

# EREX – «Big» data in Norway

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26.09.2025



# Agenda

- Validation
- Overview of trouble meters
- Invoicing/Energy BI
- GPS analysis
- Summary

# Validation NO+SE (+DK)

- Orders all raw energy values (CSV/Zip)
- Changes filenames (avoid copy names)
- Process files to validate:
  - Driving without consumption (based on GPS)
  - Missing GPS
- Download unallocated metered energy times series for all
- Process unallocated to validate GPS
- Order all AER (schedule+order)
- Download monthly DCS values
- Process DCS + Unallocated + AER to see where data is lost
- Uses validation for checklist per RU

Navn	Endringsdato	Type	Størrelse
202509054914_2025-08-01 - 2025-09-01_energy-raw-data-exchange-report	05.09.2025 16:49	Kommandelt fil for Mi...	650 kB
202509055015_2025-08-01 - 2025-09-01_energy-raw-data-exchange-report	05.09.2025 16:50	Kommandelt fil for Mi...	2 558 kB
202509055116_2025-08-01 - 2025-08-15_energy-raw-data-exchange-report	05.09.2025 15:51	Komprimert (zip)et ...	2 254 kB
202509055121_2025-08-01 - 2025-09-01_energy-raw-data-exchange-report	05.09.2025 16:51	Kommandelt fil for Mi...	2 197 kB
202509055300_2025-08-01 - 2025-08-15_energy-raw-data-exchange-report	05.09.2025 15:53	Komprimert (zip)et ...	1 807 kB
202509055317_2025-08-01 - 2025-09-01_energy-raw-data-exchange-report	05.09.2025 16:53	Kommandelt fil for Mi...	527 kB
202509055505_2025-08-15 - 2025-09-01_energy-raw-data-exchange-report	05.09.2025 15:55	Komprimert (zip)et ...	2 156 kB
202509055714_2025-08-15 - 2025-09-01_energy-raw-data-exchange-report	05.09.2025 15:57	Komprimert (zip)et ...	2 925 kB
202509055919_2025-08-01 - 2025-08-10_energy-raw-data-exchange-report	05.09.2025 15:59	Komprimert (zip)et ...	3 877 kB
202509080159_2025-08-25 - 2025-09-01_energy-raw-data-exchange-report	08.09.2025 10:02	Komprimert (zip)et ...	3 341 kB
202509082018_2025-08-01 - 2025-09-01_energy-raw-data-exchange-report	08.09.2025 09:20	Kommandelt fil for Mi...	37 kB
202509082115_2025-08-01 - 2025-09-01_energy-raw-data-exchange-report	08.09.2025 09:21	Kommandelt fil for Mi...	495 kB
202509082220_2025-08-01 - 2025-09-01_energy-raw-data-exchange-report	08.09.2025 09:22	Kommandelt fil for Mi...	247 kB
202509082320_2025-08-01 - 2025-09-01_energy-raw-data-exchange-report	08.09.2025 09:23	Kommandelt fil for Mi...	519 kB
202509082419_2025-08-01 - 2025-09-01_energy-raw-data-exchange-report	08.09.2025 09:24	Kommandelt fil for Mi...	527 kB
202509083905_2025-08-01 - 2025-08-05_energy-raw-data-exchange-report	08.09.2025 09:39	Komprimert (zip)et ...	1 774 kB
202509084102_2025-08-01 - 2025-08-05_energy-raw-data-exchange-report	08.09.2025 09:41	Komprimert (zip)et ...	2 400 kB
202509084334_2025-08-05 - 2025-08-10_energy-raw-data-exchange-report	08.09.2025 09:43	Komprimert (zip)et ...	3 324 kB
202509084438_2025-08-05 - 2025-08-10_energy-raw-data-exchange-report	08.09.2025 09:44	Komprimert (zip)et ...	2 184 kB
202509084729_2025-08-10 - 2025-08-15_energy-raw-data-exchange-report	08.09.2025 09:47	Komprimert (zip)et ...	2 379 kB
202509084946_2025-08-10 - 2025-08-15_energy-raw-data-exchange-report	08.09.2025 09:49	Komprimert (zip)et ...	3 495 kB
202509085052_2025-08-15 - 2025-08-20_energy-raw-data-exchange-report	08.09.2025 09:50	Komprimert (zip)et ...	3 236 kB
202509085329_2025-08-15 - 2025-08-20_energy-raw-data-exchange-report	08.09.2025 09:53	Komprimert (zip)et ...	2 451 kB
202509085514_2025-08-20 - 2025-08-25_energy-raw-data-exchange-report	08.09.2025 09:55	Komprimert (zip)et ...	2 336 kB
202509085743_2025-08-20 - 2025-08-25_energy-raw-data-exchange-report	08.09.2025 09:57	Komprimert (zip)et ...	3 332 kB
202509085946_2025-08-25 - 2025-09-01_energy-raw-data-exchange-report	08.09.2025 09:59	Komprimert (zip)et ...	4 711 kB

CPID_EX	ive consumption (MW)	ive generation (MW)	Net_EX	CPID_ST	nsumption (MW)	eneration (MW)	Net_ST	TUname	CPID_DCS	nsumption (MW)	eneration (MW)	Net_DCS	CP	et_unallocat	Diff	Diff DCS-EX	Diff EX-ST	EX-ST non-unalloc	Comment
	31.1919	0	31.1919		30.0181	0	30.0181			31.191906	0	31.191906		-1.3091	-1.173806	-6E-06	-1.1738		0.1353

# Overview of NO trouble meters

- Overview of trouble meters for help with maintenance
- See what meters have continuous/recurring issues
- Import checklists to MS Lists monthly with PA
- Change status/comment based on repairs/maintenance reported by RUs
- Shares data with Rus (sadly not list itself)
- To be introduced for SE also

TU Type	CP	CPID	TU	RU	Status	Validation	Issue Description	Endret	Comment	DCS	EMS Type	EMS Standard
EL14	EL14	70	EL14		Utbudet	2024-01: Annet 100%		23. oktober 2024		OREM	HR	2012
TP 78	TP 78	94	TP 78		Utbudet	2024-01: Kjøler uten forbruk 100%		25. oktober 2024		OREM	HR	2012
TP 78	TP 78	94	TP 78		Utbudet	2024-01: Kjøler uten forbruk 100% 2024-02: Kjøler uten forbruk 100% 2024-03: Kjøler uten forbruk 100% 2024-04: Sender ikke data 100% 2024-05: Sender ikke data 100% 2024-06: Sender ikke data 100% 2024-07: Sender ikke data 100% 2024-08: Sender ikke data 100%		20. september 2024		OREM	HR	2012
BR 187	BR18	91	BR18		Utbudet	2024-01: Annet 100% 2024-02: Annet 100% 2024-03: Annet 100%		10. februar		DB	LEM	2012
EL14	EL14	70	EL14		Utbudet	2024-01: Annet 100%	ok etter bytte til HR energimåler i feb.2024	23. oktober 2024		OREM	HR	2012
EL14	EL14	70	EL14		Utbudet	2024-01: Annet 100% 2024-02: Annet 100% 2024-03: Annet 100% 2024-06: Annet 100%		23. oktober 2024		OREM	HR	2012
RC4	RC4	91	RC4		OK uten tiltak	2024-01: Sender ikke data 100% 2024-02: Sender ikke data 100% 2024-03: Sender ikke data 100% 2024-04: Sender ikke data 100% 2024-05: Sender ikke data 100% 2024-06: Sender ikke data 100% 2024-07: Sender ikke data 100% 2024-08: Sender ikke data 100% 2024-09: Sender ikke data 100% 2024-10: Sender ikke data 100% 2024-11: Sender ikke data 100% 2024-12: Sender ikke data 100%	Dette er en GSM-energimåler som ikke kan sende data i Norge. Annet derfor ok. HFB	23. juli		OREM	HR	2012
EL14	EL14	70	EL14		Utbudet	2024-01: Annet 100% 2024-02: Annet 100% 2024-03: Annet 100%	Overgang til Haster Rail da etter dette.	23. oktober 2024		OREM	HR	2012
EL14	EL14	70	EL14		Utbudet	2024-01: Annet 100% 2024-02: Annet 100% 2024-03: Annet 100% 2024-06: Annet 100%	Bytte til Haster Rail 20/9-2024	23. oktober 2024		OREM	HR	2012



TP	Materiell	CPID	DCS	Forbruk Erec Norge	Tilbakemating Erec Norge	Forbruk Energpoptall	Tilbakemating Energpoptall	Kontroll	Biltem	Føljeskive	Innrap	Kjøretid	Z	I1	I1	I2	I2	I3	I3	x3	x3	Biltem	Hjelpetekst	Fritekst	Error period	Error value	
EL18	EL18		HR	OREM	212,3498	32,2753	212,751	32,398	-278,2	✓																	
EL18	EL18		HR	OREM	81,7472	11,4334	81,878	11,439	-114,9	✓																	
EL18	EL18		HR	OREM	178,3306	28,8904	178,453	28,987	-26,1	✓																	
TP 69	TP 69		HR	OREM	72,1122	0	72,137	0	-25,0	✓	1285789	0,058	0														
TP 69	TP 69		HR	OREM	32,8898	0	32,789	0	-99,0	✓	489282	0,065	0														
TP 72	TP 72		HR	OREM	139,5113	26,0302	129,595	26,152	-156,2	✗	GPS-heng	1782781	0,058	1	13	13								4,13,17	577,364,341		
TP 72	TP 72		HR	OREM	180,6179	48,2147	182,002	48,279	-1319,8	✗	GPS-heng	3039151	0,044	1	24	24								3%	GPS-heng f Reeksportert x2	52,24,26	301,385,384
TP 72	TP 72		HR	OREM	179,8991	25,3043	181,994	25,535	-1864,2	✗	GPS-heng	3077898	0,050	1	10	10								3%	GPS-heng fom 10. tom 10.	10,22	1343,305
TP 72	TP 72		HR	OREM	0	0	0	0	0,0	✓																	
TP 72	TP 72		HR	OREM	131,0365	30,9938	131,306	31,001	-362,2	✗	1968769	0,051	0														
TP 72	TP 72		HR	OREM	12,0959	0,0008	12,092	1	3,5	✓																	
TP 72	TP 72		HR	OREM	195,9001	23,5045	196,358	23,513	-448,5	✓																	
TP 72	TP 72		HR	OREM	151,1917	22,0704	151,287	22,068	-97,3	✓																	
TP 72	TP 72		HR	OREM	185,488	24,9851	185,689	24,984	-201,5	✓																	
TP 72	TP 72		HR	OREM	184,2375	29,298	185,137	29,014	-903,3	✗	GPS-heng	3139926	0,049	1	16	16								3%	GPS-heng f Reeksportert x2	16	679
TP 72	TP 72		HR	OREM	231,676	61,7836	233,753	62,080	-1780,0	✗	GPS-heng	3830452	0,044	1	25	25								3%	GPS-heng fom 25. tom 25.	23,25	647,1069

# Overview of invoicing and % metered

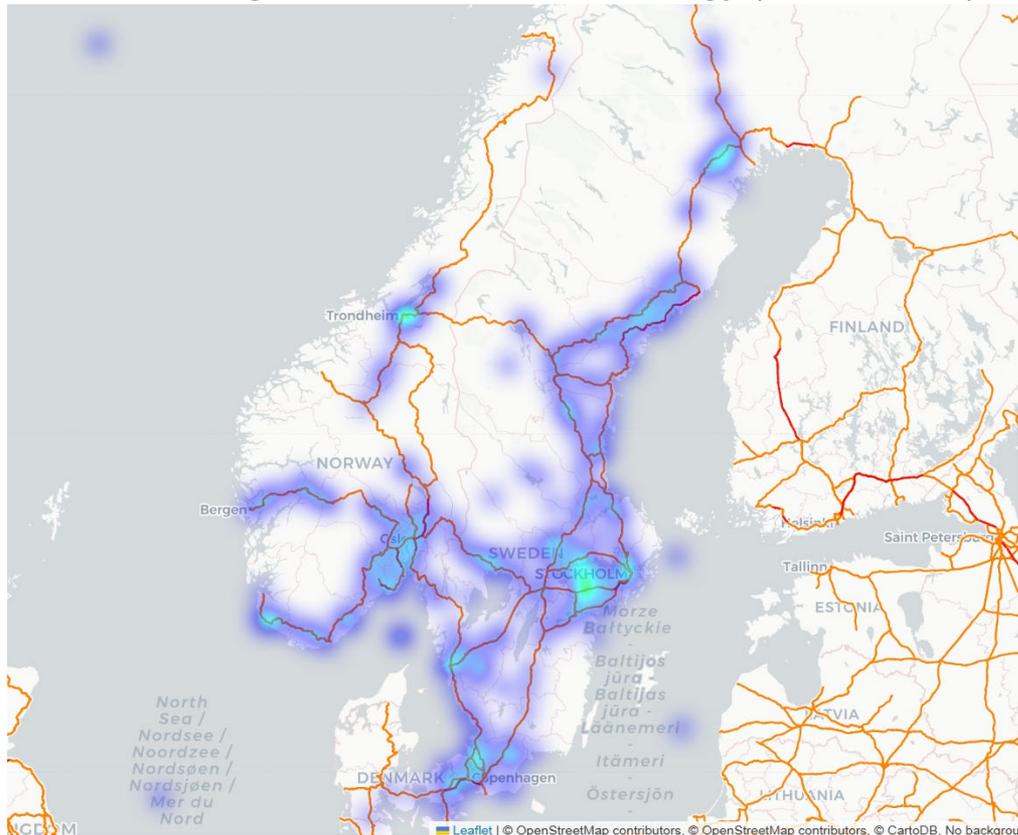
- Orders and saves all invoices for billing
- Process all invoices to get per company:
  - Invoiced costs
  - Volumes + % metered
  - Volumes per area
  - Cost per category
  - Prices per area
- Primarily used to check if on-account needs to be adjusted
- Also process to get final sums for the year

## BI dashboard for one Company



# Analyse missing GPS locations

- Plotting unallocated metered energy (NO+SE+DK)



# Summary

- What data is processed:
  - DCS, monthly sum metered per CP
  - Exchange, raw data + unallocated
  - Settlement, metered train energy for settlement (AER)
  - Checklists based on the above data sources
- How is it processed:
  - Python (mostly)
  - Power automate
- Purpose:
  - Validation of monthly energy data pre-invoicing
  - Checking and summarizing/visualizing invoiced costs
- Future:
  - Working on using train run data (lacking completeness for EVN)
  - Various initiatives to improve GPS
  - Smart use of data

Q&A

