# The second sector in the Energy Sector

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# FIG Working Week 2016

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## Why should surveyors focus on the Energy Sector?

- an extremely wide range of applications
- utilization of all kinds of data capture and modeling methods
- 3D and **BIM** models required for all engineering disciplines
- Surveying engineers can contribute throughout the entire life cycle of any project
  - initial documentation
  - progess monitoring
  - project handover



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#### **3D Data Acquisition**





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## **Data Processing – Project deliverables**

- 3D CAD Models
- 3D BIM Models
- Elevation Views, Sections, Plan Views Relational Drawings
- Terrain Modelling
- 3D collaboration models
- 3D visualizations
- Bills of quantities



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## **Engineering applications**

- As-built documentation
- BIM
- Facility Managment
- Finite Element Analysis
- Computational Fluid Dynamics
- 3D Comparison
- 3D monitoring
- 3D Collision check
- 3D Fabrication
- 3D Prototyping
- 3D Printing
- Volumetric Surveys





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## **Our Team**



# Photogrammetry

Anders Nesse,

#### **Ulf Hägnefelt,** 3D Scanning



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#### Artemis Valanis, BIM modelling, photogrammetry



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## **3 projects case studies**

- A Project on New Construction Design
- A Rehabilitation Project
- A 3D Documentation Project



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## Example projects 1/3

# **New Construction Design**





## **Project descrition:**

- New hydropower plant
- The biggest of its kind
- Entirely designed in 3D as a BIM model
- A Completely Paperless Project
- 1 sq Km Project Area
- Aerial and terrastrial Laser Scanning, Aerial and Ground image data, GIS data, Geodetic surveys



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Example projects 2/3

# **A Rehabilitation Project**





## **Project descrition:**

- Large project for rehabilitation and upgrade of a number of plants
- 3D documentation and modeling of a hydropower station including the existing waterways
- Terrastrial Laser Scanning and use of ROV for scanning the waterways



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#### **Existing Data**







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## Example projects 3/3

# **A 3D Documentation Project**





## **Project descrition:**

- part of a bigger project
- documentation, rehabilitation and upgrade of several power stations, including distribution power lines
- DEM data, orthophotos, GIS data and laser scanning for a number of stations
- Combination and processing of data into AutoCAD, Revit and Infraworks
- Focus on 3D documentation and modeling of an electric substation



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## Conclusions

3D Data Acquisition and Modeling for the Energy Sector

- An exciting and challenging area for surveyors
- A very wide range of applications and possibilities
- Constant requirement for high quality data, new workflows, data fusion and integration of processes



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Thank you