

PEGAS trader workshop Germany

Discussions around proposals for market, business and product improvements as well as upcoming market developments

Sales and Business Development, Natural Gas Markets

Berlin, 16/11/2017

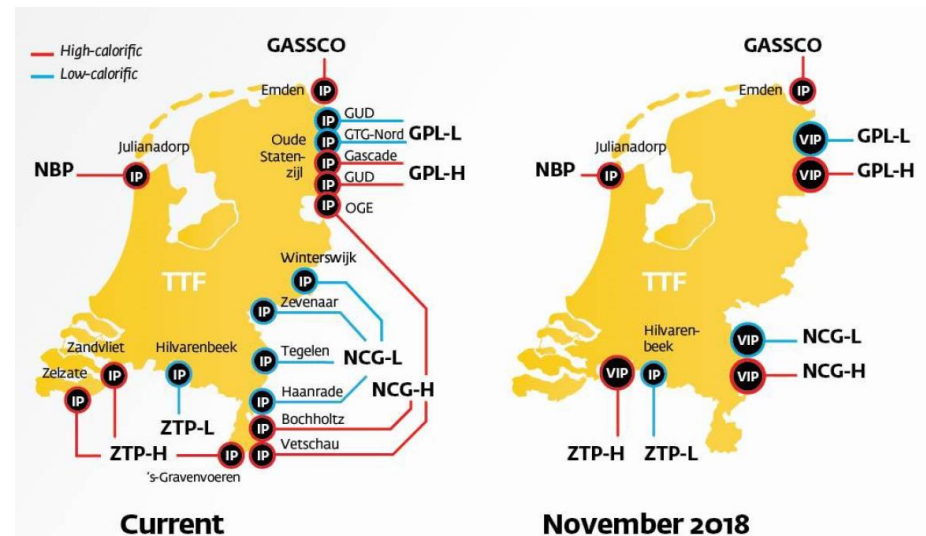
Introduction of Virtual Interconnection Points (VIP's)

What is already known about Virtual Interconnection Points?

- Specification by EU NC CAM - latest implementation date (1st Nov. 2018)
 - Multiple transport bookings of physical Interconnection Points (IP'S) between market areas should be substituted by booking of only one Virtual Interconnection Point
- Proposals about setup of VIP's on German border from Dutch TSO GTS
 - Proposals were discussed with customers/regulator inside official consultation
- Neither German MAM nor TSO's have initiated consultation for Germany yet

Summary of published proposals by GTS:

- Implementation by 1st October 2018
 - Underlying IP'S will cease to exist
 - VIP's are the only points for operational and contractual executions of existing contracts
 - All capacities will be transferred from the underlying IP'S to the new VIP (no negative impacts for the rights for cross border transport)
- H-Gas and L-Gas remains separate markets
 - VIP GPL-H/TTF and VIP GPL-L/TTF
 - VIP NCG-H/TTF and NCG-L/TTF
- Preference for synchronised introduction with German TSO's/MAM - discussions still ongoing



Source: <https://www.gasunie.nl/en/shippers/shippers-information/market-consultation-introduction-of-vips>

Gas market merger in Germany

What is already known about the merger between GPL and NCG?

- Specification by BNetzA - the latest possible merger date (01. April 2022)
 - Further information are not given yet to customers neither by MAM nor by TSO's

Why are we worried about unawareness of concrete launch date?

- Clarity needed for product development, specifications and investments
 - PEGAS offers locational, zonal and market area related balancing products
 - PEGAS provide the market with market area related indices
 - PEGAS offers the next 6 calendar years for German gas hubs (2018-2023)
- Clarity needed for PEGAS customers to reinforce gas trading in Germany



Ongoing improvement of PEGAS availability

Development of maintenance windows and outages

- Review: Bulk of non-availabilities triggered by ECC (nomination for PEGAS)
- Status quo and outlook for 2018:
 - Sept. 2017: third backup for nomination system but on an extra physical server
 - Not each planned/unplanned maintenance at ECC will lead to a PEGAS outage
 - Substantial increase in ECC, and therefore also PEGAS, availabilities expected

	PEGAS + ECC		TSO/MAM	
Year	Non-availability	Availability	Hours	Availability
2015	92.102 h	98.9 %	36.360 h	99,6 %
2016	100.132 h	98.9 %	29.448 h	99.7 %
2017*	59.061 h	99.3 %	25.500 h	99.7 %
2018 - planned

* based on latest available figures of November 17

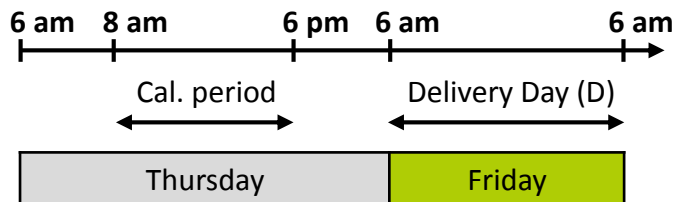
EGSI – Gas Spot Index of PEGAS

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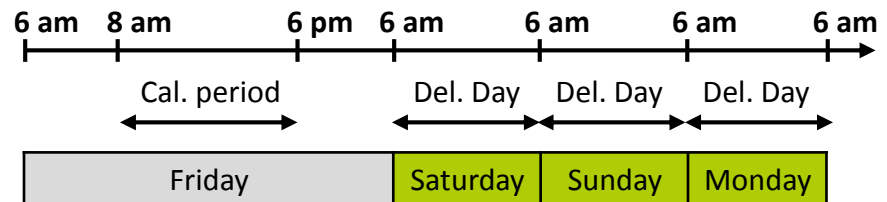
Description and general calculation

- Volume weighted mean of all trades per delivery period
 - which are executed in **Day-Ahead** and **Weekend** products between 8 am and 6 pm on the **last** exchange trading day before delivery
- Calculation will be executed for each day
- Publication every business day at 6.45 pm CET on the homepage
- Uniform calculation for following gas markets:
 - Austria (CEGH), Denmark (ETF), Germany (GPL, NCG), France (PEG-N, TRS), Netherland (TTF), Belgium (ZTP)

Next calendar day is a business day



Next calendar day is a weekend day



$$EGSI_{Friday} = \frac{\sum_{i=1}^n Price_{Fri,i} \times Volume_{Fri,i}}{\sum_{i=1}^n Volume_{Fri,i}}$$

- Saturday, Sunday and Monday will be calculated on Friday

EGSI – Advantages for customer

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What is the need for EGSI, an exchanged based gas spot index?


- Increasing importance of indexation to spot prices in gas contracts:
 - As substitution or complement to alternative commodities like oil or coal
 - Due to the increasing price impacts coming from renewable energies
- Ongoing move from bilateral to transparent exchange trading at PEGAS
 - PEGAS is the most important exchange for physical gas trading in Europe
 - Spot volumes increased between 2013 to 2016 from 140 to 640 TWh/a (+350%)


Improvement to existing spot market indices


- Transparent and reliable gas spot index formed on a supervised exchange
- Uniform index name and determination for all liquid PEGAS spot markets
- Cost-free access and usage of recent and historical values
- Exclusion of price distorting trades, which were executed:
 - In non-business hours (before 8 am or after 6 pm)
 - On non-exchange trading days (e.g. Sat., Sun., Bank Holiday)
 - In Within-Day, hourly, local or zonal products

EGSI – Roadmap for introduction and rollout

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- 03. Aug 17: Announcement of EGSI inside a customer information 
 - <http://www.pegas-trading.com/download/pegas/71984>

- 05. Sep 17: Launch of publication on homepage and information products 
 - Announcement of EGSI via press release
 - EGSI values under: <https://www.powernext.com/spot-market-data>
 - Provision of EGSI values also at EEX market data
 - On request provision of historical EGSI values until 31.08.2017

- Sep-Dec. 17: Overlapping publication of EGSI and DRP/DAP* 

- 31.12.2017: Expiration of publication of existing DRP and DAP*

- 01.01.2018: Sole calculation/publication of EGSI

* Calculation methodology of these index already corresponds to EGSI

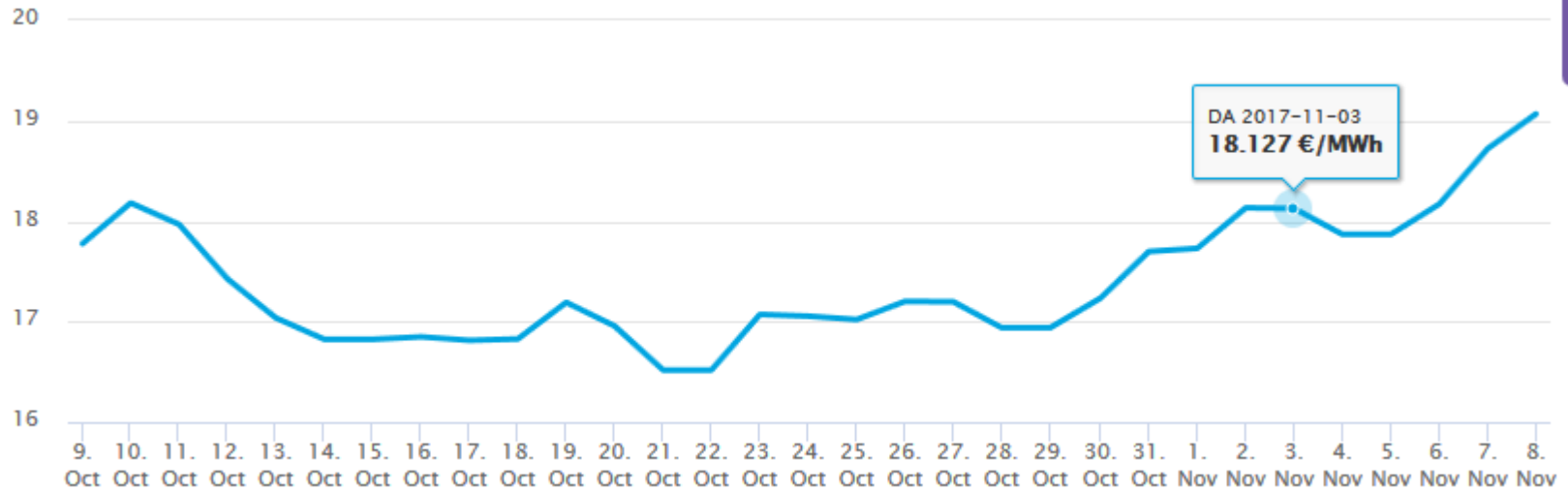
EGSI – Visualisation on the homepage

European Gas Spot Index



EGSI €/MWh

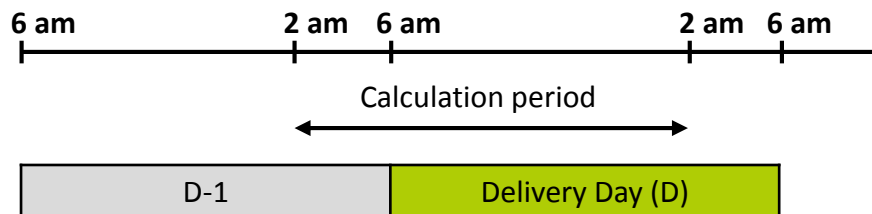
Select an area by dragging across the lower chart



Within-Day reference price (WDRP) at PEGAS 1/2

Description and general calculation

- Volume weighted mean of all trades per delivery period
 - which are executed in **Within-Day** products between 8 am and 6 pm
- Calculation will be executed for each day
- Backup price in case of absent trades: EGSI
- Publication every business day at 6.45 pm CET on the homepage
- Uniform calculation for following gas markets:
 - Austria (CEGH), Denmark (ETF), Germany (GPL, NCG), France (PEG-N, TRS), Netherland (TTF), Belgium (ZTP)



$$WDRP_{Friday} = \frac{\sum_{i=1}^n Price_{Fri,i} \times Volume_{Fri,i}}{\sum_{i=1}^n Volume_{Fri,i}}$$

WDRP – Visualisation on the homepage

2/2

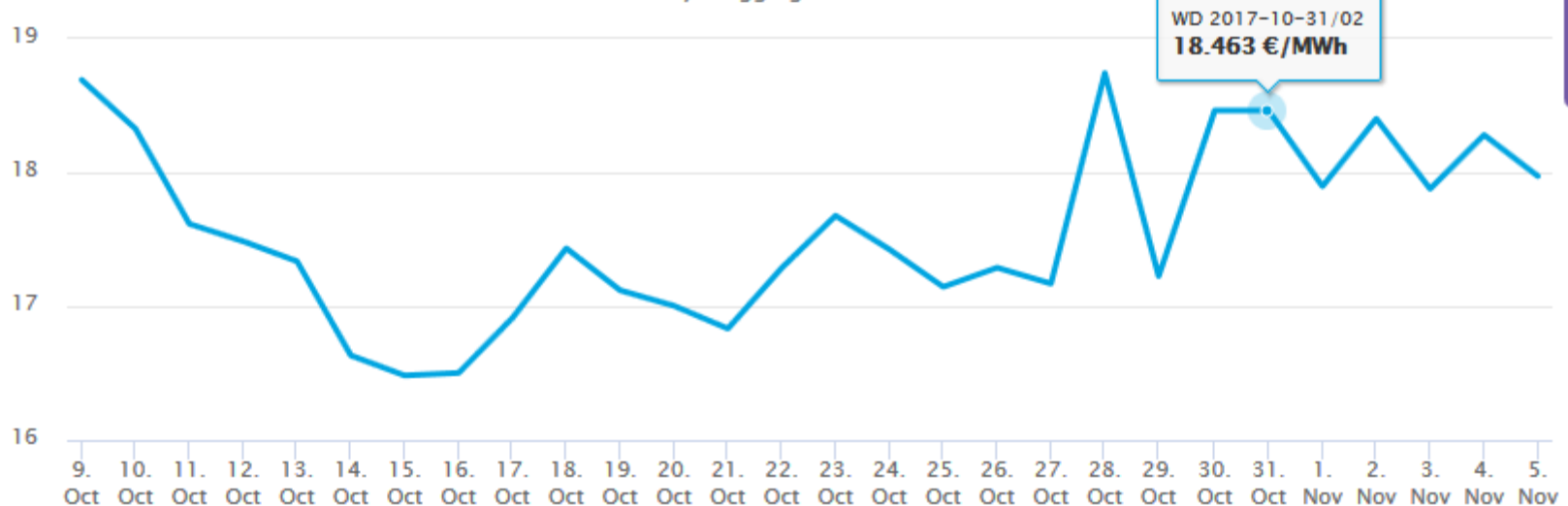
- WDRP values under: <https://www.powernext.com/spot-market-data>
- Provision of WDRP values also at EEX market data

Within-Day Reference Price



Price Reference €/MWh

Select an area by dragging across the lower chart

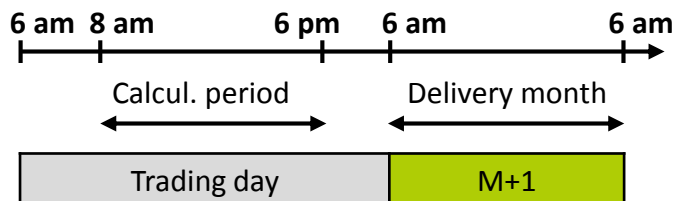


More indices harmonisation - EGIX and Monthly Index

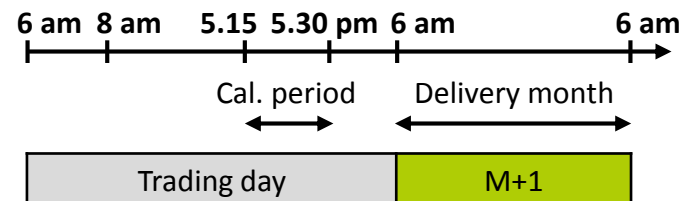
Now uniform application and calculation for **all** PEGAS hubs

- EGIX – European Gas Index
 - Computed on M+1 trades executed in business hours (8 am - 6 pm)
 - Germany (GPL, NCG, Germany*) + Austria (CEGH), Denmark (ETF), France (PEG-N, TRS), Netherland (TTF), Belgium (ZEE+ZTP), UK (NBP)
 - Backup price in case of absent trades: Monthly Index
- Monthly Index
 - Computed on M+1 trades executed inside the settlement window (5.15 - 5.30 pm)
 - Austria (CEGH), Denmark (ETF), France (PEG-N, TRS), Netherland (TTF), Belgium (ZEE+ZTP), UK (NBP) + Germany (GPL, NCG)
- Publication every business day at 6.45 pm CET on the homepage

EGIX calculation across business hours



Monthly Index calculation inside settlement window



EGIX – Visualisation on the homepage

2/2

- Values under: <https://www.powernext.com/spot-market-data>
- Provision of EGIX & Monthly Index also at EEX market data



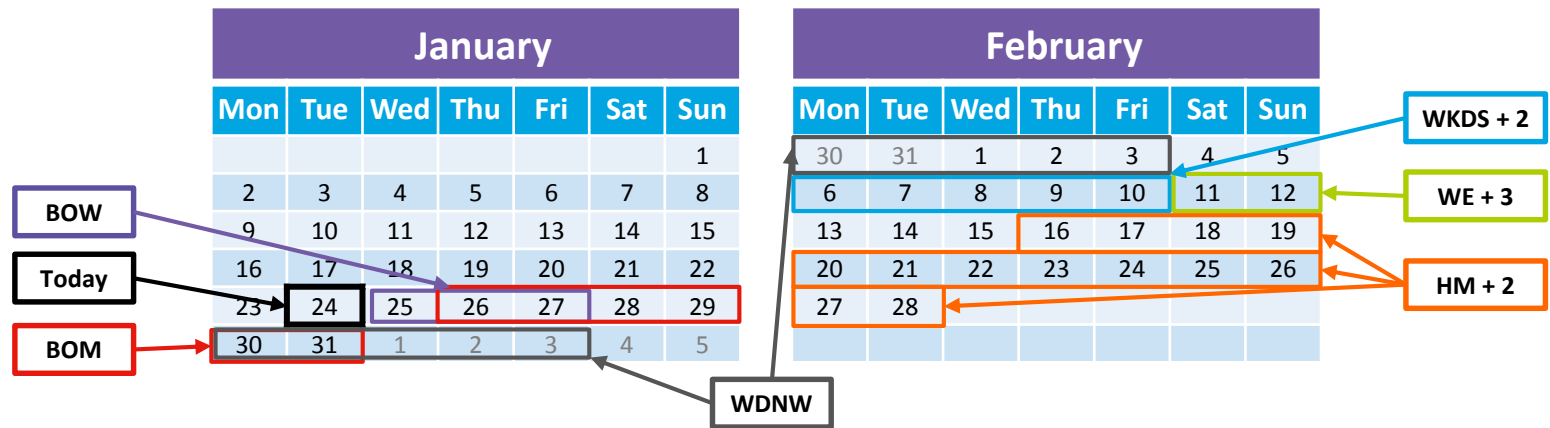
Coming next: Prompt products

1/2

PEGAS plans to launch new “prompt” gas contracts, especially Working Days Next Week (WDNW), Balance of the Week (BoW) and Balance of the Month (BoM)

Product Definition

- Short-term contracts with a delivery period of less than one month, usually referred to as **prompt contracts** under the spot market definition in the OTC market. In contrast, curve products are contracts from the front month forward.



Customers requirements

- Customers told us following:
 - Existing prompt products listed as **Futures** on Exchanges are not traded due to a time-consuming manual delivery process
 - Demand for prompt products in the OTC market is very strong
 - Need to have these products managed in members spot system, to comply with their spot system functionalities (no mark-to-market, etc).

Coming next: Prompt products

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Spot	TTF				Open	
	Qty	Bid	Ask	Qty	Last	TQty
WD	35	16,535	16,655	30	16,590	120
DA	20	16,600	16,720	15	16,650	40
WE	30	16,650	16,790	20	16,785	34
Saturday	10	16,775	16,900	5	16,900	67
Sunday	5	16,770	16,825	10	16,800	42
Prompts	TTF				Open	
	Qty	Bid	Ask	Qty	Last	TQty
BOW	5	16,670	16,700	10	16,700	25
WDNW	15	16,510	16,555	30	16,540	35
BoM	30	16,600	16,665	40	16,600	10
WKDS 43 24/10-28/10	5	16,510	16,555	10	16,530	6
WKDS 44 31/10-04/11	20	16,600	16,665	5	16,650	8
WKDS 45 07/11-11/11	15	16,775	16,900	20	16,780	76
WKDS 46 14/11-18/11	10	16,770	16,915	15	16,800	90
WKDS 47 21/10-25/11			17,000	5	17,000	110
WE 42 22/10-23/10	35	16,535	16,655	30	16,590	120
WE 43 29/10-30/10	20	16,600	16,720	15	16,650	40
WE 44 5/11-6/11	30	16,650	16,790	20	16,785	34
WE 45 12/11-13/11	10	16,775	16,900	5	16,900	67
WE 46 19/11-20/11	5	16,770			16,800	42
BK Oct (16-31)	30	16,775	16,900	10	16,865	30
FR Nov (1-15)	5	16,850	17,000	15	17,000	20
BK Nov (16-30)	10	16,985			17,150	10
FR Dec (1-15)			17,100	5	17,100	3

Planned product suite

- BOW
- WDNW
- BOM
- WKDS +2, 3, 4, 5, 6
- Weekends +2, 3, 4, 5, 6
- Half months +1, 2, 3, 4

Trade at Index (TAI) and at Settlement (TAS) 1/2

Background information to planned trading functionalities in 2018

- Allows trader to buy or sell a product during the trading day at a price that will be equal, above or below to index (TAI) or settlement (TAS) price
- Indices: EGSI & EGIX Daily; settlement prices: EOD and Month+1
- Functionality requested by member, who reference customer contracts and deals to **free of charge** and exchange formed indices and settlement prices
 - Once deal is executed, no longer observation of intraday price movements needed, due to delivery at agreed TAI or TAS price → elimination of post-trade price risks
 - Spot: very supportive for trader who have to trade in the morning big chunks in less clips but are unsure about the fair market price due to absent market information

Spot	GPL				Open	
	Qty	Bid	Ask	Qty	Last	TQty
WD	35	16,535	16,655	30	16,590	120
DA	20	16,600	16,720	15	16,650	3.240
DA PEGAS TAI	110	0,000	0,010	20	0,010	60
DA PEGAS TAS	10	-0,005	0,015	5	0,005	340
WE	30	16,675	16,700	95	16,700	1.200
WE PEGAS TAI	30	-0,025	0,050	20	0,010	34
WE PEGAS TAS	10	0,000	0,005	5	0,000	8
...						

TAI: Trade at EGSI; EGSI considers trades between 8 am and 6 pm

TAS: Trade at EOD; EOD considers trades between 5.15 pm and 5.30 pm

Futures	TTF				Open	
	Qty	Bid	Ask	Qty	Last	TQty
Dec 17	5	16,670	16,700	10	16,700	25
Dec 17 PEGAS TAI	15	-0,010	0,005	30	-0,005	140
Dec 17 PEGAS TAS	30	0,000	0,015	40	0,000	120
Jan 18	5	16,510	16,550	10	16,530	6
...						

TAI: Trade at EGIX Daily; EGIX Daily considers trades between 8 am and 6 pm

TAS: Trade at M+1; M+1 considers trades between 5.15 pm and 5.30 pm

Trade at Index (TAI) and at Settlement (TAS)

2/2

Which price will be implemented in ECC's clearing systems

- After the execution of a trade, usage of an interim price
 - TAI: EGSI or EGIX from the previous trading day
 - TAS: EOD or Month+1 from the previous trading day
- Replacement of the interim price with the final index or settlement price
 - Immediately after determination of index and settlement price earliest 6.30 pm
 - Trade will be updated and is then at Index or Settlement

Where is the need for temperature trading

Revenue = business success

Around 80% of all business is directly or indirectly affected by weather.
Weather influence business of around 450 billion € worldwide.*

Agriculture

- Hedging against crop failures due to heat, cold or frost

Clothing & Sports goods producer

- Hedging against sales risks for production of seasonal goods (e.g. skis, swimwear, sun glasses)

Tourism & Entertainment

- Hedging against weather-related use of ski areas, cinemas, lidos

Construction and trade

- Hedging against weather-related downtimes, outages and delays

Automobile manufacturer

- Hedging against sales risks for production of seasonal goods (e.g. summer/winter tire)

Transport

- Hedging against weather-related delays and outages

Energy industry

- Hedging against weather-related sales risks of power, natural gas, heat and cold

Food & beverage industry

- Hedging against sales risks for production of seasonal goods (e.g. ice-cream, mulled wine)

Finance & insurance

- Hedging of weather-related investments and insurances

Weather derivatives (thereof ca. 95% temperature derivatives) enables stable revenues, balance sheet protection and increase of „shareholder value“.

Market structure & products for temperature trading

Primary market - Hedger

- Trading for minimization/avoidance of temperature risks in the core business field
 - Energy supplier, construction companies, leisure parks, farmer, tourism, food and beverage industry
- Increasing trading of temperature products
 - Almost each trade triggers for hedging purposes at least one transaction in the secondary market

Secondary market - Investors/Insurers

- Arbitrage trading
 - Trading of price differences - Intermediaries
 - Frequent opening/closing of positions for risk minimisation and profit maximisation
 - Banks, investment funds, (re) insurances, energy companies with weather desks, international active companies, arbitrageurs
 - Trading of temperature products is established

Direct trading of temperatures

- Inside the order book all temperatures were traded with absolute values in °C as price
 - Temperature Future (TF) - financial fulfilment
 - Temperature Cap Future (TCF) - financial fulfilment
 - Temperature Floor Future (TFF) - financial fulfilment
- Example: order book of a Temperature Future

	Germany				Open	
	Qty	Bid	Ask	Qty	Last	TQty
①	② ...	③ ...	③ ...	② ...	④	⑤
Jun 16	800	20,24	20,61	1.700	20,52	1.000
Jul 16	4.200	23,15	23,40	300		

- ① Name of the delivery period
- ② Quantity of requested/offered TF per day (≙ €/day)
- ③ Price for buy/sell of Temperature Future in € (≙ Temperature in °C)
- ④ Price of last traded Temperature Future on a trading day
- ⑤ Sum of all traded TF for the delivery period on a trading day

Trading of temperatures via other products (indirect)

- Inside the order book all temperatures were priced & traded indirect via other products in €/MWh
 - Temperature Gas Future (TGF) - physical fulfilment
 - Temperature Gas Price Swap (TGPS) - finan. Fulfilment
- Example: order book of a Temperature Gas Future

	NCG				Open	
	Qty	Bid	Ask	Qty	Last	TQty
①	② ..	③ ...	③ ...	② ...	④	⑤
Jun 16	10	12,850	12,900	2	12,875	8
Jul 16	90	11,925	12,275	50		

- ① Name of the delivery period
- ② Volume of requested/offered TGF per hour (≙ MWh/h)
- ③ Price for buy/sell of Temperature Gas Future in €/MWh
- ④ Price of last traded Temperature Gas Future on a trading day
- ⑤ Sum of all traded TGF for the delivery period on a trading day

c)

Thank you