Gas quality tracking tools

Tracking gas quality along the network

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Content

- Aims and Objectives (Which gas quality is where at what time?)
- What is necessary to reach these aims?
- GASCADE gas transmission network
- SCADA-System
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- Gas quality tracking and forecast
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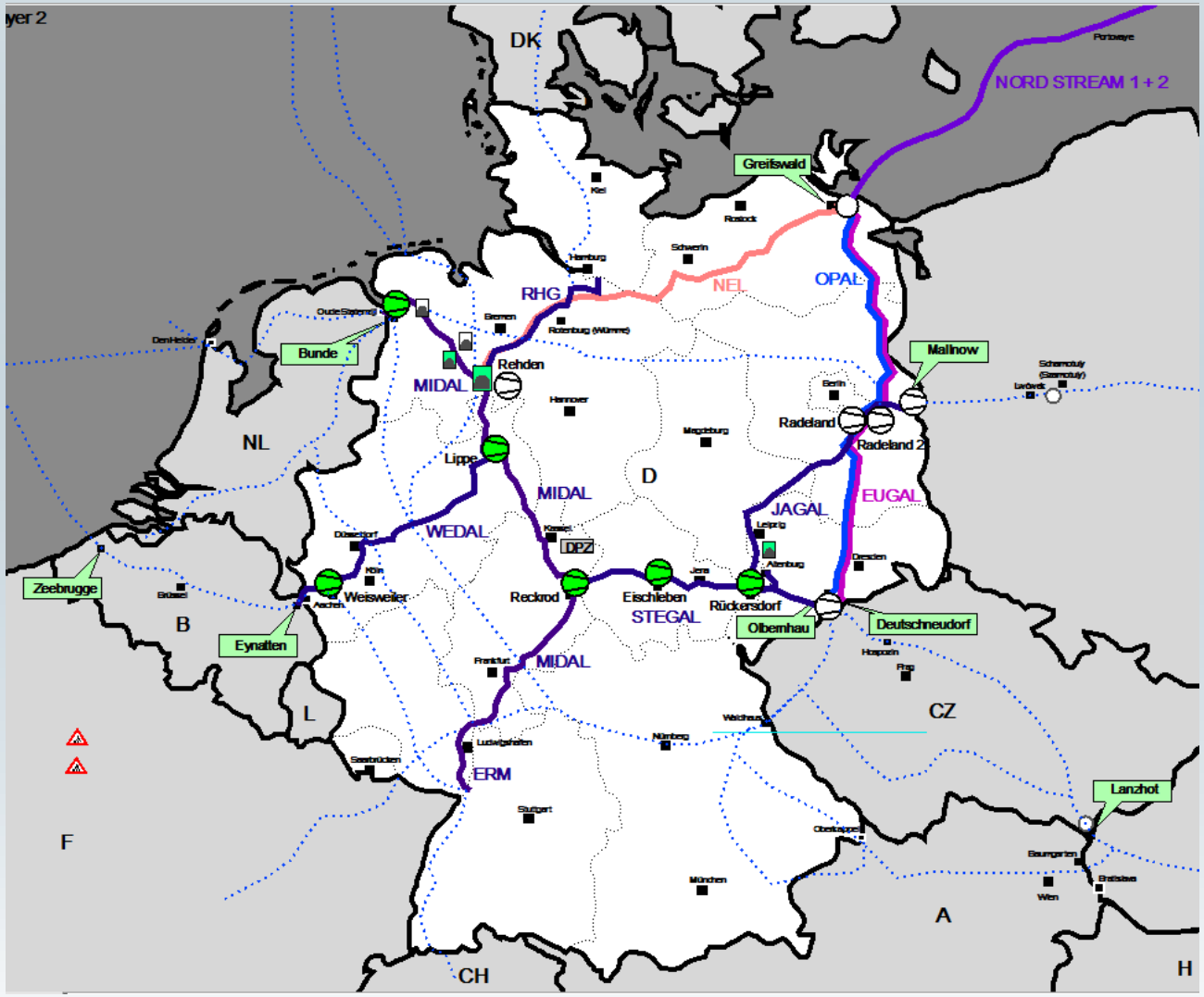
GASCADE gas network

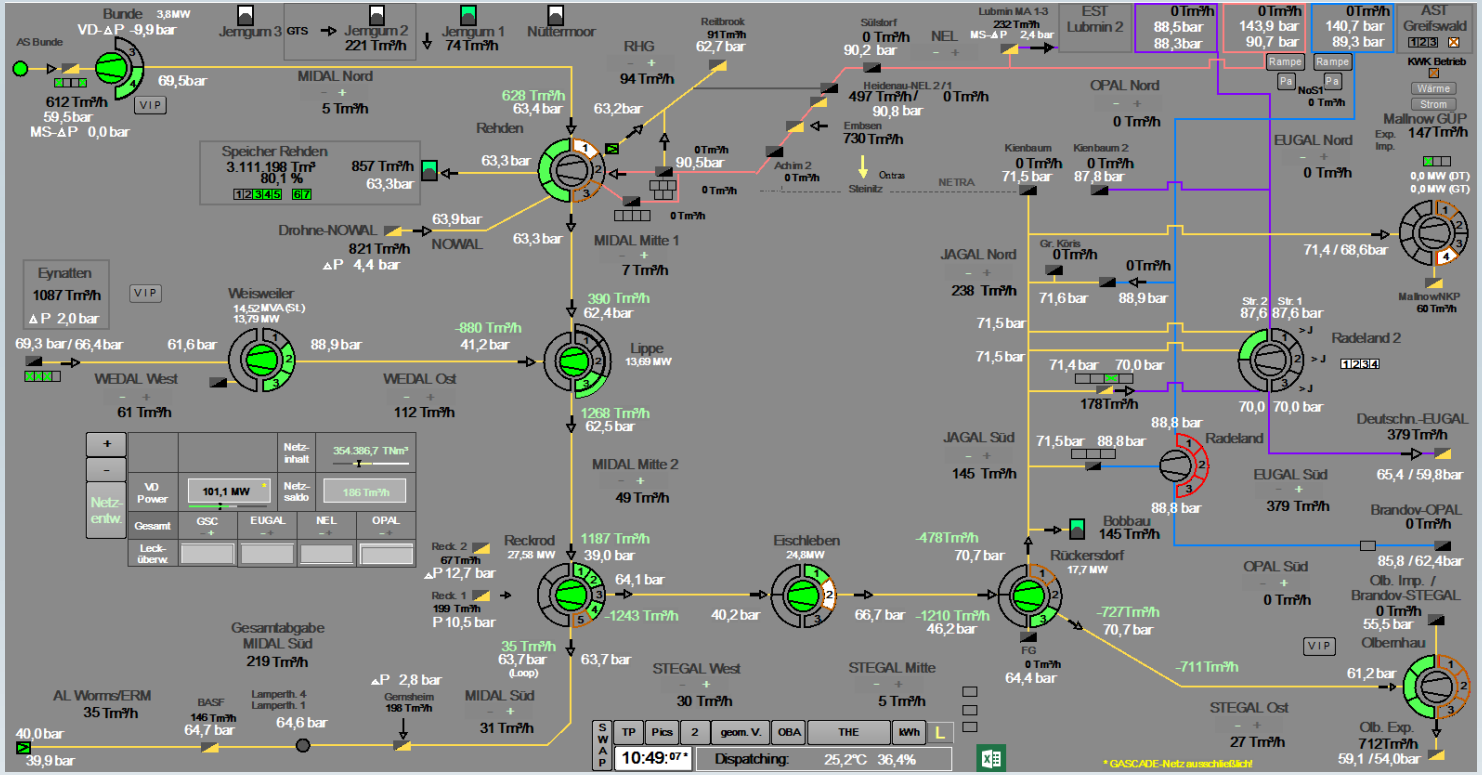


Cross-Border Transmission IPs (Entry) :

- Mallnow
- Bunde
- Eynatten
- Olbernhau
- Deutschneudorf
- Brandov
- Greifswald
- Lubmin II

Transmission Points (market area THE)

SCADA-System GASCADE



SCADA - Supervisory Control and Data Acquisition

measured values:

- Pressure,
- Temperature,
- Flow,
- Gas quality

Gas quality:

- Methane
- Ethane
- Propane
- Butane
- Hexane
- Sulphur
- Oxygen
- And others…

Gas network Simulation

For example from Bergwitz to Jüdenberg (shut-off stations, distance 16,2 km)

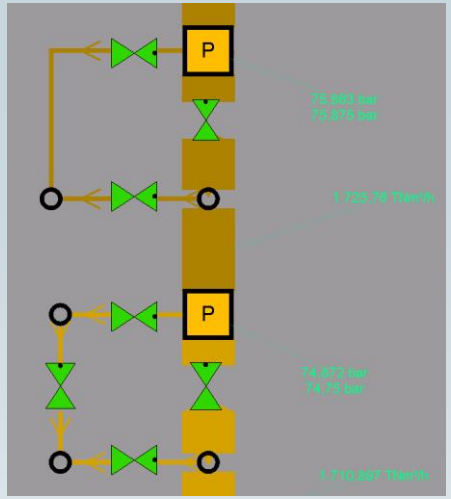
Master data

length L
diameter D
pipe roughness λ_1
thermal conductivity

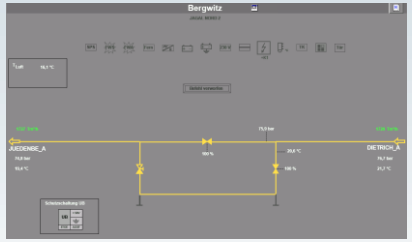
computing kernel (GANESI)

$$\Delta p_v = \rho_1 \cdot \lambda_1 \cdot \frac{L}{D} \cdot \frac{c_1^2}{2} \cdot \frac{\bar{T}}{T_1}$$

Results

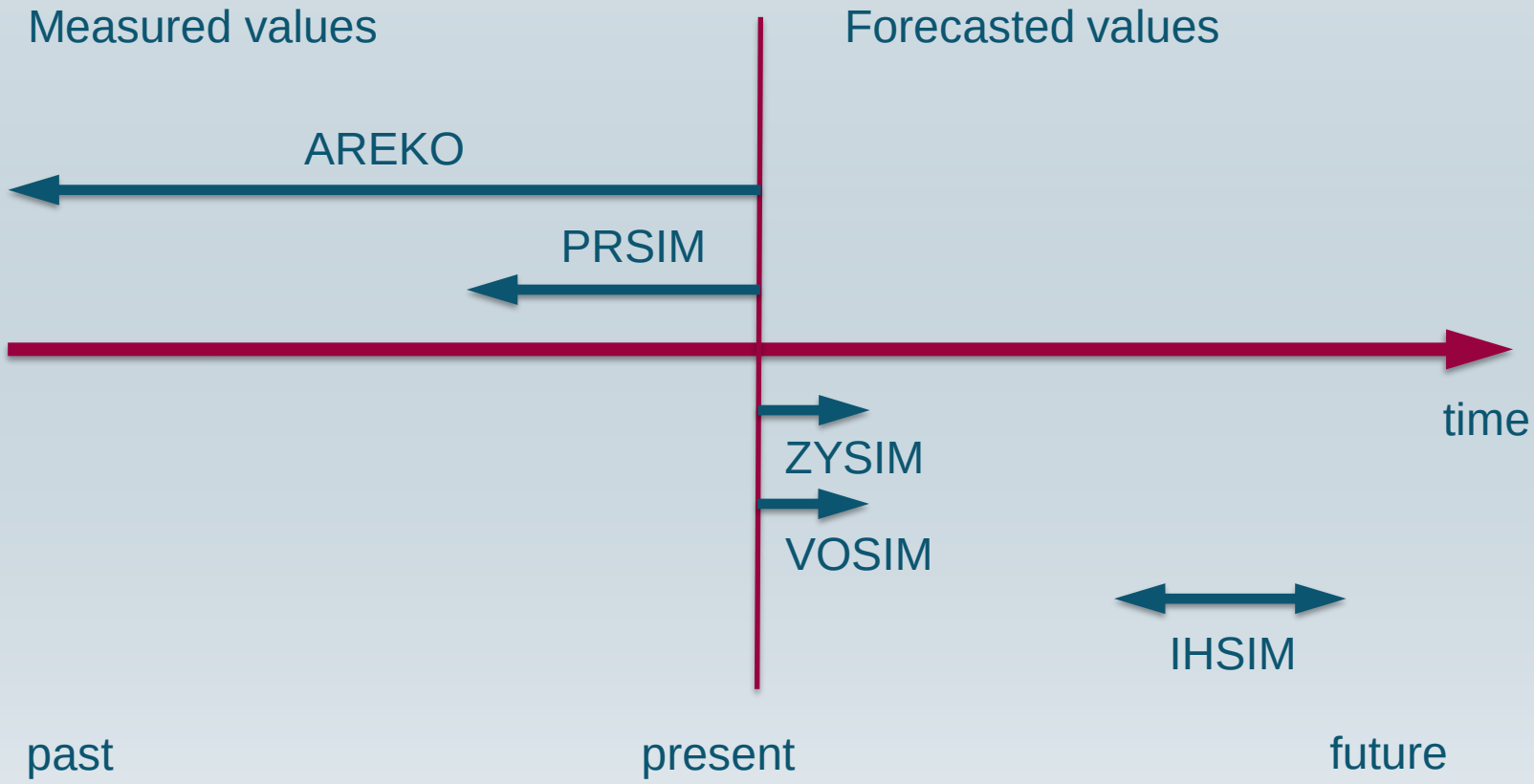


Measured values



Gas pressure p_1
Gas temperature T_1
Gas density ρ_1
Gas velocity c_1

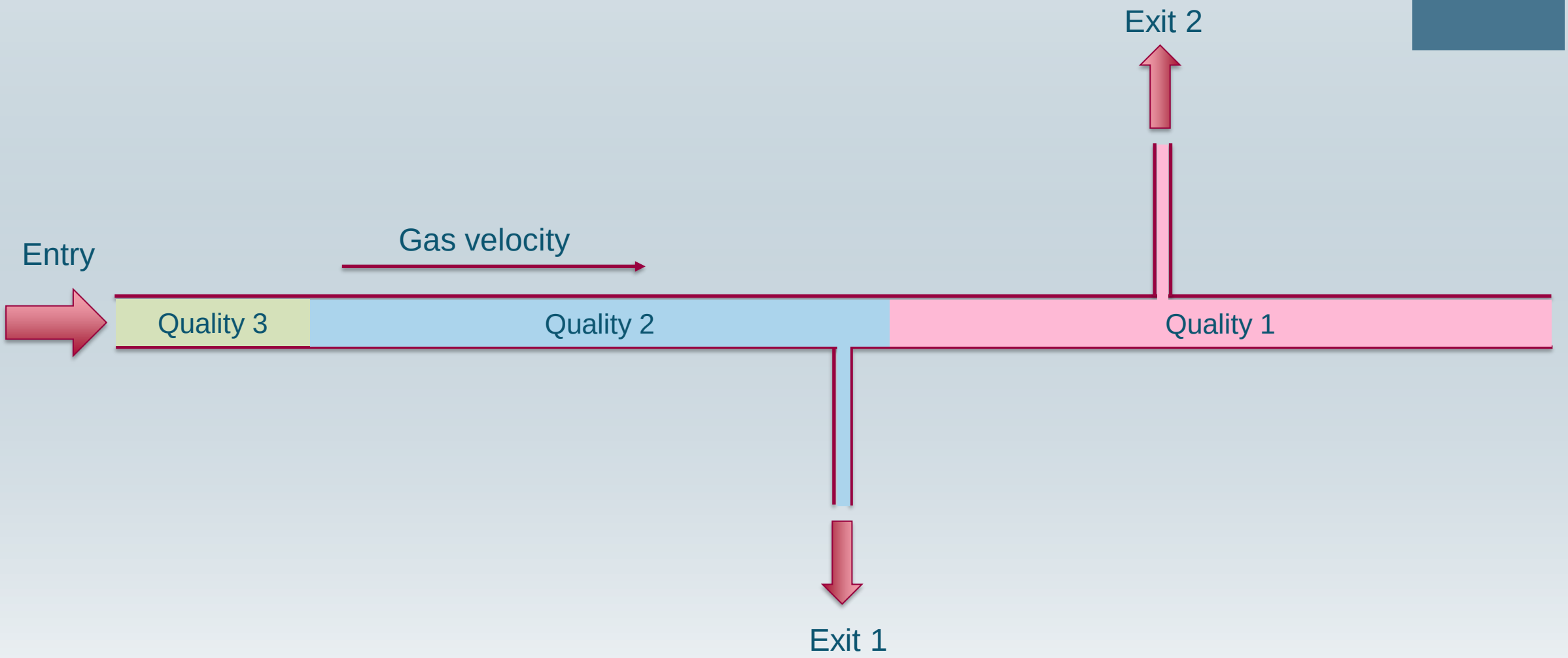
Time ranges of the simulation types



forecasted values:
- Nominations,
- gas consumption,
- MFT-schedules

Gas qualities are calculatet by ZYSIM each 30 minutes

Gas quality tracking



Data export and business message

Messages are generated once an hour

MsgType	MSCONS						
KNZ	1.AUS.MIDALSU..RM_GAD1UMA.ABG						
receiver	9870025200005						
location	DE700252642930000000000010000008						
creation-timestamp	2022-10-06T15:50:00+02:00						
Einheiten	kg/m³	kWh/m³	kWh/m³	mol%	mol%	mol%	mg/m³
OBIS-Codes	7-0:99.45.43	7-0:54.0.16	7-0:70.19.16	7-0:70.67.16	7-0:70.66.16	7-0:70.60.16	7-0:70.13.16
Datum	Normdichte	Brennwert	Heizwert	Methan	Kohlenstoffdioxid	Stickstoff	Gesamtschwefel
2022-10-06T17:00:00+02:00	0,78	11,511	10,394	92,573	0,798	0,88	0,801
2022-10-06T18:00:00+02:00	0,779	11,508	10,391	92,682	0,769	0,855	0,786
2022-10-06T19:00:00+02:00	0,779	11,507	10,39	92,7	0,764	0,847	0,783
2022-10-06T20:00:00+02:00	0,78	11,509	10,391	92,608	0,788	0,867	0,814
2022-10-06T21:00:00+02:00	0,781	11,513	10,396	92,435	0,83	0,904	0,878
2022-10-06T22:00:00+02:00	0,783	11,519	10,402	92,255	0,865	0,948	0,928

csv export from simulation

```
UNB+UNOC:3+9870010000006:502+9870025200005:502+221006:1551+MSCONS67711++TL'
UNH+MSCONS67711+MSCONS:D:04B:UN:2.4a'
BGM+Z21+MSCONS67711+9'
DTM+137:202210061350?+00:303'
RFF+Z13:13007'
NAD+MS+9870010000006::332'
NAD+MR+9870025200005::332'
UNS+D'
NAD+DP'
LOC+172+DE700252642930000000000010000008'
DTM+163:202210061500?+00:303'
DTM+164:202210062100?+00:303'
DTM+293:20221006135121?+00:304'
LIN+1'
PIA+5+7-0?:99.45.43:SRW'
QTY+187:0.780'
DTM+163:202210061500?+00:303'
DTM+164:202210061600?+00:303'
QTY+187:0.779'
DTM+163:202210061600?+00:303'
DTM+164:202210061700?+00:303'
QTY+187:0.779'
DTM+163:202210061700?+00:303'
DTM+164:202210061800?+00:303'
QTY+187:0.780'
DTM+163:202210061800?+00:303'
DTM+164:202210061900?+00:303'
```

csv converted in Edig@s MSCONS
To customer via email

Important to know

- Good measurement infrastructure is required
- Nominations can change each hour
- MFT-schedules can change each hour
- gas consumption forecast is difficult, quality might be varying
- Only measured values of gas quality at the Cross-Border Transmission IPs and Transmission Points (MFT)