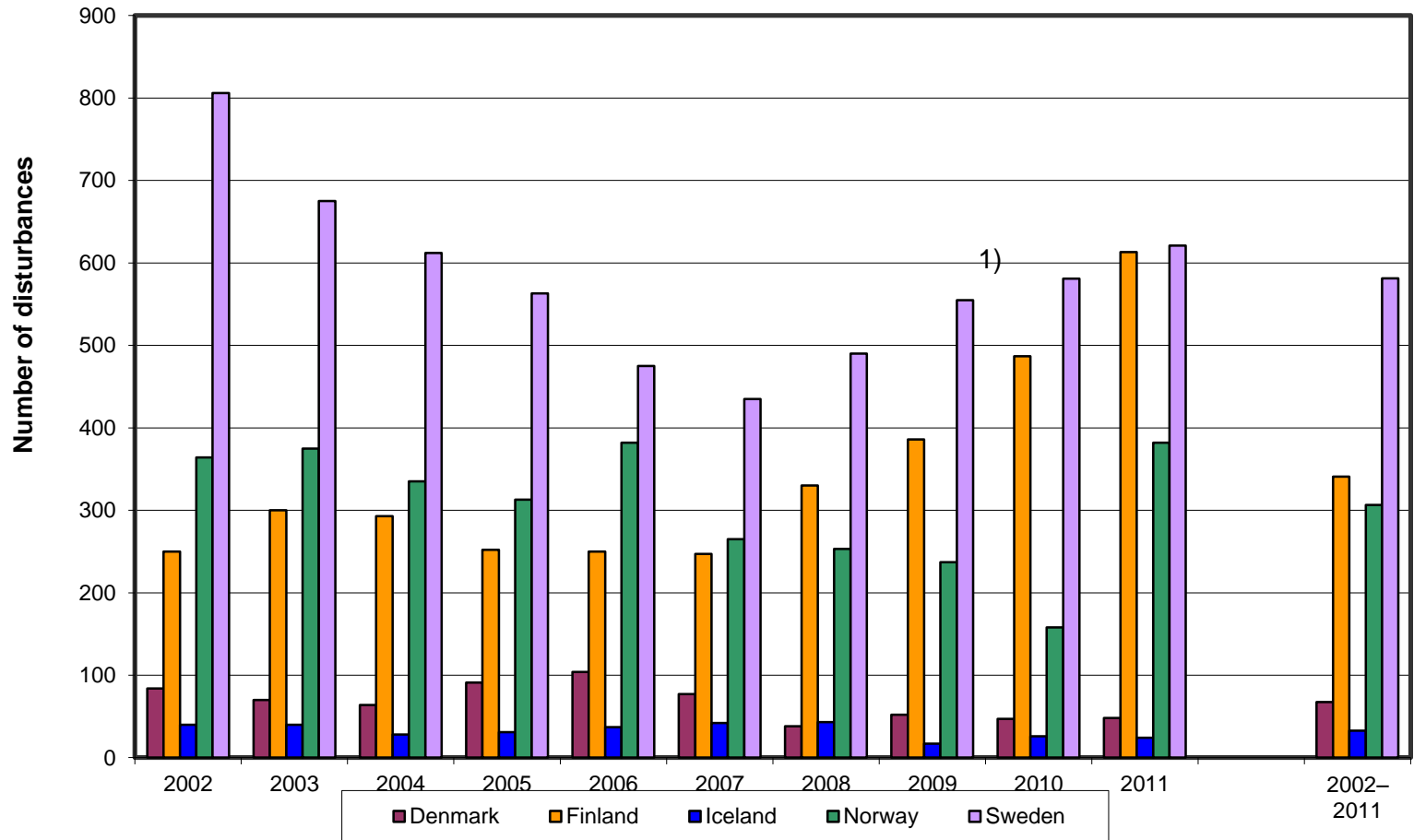
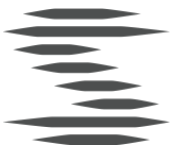
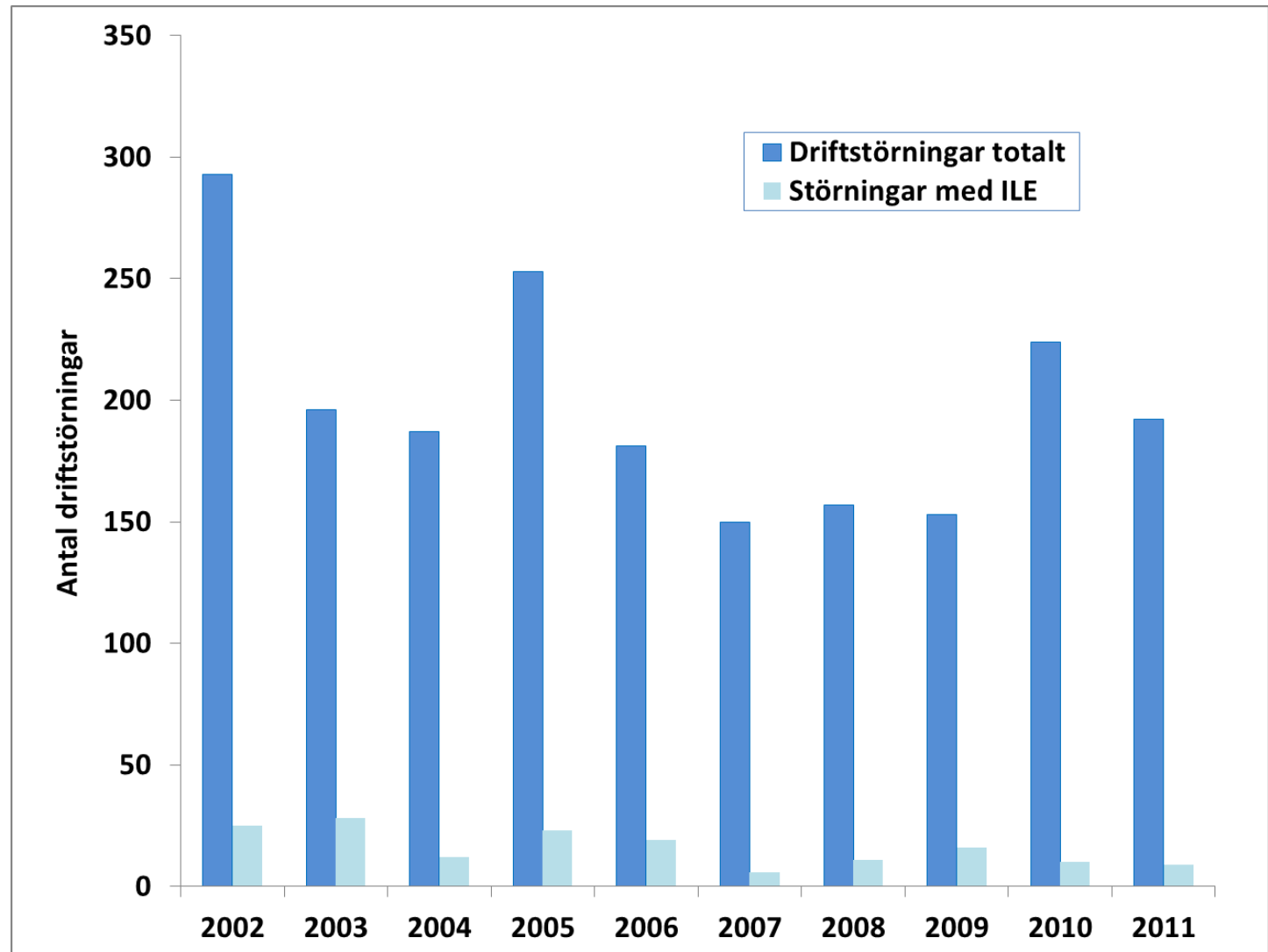


Figure 3.1 Number of grid disturbances in the Nordic countries during 2002–2011.

- 1) The increased number of lightning faults affects the number of grid
- 2) disturbances in Finland and Sweden.



Antal driftstörningar per år



Distribution of grid disturbances according to month

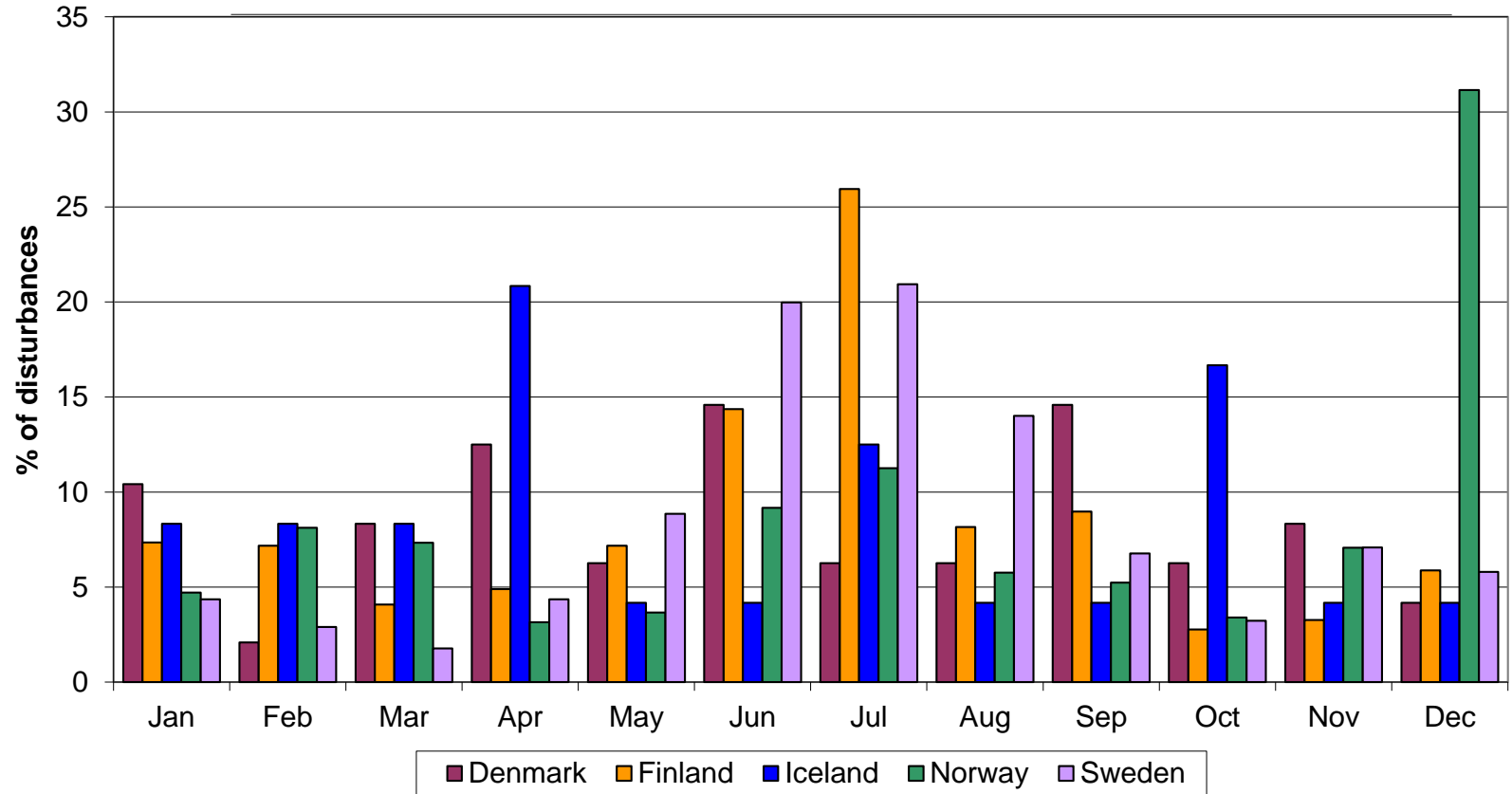
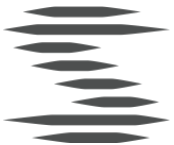


Figure 3.2 Percentage distribution of grid disturbances according to month in each country in 2011.



Average distribution of grid disturbances according to cause

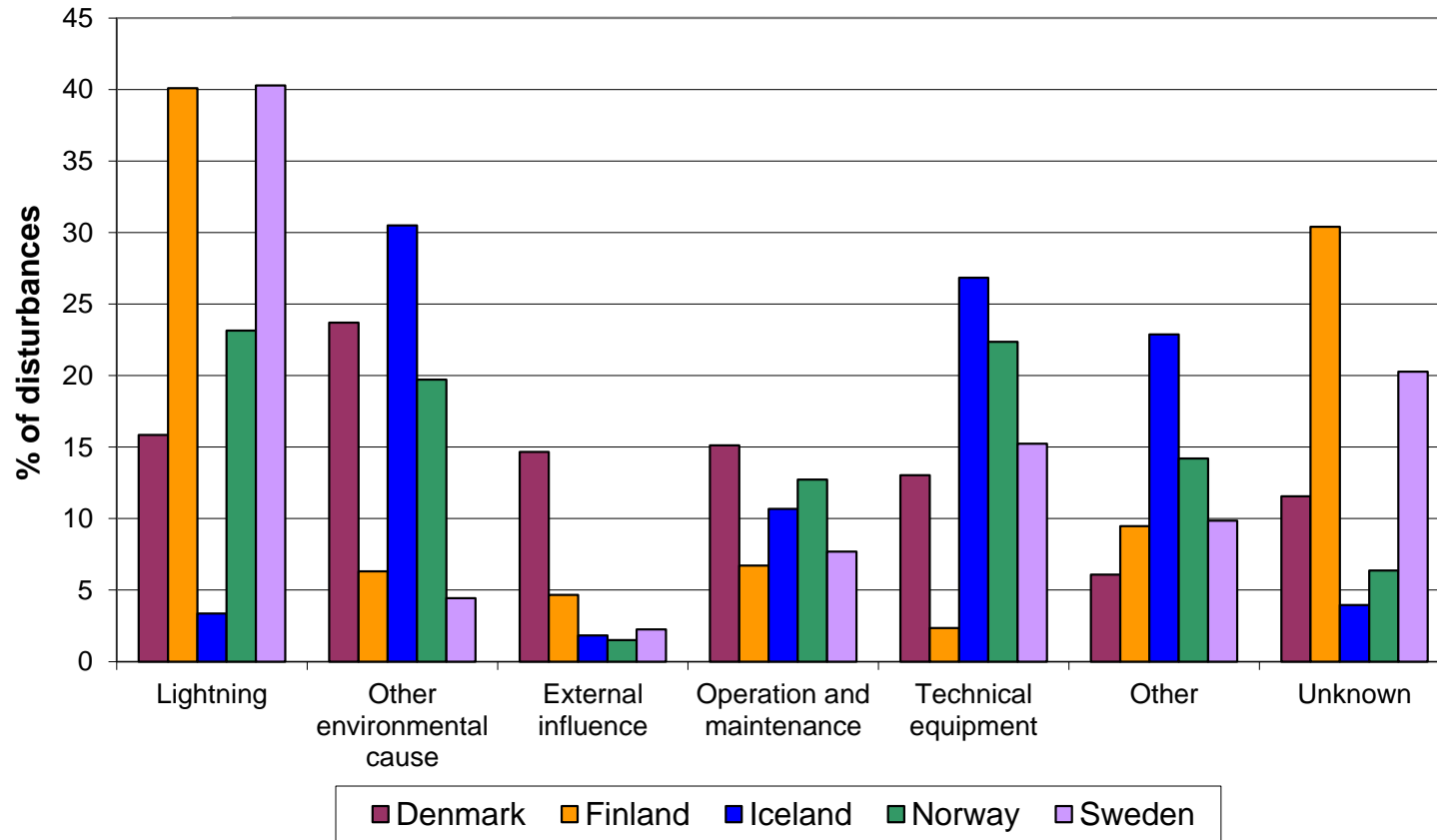
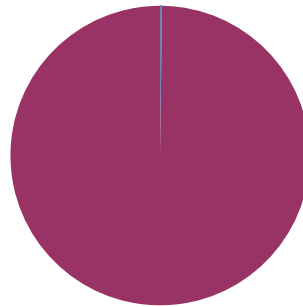


Figure 3.5 Average percentage distribution of grid disturbances according to cause during the period 2002–2011



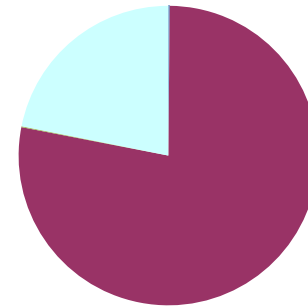
ENS divided into different voltage⁸ levels in 2011

Denmark



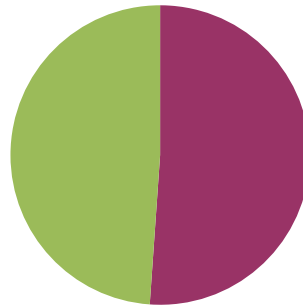
- Other
- 132 kV
- 220 kV
- 400 kV

Finland



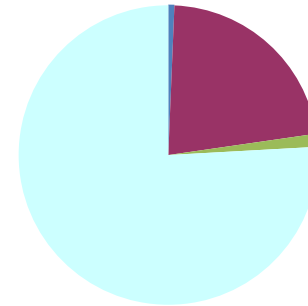
- Other
- 132 kV
- 220 kV
- 400 kV

Iceland



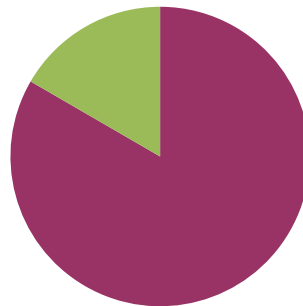
- Other
- 132 kV
- 220 kV
- 400 kV

Norway



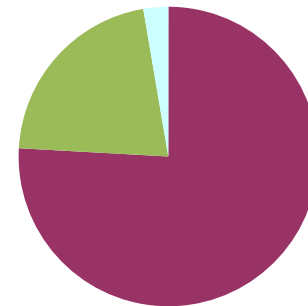
- Other
- 132 kV
- 220 kV
- 400 kV

Sweden

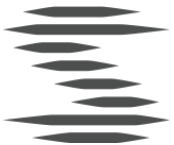


- Other
- 132 kV
- 220 kV
- 400 kV

Nordic



- Other
- 132 kV
- 220 kV
- 400 kV



Distribution of ENS according to cause

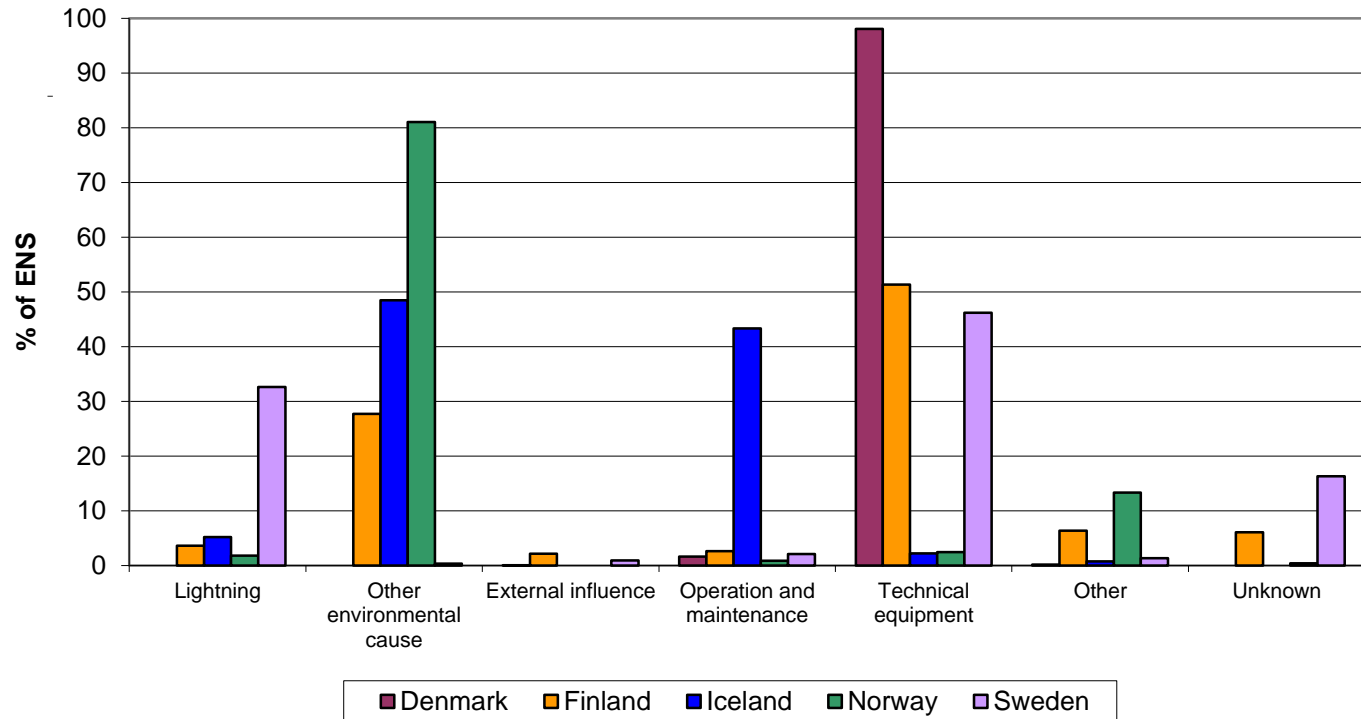
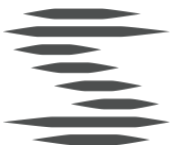


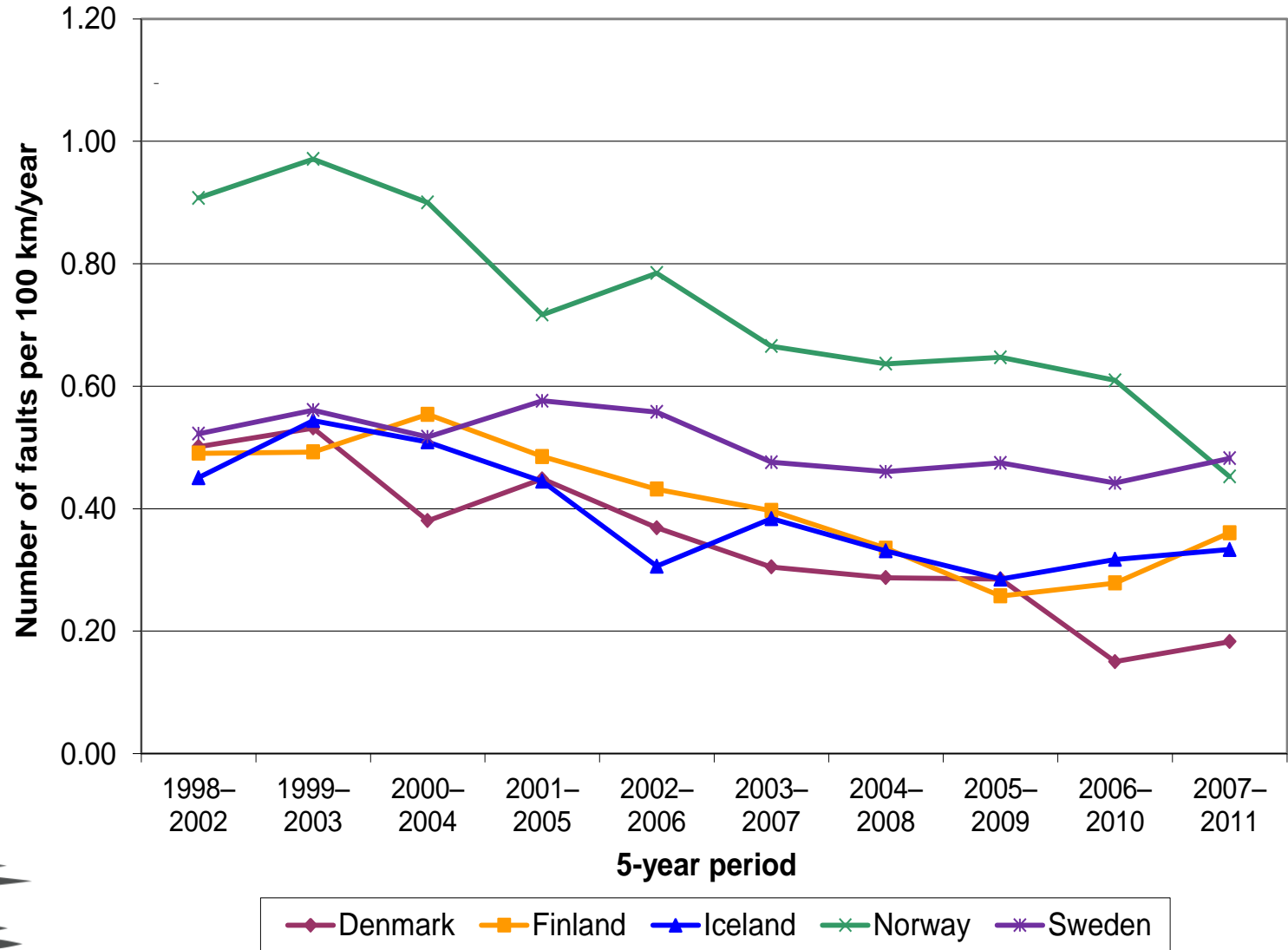
Figure 4.5 Percentage distribution of energy not supplied (ENS) according to the cause of the primary fault in 2011.

Table 4.3 Energy not supplied (ENS) in 2011 and the annual average for the period 2002–2011

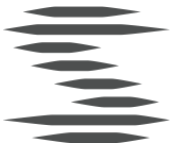
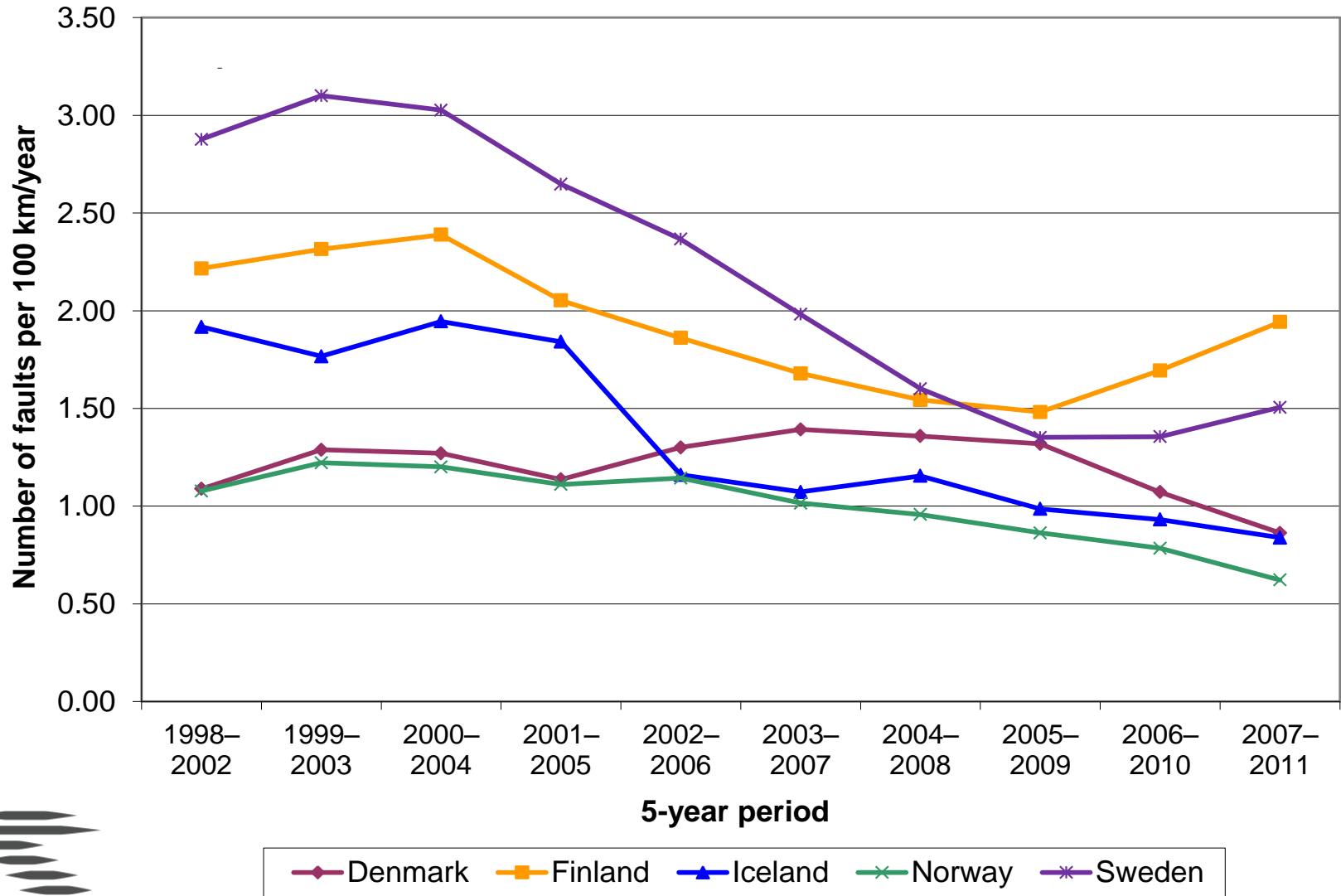
	Denmark		Finland		Iceland		Norway		Sweden		Nordic	
Time period	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002
	–	–	–	–	–	–	–	–	–	–	–	–
	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011
ENS (MWh)	8	956	511	288	641	772	1310	2	2940	1389	3141	1565
												1
												8098



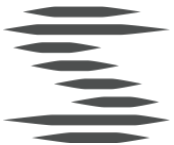
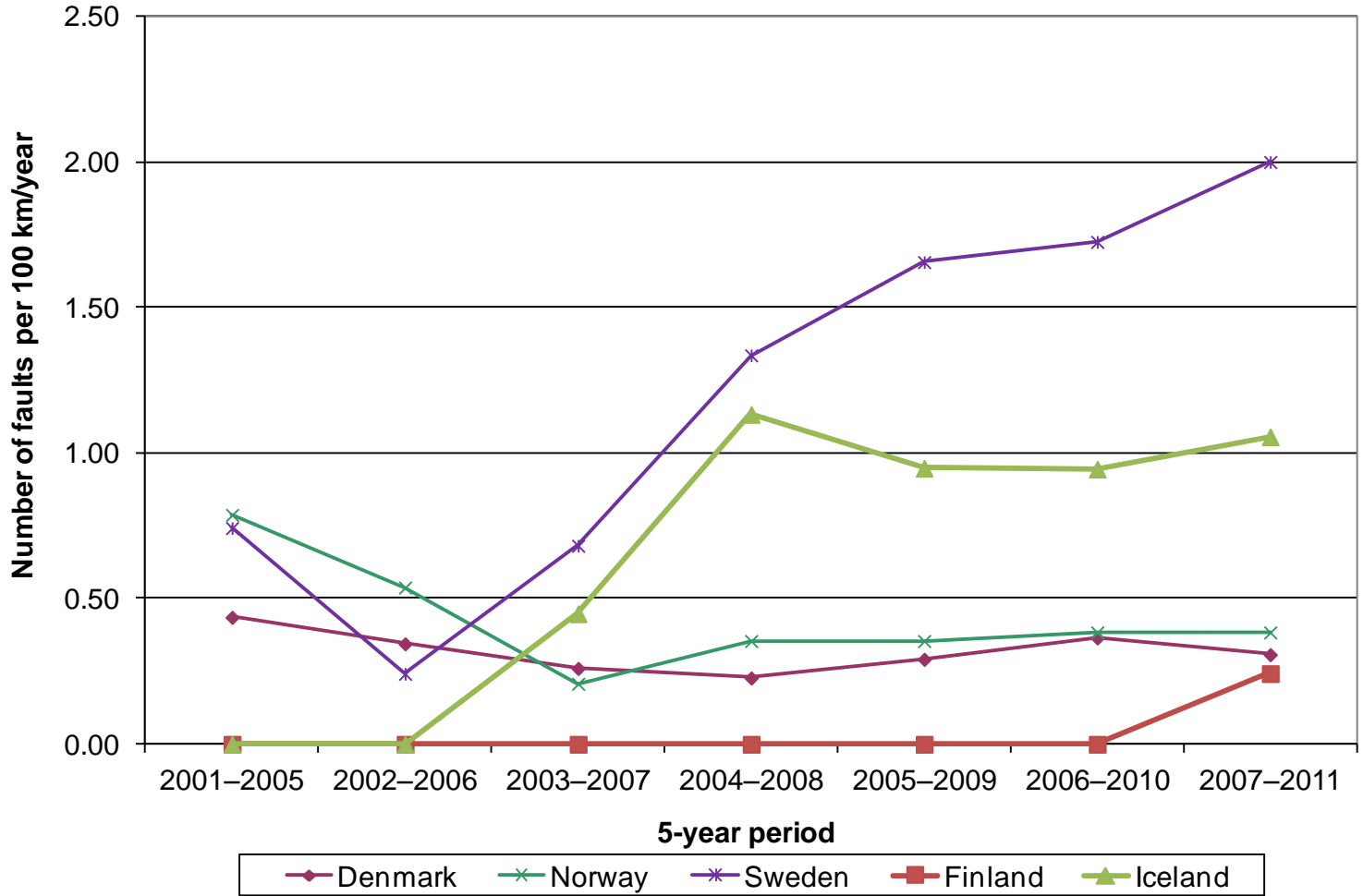
Fault trend for 220–400 kV overhead lines



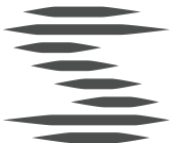
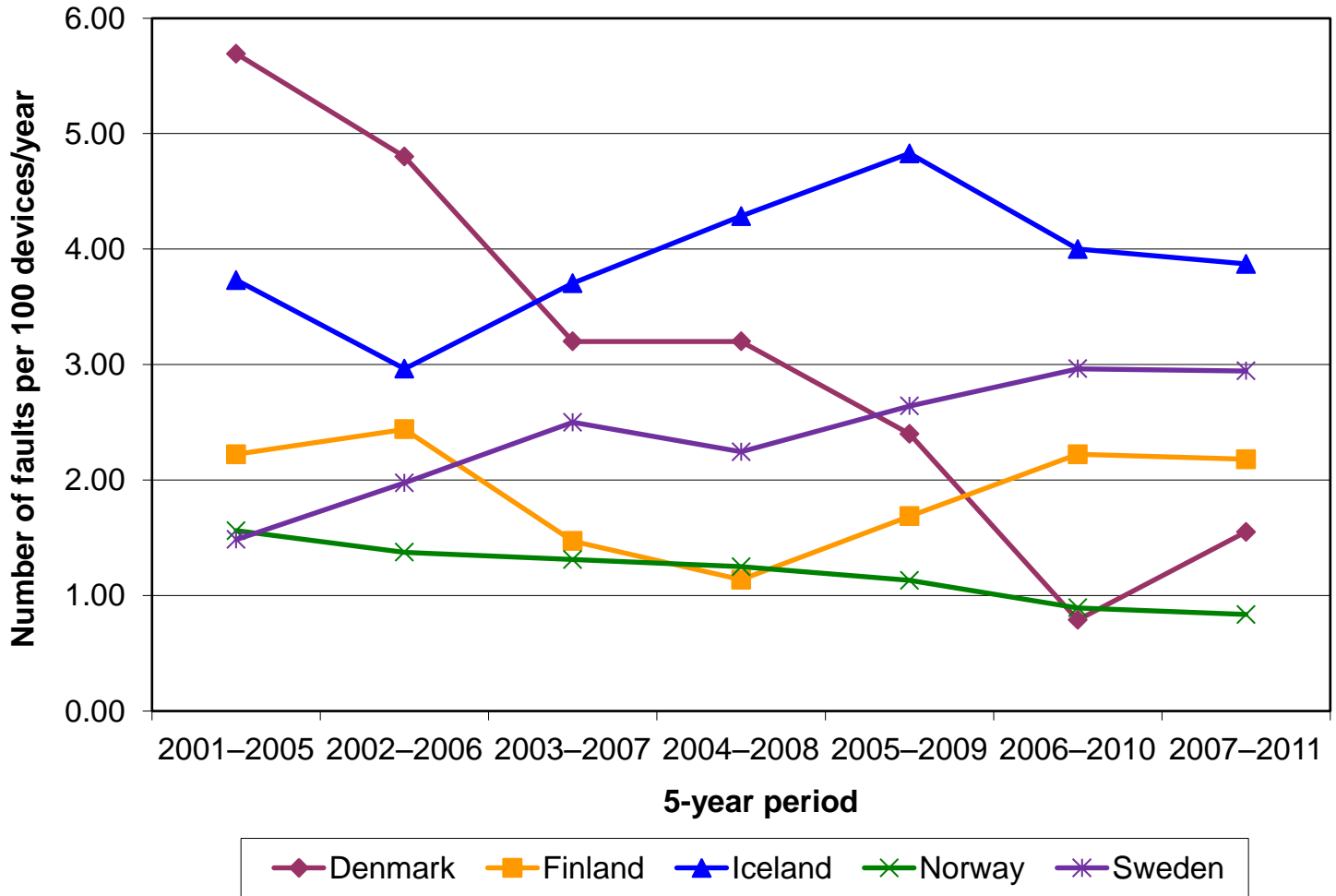
Fault trend for 132 kV overhead lines



Fault trend for cables



Fault trend for 220–400 kV power transformers



Fault trend for 132 kV power transformers

