

# Presentation

## Elhub Go-live experiences

07.05.2019



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Elhub Development Department

## content

**1. Go Live 18.02.2019**

**2. Elhub services**

**3. Experiences**



**4. Q&A**



# Successfull completion of the Elhub Go Live Process!

- **07.02.2019:** Data migration completed
- **Søndag 10.02.2019:** DSO Skagerak and DSO Hafslund sent the first master data updates
- **11.02.2019:** Remaining DSO's (137) sent buffered master data updates. Elhub opened for BRS-NO-611
- **18.02.2019:** Retailers sent buffered marked messages
- **19.02.2019:** First MGA imbalance calculation for 18th February (314 MGA's in Norway)
- **21.02.2019:** Last cut-over for meter data from DSO 18.02.2019
- **Tirsdag 26.02.2019:** D+5 MGA calculation for 18.02.2019, firsts MGA reporting to market parties and eSett (the Nordic imbalance settlement company).

*Sunday - Feb. 10th – 08:09 am:*

*Exiting moment when awaiting the first real production messages to be exchanged with Elhub*



# Official celebration of Elhub Go-live

## 20.02.2019



<https://enerwe.no/nyheter/det-kommer-inn-mellom-70-millioner-til-90-millioner-maleverdier-hver-dag/>



Hva er Elhub?



Du har sikkert fått med deg at Elhub er i drift fra i dag, men mange lurer på hva dette er og hva det har å si for oss forbrukere. Her får du en kjapp innføring i det du trenger å vite om Elhub.



## content

1. Go Live 18.02.2019

2. **Elhub services**

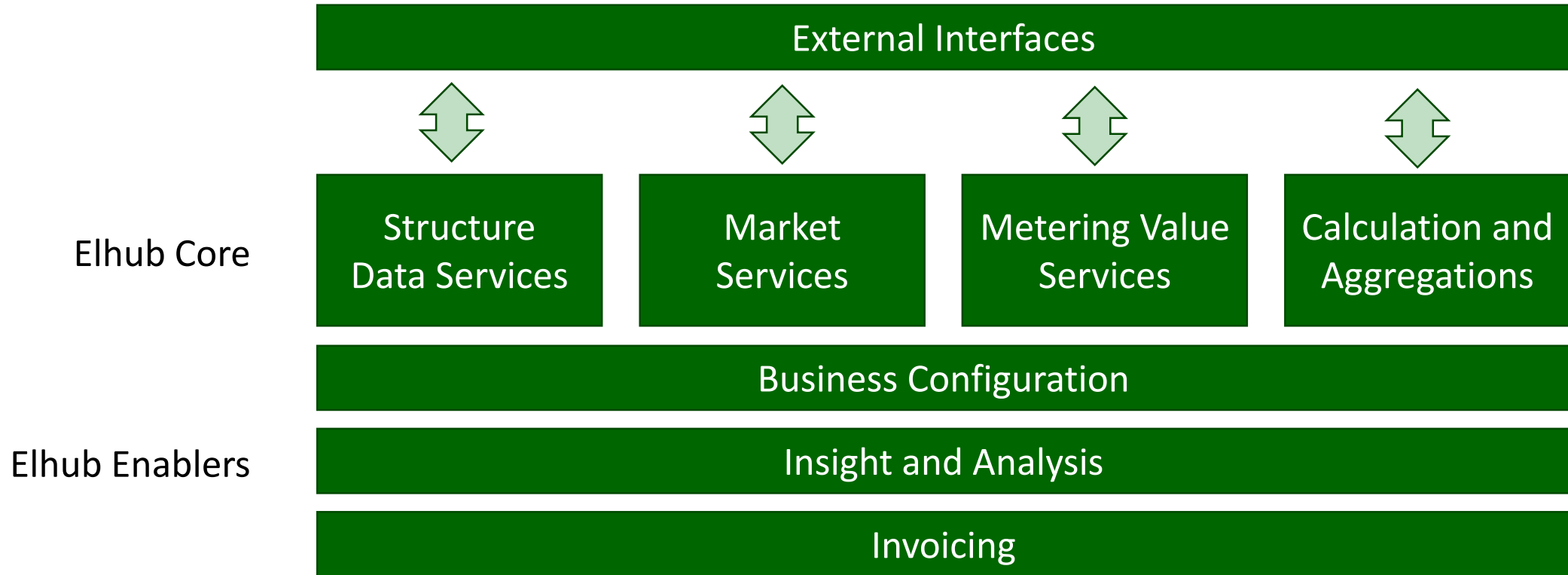
3. Experiences



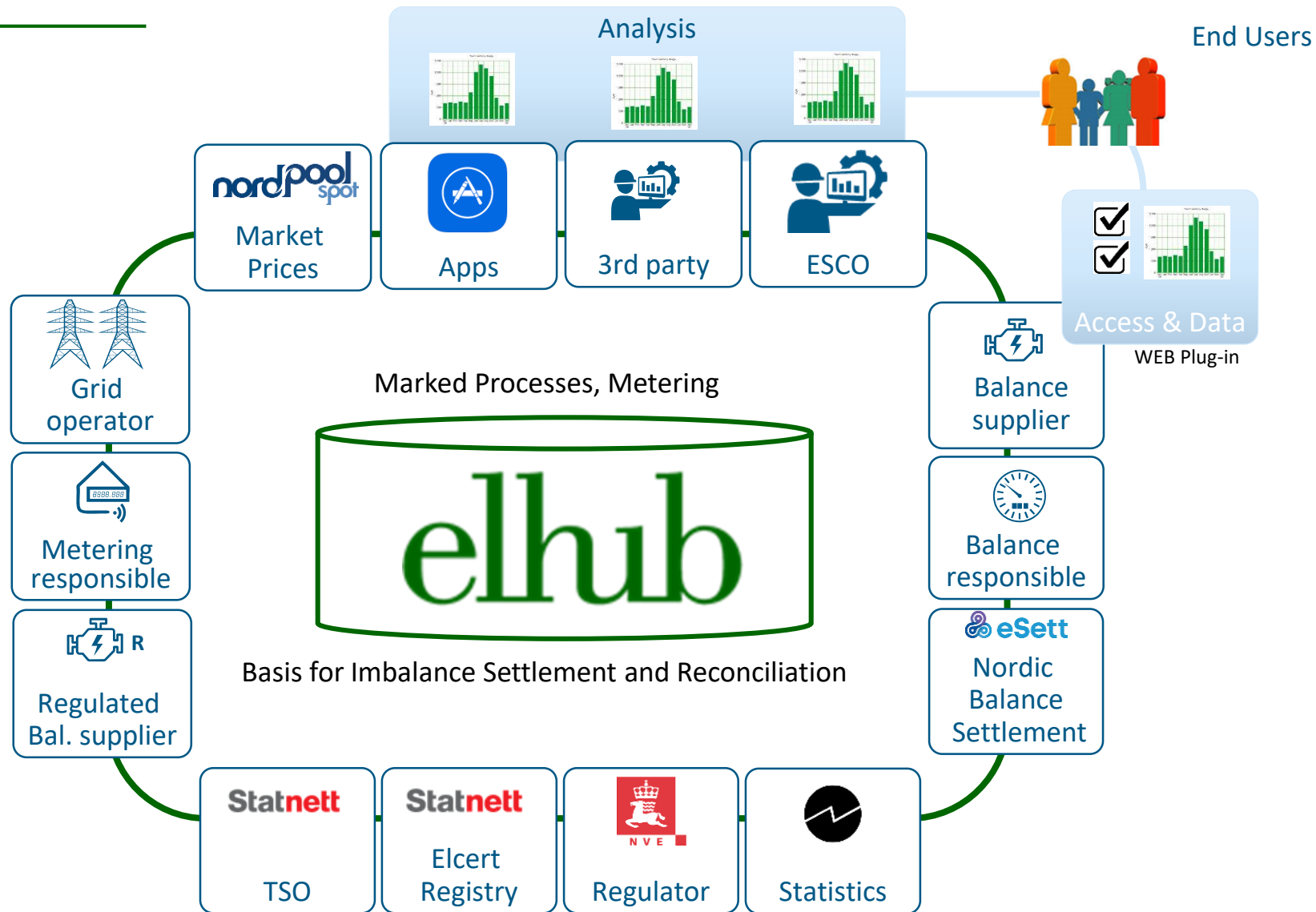
4. Q&A

# Elhub system high level functional architecture

First level of detail  
Business Services



# Market Parties and Users



Elhub Services and functions				External Interfaces			
EMIF (Market Parties)	NOA - SN	NBS - eSett	NECS - SN	IFS - SN	NordPool	Altinn	Ediel
Structure Data Services	Market Processes Services			Metering Values Services		Calc. and Aggregation Services	
Access management – EMIF, EQIF, Portal and Plug-in				Business Configuration and Access Management (Role/data)			
Statistics and reporting – Custom and OBIEE/BI				Insight and Analysis			
Subscription Fee Management ( to IFS)				Invoicing			





# Market Overview

Advanced Search   **Market Statistics**   Profiled AMS Metering points

Market Overview Date \*  
05.05.2019

Balance Supplier  
--Select Value--

Grid Owner  
--Select Value--

Third Party  
--Select Value--

View Selection \*  
☒ Standard  
☐ Extended

Apply

Reset

\* Required fields

## Market Statistics

Number of metering points		3.255.558	Estimated Annual Consumption		83.781.176.306
Status			Last Resort		75.996
Active		3.167.966			
Inactive		67.163			
Terminated		20.429			
Metering Point Type			Meter reading characteristics		
Combined		2.550	Automated		3.105.921
Connection		422	Manual		117.624
Consumption		3.248.913	No value		10.360
Exchange		1.940	Not metered		21.653
Production		1.733			
Settlement Method			Count Active Metering Point without Grid Contract		
No value		2.362			
Non-profiled		2.855.012			
Profiled		398.184			



## Daily Follow Up

### Number of Meter Reads Processed

Grid Area

--Select Value--

Apply

Reset

### Yesterdays meter reads received

Completeness Consumption

**99,9265%**

Missing volumes

Completeness Production and Exchan...

**99,7493%**

Missing volumes

### Metering points that delivered data for yesterday

Grid Area

--Select Value--

Grid Owner

--Select Value--

Usage date \*

05.05.2019

Apply

Reset

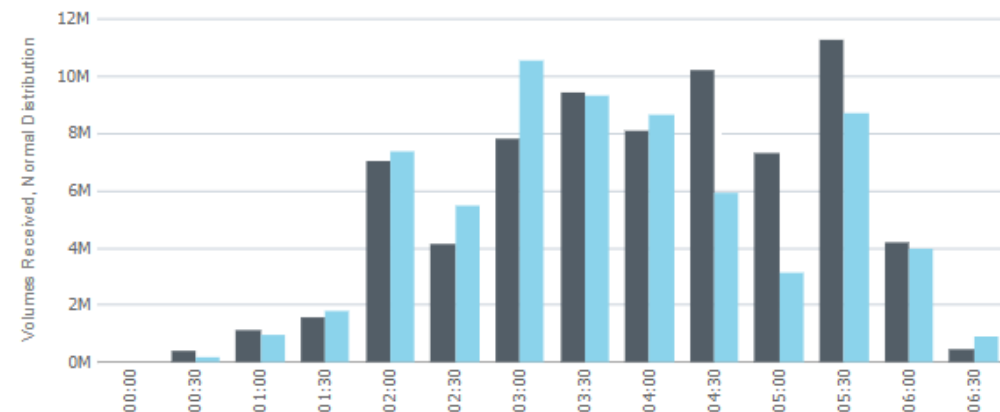
\* Required fields

### Volumes Received

Usage date	Received Reads	Expected Reads	Completeness	Temporary	Estimated	Metered
5 mai. 2019	72.894.348	102.579.912	71,0610%	157663	3236223	66485069

[Refresh](#)

[Export To Excel](#)



## Metering values sent to Elhub per day

day	21.02.2019	24.02.2019
Metering Points updated	<b>2.903.392</b>	<b>2.865.403</b>
Metering values (AMS)	53.513.736	49.180.988
Estimated values (VEE)	15.425.483	20.011.330
Total number of metering values /day	<b>68.939.219</b>	<b>69.192.318</b>
Number of values /year	~30 000 mill (+ reactive channels)	

All incoming metering values are distributed to balance supplier, grid owner and third parties with access.



# Statistics week 14 – market processes

BRS		01.04.2019	02.04.2019	03.04.2019	04.04.2019	05.04.2019	06.04.2019	07.04.2019	Sum	
BRS-NO-101	Oppstart kraftleveranse - Leverandørskifte	3 860	2 914	2 193	3 784	3 344	1 049	786	17 930	Change of supplier
BRS-NO-102	Oppstart kraftleveranse - innflytting tilbake i tid	308	100	89	64	127	23	6	717	Move in/out
BRS-NO-103	Oppstart kraftleveranse - innflytting frem i tid	2 124	2 054	1 658	1 638	2 024	106	14	9 618	Move in/out
BRS-NO-104	Oppstart kraftleveranse - Leverandørskifte fra leveringsplikt	572	314	330	379	268	5	3	1 871	Move in/out
BRS-NO-111	Reversering av oppstart kraftleveranse	44	122	70	71	50	-	2	359	
BRS-NO-121	Nytt målepunkt	450	740	511	373	257	-	-	2 331	
BRS-NO-122	Aktivisering av målepunkt	189	156	224	237	138	-	-	944	
BRS-NO-123	Oppstart i målepunkt - innflytting	956	816	843	827	541	32	22	4 037	
BRS-NO-132	Reversering av aktivisering av målepunkt	1	5	5	4	2	-	2	19	
BRS-NO-133	Reversering av oppstart i målepunkt	9	21	17	16	10	-	-	73	
BRS-NO-201	Opphør pga utflytting	546	338	302	177	195	34	27	1 619	
BRS-NO-202	Opphør av kraftleveranse	171	586	91	117	63	1	30	1 059	
BRS-NO-211	Utflytting fra målepunkt meldt til netteier	118	114	107	104	116	79	2	640	
BRS-NO-212	Deaktivering av målepunkt	165	125	187	148	132	7	1	765	
BRS-NO-213	Fjerning av målepunkt	70	21	96	56	66	-	-	309	
BRS-NO-221	Reversering av opphør kraftleveranse	25	8	27	261	9	-	-	330	
BRS-NO-222	Reversering av utflytting fra målepunkt	13	6	5	6	5	-	-	35	
BRS-NO-223	Reversering av deaktivering av målepunkt	20	27	18	35	22	-	2	124	
BRS-NO-224	Reversering av fjerning av målepunkt	-	6 764	1	8 878	8 536	-	-	24 179	
BRS-NO-301	Oppdatering av grunndata - kraftleverandør	18 860	3 635	11 435	2 511	3 338	1 975	792	42 546	
BRS-NO-302	Oppdatering av grunndata - nettselskap	16 395	41	4 355	31	32	333	55	21 242	
BRS-NO-303	Spørring grunndata	43	117	44	220	211	-	-	635	
BRS-NO-306	Endring i avregningsform	4 388	1 132	202	600	743	-	-	7 065	
BRS-NO-311	Målerstand og antatt årsforbruk fra kraftleverandør	1 688	115 977	953	49 745	1 086	30	12	169 491	Est. annual cons.
BRS-NO-315	Spørring måleverdier	1 650	51 748	91 894	4 759	18 388	271	180	168 890	
BRS-NO-317	Oppdatering av antatt årsforbruk	7 002	11 082	59 157	2 126	12	137 493	31 138	248 010	
BRS-NO-402	Korrigerings av grunndata fra nettselskap	2 028	54	2 509	21	2 358	123	178	7 271	
BRS-NO-601	Forespørsel til nettselskapet	23	2	32	4	19	-	-	80	
BRS-NO-611	Verifisere grunndata i målepunktet (spørre etter mp id)	90 999	75 133	70 402	113 091	78 311	46 827	7 328	482 091	Requests
BRS-NO-622	Oppdatering av tredjeparts tilgang	46	5 915	210	119	74	-	-	6 364	
Totalt		145 405	273 823	243 116	184 093	120 477	187 205	39 769	1 193 888	



# Overview of Imbalance Settlement

314 MGA  
56 Sub-net

Status usage date

- 55 Failed
- 2 Warning
- 1375 Success
- 1 Pending
- 0 Timed hold
- 137 Stopped

Results for

5 May. 2019

Grid Area

Start typing to see options

Grid Area ID

Grid Area ID

Clear

Search

Loss Calculation Method

Loss

Grid Owner

Exclude subgrids☒

Failure list after D+5

Sort by

1 May 2019

Next day

Prev day

Grid Area	Grid Area ID	5 May 2019	4 May 2019	3 May 2019	2 May 2019	1 May 2019
AURL1	50Y-AABJ1ZGH7DNR	✖	✖	✖	✖	✖
FUSA1	50YRGB598QGPCG02	✔	✔	✔	✔	✖
HAUGAL2	50YQAA6XBU3F1E22	✖	✖	✖	✖	✖
NOTOD2	50YMCULDQZJJF3KS	✖	✖	✖	✔	✖
ODDA3	50YF1C0FUEV1ZC-6	!	!	✖	✔	✖
SUNNDAL1	50YO-DD05AYDXGP1	!	✖	✖	✔	✖
UVDAL1	50YD80JRSQVHBI6V	✖	✖	✖	✖	✖
BKKN1	50YK95649Y18F010	✔	✔	✔	✔	!
BKKNH1	50YGQFT6A640FCPA	✖	✖	✖	✔	!
ELKEM SI1	50YNG9WYEW-9BU37	!	!	✔	!	!
JBV6	50YLN61D6VFHZFJ1	✔	✔	✔	✔	!
SAUDEF1	50Y0G81CE65XXBJB	!	!	!	!	!
SODVIN1	50YTK9AAGD717R0D	✖	✖	!	✖	!
TINFO4	50YG6HF7DMDD2TEG	✔	✔	✔	!	!
ØEIKER1	50YP65NDMGD-DNIE	✔	✔	✔	✔	!
AEN1 RN	50YH5AGNQTL5BB-A	!	!	✔	✔	✔

# Imbalance settlement basis

[Audit basis files](#)

Usage date: Monday, 15 Apr. 2019

D+5 Cut off: Saturday, 20 Apr. 2019, 10:06:13

[Next day](#)[Prev day](#)Status  Success Saturday, 20 Apr. 2019, 10:11[Approve](#)[Disapprove](#)[Relaunch](#)

## Validation

Grid loss &lt; 15 % of infeed

Successful

Grid loss = 0 (special grids)

Successful

Exchange and large production complete

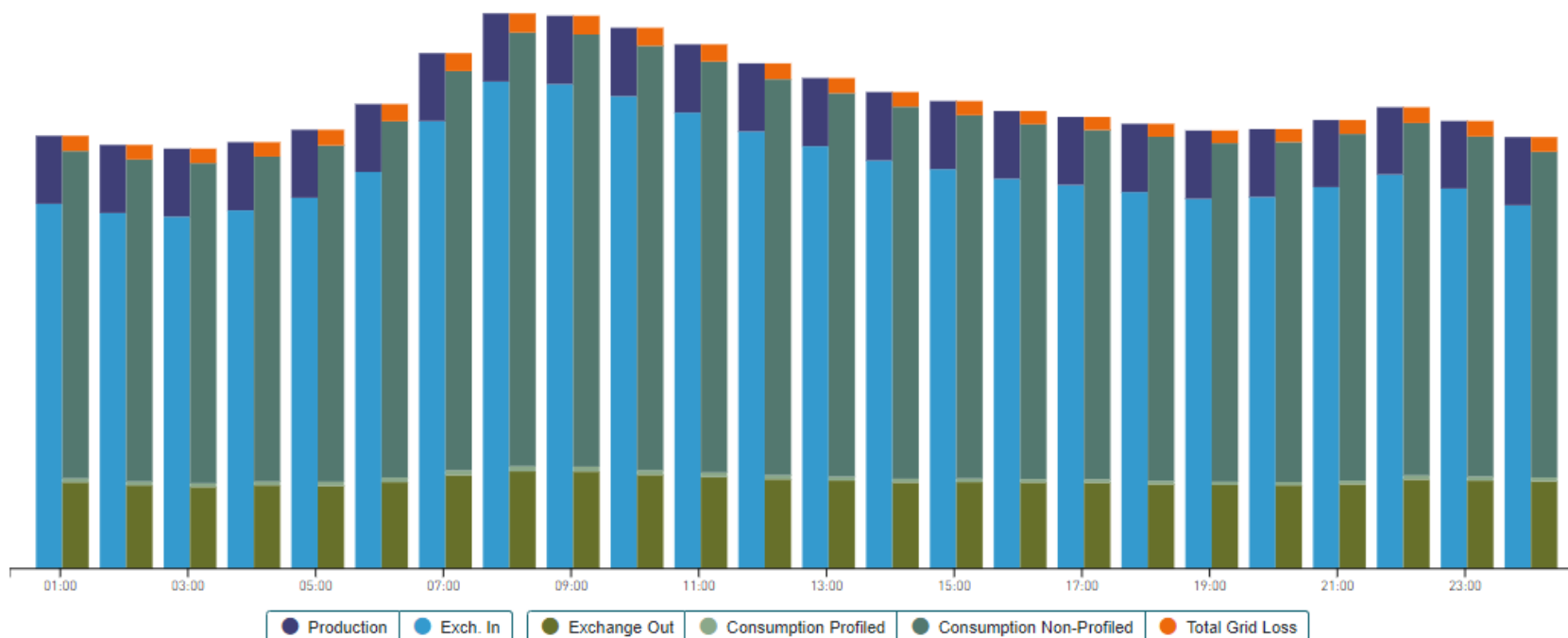
Successful

## Action history









[Overview](#)[Compare in](#)[Compare out](#)

Hourly readings for

D+5

[View table](#)

## Sum up for entire day

 Net infeed	51,936,418.980 kWh
 Production	9,257,958.680 kWh
 Exch. In	54,580,080.300 kWh
 Exchange Out	11,901,620.000 kWh
 Consumption Profiled	546,575.939 kWh
 Consumption Non-Profiled	49,306,219.511 kWh
<hr/>	
General Consumption	49,306,219.511 kWh
Pumped Storage	0.000 kWh
Pumped Hydro	0.000 kWh
 Total Grid Loss (Small ALP)	2,083,623.532 kWh
<hr/>	
No Balance Supplier Loss	289,696.433 kWh
Calculated Loss	1,793,927.099 kWh
System Estimated Usage	0.000 kWh
 ALP	599,483.366 kWh



## content

1. Go Live 18.02.2019

2. Elhub services

3. **Experiences**



4. Q&A

# Intro

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- We have been through a complex and comprehensive start-up , which seems to be a success.
  - Large data-sett migrated into Elhub, with a very strict regime for starting up – open up for the market.
  - Large volume of market processes handled correctly every day (365)
  - Metering values received daily and distributed to market parties
  - Elhub calculate and distributes basis for settlement and most supplier are able to invoice their customer based of the values.
- There has been several challenges
  - Still large challenges at grid companies sending a complete sett of metering data with quality
  - Some functional defects at market parties system providers and in Elhub, both connected to market processes and meter value distribution
  - Cyberattack at Norsk Hydro had large consequences in delivering metering values and ended up with delays in reporting to eSett
  - Change to summertime
  - Issues in interfaces and data between Elhub- eSett and Elhub - NECS
- Focus now is to stabilize the operation
  - Daily reporting of metering values and quality control
  - Correct use of market processes and solve problems between Elhub and market parties IT-systems
  - Increase quality of master data and end-user information

# Metering Values reporting, basis for settlement

---

Day D	Consumption	Large Prod.	Small Prod.	Exchange
24.03.2019	0,9977	0,9646	0,9968	0,9264
25.03.2019	0,9968	0,9847	0,9945	0,9736
26.03.2019	0,9987	0,9884	0,9968	0,9738
27.03.2019	0,9983	0,9890	0,9946	0,9738
28.03.2019	0,9981	0,9774	0,9950	0,9720
29.03.2019	0,9981	0,9896	0,9959	0,9695
30.03.2019	0,9889	0,9212	0,9951	0,9403
31.03.2019	0,9280	0,9090	0,9329	0,8800
01.04.2019	0,9925	0,8696	0,9915	0,8535
02.04.2019	0,9984	0,9083	0,9964	0,8993
03.04.2019	0,9987	0,8989	0,9834	0,9257
04.04.2019	0,9988	0,9133	0,9775	0,9414
05.04.2019	0,9986	0,9329	0,9793	0,9527
06.04.2019	0,9938	0,9090	0,9640	0,8838
07.04.2019	0,9440	0,8509	0,9717	0,9310

## Completeness D+1

- Stable Un-stable
- Several underlying factors
- Regulator heavily involved (NVE)
- [Published status per MGA](#)



# Metering values and basis for calculation

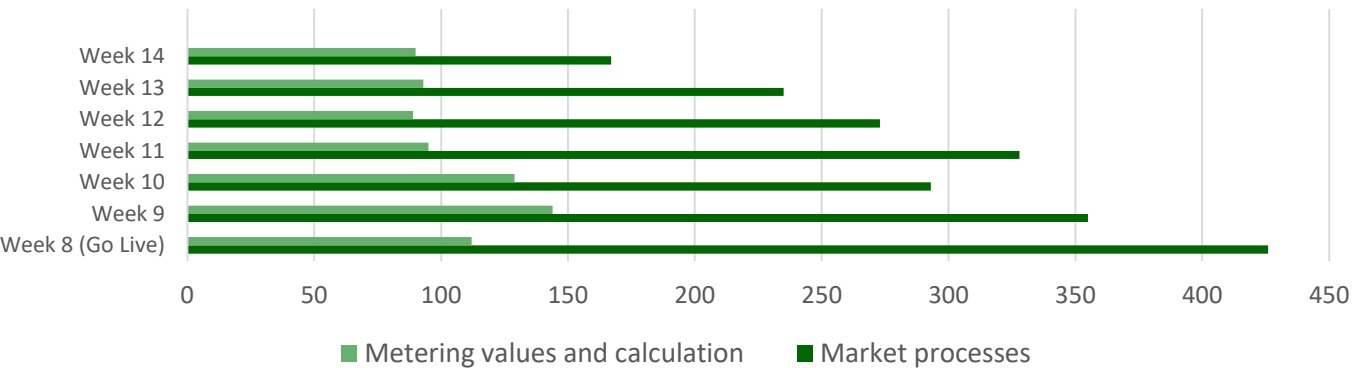
- Basis for settlement calculations
  - Large variations in D+1 quality for the 314 MGAs
  - Under excepted quality level the last weeks
  - At "D+5" we still have serval MGA in error (not in balance)

Status per MGA per version run

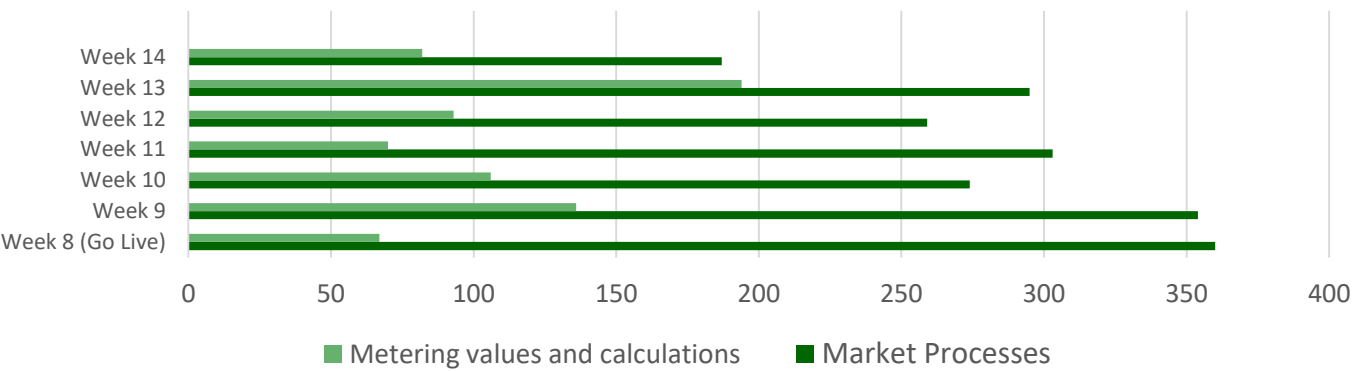
	D+1			D+2			D+3			D+4			D+5		
	Approved	Error	Stopped	Approved	Error	Stopped	Approved	Error	Stopped	Approved	Error	Stopped	Approved	Error	Stopped
24.03.2019	233	20	61	280	7	27	279	5	30	283	6	25	314	0	0
25.03.2019	249	16	49	274	8	32	279	5	30	283	4	27	314	0	0
26.03.2019	250	22	42	276	8	30	282	5	27	287	5	22	314	0	0
27.03.2019	244	22	48	280	6	28	281	6	27	282	5	27	314	0	0
28.03.2019	235	21	58	277	10	27	276	8	30	278	7	29	314	0	0
29.03.2019	250	20	44	267	15	32	269	14	31	286	5	23	311	1	2
30.03.2019	213	32	69	249	21	44	269	6	39	292	6	16	311	1	2
31.03.2019	129	71	114	245	21	48	277	14	23	289	13	12	306	3	5
01.04.2019	164	47	103	255	20	39	267	18	29	272	14	28			
02.04.2019	197	43	74	237	30	47	253	17	44	288	10	16			
03.04.2019	208	41	65	252	21	41	286	8	20	287	13	14			
04.04.2019	224	30	60	260	18	36	267	15	32	265	15	34			
05.04.2019	216	34	64	249	19	46	249	18	47						
06.04.2019	188	31	95	249	21	44									
07.04.2019	216	33	65												
Max	271			305			307			309					
Min	111			237			249			265					
Gjennomsnitt	229	27	60	279	11	25	287	7	20	295	5	14			

# Operational support

Incoming issues / requests

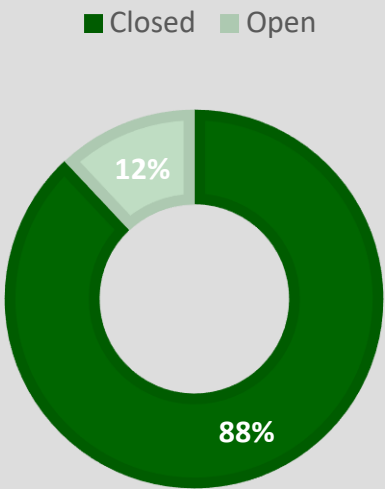


Closed



Incoming issues/requests  
2882

Closed issues  
2555



## Other observations

- Communication. Two models not entirely 100% aligned.
- A large change in the end-user market model when implementing a datahub, demands close cooperation in planning and alignments with all partners involved.
- We see several areas where Elhub should have been in more direct contact discussing both the new model, structural challenges, the interface between us, dataflow, processes and procedures.
  - Changes has to be discussed and the most time and cost-effective solution selected. Elhub has done several changes to adopt.
  - E.g. 15 minutes settlement – needs close cooperation.
- Since Elhub have the MGA - Market Party structure configured and processes for updating, and the control – unnecessary and heavy data replication should have been prevented.
- It's very time consuming to keep structure data in Elhub and eSett in sync. Elhub use around 1-2 hours per day to keep it up to date, prosumers – in particular.
- We appreciate the support from eSett – specially connected to the delay of the "Day + 5" data-sett and the late delivery to eSett
- We also need to align development /release plans, including proposed enhancements and changes between eSett and datahubs. Testing facilities at eSett will be needed for all countries.



## Elhub Operations



Eigil



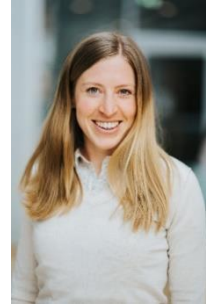
Julie



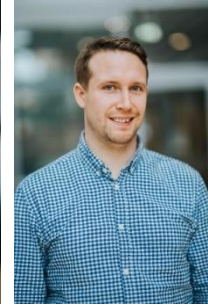
Anita



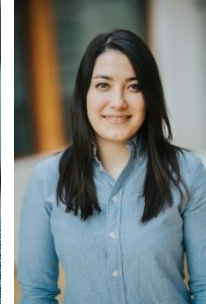
Alf



Christine



Truls



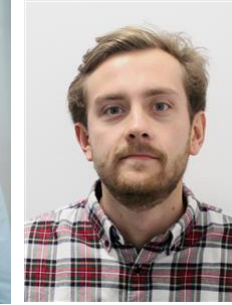
Kim



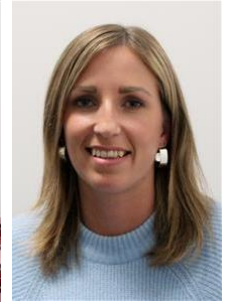
Victoria



Helle



Henrik



Alexandra



Ola



Jørgen



Ingvar



Kristoffer



Arne



Bård



Are

## Elhub Development (functional and technical)



Jan M.



Christian



Anne Cath.



Anne Stine



Ali



Andreas



Ingrid



Michael



Szymon



Trond



Audun



Erik

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Thank you

