



Smart grid Eidsiva Nett - AMS and information security



Fifth largest energy company in Norway

- Turnover EUR 436m in 2015
- Customer base 155 000 (households and businesses)
- 1100 employees
- Long term ownership by Hedmark/Oppland counties and 27 local municipalities



Facts

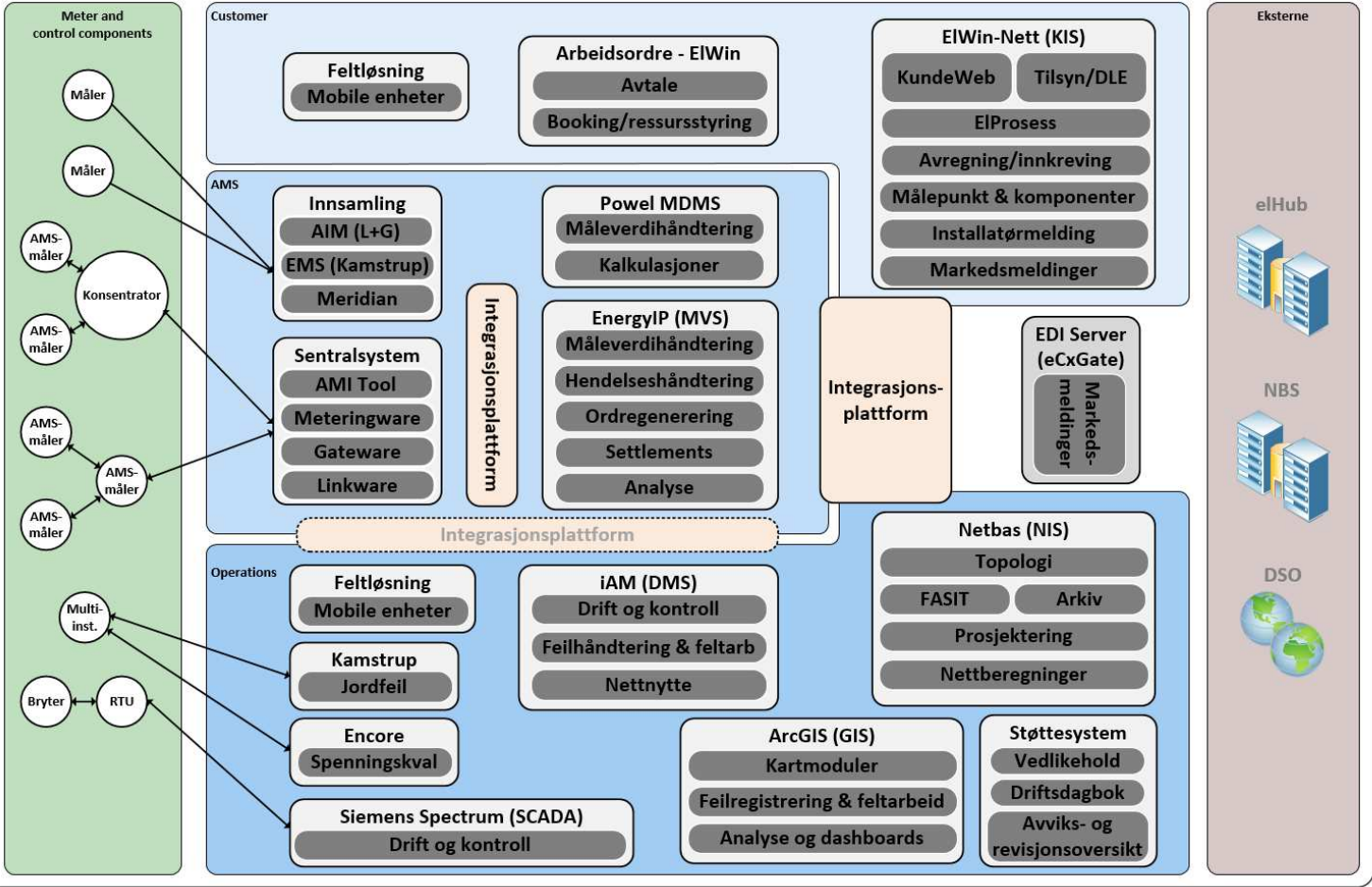
- 20 wholly owned and 25 partly owned power plants
- Total 7.5 TWh power production in total
- Deliver district heating in 10 cities/villages in Hedmark/Oppland counties
- 23 000 km power grid serving approx. 155 000 households
- Energy supplier to 80 percent of domestic end-users within own grid
- Broadband customer base 55 000



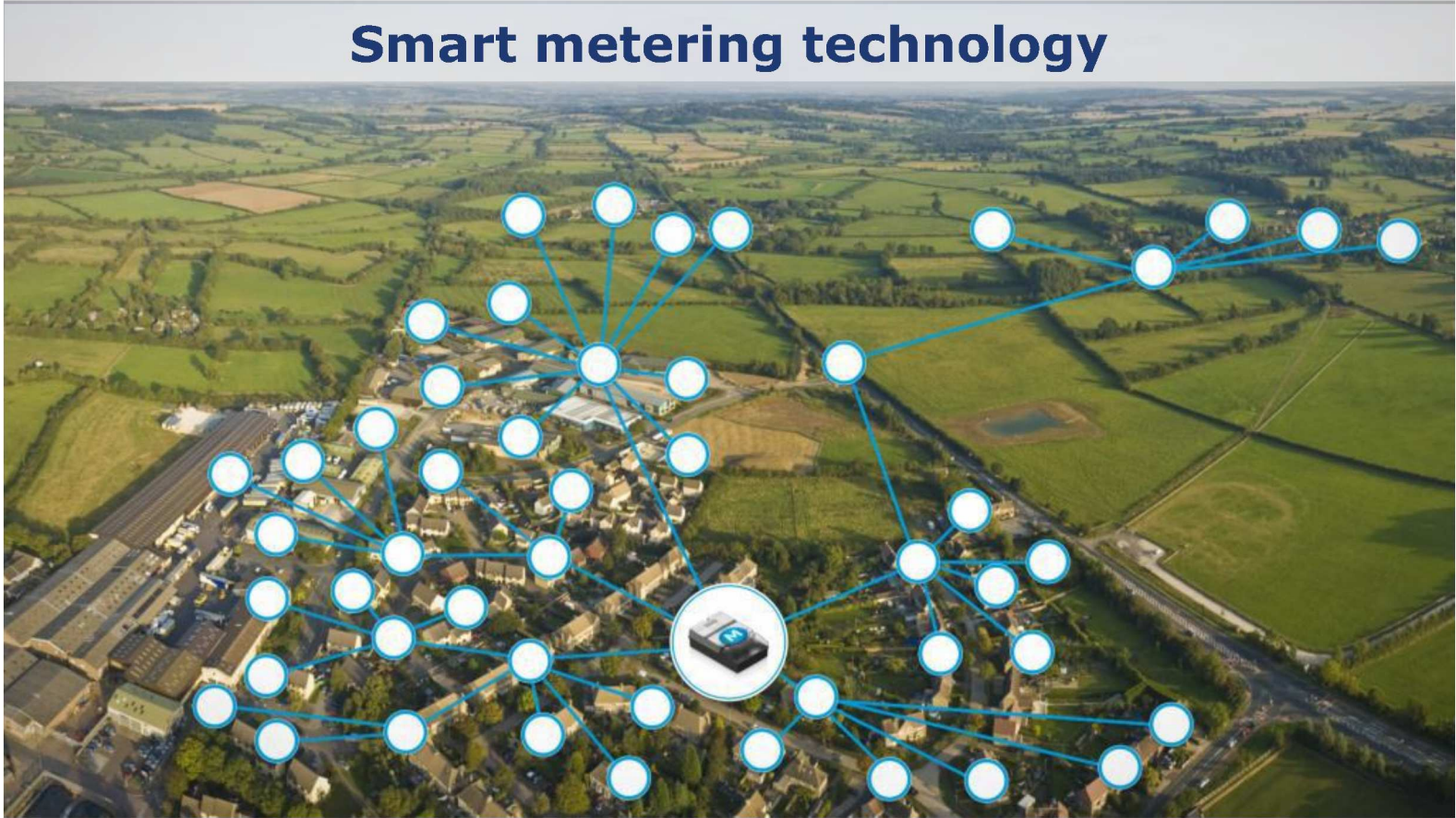
Business areas

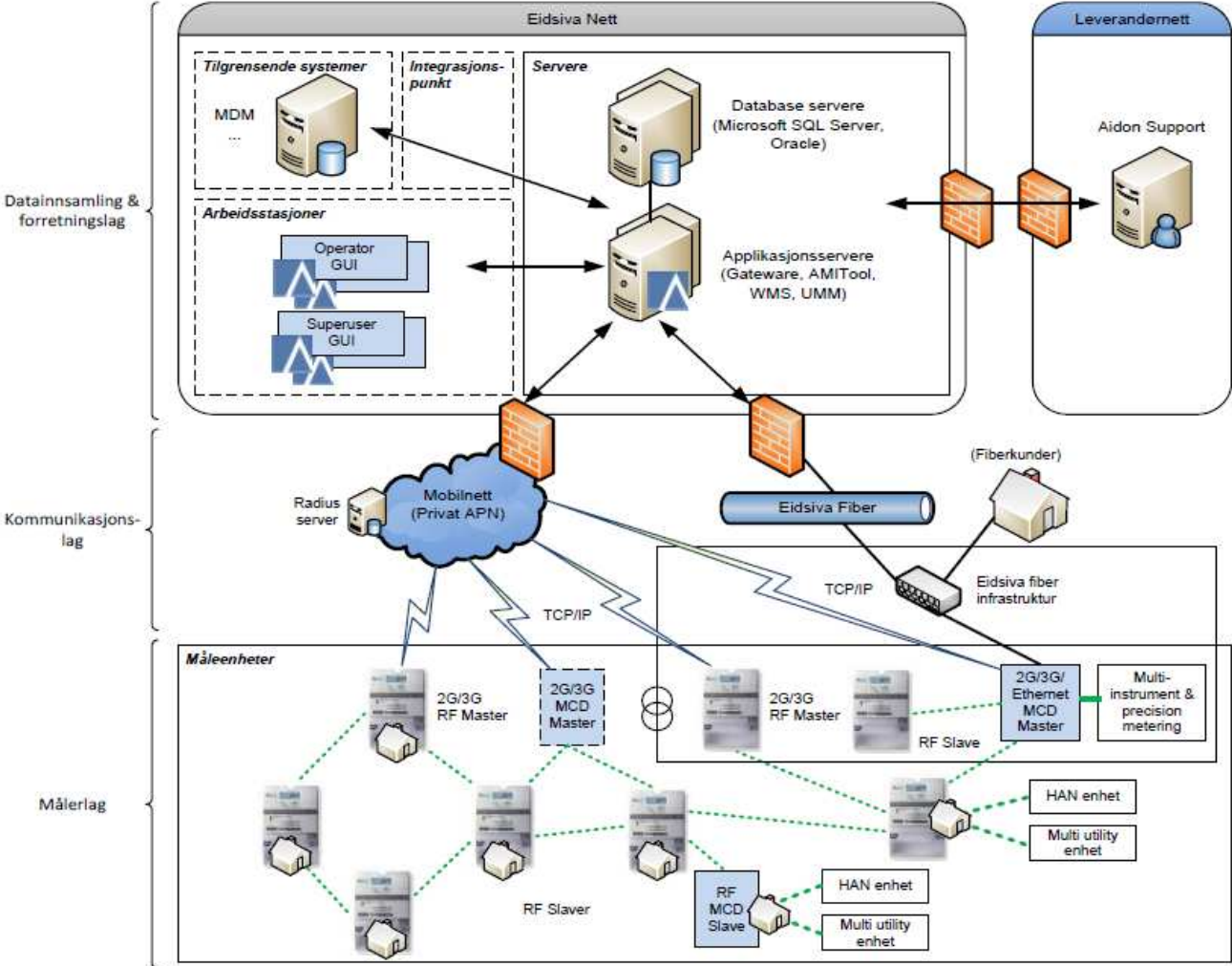


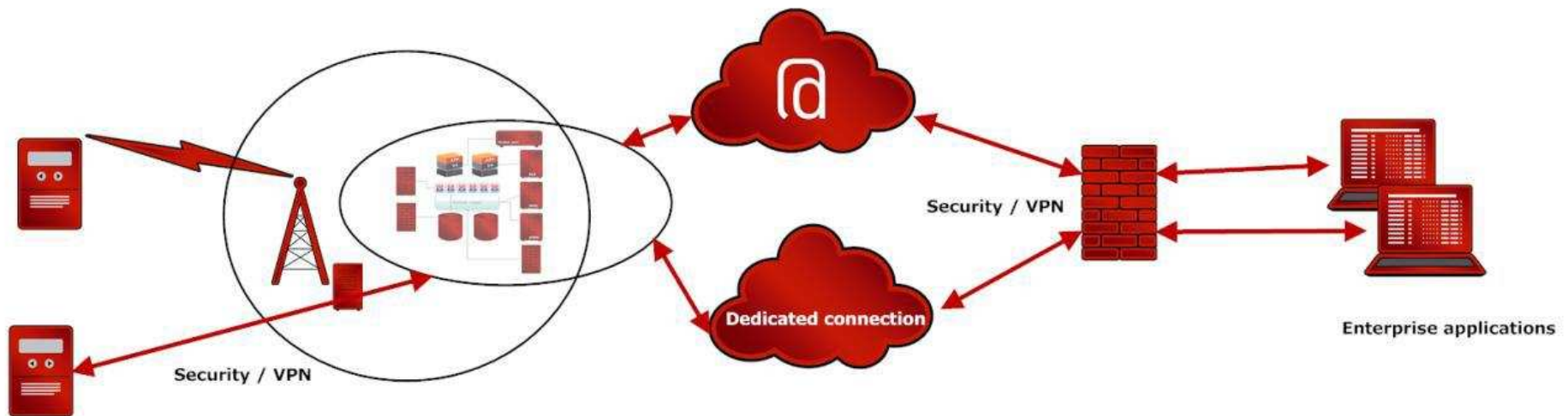
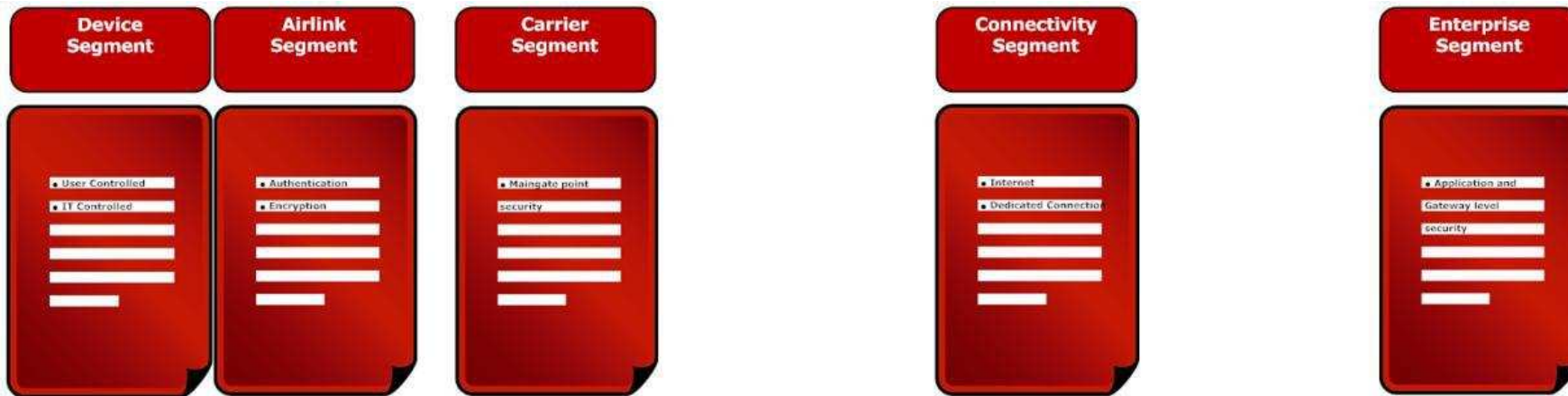
System landscape – Smart Grid



Smart metering technology







Shift in technology

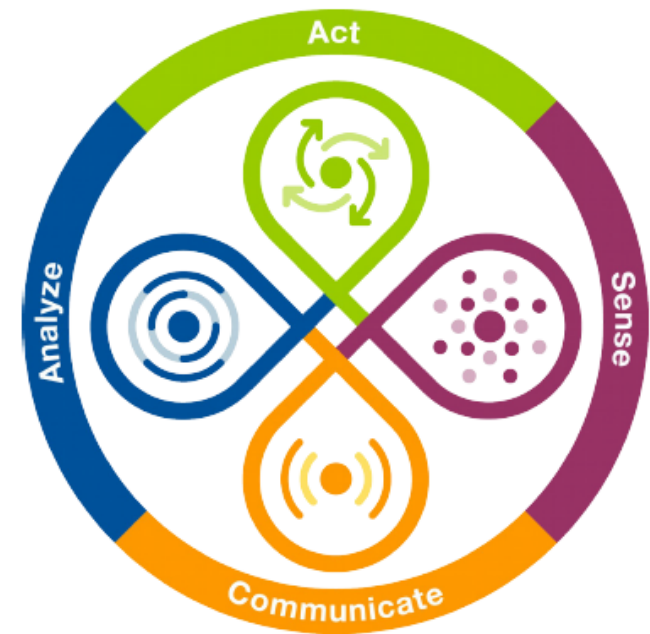
«Sett i lys av hva man mener utviklingen vil innebære av bruk av IKT-teknologi, programvare- og tjenesteutvikling vil de ikke være unaturlig å anta at IKT i nær fremtid vil være en vel så stor del av et nettselskaps virksomhet som selve drift og vedlikehold av strømnettet.» [NVE rapport 118- 2015]

Gartner's IoT Definition

The IoT is the network of *dedicated** physical objects that contain ...

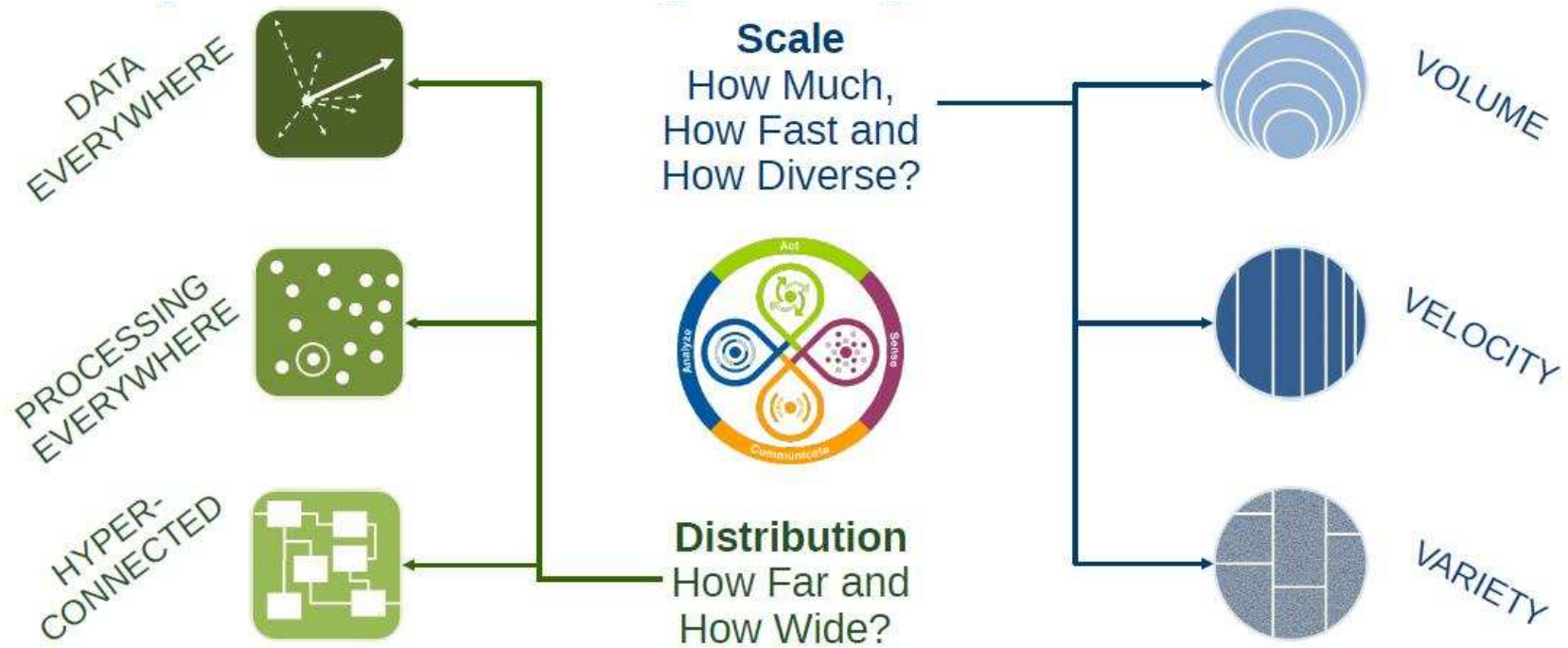
- Embedded technology, to ...
- Sense or interact with their internal state or external environment.

The IoT comprises an ecosystem that includes things, communication, applications and data analysis.



* Excludes general-purpose devices such as PCs and smartphones

IoT and Big Data combined

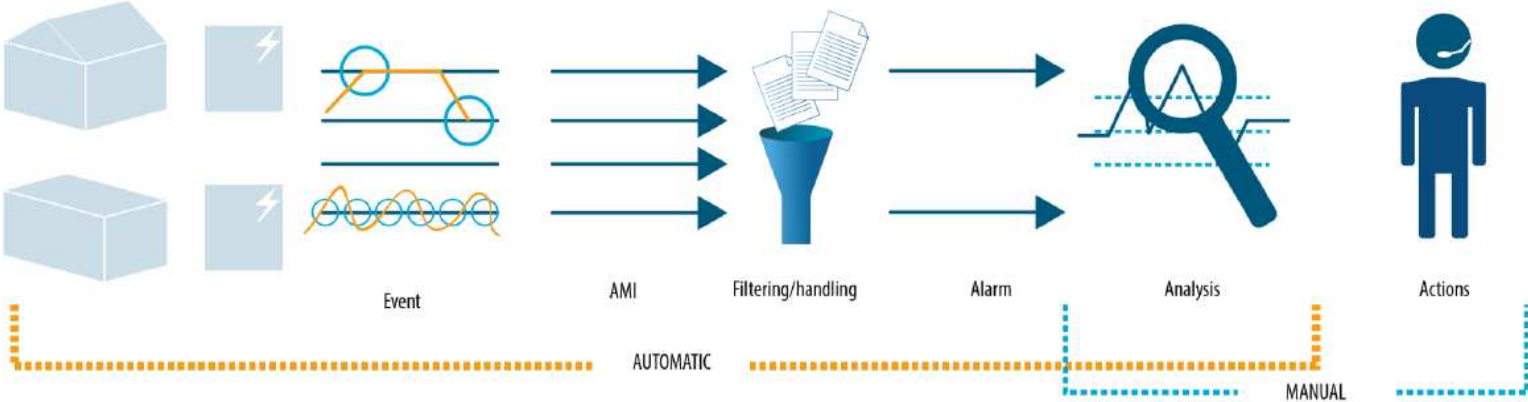


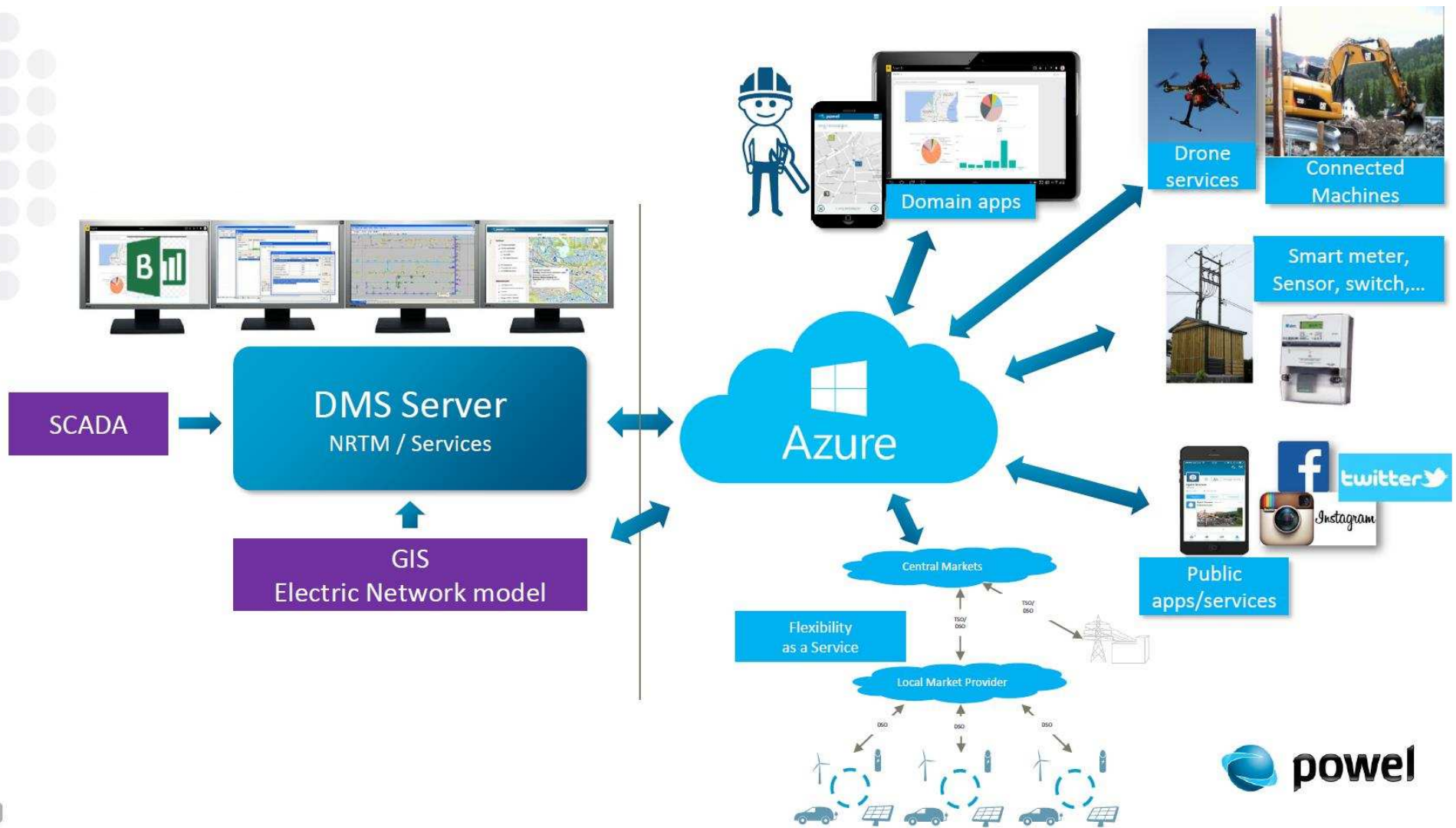
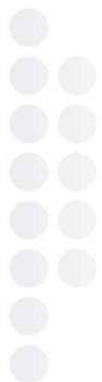
*From Gartner

Information security and IoT

- Control devices, RTUs, switches and breakers
- Fleet management and trip logs
- Cameras/Mobile phones/GPS
- Field engineers
- Built in sensors
- Drones
- Connected machines (for instance excavators)
- External sources (customers, public services etc)
- Machine learning, analytics
- Maps and geographic positioning

- Consumption
- Voltage
- Ground fault
- Short Circuit
- Switch position
- Open door
- Humidity
- Temperature





Secure enough ?

All information at Eidsiva Nett shall be protected against unwanted access, be available when it is needed, and protected against unwanted changes in accordance with laws, regulations and internal policies.









Awareness

To ensure the information security is handled correctly we need awareness regarding the information we manage, to what purpose we use it and the risk related to each area of use.

Privacy

The Grid company is responsible for securing the personal information for each customer and contact. Only those who have an official purpose for use, shall have access to the information. Ensure that data can't be altered or deleted by others than those who are authorised to do it. [Datatilsynet]

What do we do today?

- Standardised security requirements
- Separated functions
 - HAN port (one way)
 - Not integrated AMS with DMS/SCADA
 - Circuit breaker, only single commands
- Infrastructure
 - Firewall
 - IDS
 - Logging
 - Events
 - Mirrored sites
- Focus on backup/roll-back
- Hardening of system
- User management/access control
- Encryption and whitelisting

What do we do today?

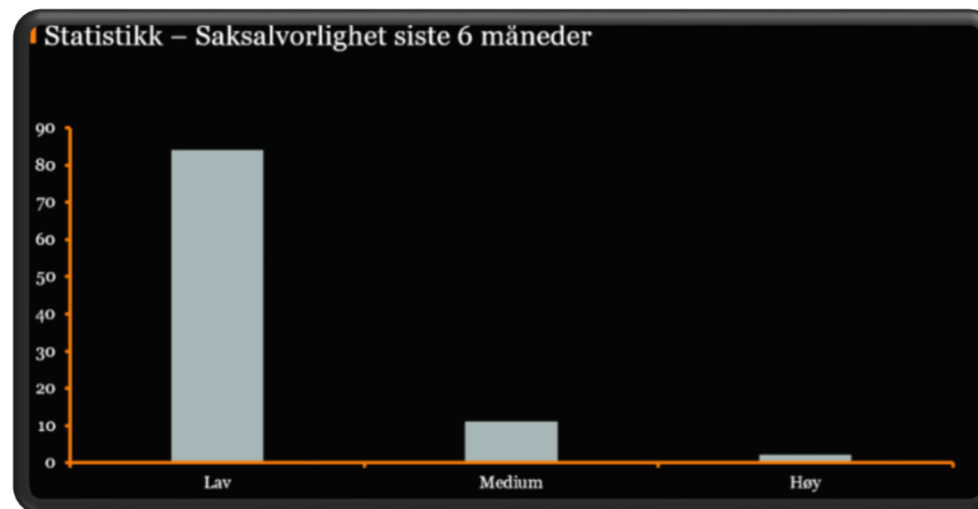
- Use of experts
 - Audits, revisions
 - Surveillance
 - PEN-testing
- Risk & vulnerability analysis (ROS-analyse)
- People
 - Policies, knowledge and awareness
- Privacy
 - Personal information
 - Storage/deletion
 - Aggregation

During the last 6 months the IDS' at Eidsiva have managed 68 million events (approx. 377 000 each day)

97 issues are handled by humans (85 low, 10 medium and 2 high)

Conclusion:

Important to set the right level to prevent information flood.
But at the same time manages to capture the really important ones.





Continuous process

What was good enough security yesterday, isn't necessarily good enough today or tomorrow.

And tomorrow?

- AI/machine learning
 - Pattern recognition
 - Prediction
- Anomaly detection system
- Events combined with measured data
- Continued surveillance
- Better information management
- Continuous awareness
 - Employees
 - Suppliers
 - Partners
- Blockchain?