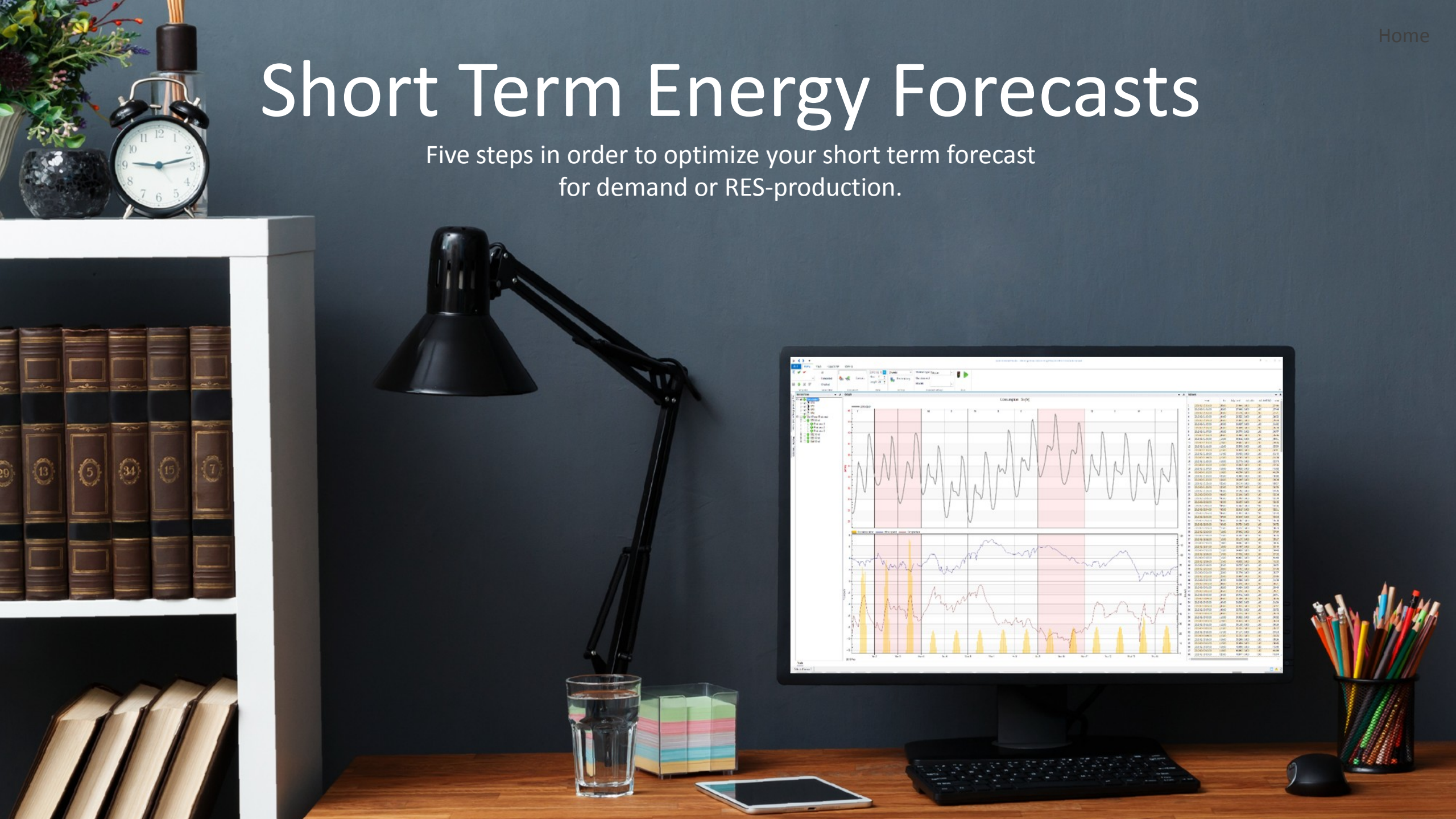
Short Term Energy Forecasts

Five steps in order to optimize your short term forecast
for demand or RES-production.



Speakers

Johan Nihleen
Head of
Growth & UX

Alexander Nordling
Customer Portfolio
Manager


Vitec Software Group

Founded in 1985

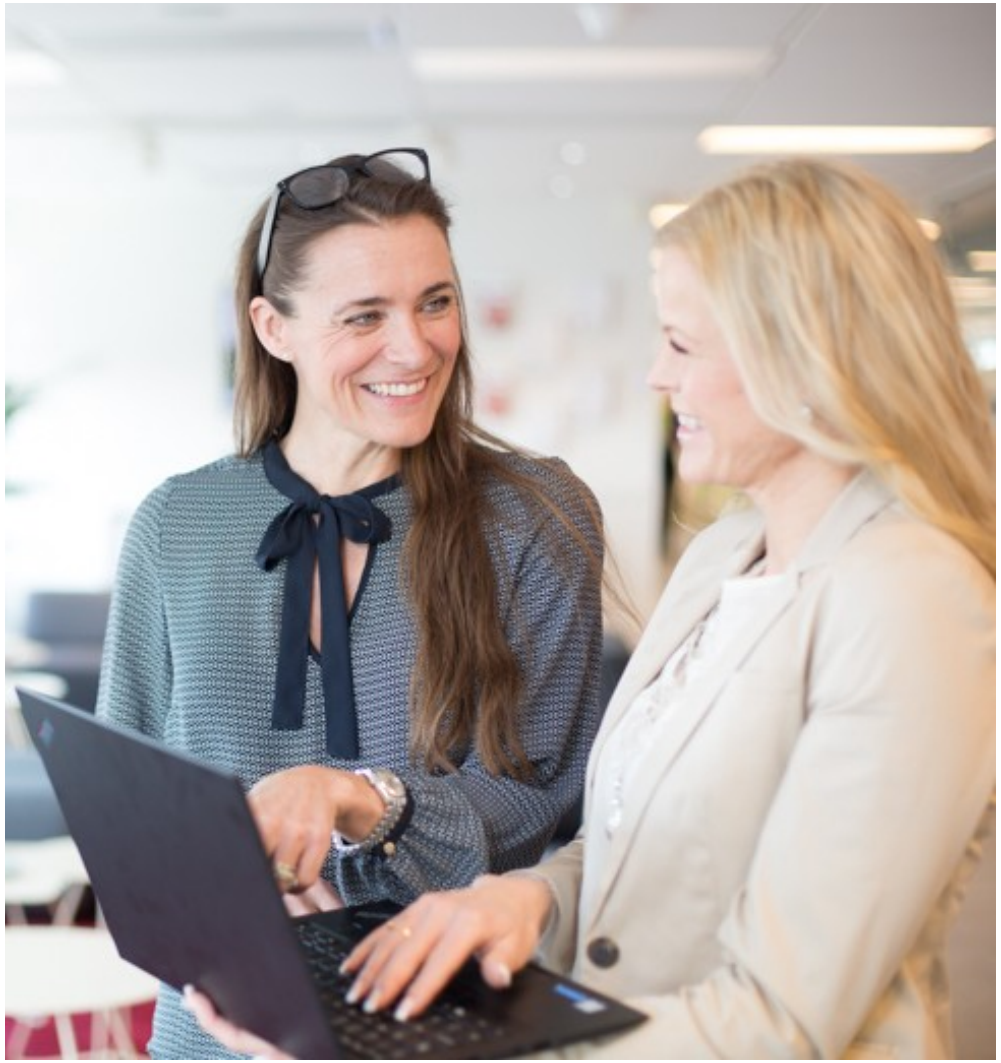
Vitec was founded in 1985 by Lars Stenlund and Olov Sandberg.

Vitec is a spin-off from Umeå University.

AFS was the second product being developed.

We develop and deliver **standardised** software for industry-specific needs.

A selection of customers



Auto	ALPPILAN Autohuolto, Mekonomen, KG Busservice, nellemann
Energy	FINGRID, VATTENFALL, aspo, SVENSKA KRAFTNÄT
Real Estate	PEAB, nikshem, Nortura - fra råvarer til merkevarer, AVINOR
Finance & Insurance	SEB, Nordea, DNB, minpension.se
Health	ORTON, FSHS Finnish Student Health Service, Doctors, Helsingin kaupunki
Environ-ment	Jätekukko, Paperinkeräys, etappi, SUEZ environnement SITA
Estate Agents	Länsförsäkringar Fastighetsförmedling, DNB Eiendom, HusmanHagberg, Krogsveen

VITEC

What we do

Electricity/Gas
Retail Demand Forecasting

1min to several years

Electricity/Gas
Wholesale Demand Forecasting

15min to several years

Renewables
Generation Forecasting

15min to 240 hours

Evaluation and
Optimal Weighting

VITEC

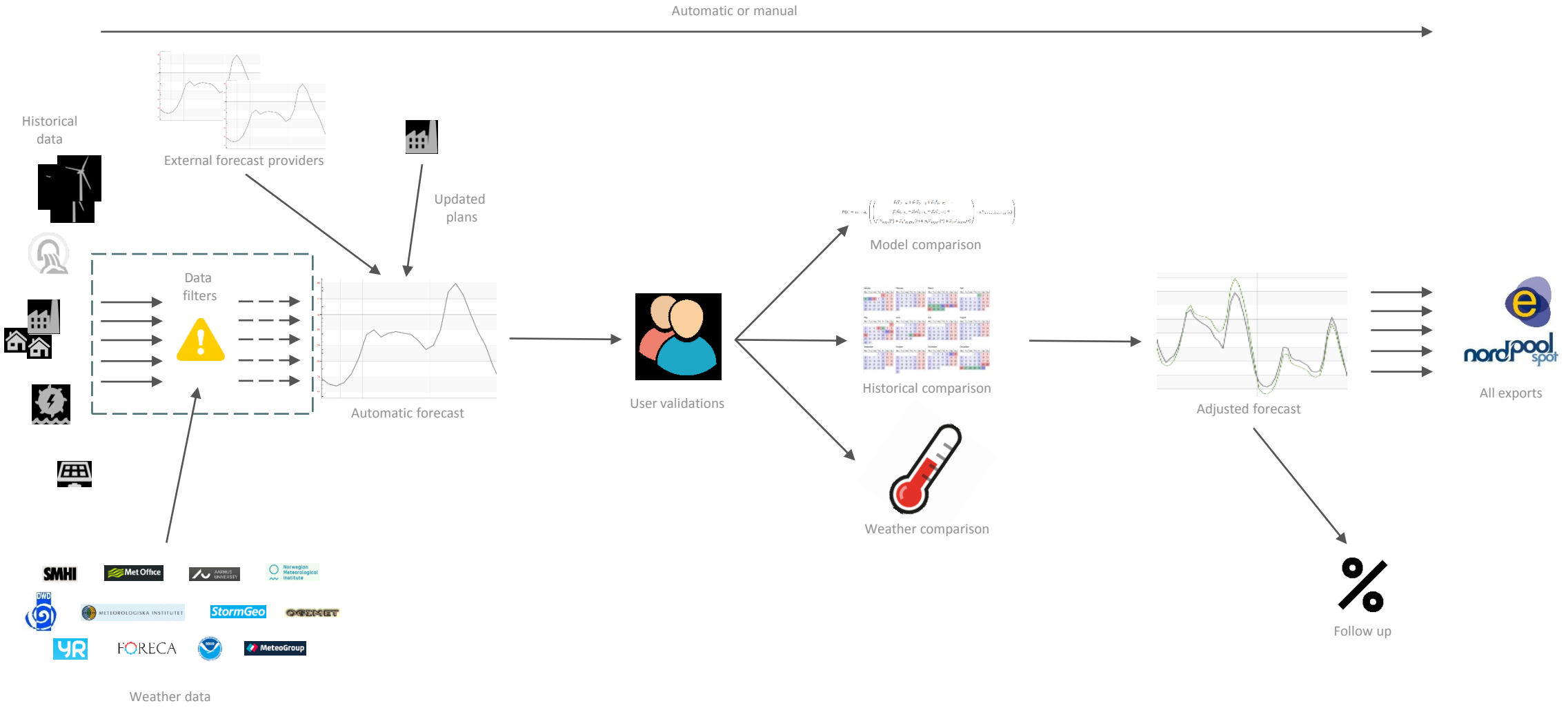
Customers

And 60 more

Forecasting Essential
#1

Creation of Quality Input Data

Everyday process



Problem?

- Huge data sets
- 24/365 obligations
- Intra day forecasts is time consuming
- New staffs learning curve mean an extra risk

Complexity

Data control

Check history for gaps

Check history for spikes

Check history for manual changes

Compare Import to Exports

Background processes

Check weather forecast delivery

Check energy data import protocols

Check atomatic forecast process

Set forecast export protocols

Check energy data availability

Did the adaption work?

Were the day types right?

Check fraction numbers

Reporting

Check accuracy in MAE

Check accuracy in AE

Check accuracy in RMSE

What are the number of valid observations?

Create executive summary reports

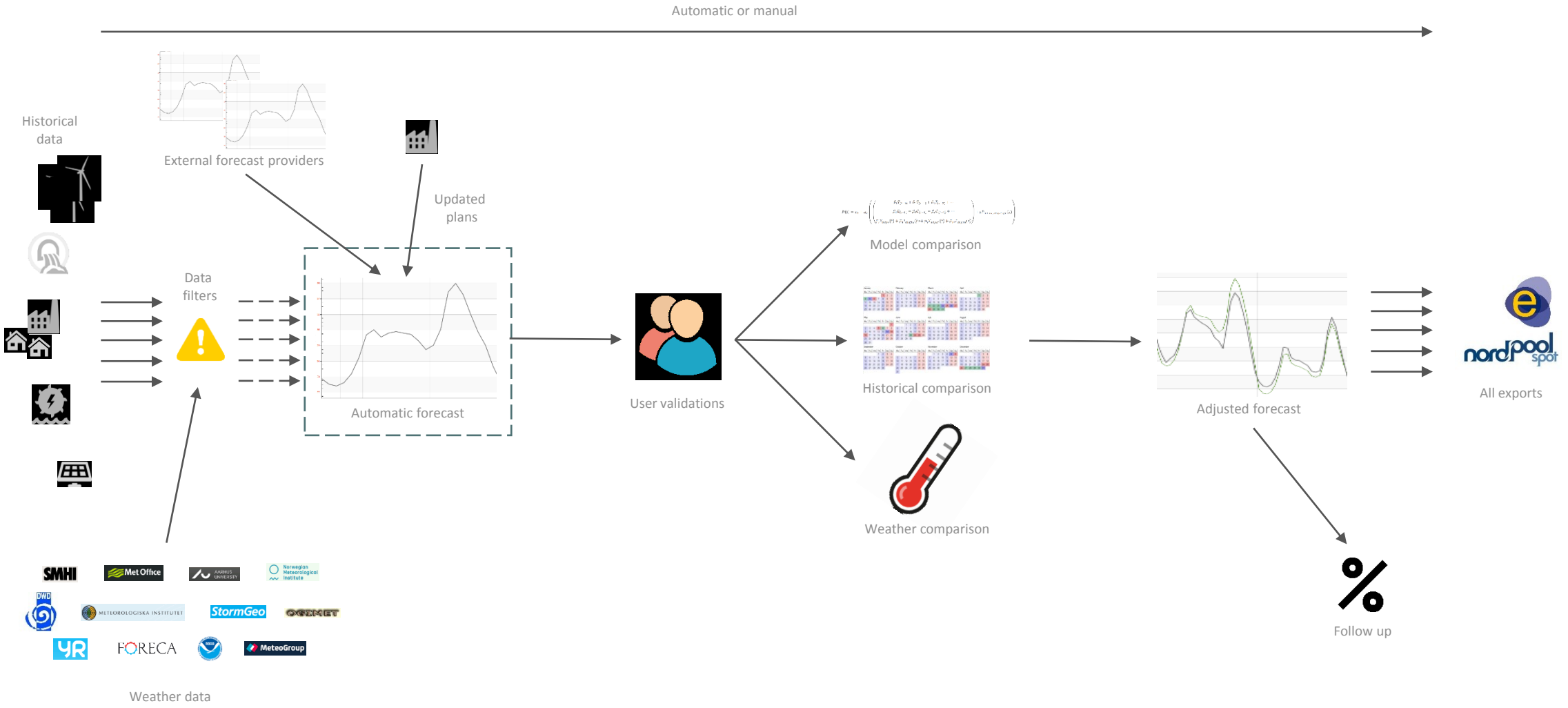
Create daily digest reports

Create over time reports

Forecasting Essential
#2

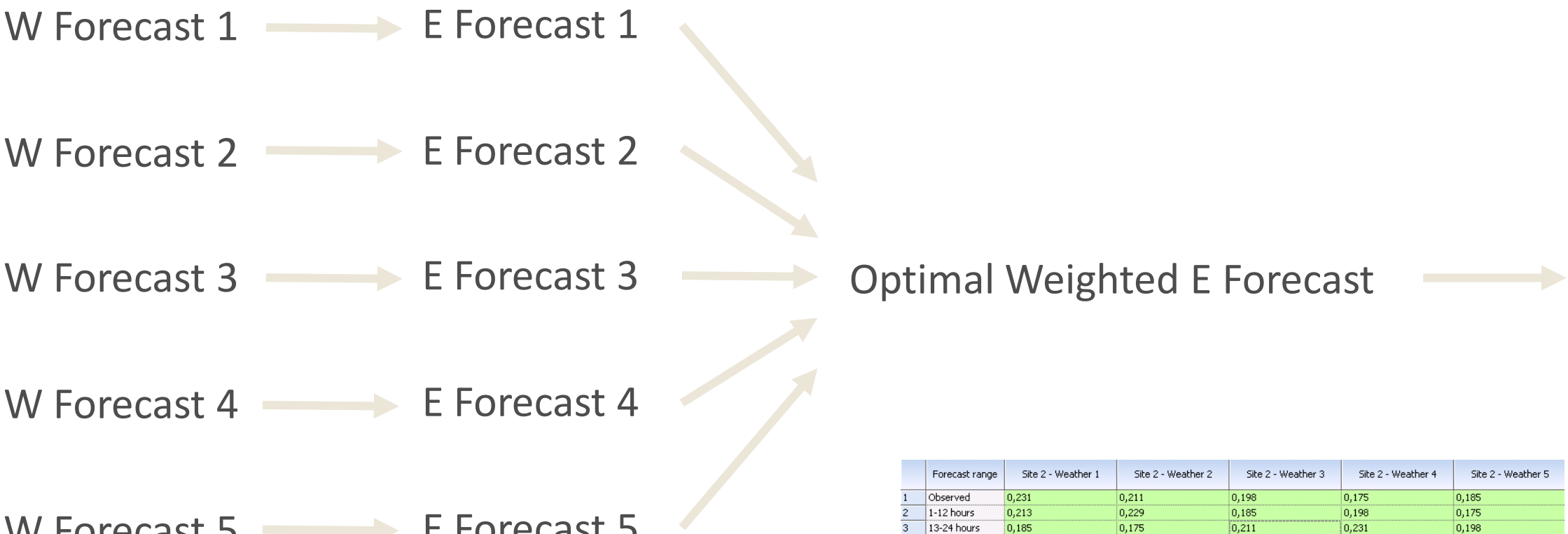
Weighting Of Forecasts

Everyday process



Multiple weather institutes

Weather Institutes



	Forecast range	Site 2 - Weather 1	Site 2 - Weather 2	Site 2 - Weather 3	Site 2 - Weather 4	Site 2 - Weather 5
1	Observed	0,231	0,211	0,198	0,175	0,185
2	1-12 hours	0,213	0,229	0,185	0,198	0,175
3	13-24 hours	0,185	0,175	0,211	0,231	0,198
4	25-36 hours	0,211	0,231	0,185	0,198	0,175
5	>36 hours	0,185	0,211	0,175	0,231	0,198

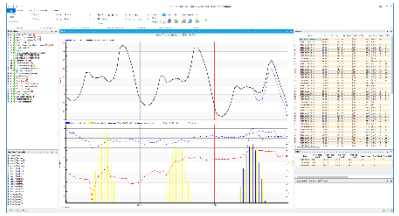
Suppliers or Models

Supplier 1 - Model A

Supplier 1 - Model B

Supplier 2

Supplier 3

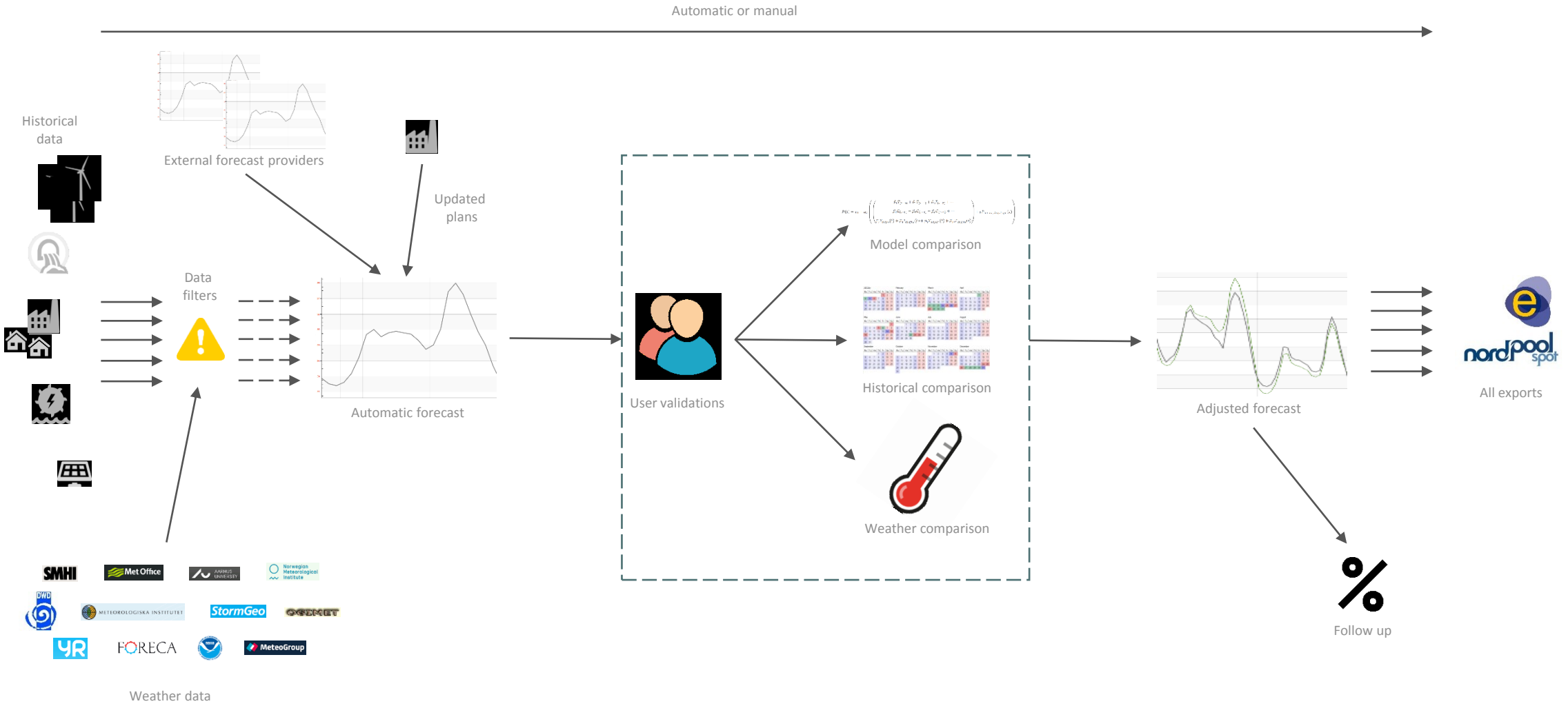


Always the best weighted forecast

Forecasting Essential
#3

Make Manual Validations of Your Forecast

Everyday process



Continuous Evaluation

Learn from previous made forecasts
Get instant feedback of previous made forecasts

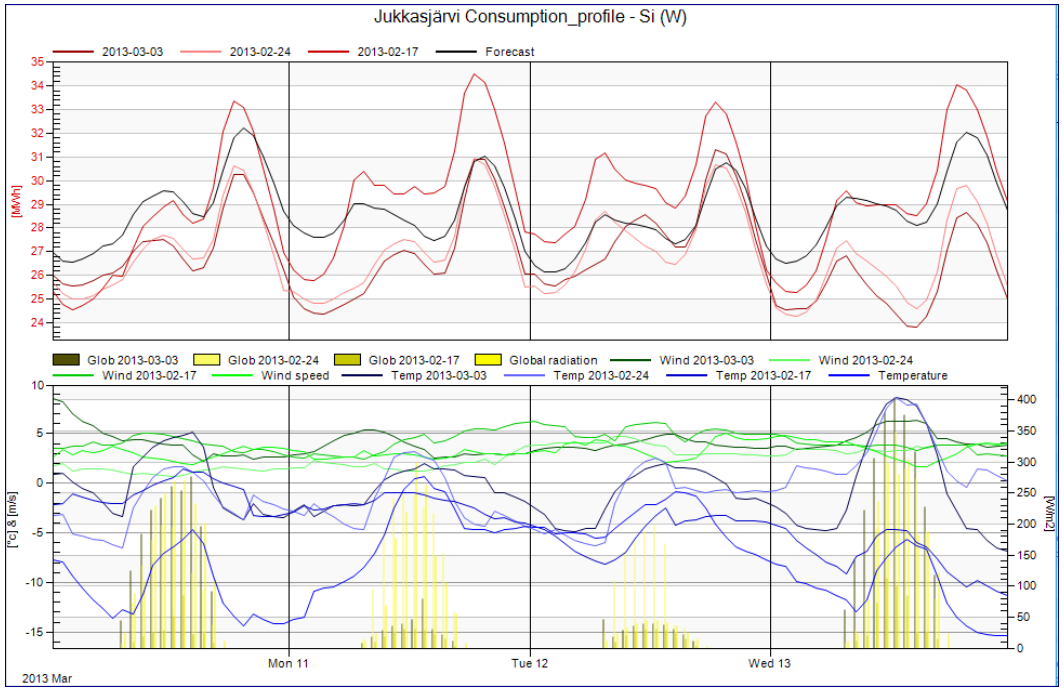
Displayed in Home together with your new forecast
No toggling needed to Follow up tab or any other place

Corrections displayed together with saved forecast
Continue previous work, learn from colleagues or use previous corrections

Separated History series
To let Forecast and measurements overlap and give you fast feedback of Real time measurements

Display Regulation prices
See relevant market situation for the relevant price area in Home

Validate your forecast

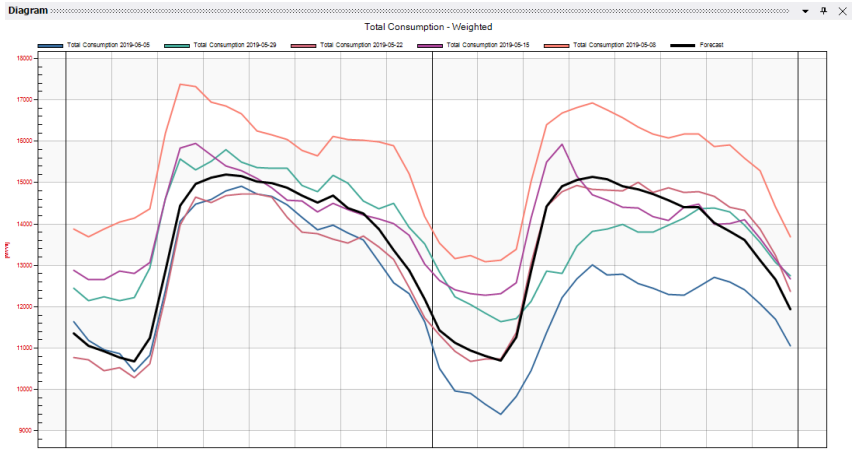


1. Historical comparison
   a. Plot historical values on top of each other
   b. Percentiles for uncertainty
2. Model Comparison
   a. Plot alternative model results
3. Weather comparison
   a. Plot weather based on individual provider
   b. Simulate offset in temperature

Sort according to volume and validate from largest to smallest

Validate your forecast

1. Historical comparison

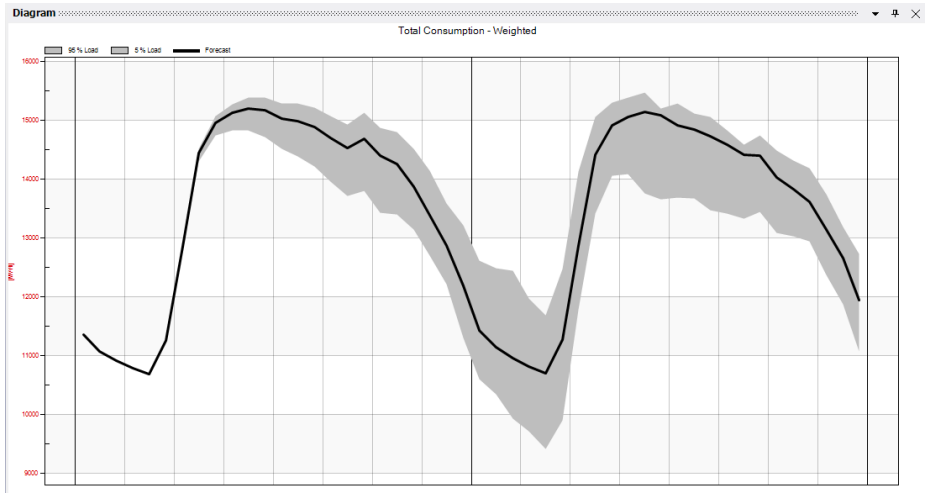


Display previous weeks, days or years

Plot historical measurements on top of your current forecast to validate level and profile

Calculate and display percentiles

Get hints of possible adjustments based on previous errors

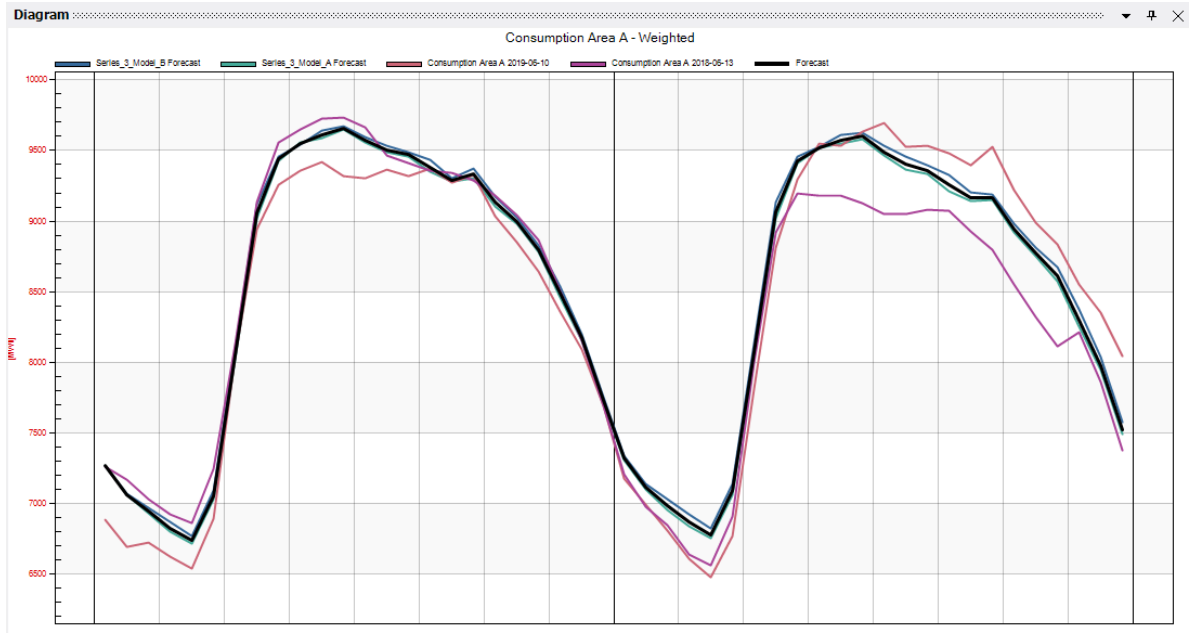


Validate your forecast

2. Model comparison

See output from alternative models

See how alternative model approaches reacts to current conditions



Validate your forecast

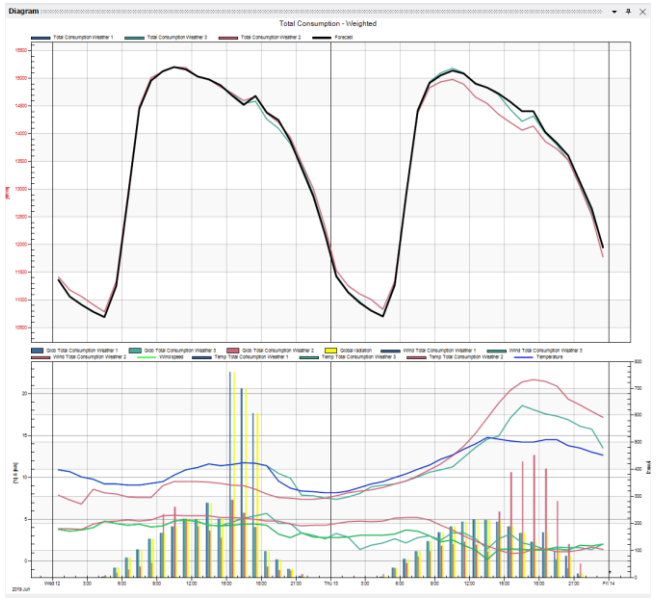
3. Weather comparison

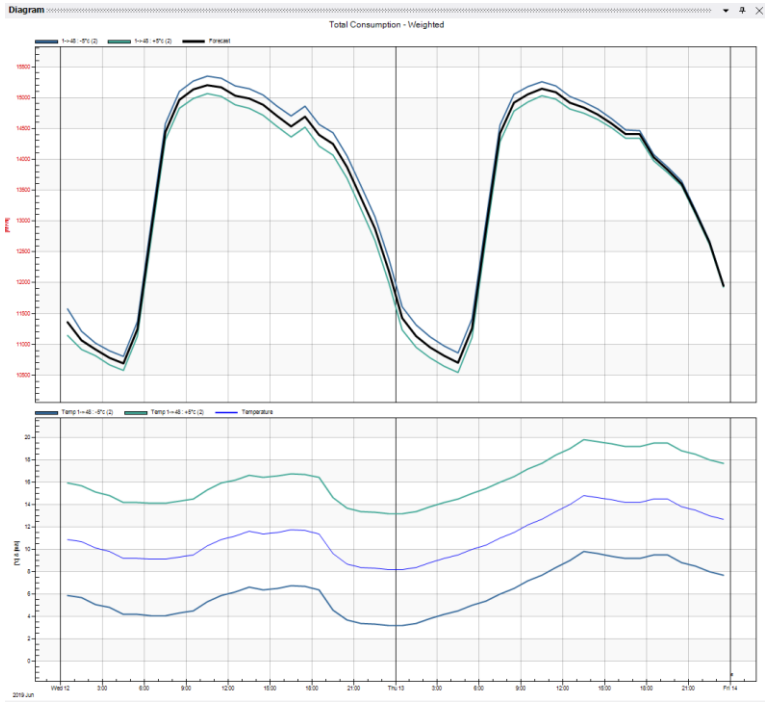
Display all input from weather providers

Plot providers individual forecasts to spot outliers or alternative weights

Simulate off set in temperature

See the temperature dependency by simulating off set to temperature





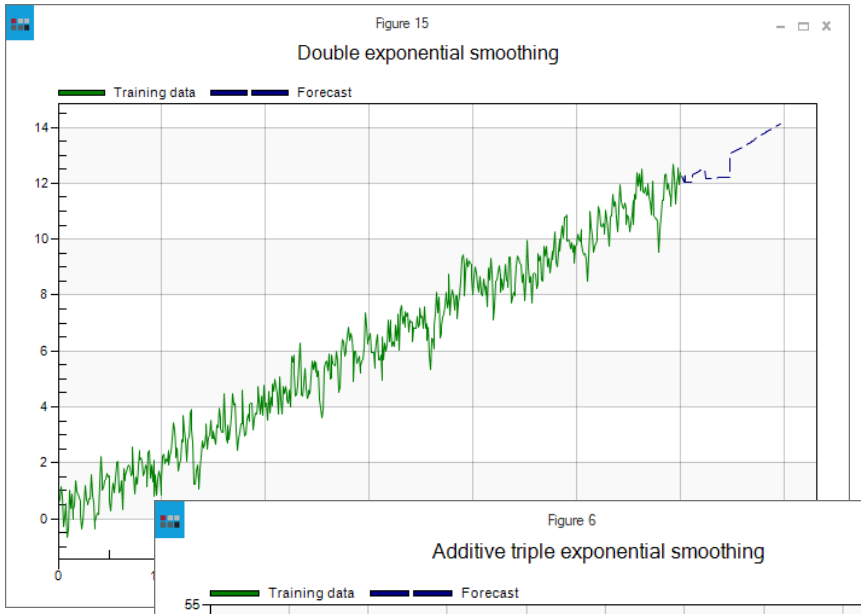
Real time corrections

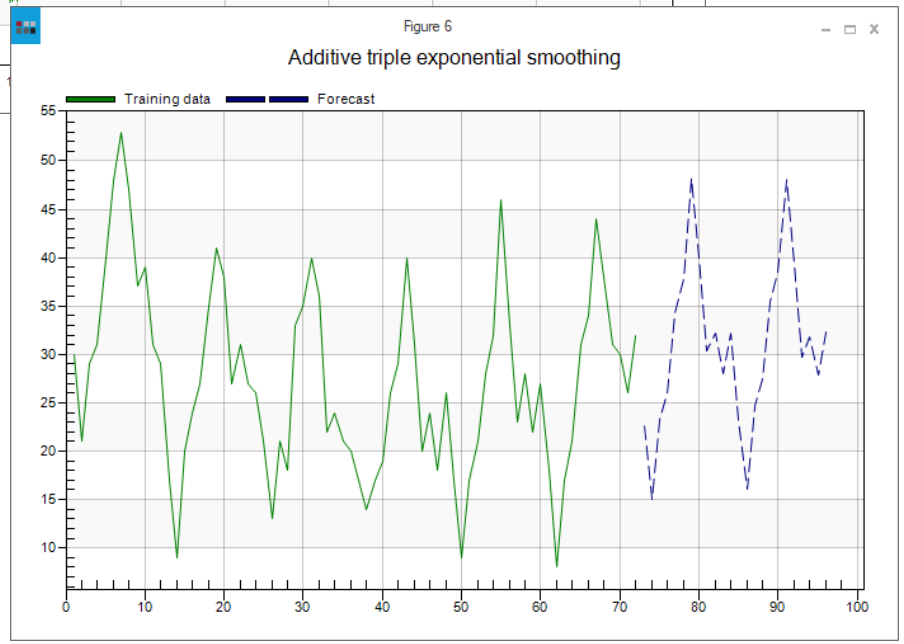
Correct your forecast according to most recent data

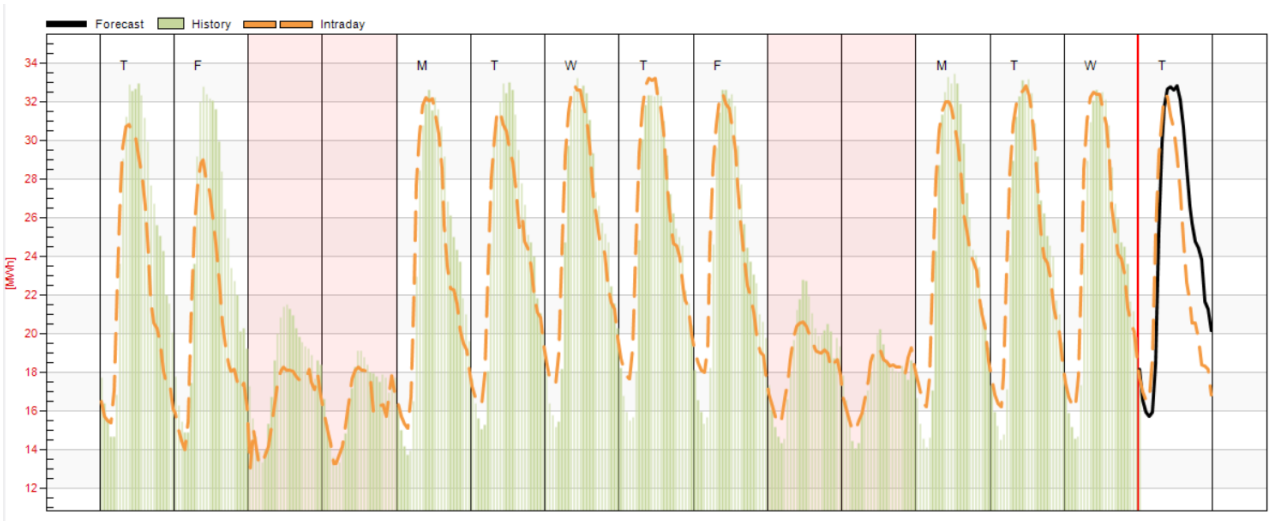
Linear, Auto regressive, Exponential smoothing, persistence, moving average etc.

Learn from historical forecasts

Calculate corrections according to recent errors



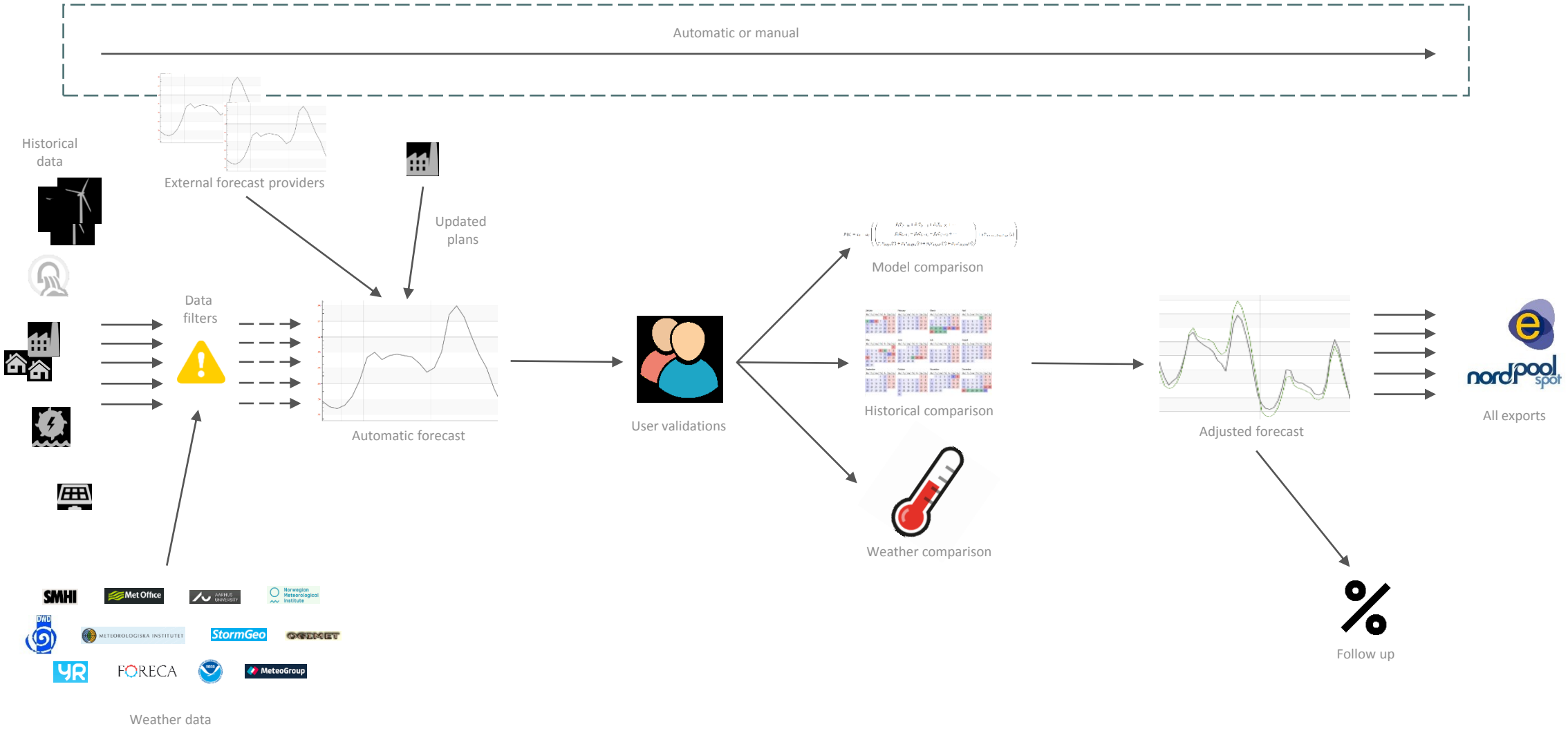




Forecasting Essential
#4

Use Automation

Everyday process

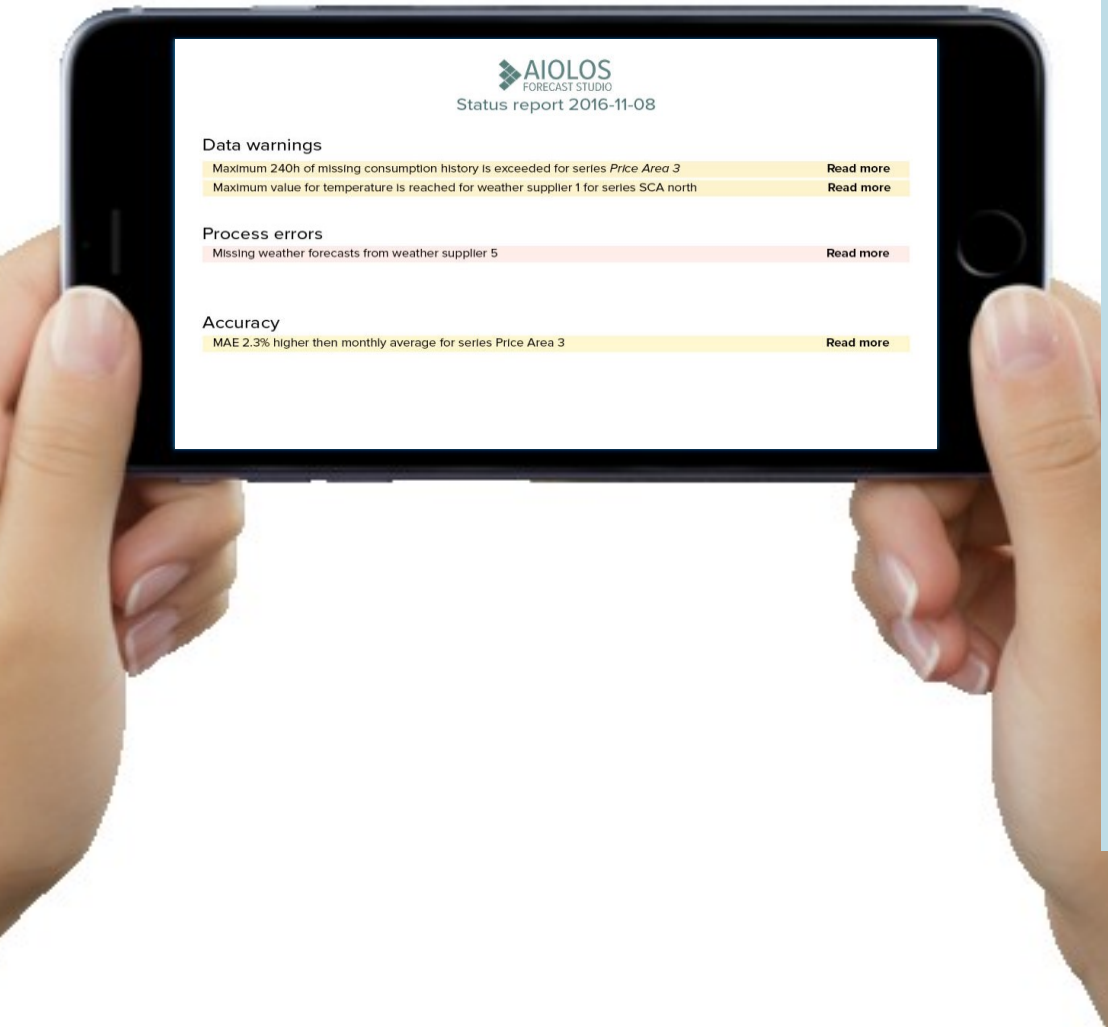


Automation

- Import of data
- Filtering
- Tuning of models and settings
- Pre-set forecast horizon
- Export at designated time
- Trigger-based actions
- Reporting
- More complex modelling approach

Avoid human error!

Automation



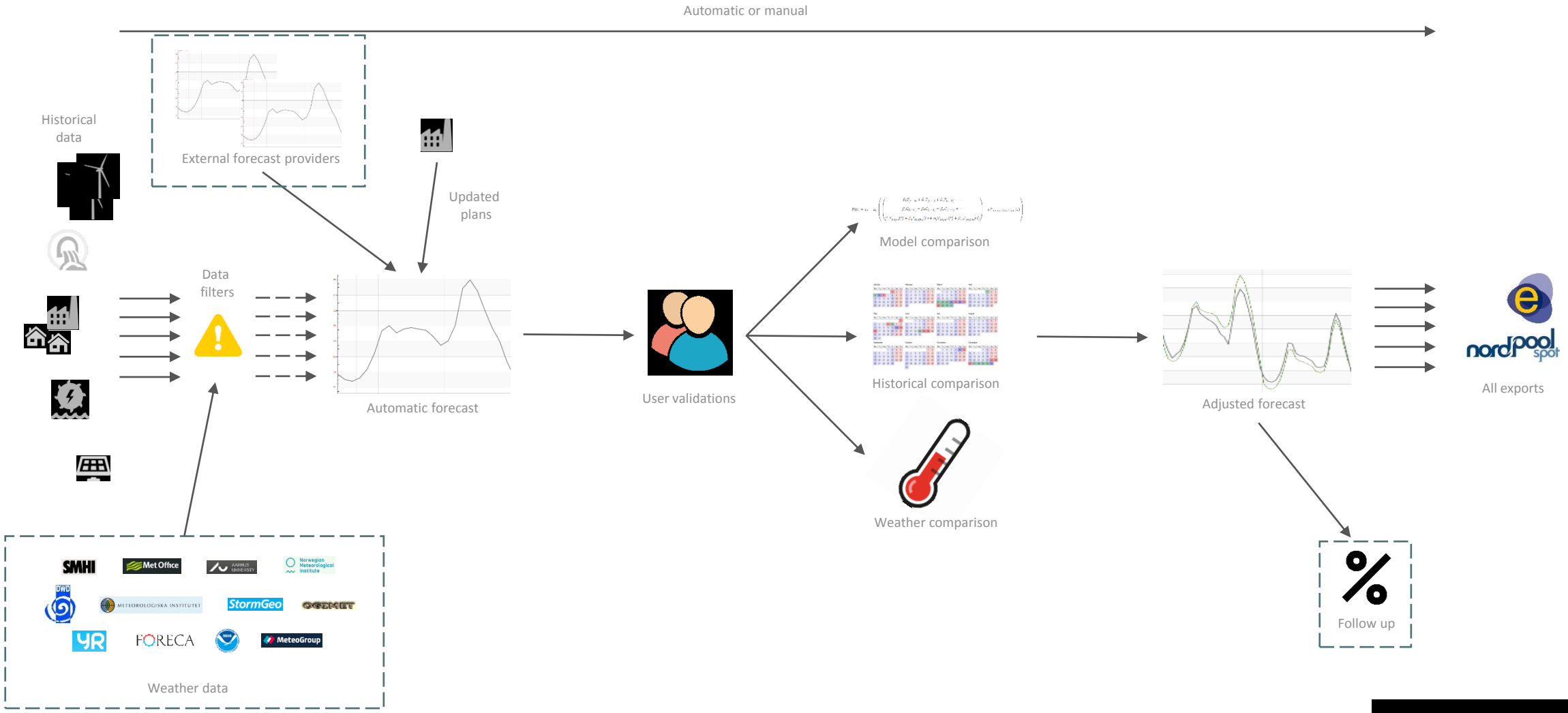
- Import of data
- Filtering
- Tuning of models and settings
- Pre-set forecast horizon
- Export at designated time
- Trigger-based actions
- Reporting
- More complex modelling approach

Avoid human error!

Forecasting Essential
#5

Proper Evaluation of Data Sources

Everyday process

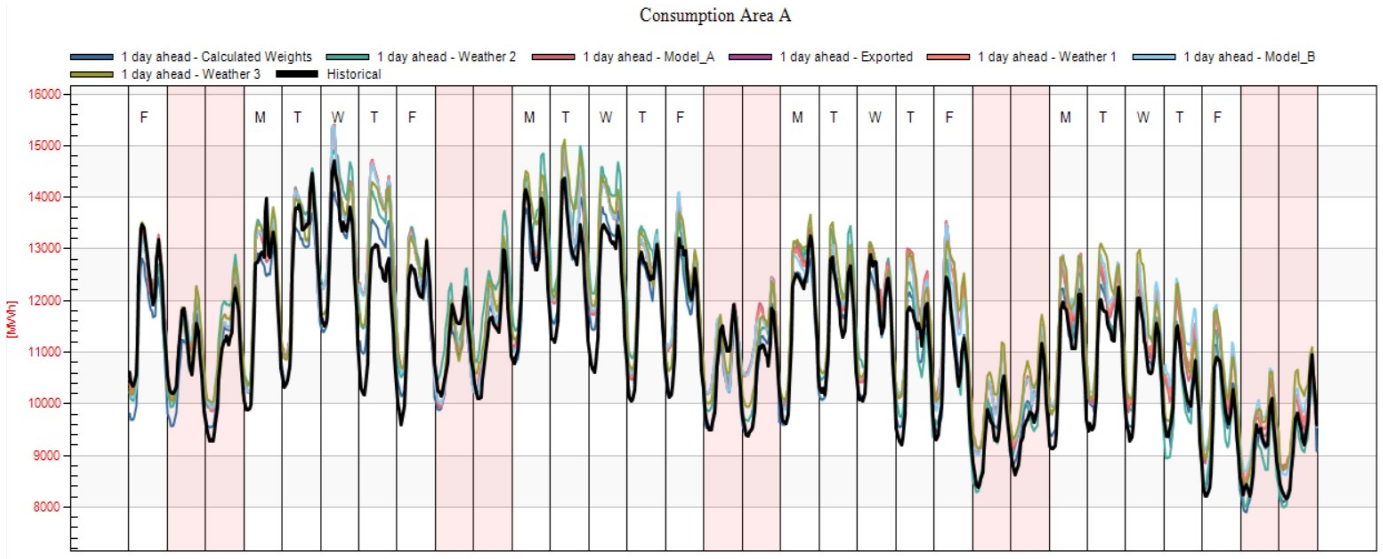


Evaluation

Evaluation of separate data sources
Benchmark used models, weather institutes and providers separately

Evaluation of combined data sources
See which models, weather institutes or providers actually contribute

See monetary effects
Follow up on actual costs for multiple input separately and combined



	Alternative	ME	ME %	MAE	MAE %	nMAE %	RMSE	RMSE %	nRMSE %	BIAS %	STD BIAS %	DISP %	SKEWNESS	KURTOSIS	Rank MAE	Rank MAE %
1	1 day ahead - Calculated Weights	1,049192	0,009395923	257,6633	2,307475	0,8588776	334,9806	2,999882	1,116602	0,000981003	1,418294	94,20918	0,194488	3,613168	7	7
2	1 day ahead - Weather 2	-345,3294	-3,09256	481,8242	4,314925	1,606081	592,6852	5,307728	1,975618	33,94837	10,42443	53,96556	-0,1611927	2,636036	6	6
3	1 day ahead - Model_A	-456,467	-4,087841	517,1711	4,63147	1,723904	630,874	5,649724	2,102913	52,35204	0,07405363	46,33768	-0,333461	4,174304	5	5
4	1 day ahead - Exported	-471,1588	-4,219412	530,7879	4,753413	1,769293	637,3464	5,707686	2,124488	54,64918	0,2755849	43,84663	-0,2216802	4,075128	4	4
5	1 day ahead - Weather 1	-471,1588	-4,219412	530,7879	4,753413	1,769293	637,3464	5,707686	2,124488	54,64918	0,2755849	43,84663	-0,2216802	4,075128	3	3
6	1 day ahead - Model_B	-493,196	-4,416763	554,6776	4,967355	1,848925	660,5162	5,915181	2,20172	55,75351	0,6207321	42,47286	-0,09033804	3,656214	2	2
7	1 day ahead - Weather 3	-548,1175	-4,908607	582,4804	5,21634	1,941601	667,7997	5,980408	2,225999	67,36819	0,04899577	31,46624	0,1869031	3,522325	1	1

Summary

- Creation of Quality Input Data -

- Weighting of Forecasts -

- Make Manual Validations of Your Forecast -

- Use Semi-Automation -

- Proper Evaluation of Data Sources -


www.aiolosforecaststudio.com
Thank You For
Your Attention!