power solution european energy

Our competence for your success

Fundamentals of optimized energy purchase

Roland Kuras

I am a technician and I have spent my entire life in the field of energy management.

- Siemens in power plant construction – Commissioning power plants
- TU – Vienna – Basis for sustainable energy supply
- Austrian energy suppliers – Preparing for the liberalized energy market
- EnBW – Energy supplier – Entry of a German energy supplier in the Austrian market

Today, I am the Managing Director and owner of PowerSolution Energieberatung GmbH with focus on strategic energy purchase – holistic energy management – Energy contracting. Moreover, I am a member of the E-Control Commission – Regulatory authorities in Austria – they specify the power grid regulations.

Some of our Customers

Universitätsklinikum Hamburg-Eppendorf

MARTINI
DRUCK- UND VERLAGSGMBH
WWW.MARTINI-DRUCK.COM

A1

STEIGENBERGER
HOTEL
BERLIN

AUMAIER
COACHING I CONSULTING
Competence in Leadership

ACCOR

VIE Vienna International Airport
Offen für neue Horizonte.

SCHICK HOTELS WIEN
★★★★

HAHL PEDEX
FILAMENT TECHNOLOGIES

Customers with energy consumption of 2,500,000,000 kWh repose their trust in our know-how in Europe.

Overview of the Contents

1.Price Development

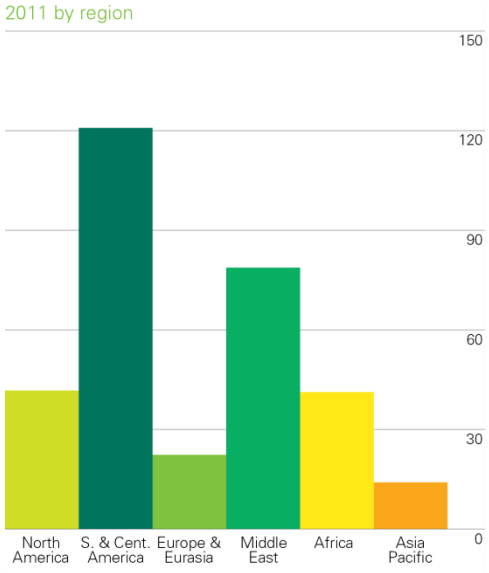
2.Energy Exchange

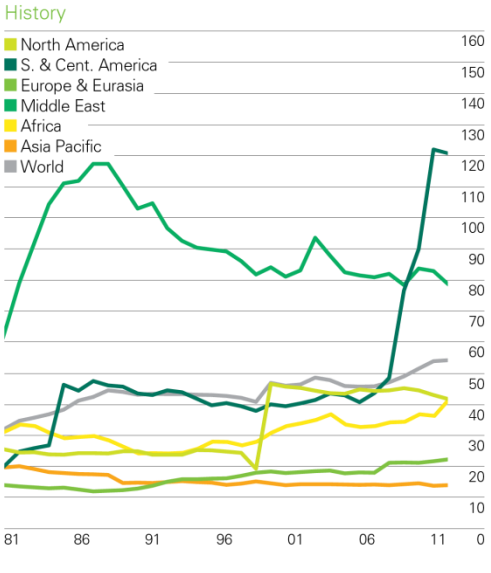
3.Energy purchase of electricity and gas

Overview of the Contents

1. Price Development
   - Fossil fuels – Oil/Coal/Natural gas
   - Electricity
   - Emission trading
   - ECO Energy
   - Factors influencing the energy price

Oil Reserves



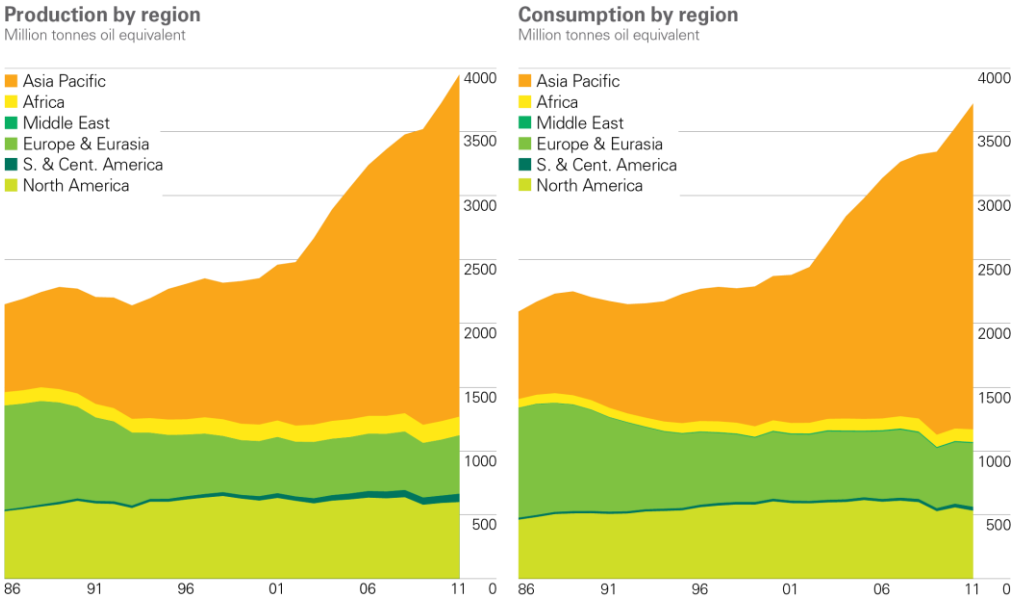


World oil reserves

Based on the oil consumption in 2011, the world reserves are adequate for about 54 years.

Thanks to the oil finds in Venezuela, the reserves in this region have increased substantially.

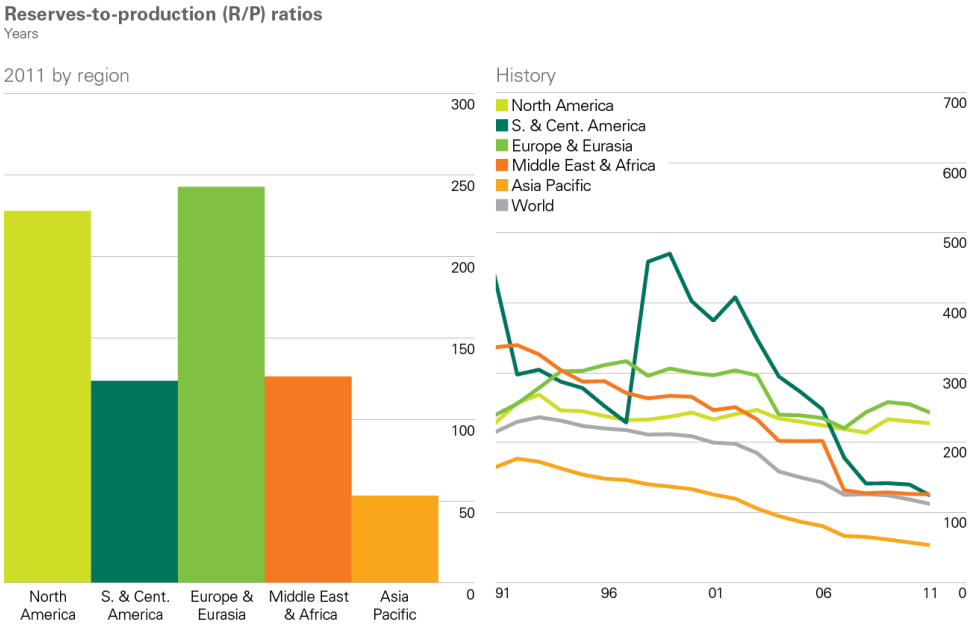
Coal



Coal Consumption

The use of coal has increased considerably in recent years. The maximum increase is recorded in the Asian region. In North America, the consumption has reduced remarkably.

Coal Reserves

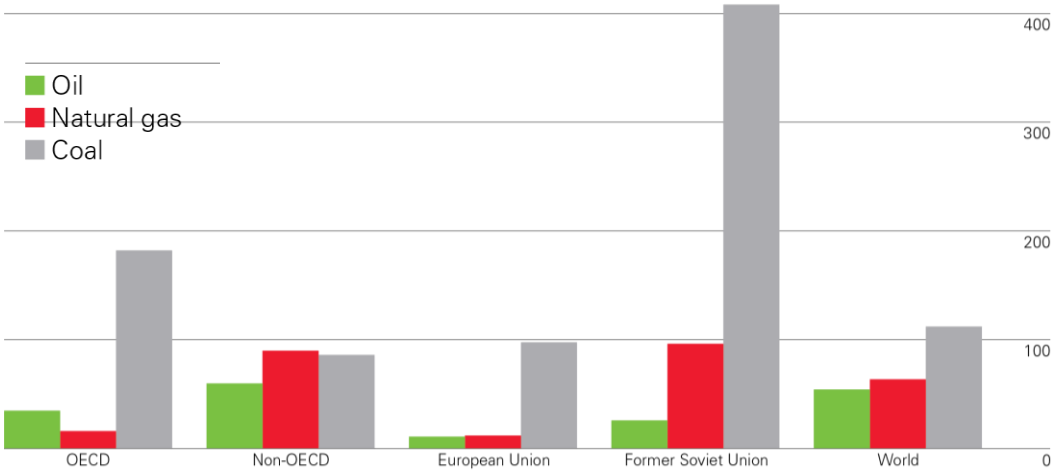


Coal Reserves

Based on the coal consumption in 2011, the reserves are adequate for about 112 years.

The reserves have declined continuously in recent years. Asia has the second largest reserves.

World Energy Reserves

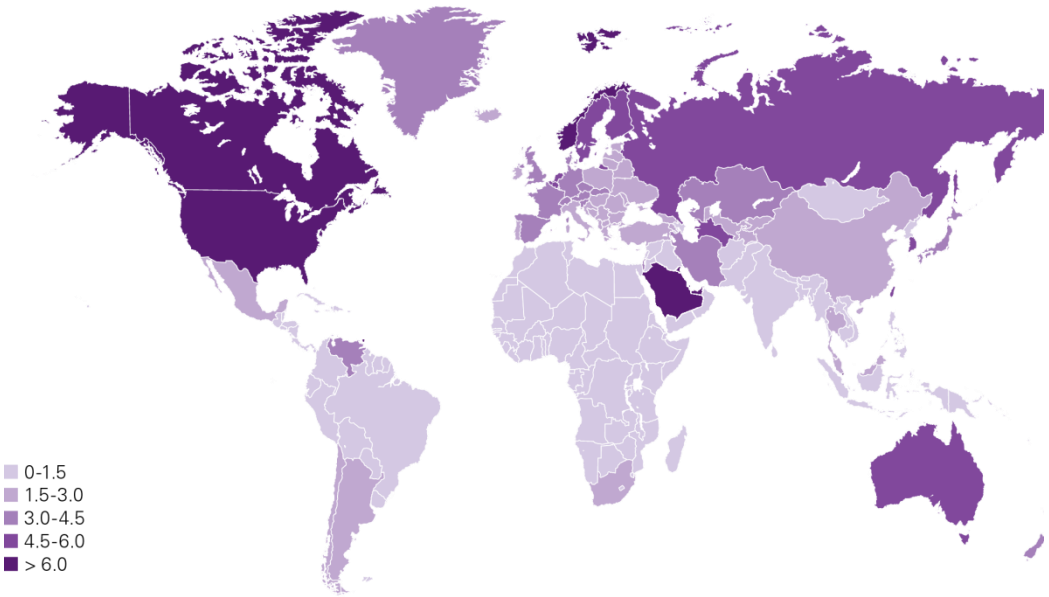


Fossil fuel energy reserves

The known reserves in oil and gas have gone up.

The reserves in coal have gone down.

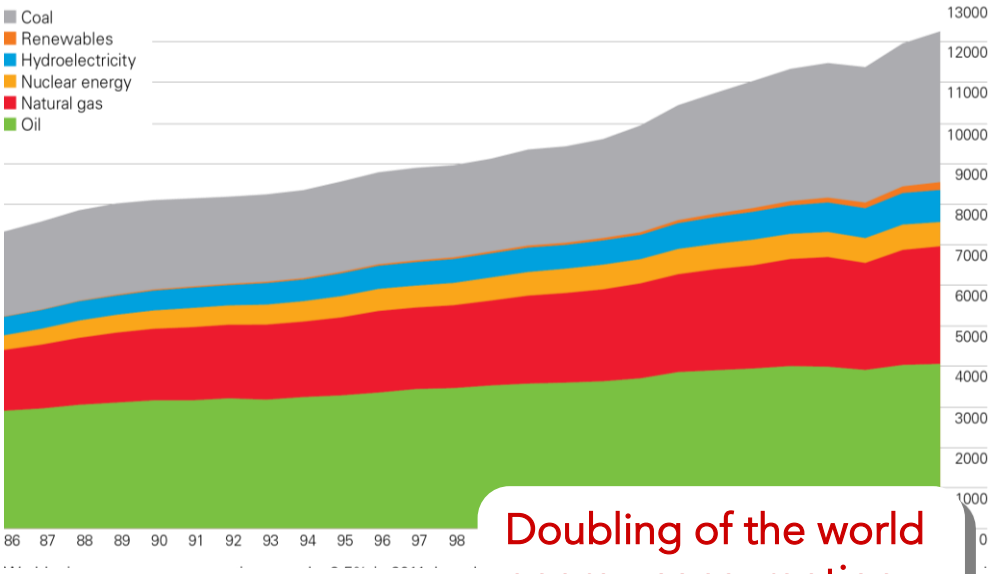
Specific Primary Energy Consumption



Per capita Energy Consumption

The specific energy consumption is highly diverse. This is where North America has the maximum energy need. The Asian region has very high increases.

Development of World Energy Consumption

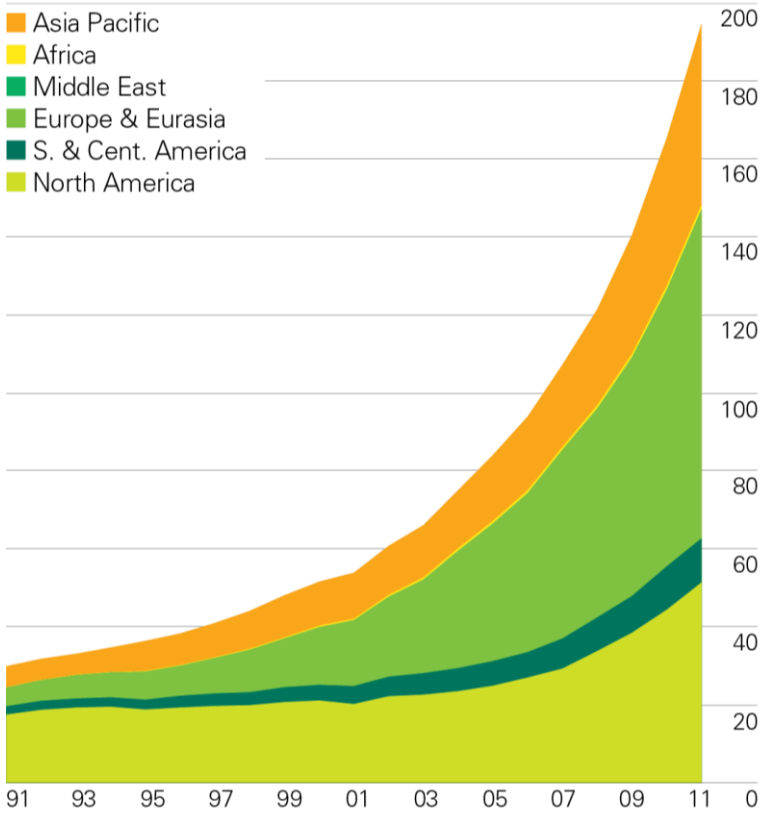


Doubling of the world energy consumption until 2030

Consumption is rising unabated

The world energy consumption has risen by 70% in the last 25 years. There was a growth of about 2.5% in the year 2011. Oil is still one of the most important fuels with a share of 33%, followed by coal with a share of 30%.

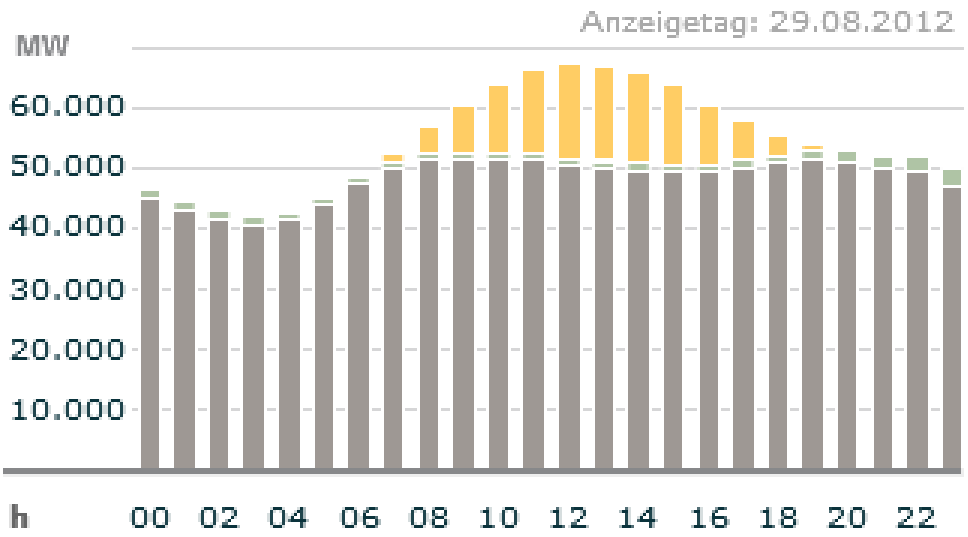
Renewable Energy



Renewable energy sources have grown considerably

The share of renewable energy sources has grown substantially particularly in Europe. This changes the energy market sustainably.

Electricity Generation – Germany - Austria



The significance of alternative energy carriers is increasing.

- Political will
- Economic conditions
- Ecological impact
- Integration in exchange trading

Ifo Business Climate in Germany

Overview of the Contents

2. Energy Exchange

- Markets and Products
- Price development

Teamwork
Oil price development

Oil price development in Dollars per barrel

Current price – Reference value: 100 USD/Barrel

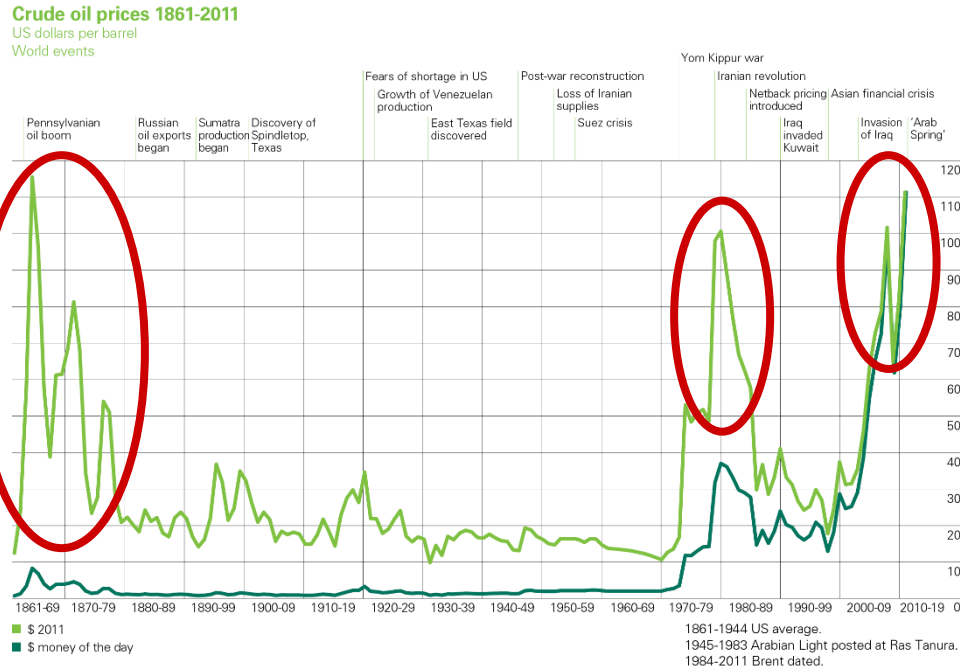
Mean yearly value

- 2014
- 2015
- 2020
- 2025
- 2030
- 2035

Energy market

Considerable price fluctuations characterize the picture and render decision-making more complex.

Development of Energy Price

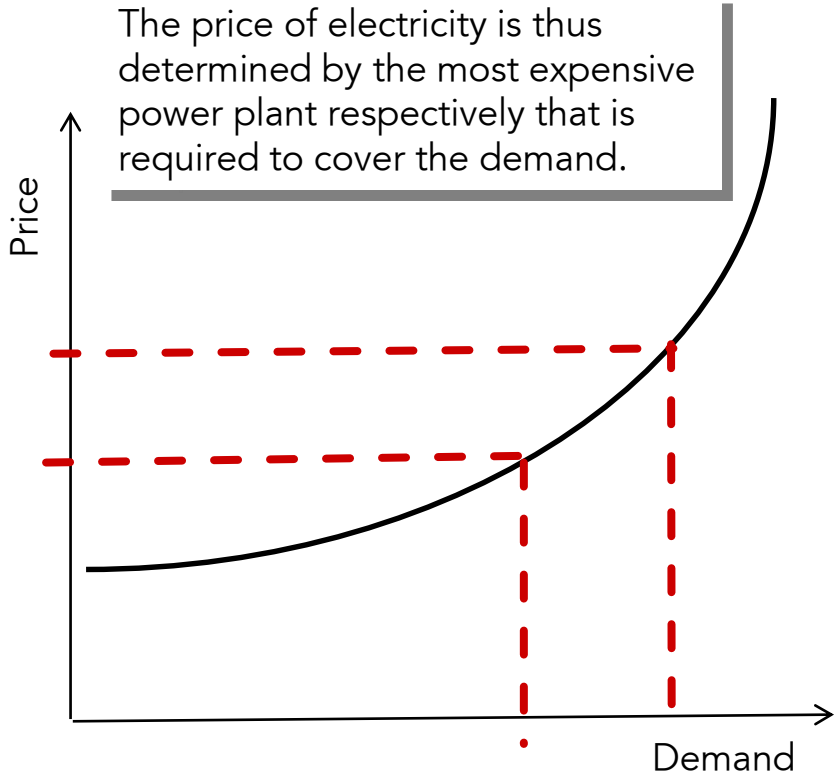


Oil price

The oil price is subject to considerable fluctuations time and again.

The first / second oil price shock was felt in the mid 70's and beginning of the 80's. Price jump in 2008.

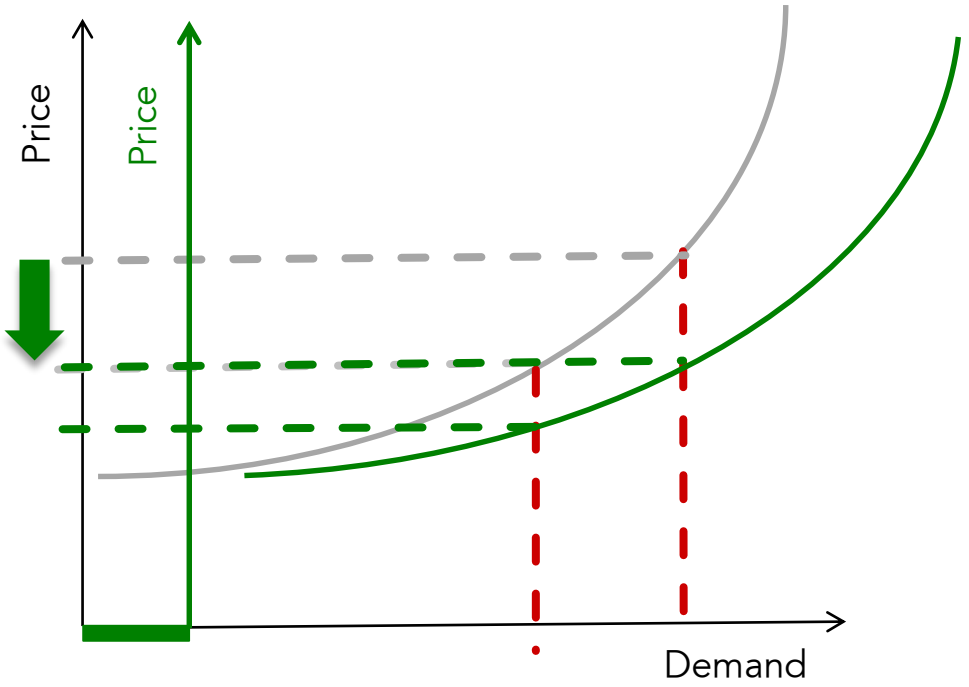
Merit Order Curve



Price Curve

Merit Order on the electricity exchange is referred to as the order of deployment of the power plants. This order is composed of the hourly price-quantity offers of the electricity suppliers on the previous day.

Merit Order Curve - GREEN ELECTRICITY



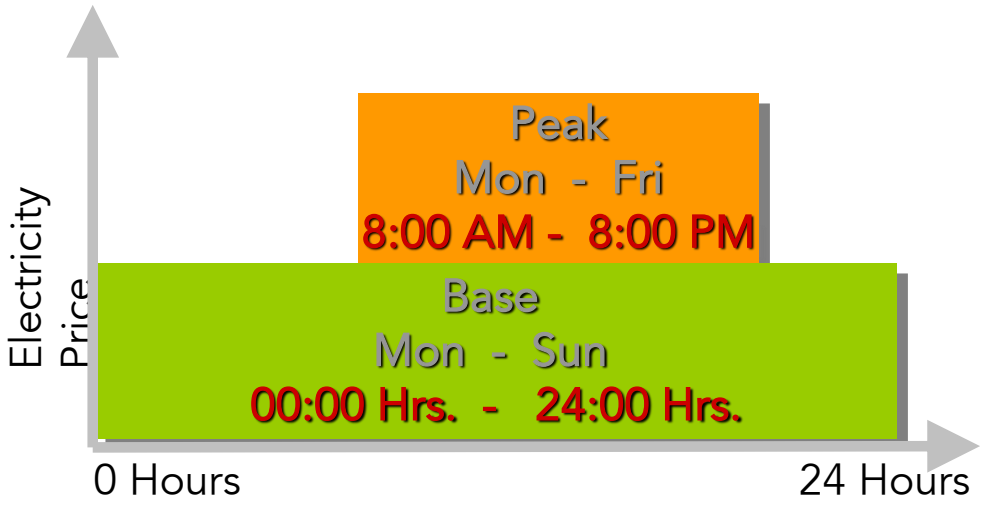
Price Curve

The price curve gets shifted by the supply of alternative

quantities of energy demand.

The prices on the exchange are becoming more favourable.

Exchange - Energy Products

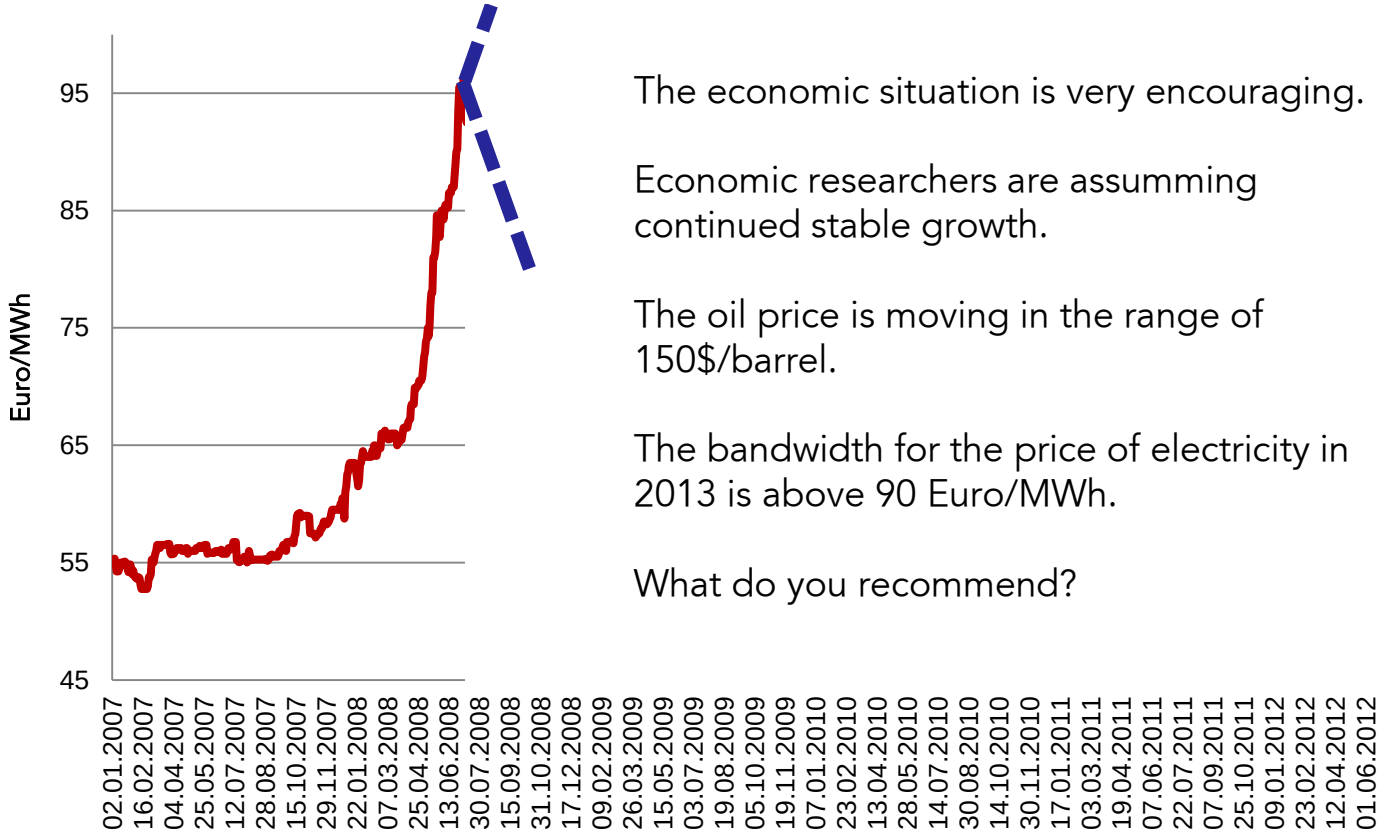


Energy Products

These are becoming products that can be traded with the help of standardized products for electricity, gas, coal, oil and (Carbon dioxide) emissions.

Depending on the time period, you speak of annual, quarterly or monthly products – or the spot market.

EEX Base 2013 - Trading periods since 2007
Basis for decision-making July 2008



The economic situation is very encouraging.

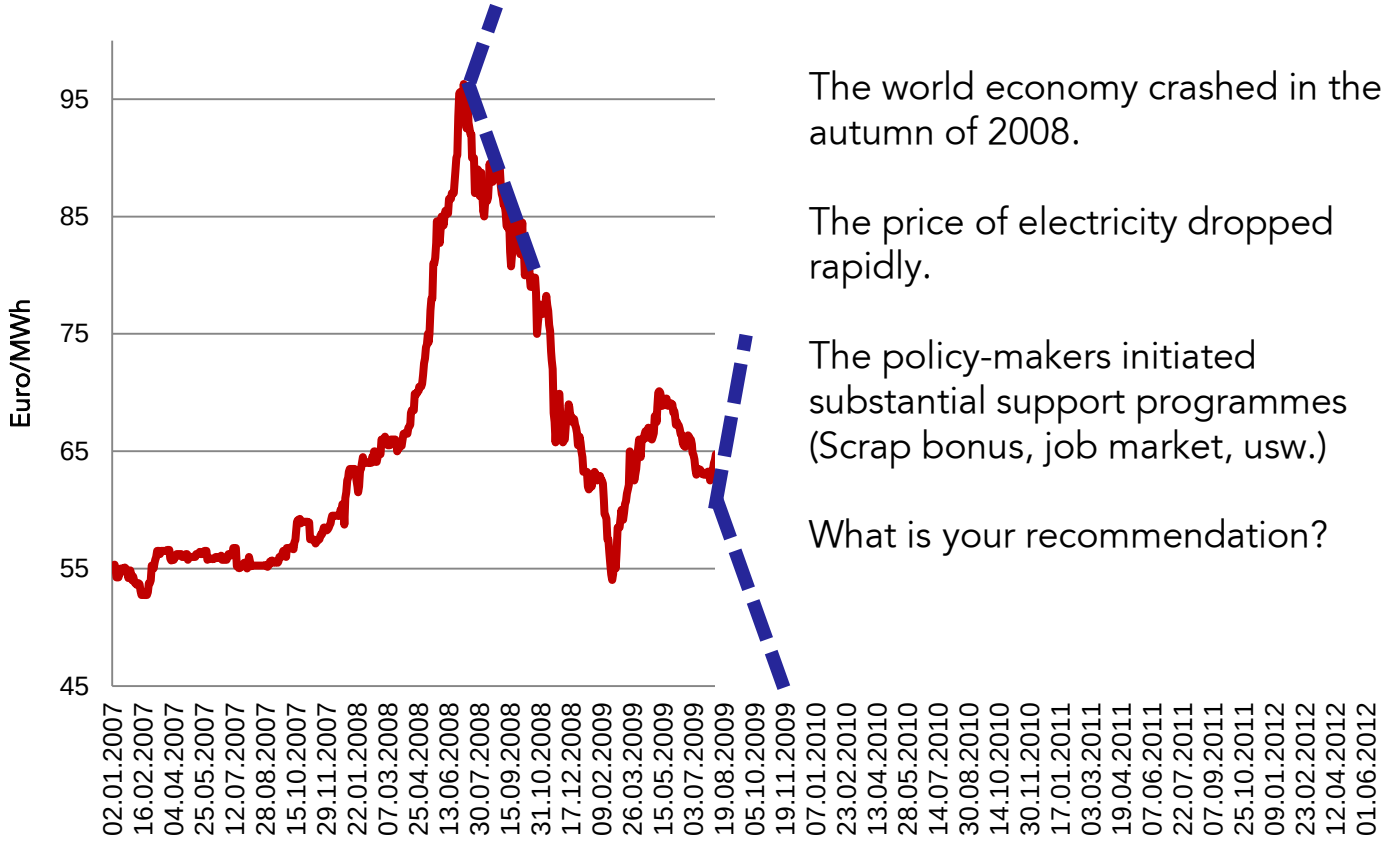
Economic researchers are assumming continued stable growth.

The oil price is moving in the range of 150$/barrel.

The bandwidth for the price of electricity in 2013 is above 90 Euro/MWh.

What do you recommend?

EEX Base 2013 - Trading periods since 2007
Basis for decision-making July 2009



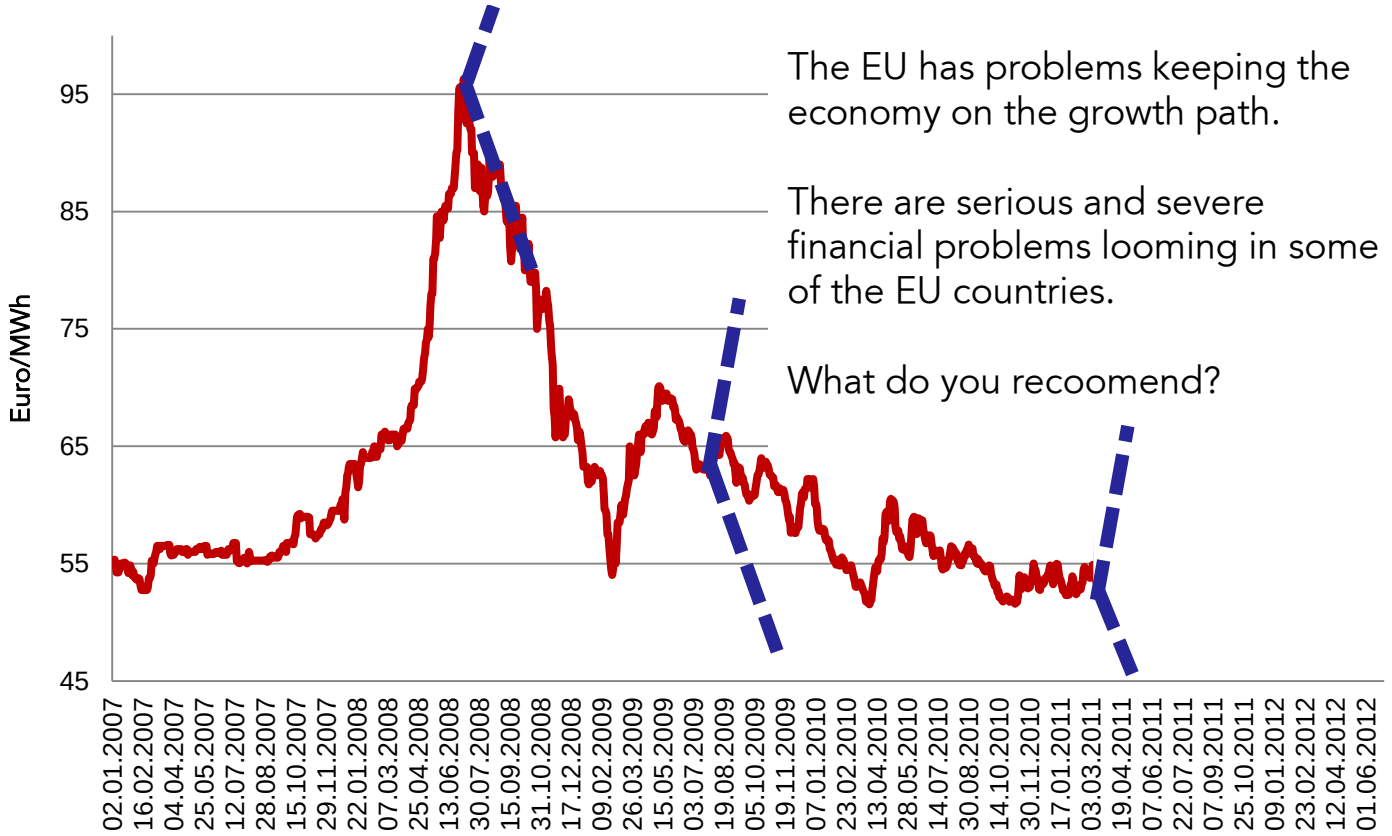
The world economy crashed in the autumn of 2008.

The price of electricity dropped rapidly.

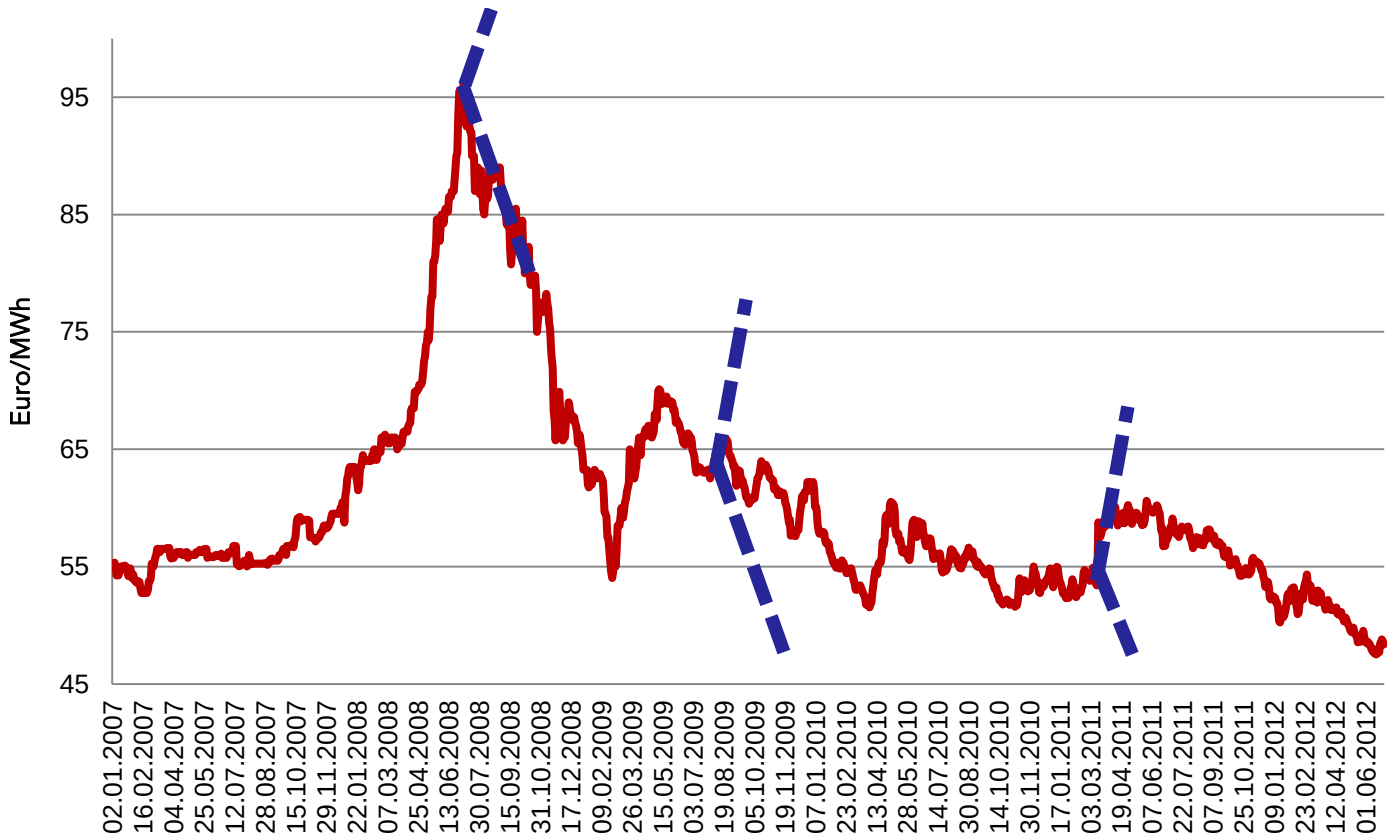
The policy-makers initiated substantial support programmes (Scrap bonus, job market, usw.)

What is your recommendation?

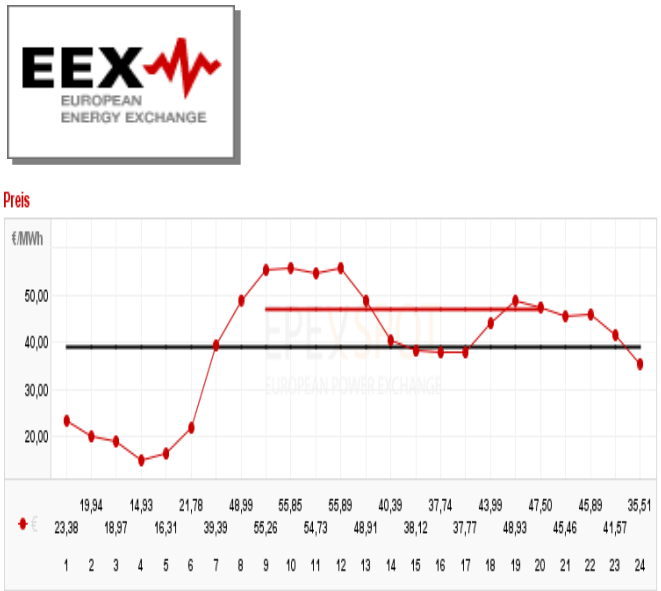
EEX Base 2013 - Trading periods since 2007
Basis for decision-making July 2011



EEX Base 2013 - Trading periods since 2007
Basis for decision-making July 2012



Factors affecting the energy price

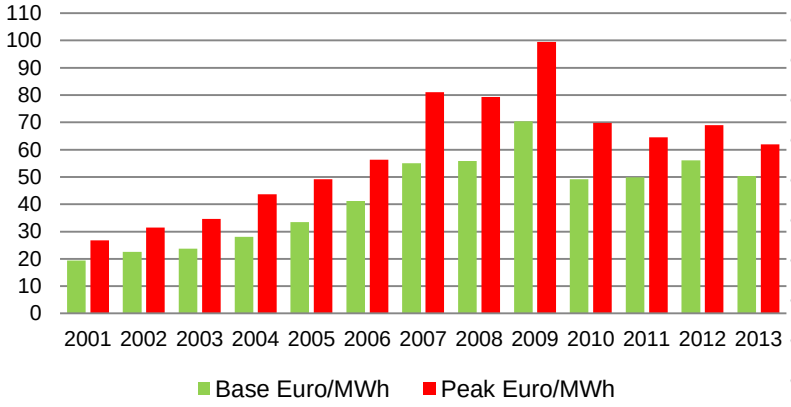


- Long-term expectations
- Worldwide energy reserves
- CO_2 – Problem
- Weather forecast
- Actual consumption
- Peak loads
- Time of day and time of year
- Region
- ….

Example: 21st May 2012 - Time of day - a significant price factor

Future Price Development in the Electricity Market

Futures Market – Year ahead



The mean price 2001 - 2014 rounded:
Base 42Euro/MWh

EEX	Termin - Frontjahr		
Jahr	Base	Peak	Peak/Base
	Euro/MWh	Euro/MWh	
2001	19,41	26,75	138%
2002	22,54	31,52	140%
2003	23,74	34,61	146%
2004	28,01	43,60	156%
2005	33,50	49,12	147%
2006	41,24	56,33	137%
2007	55,00	81,04	147%
2008	55,83	79,33	142%
2009	70,37	99,46	141%
2010	49,17	69,75	142%
2011	49,90	64,48	129%
2012	56,03	68,96	123%
2013	49,30	60,86	123%
2014	39,08	49,67	127%
2015	36,32	46,78	129%

Price Development of Electricity on the Spot Market

EEX - Base - Spot - Monatsmittelwert - Euro/MWh									
Jahr	2004	2005	2006	2007	2008	2009	2010	2011	2012
Jänner	27,84	30,82	65,54	31,85	56,00	57,12	42,21	50,13	39,89
Februar	26,54	39,58	68,53	31,65	59,47	47,79	41,73	50,86	54,92
März	31,02	45,19	61,55	25,91	53,34	37,19	39,19	54,47	41,13
April	25,57	40,20	43,14	31,06	67,46	33,05	40,04	51,58	43,57
Mai	26,51	37,81	34,07	32,82	56,24	30,93	41,17	56,83	38,85
Juni	27,35	46,67	39,80	35,77	73,24	33,21	43,35	52,30	38,81
Juli	27,32	45,34	73,40	29,31	69,94	35,57	45,83	46,40	41,02
August	29,25	38,16	44,48	29,31	61,76	36,07	39,80	48,46	44,90
September	31,63	48,24	45,70	34,52	88,30	39,58	45,86	52,54	44,67
Oktober	29,74	47,52	43,56	56,88	85,65	44,54	50,30	51,68	43,93
November	29,61	69,63	50,92	64,91	63,72	35,94	48,53	55,36	44,79
Dezember	29,74	62,62	39,72	51,68	54,55	35,69	55,55	42,90	35,51
Jahr	28,51	45,98	50,87	37,97	65,81	38,89	44,46	51,13	42,67
Jahresfuture	28,01	33,50	41,24	55,00	55,83	70,37	49,17	49,90	56,03
Delta	0,50	12,48	9,63	- 17,03	9,98	- 31,48	- 4,71	1,23	- 13,36

- Data: EUR/MWh

Spot market

The significance of the spot market has grown continuously in recent years. In the years 2002 to 2012, the trading volume on the spot market has risen by 11 times (2002:31 TWh, 2010:279 TWh, 2011: 314 TWh, 2012: 339 TWh).

The prices are less than those of futures in recent years.

Overview of the Contents

3. Energy purchase of electricity and gas
   - Energy Exchange
   - Types of agreement

Development of Energy Purchase

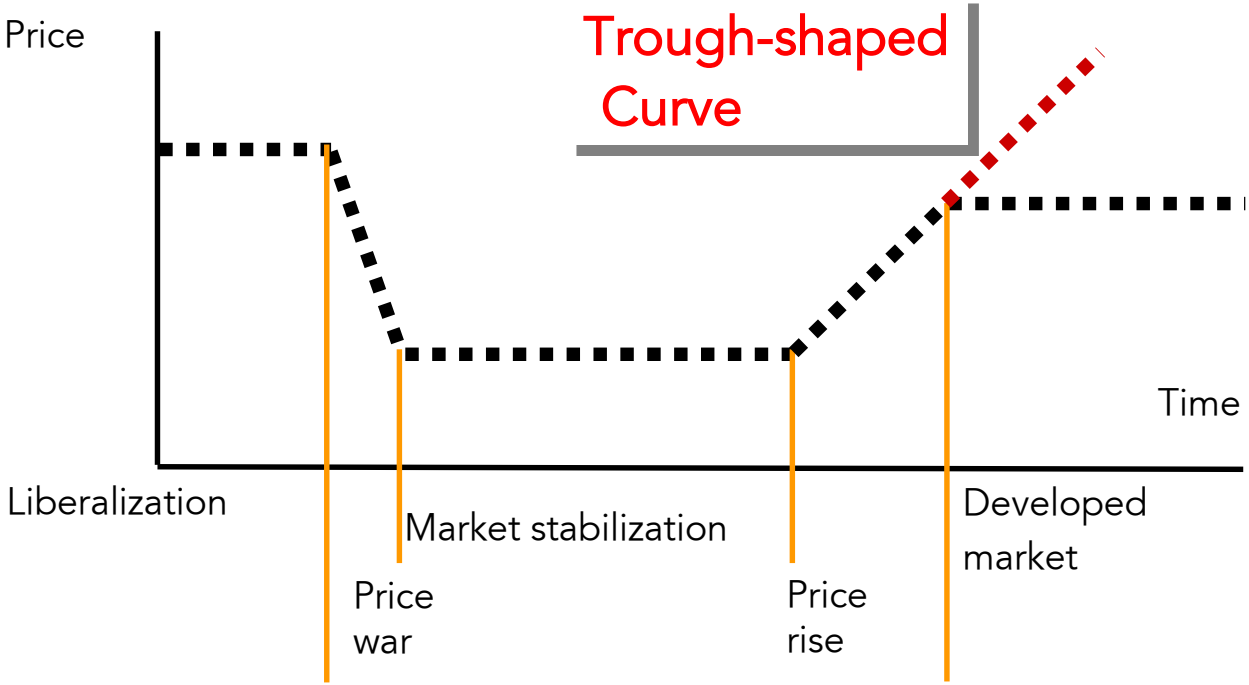
I. Fixed price

II. Purchasing in several steps

III. Wholesale trade products – Futures market

IV. Connection, futures market - spot market

Price Development



Price structure in the free energy market

Electricity Price

=

Handling expenses

+

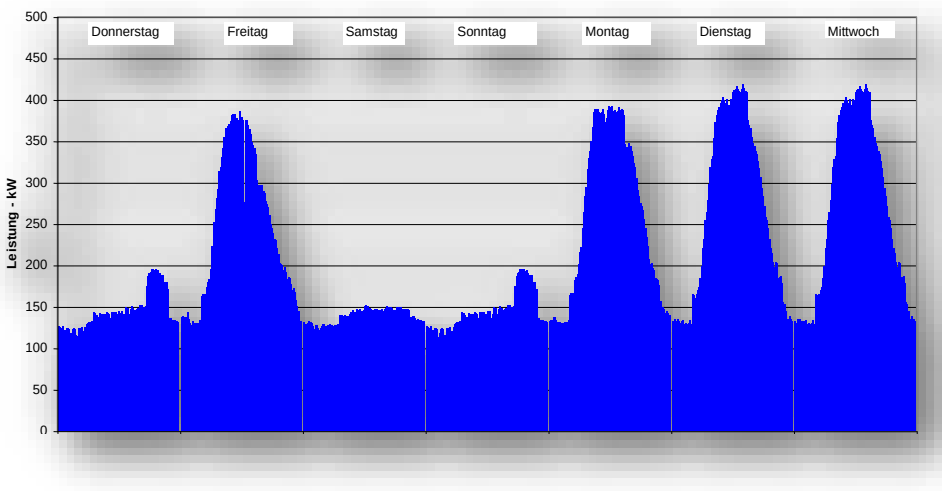
Base Price * Share factor +
Peak Price * Share factor

Price Components

- Energy costs
- Handling costs
- Storage costs
- Structural costs of the energy
- Balancing energy costs
- Costs of risks

.

Consumption pattern
Load profile analysis, e.g. office

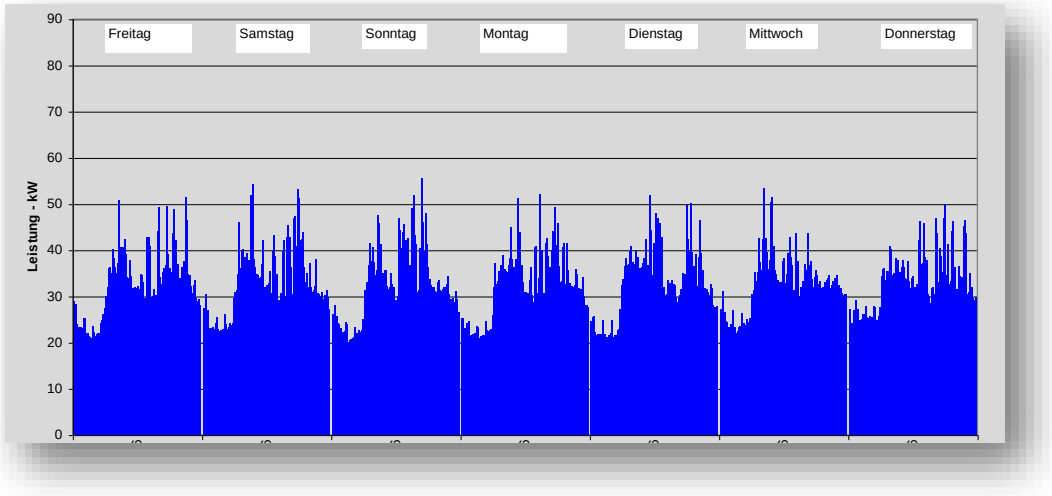


Office Load Profile

Consumption pattern characterized by working hours.

Consumption on Saturday and Sunday is considerably lower than that during the week. Base load is provided by large servers.

Consumption pattern
Load profile analysis, e.g. Hotel

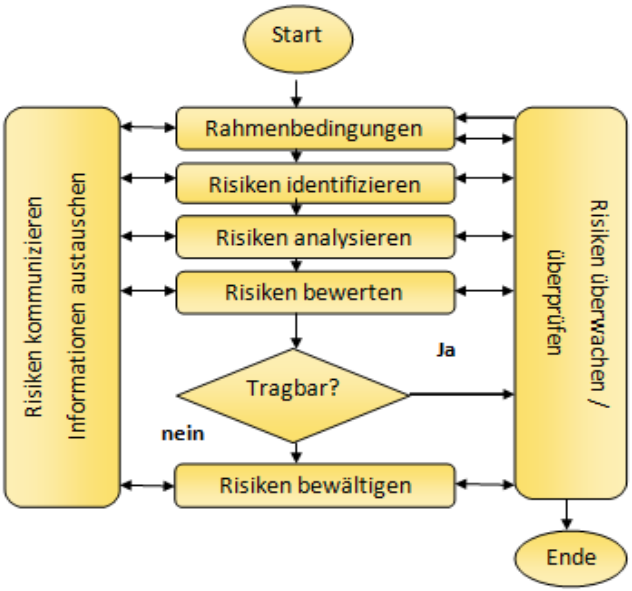


Hotel Load Profile

Consumption pattern is very uniform.

Consumption even on Saturday and Sunday. Air-conditioning system causes somewhat higher consumption in summer.

Risk Management



Risk Management

Risk management includes processes and behavioural patterns that are aimed at controlling an organization with respect to its risks. In particular, this also means that decision paths must be controlled clearly.

Risk: Impact of uncertainties on a goal.

Risk management is the job of the management.

Risk Parameters

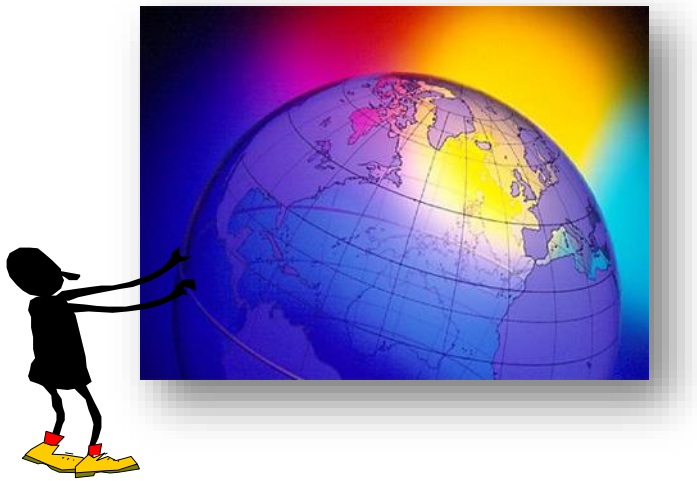
- Favourable and Unfavourable Impact: A risk may have both favourable and even unfavourable impact on the goals of organizations and systems.
- Likelihood: Estimate or convey the uncertainty or doubt regarding the occurrence or impact of a risk.
- Combination of likelihood and impact: If you are talking of a risk, it is always a combination of both these factors.
- Goals of the Organization:
- Sources of Risks: Sources of risks are significant for coping with risks in risk management. It is about being aware of the cause of a risk and to influence it conveniently.

Sources of Risks

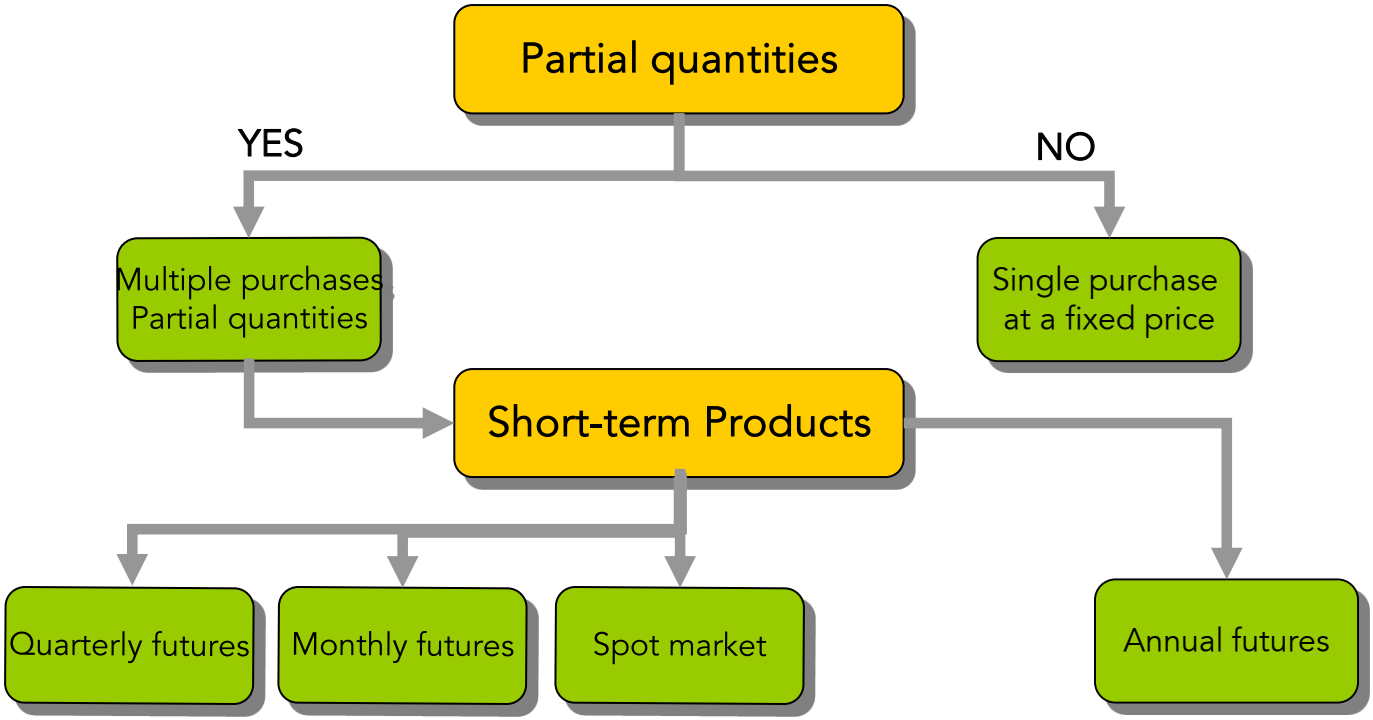
- **Dynamic Risks:** The risk lies in the development and change of circumstances. Developments occur slowly, gradually and sneakingly.

- **Static Risks:** The events take place suddenly and surprisingly. These are classical events causing damage or loss.

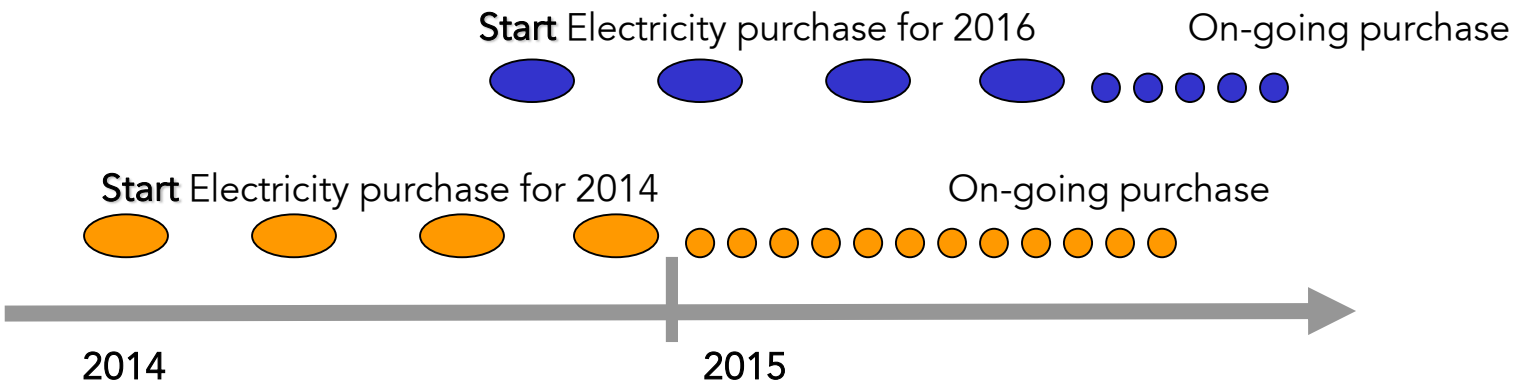
- Both the risks described above may have an **internal** or **external** cause.



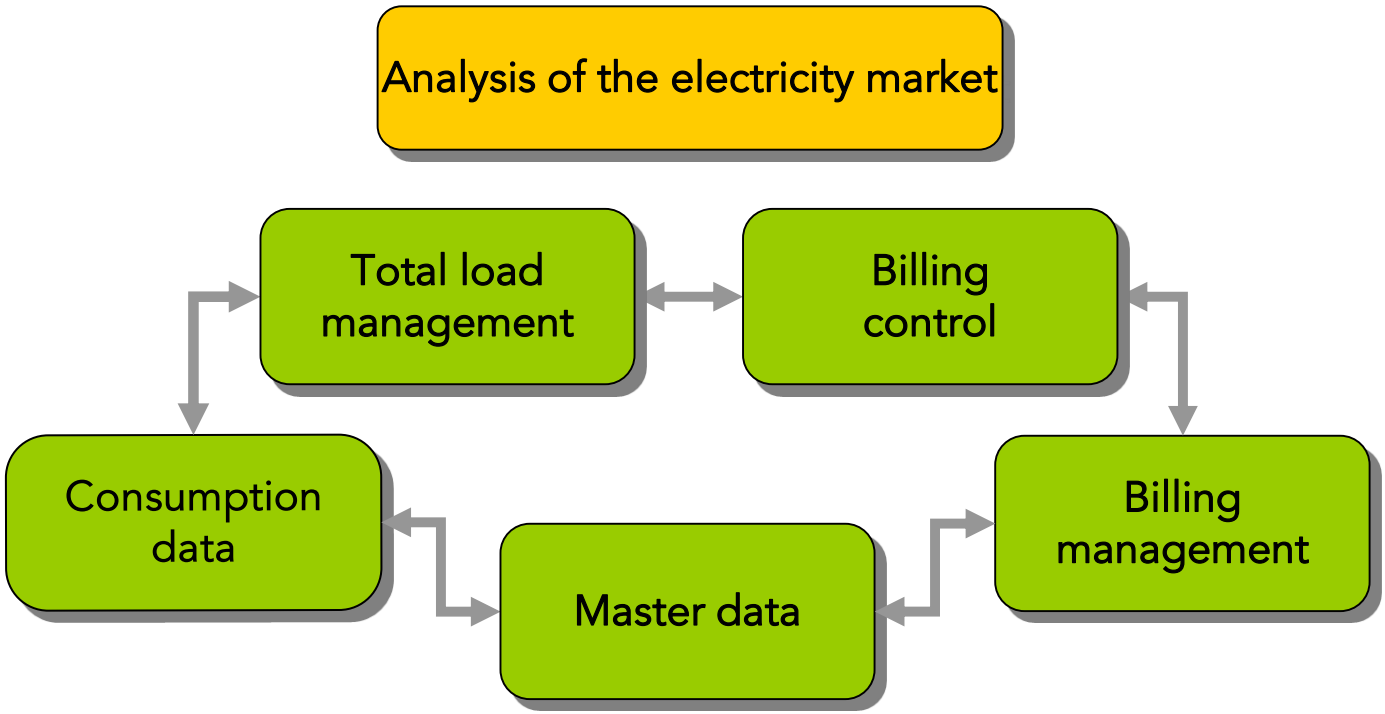
Options for Energy Purchase



Decisions

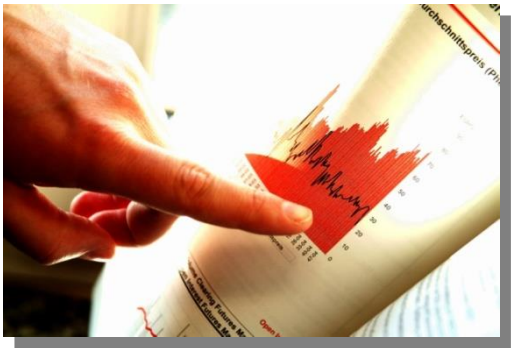

Start Electricity purchase for 2016
On-going purchase
Start Electricity purchase for 2014
On-going purchase
2014
2015

Blocks of ***on-going*** management



Process according to strict trading regulations

- Time axis and partial quantities defined clearly.
- Consider several levels of time long-term, medium-term and short-term products.
- Plan every trade transaction, short-term information gets incorporated.
- Specify limit values - adapt them according to the developments.
- Observe key indicators continuously, CO_2 - trade - Oil price - Power plant capacities – Weather forecasts.



Summary

– Structured
  Energy Procurement

– Risk Manual

– Automatic
  Energy Controlling

We are the
visionary pioneers
in the Central and East European
energy market.

We are competent and
independent energy optimizers.
We optimize energy purchase,
reduce energy consumption
and invest in new energy technologies.

THANK YOU for your Attention

Sources

Web addresses

- eex.de
- e-control.at
- power-solution.eu
- Finanzen.net
- BP Statistical Review of World Energy

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