

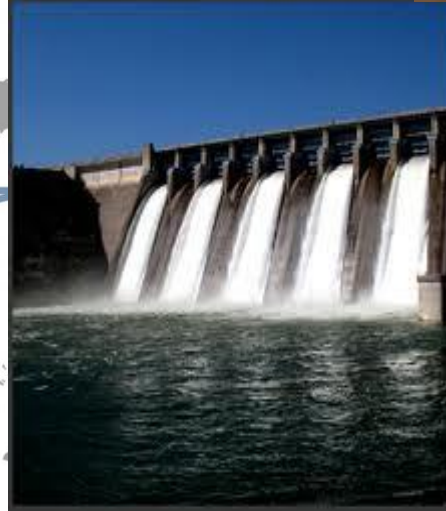
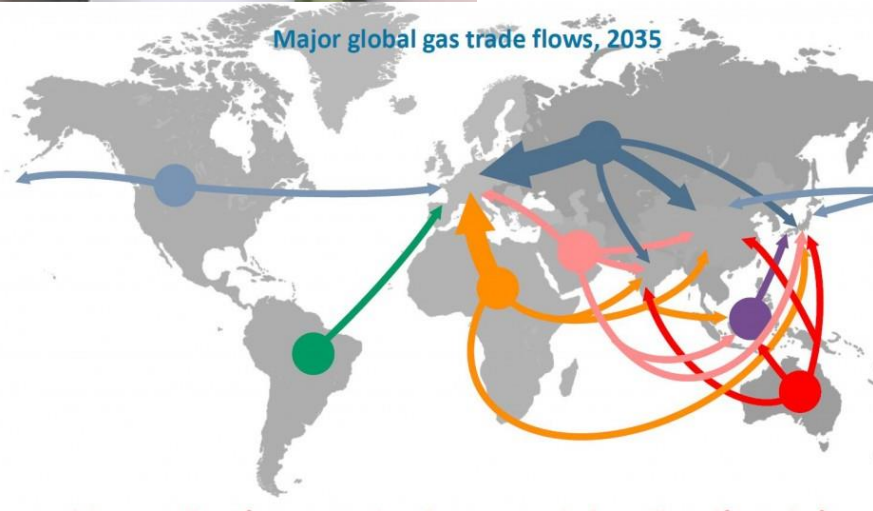
The Strategic reserve - why and how?

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Major global gas trade flows, 2035



Agenda

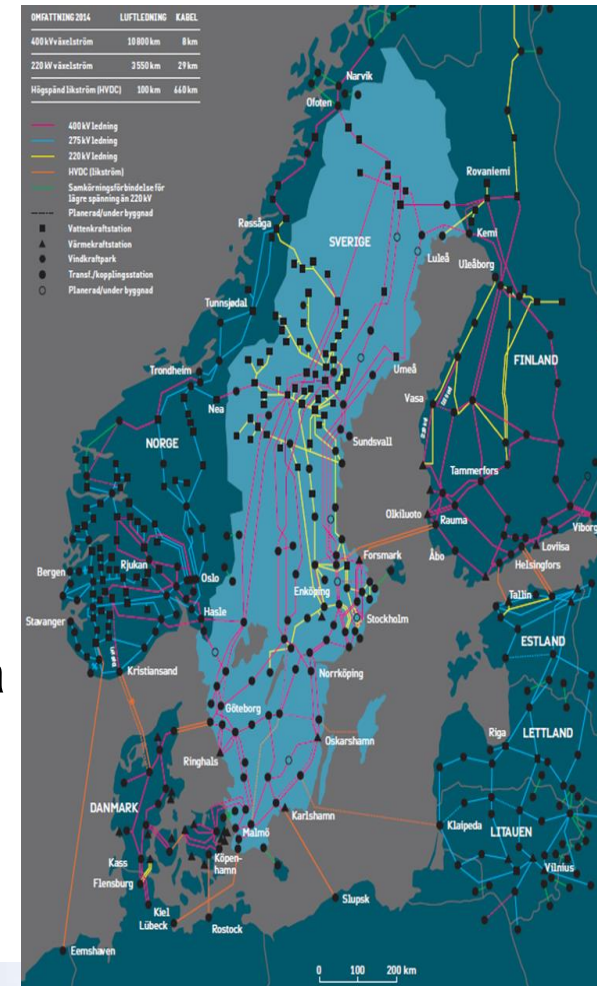
- **The history behind it**
- **Generation adequacy- the current situation**
 - recent activities
- **The current system**
 - size
 - period
 - cost
 - impact on trade

Why do we have a reserve?

- **Before deregulation, physical obligation**
- **Need for heating during extremely cold conditions.**
- **Factor 3 between summer and winter consumption.**
- **Weak or non existing commercial incentives.**
- **Aggravated after decommission of nuclear in 1999 and 2002 (Barsebäck. 1200 MW)**

Preconditions

- **Cables to 5 neighboring countries**
 - more to come
 - 4/5 have normally have higher prices
- **4 bidding zones**
 - limitations between areas.
- **Prices far below LRMC.**
- **9/10 of all consumers live in SE3 and SE4**
- **Adequacy problems in south of Sweden**
- **All nuclear production in SE3**
- **Additional power in Sweden, Finland, Lithuania and Denmark**



Energy balance 2015

- **Sweden and the nordic countries will have a surplus of energy**
- **Production 2014: 151 TWh**
- **Consumption 2014: 135 TWh under 2014**
- **Ringhals 1 and 2 produced approximately 10 TWh under 2014.**
- **Oskarshamn 1 and 2 produced approximately 3 TWh**
 - Normally annual production 8 TWh
- **5 TWh within electric certificate system.**
- **Additional power in the neighbouring countries**

Load balance 2014

<i>Område</i>	<i>Tillgänglig produktion</i>	<i>Elförbrukning</i>		<i>Områdesbalans</i>	
		Normalvinter	Tioårsvinter	Normalvinter	Tioårsvinter
SE1	4680	- 1 600	- 1 700	3 080	2 980
SE2	7300	- 3 000	- 3 200	4 300	4 100
SE3	12750	- 16 800	- 17 700	- 4 050	-4 950
SE4	2570	- 4 800	- 5 100	- 2 230	-2 530
Summa	27300	- 26 200	- 27 700	- 1 100	- 400

Uncertain nuclear production

KÄRNKRAFTVERKENS ENERGITILLGÄNGLIGHET OCH PRODUKTION

Block	Nettoeffekt MW	I drift	Energitillgänglighet						Produktion						Summa prod. från idrifttagning t o m år 2014 TWh
			2009 %	2010 %	2011 %	2012 %	2013 %	2014 %	2009 TWh	2010 TWh	2011 TWh	2012 TWh	2013 TWh	2014 TWh	
Barsebäck 1	(600)	1975													92,7
Barsebäck 2	(600)	1977													107,6
Forsmark 1	984	1980	90,1	93,8	79,2	88,4	87,7	94,4	7,6	8,0	6,8	7,6	7,5	8,1	235,9
Forsmark 2	1 120	1981	64,1	38,5	93,9	85,7	91,9	90,2	5,5	3,3	8,1	7,5	8,7	8,8	227,6
Forsmark 3	1 167	1985	86,1	81,4	85,4	93,1	88,7	83,1	8,8	8,3	8,7	9,5	9,0	8,5	252,7
Oskarshamn 1	473	1972	70,5	79,0	73,3	0,0	15,1	75,1	2,8	3,2	3,0	0,0	0,5	3,1	102,7
Oskarshamn 2	638	1974	77,9	92,0	76,6	72,4	35,6	0,0	3,9	5,0	4,2	4,0	1,7	0,0	154,0
Oskarshamn 3	1 400	1985	15,2	32,0	70,3	70,0	77,5	77,3	1,7	3,8	8,3	8,4	9,4	9,2	236,0
Ringhals 1	878	1976	17,4	48,7	81,6	72,5	80,4	71,8	1,3	3,6	6,0	5,5	6,1	5,5	184,8
Ringhals 2	866	1975	39,1	80,3	24,9	48,5	86,2	61,6	2,8	5,6	1,7	3,6	6,3	4,3	195,8
Ringhals 3	1 064	1981	91,3	83,7	79,3	91,2	76,7	88,4	8,1	7,6	7,1	8,3	6,9	8,1	210,3
Ringhals 4	938	1983	92,8	89,3	50,1	85,2	91,2	83,5	7,5	7,2	4,1	6,9	7,4	6,7	200,4
	9 528		64,0	70,1	72,0	75,2	78,0	75,9	50,0	55,6	58,0	61,4	63,6	62,2	2 200,5

Källa: OKG, Ringhalsgruppen, Forsmarks Kraftgrupp

Load balance with 4 reactors decommissioned

<i>Område</i>	<i>Tillgänglig produktion</i>	<i>Elförbrukning</i>		<i>Områdesbalans</i>	
		Normalvinter	Tioårsvinter	Normalvinter	Tioårsvinter
SE1	4 760	- 1 600	- 1 700	3 140	3 060
SE2	7 340	- 3 000	- 3 200	4 340	4 140
SE3	1 0840	- 17 000	- 17 900	- 6 820	- 7 720
SE4	1 920	- 4 900	- 5 200	- 2 980	- 3 280
Summa	24 860	- 26 500	- 28 000	- 2 320	- 3 800

The Swedish system

- **Annual procurement of production and demand reduction.**
- **25 percent must be demand reduction**
- **Until year 2020**
- **Thereafter supposed to be handled by the market**
- **Does not solve extreme price fluctuations**
- **Does not reduce risk and lead to better investment climate.**
- **Available between 16 November to 15 March**

Basic facts

- **Regulatory framework**
 - The Act 2003:436 on Peak Load Reserve
 - The government Regulation 2010:2004 on peak load Reserve
- **1000 MW until 2017, thereafter 750 MW**
- **Demand response. (626 MW)**
 - Stora Enso
 - Holmen
 - Rottneros
 - Reservkraft AB
- **Production resources (874 MW)**
 - Karlshamn (E.ON)
 - Stenungssund (Vattenfall)
 - Aros (Mälarenergi)
 - Oil or coal CHP
- **Unprofitable production**

Annual cost

- **Cost for 2014: 112 miljoner (13 million Euro)**
- **Cost for 2013: 138 miljoner (14 million Euro)**
- **Cost for shortage situation 900 miljoner (90 million Euro)**
- **Cost covered by balance responsible/consumers**
 - not where shortage occur.

Historic use

Winter	Activity
2014/2015	No activation
2013/2014	No activation
2012/2013	Activation one time
2011/2012	Activation 5 times.
2010/2011	No activation
2009/2010	Activation 3 times
2008/2009	No activation
2007/2008	No activation
2006/2007	Activated due to net problems
2005/2006	No activation
2004/2005	Partly activated
2003/2004	No activation

Some of these occasions are due to problems in Finland and vice versa

Production Vs Demand side management

- **2011-2013: 1750 MW**
 - 25 % demand side reduction
- **2013-2015: 1500 MW**
 - 25 % demand side reduction
- **2015-2017: 1000 MW**
 - 25 % demand side reduction
- **2017-2019: 750 MW**
 - 25 % demand side reduction

Reduction 1(3)

In general:

- **Yearly procurement of reduction resources as regards reporting and submitting bids to the Regular Power Market**
- **The resource owner is free to submit the resource to the Power Exchange - Nord Pool Spot at desired price**
- **If the resource is not activated on Nord Pool Spot market it is still available for the RPM.**

Reduction 2(3)

Resource owner commitment

- **Resource owner shall in the tendering process declare his requirements for an administrative payment in SEK per hour, effect and bid price on the RPM.**
- **Commitment by agreement:**
 - The resource owner shall submit bids to RPM for all hours the resource is available.
 - Only valid reasons for not being available are operational disturbance or activation on the Nord Pool Spot market.
 - The resource owner shall continuously report unavailability to Svenska Kraftnät.
 - The price on the bid to RPM is set by the owner in the tender.
 - Maximum 30 minutes start up time

Reduction 3(3)

Activation and payment

- **The resource owner get an administrative payment per hour for availability on the RPM**
- **The resources are activated in merit order after all the commercial resources have been activated.**
- **Payment for activation according to the accurate market price which in RPM is Marginal pricing.**
- **The resource owner is guaranteed one hour payment according to the bid price if the time of activation is less than one hour.**
- **No administrative payment if not available**

Production 1(4)

In general:

- **Yearly procurement of resources**
- **Bidding and activation after decision by Svenska kraftnät**
- **The resources may be activated on both the Nord Pool Spot market and Regular Power Market (RPM).**
- **If the resource is not activated on spot market it is still available for the RPM.**

Production 2(4)

Resource owner commitment

- **Resource owner shall in the tendering declare his requirements for the fixed payment as well as the price for activation (SEK/MW)**
- **Commitment by agreement:**
 - Ensure availability during the winter period
 - Maximum 16 hours start up time

Production 3(4)

Activation and payment on RPM

- **The resources are activated in merit order after all the commercial and reduction resources have been activated.**
- **Production resources are paid the fixed and variable compensation that they have set out in the tender agreement.**

Production 4(4)

Activation on the Nord Pool Spot market Production

- **Activation only if there is a curtailment situation in Sweden or/and Finland**
- **Price of the PLR order in Nord Pool Spot market will be the price of the highest commercial order with a volume change + 0,1 EUR/MWh**
- **Production resources are paid the fixed and variable compensation that are set out in the tender agreement**

The financing of the PLR

- **The PLR are financed by the balance providers as a group by an additional fee on the consumption energy during the winter period**
- **All excess money are repayed to the BRPs**

How to minimize need for strategic reserve?

- **Bidding zones**
 - better price signal, nor regulated prices
 - Electricity flow where it is most needed.
- **Increased market integration**
- **Strengthen transmission network**
- **Hourly metering**
 - 5 million customers without no extra fee
- **Smart grids**
- **Nordic solution**
 - shorter time frame on day ahead?
- **Nordic cooperation on how to minimize problems**
 - Measures will be discussed by ministers in November 2015

Thank you for your attention!

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