Managing Data: Lessons Learned from Real Life - Moving from “Hands On” to “Light Touch”

Wind Energy update

International Wind O&M Forum for Power Producers

19th – 20th February 2013

Day 1 Onshore Wind Section – 15:30

Martin Elliott

Wind farm data management and analysis

BVGassociates

Data: The route from “hands on” to “light touch”

In this session …

- Why change?
- What to specify?
- Budgets
- Access to data
- Data – Good, bad, and hacked!
- Testing
- Transition to “light touch”
- Is it worth the effort?

Customers

BVG Associates

- Market analysis and business development
  - Supply chain development
  - Economic impact assessment
  - Support to industrialisation
- Technical innovation & engineering analysis
  - Support to investment in technology
  - R&D programme management
  - Design and engineering services
- Project implementation
  - FIT project development (UK only)
  - SCADA & condition monitoring
  - O&M technical support

Wind farm data management and analysis

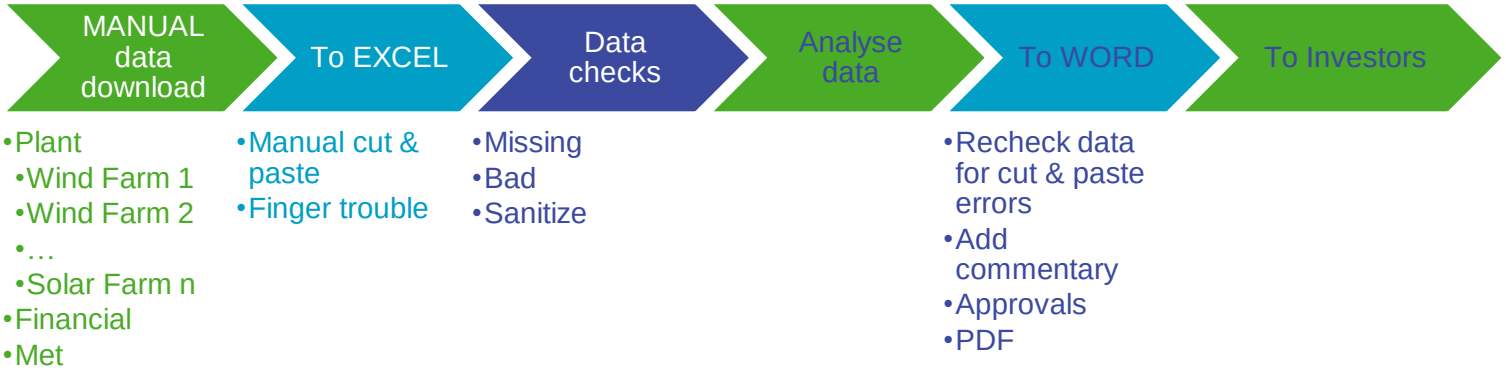
BVGassociates

Data: The route from "hands on" to "light touch"

Why change?

- **Before**
  - **Too much risk of finger trouble**
  - **Focus on making sure raw data is valid**

~8 man days per week



- **After**
  - **Data automatically delivered for engineer review**
  - **Focus on the story the data tells**

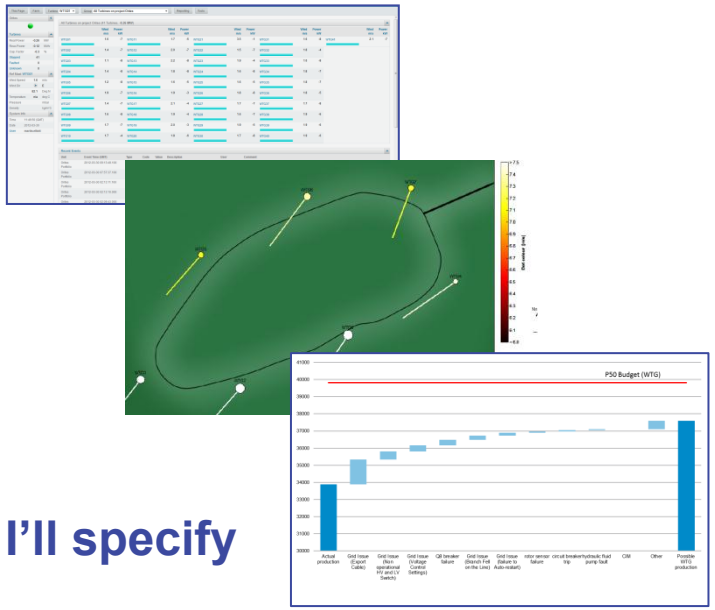
~2 man days per week

Wind farm data management and analysis

BVGassociates

Data: The route from “hands on” to “light touch”

How and what to specify?



- How do I define what I want?
  - Invest time in getting requirements clear
  - Talk to ALL your stake holders
  - Get buy-in from ALL at specification stage
    - Not during take-over

- Who knows best?
  - Answer it yourself - In house knowledge – I’ll specify
    - URS (20 pages) – FDS (150 pages)

  - Ask the Supplier(s) – They’ve done it all before – I’ll trust them
    - Mature product? But is the expertise still in the company?
    - Beware: Bespoke software will cost more than you think

  - Phone a friend – Call in an independent expert
    - Not the cheap option, but often worth the investment

URS = User Requirement Specification
FDS = Functional Design Specification

Budgets (1)

- Examining the costs
  - How much am I really spending on reporting and analysis?
    - Weekly / monthly reports
    - Incident analysis and report
    - Bad and missing data
  - How much is manual data handling that can be automated?
  - What savings will automation realistically bring?

Wind farm data management and analysis

BVGassociates

Data: The route from "hands on" to "light touch"

Budgets (2)

- **CAPEX and OPEX budgets**
  - **CAPEX**
    - **Software licencing and configuration**
    - **Set-up interfaces to existing data (Comm's / VPN / Database access rights)**
    - **IT Hardware &/or Hosting set-up**
    - **Internal: management, definition, validation**
  - **OPEX**
    - **Software and hardware maintenance**
    - **Hosting rental**
    - **Dial-up / data**
- **Hidden costs**
  - **"Just a tick in a box" can translate to €4k per site**
  - **"We've connect to this turbine type before" …**
    does not mean that the connection system was robust

	Low [€k]	High [€k]
CAPEX Budget:	**162**	**405**
Reporting Platform:	**140**	**330**
Hardware - Data Centre	12	25
Site Interfaces	30	130
Software licences	25	100
Configuration	45	100
Installation and SAT	10	45
Internal Costs:	**22**	**75**
Project Management	2	10
Engineering	15	50
Operations	5	15

Low and high for each category. Don't add the columns up!

Wind farm data management and analysis

BVGassociates

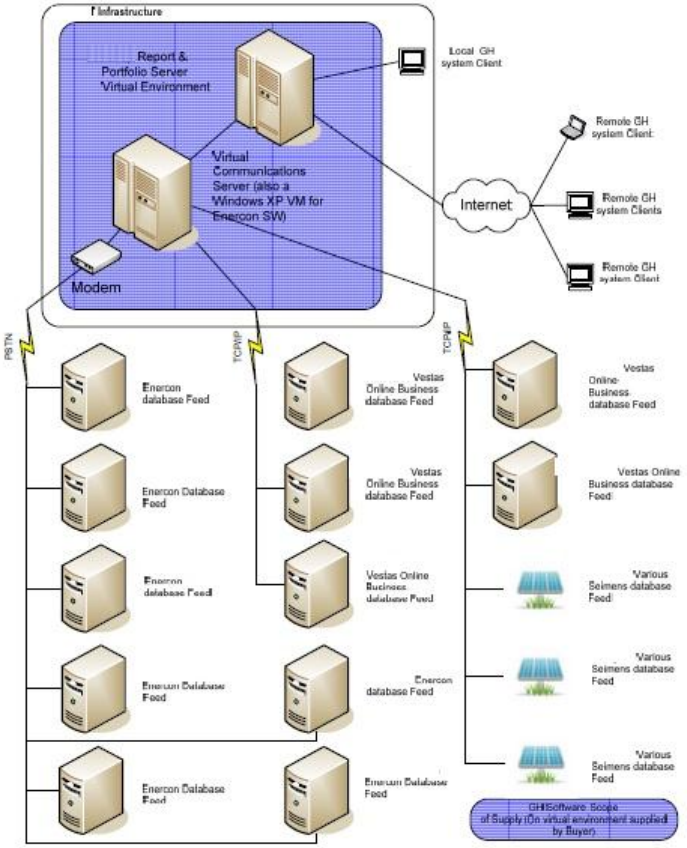
Data: The route from “hands on” to “light touch”

Access to Data

- **Access to data: understanding the challenges beyond the technical**
  - **Where to access the data?**
    - **Wind turbine – Wind farm - Cloud**
  - **Who owns the data / data server?**

- **Source data availability & reliability**
  - **Data “shadow-lands”**
  - **Edited data**
    - **By who?**
    - **Auto-fill**

- **Acceptance testing**
  - **Agree pre-contract**
  - **Apples and pears**
  - **Simulated data or sample data**



Wind farm data management and analysis

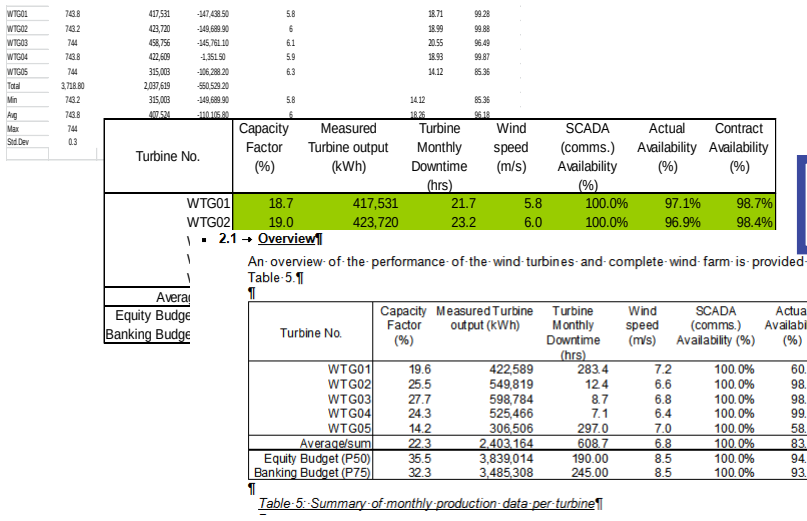
BVGassociates

Data: The route from "hands on" to "light touch"

Light Touch … How light?

- Challenges post handover:
  - Testing the transparency of routine data processing
  - Spotting exceptions
- Filling in the gaps, the benefits of manual editing compared with auto fill
  - Is the information (eg. wind speed) available to make use of autofill?

- Transitioning from "hands on" to "light touch" approach



Turbine No.	Capacity Factor (%)	Measured Turbine output (kWh)	Turbine Monthly Downtime (hrs)	Wind speed (m/s)	SCADA (comms.) Availability (%)	Actual Availability (%)	Contract Availability (%)
WTG01	18.7	417,531	21.7	5.8	100.0%	97.1%	98.7%
WTG02	19.0	423,720	23.2	6.0	100.0%	96.9%	98.4%

2.1 → Overview¶

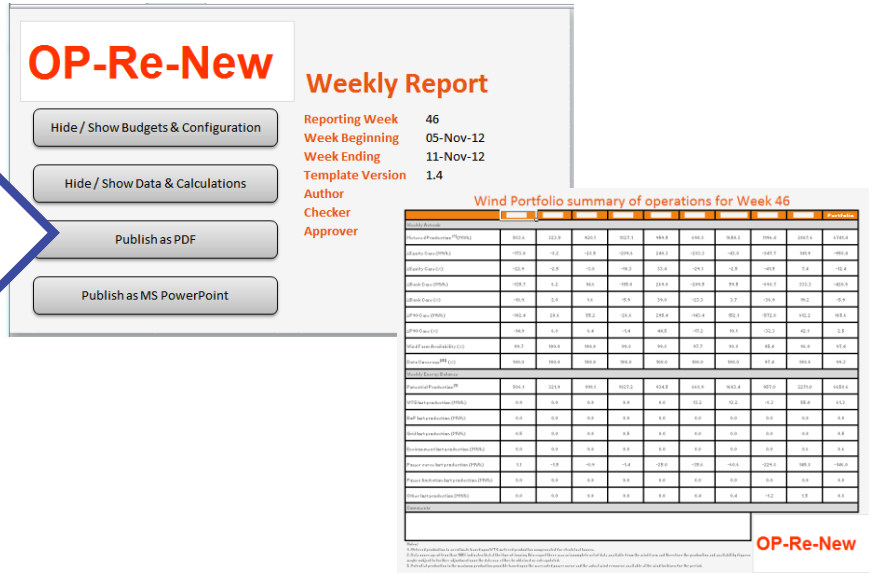
An overview of the performance of the wind turbines and complete wind farm is provided below in Table 5.¶

¶

Turbine No.	Capacity Factor (%)	Measured Turbine output (kWh)	Turbine Monthly Downtime (hrs)	Wind speed (m/s)	SCADA (comms.) Availability (%)	Actual Availability (%)	Contract Availability (%)
WTG01	19.6	422,589	283.4	7.2	100.0%	60.6%	62.5%
WTG02	25.5	549,819	12.4	6.6	100.0%	98.3%	100.3%
WTG03	27.7	598,784	8.7	6.8	100.0%	98.8%	100.8%
WTG04	24.3	525,466	7.1	6.4	100.0%	99.0%	101.0%
WTG05	14.2	306,506	297.0	7.0	100.0%	58.7%	61.6%
Average/sum	22.3	2,403,164	608.7	6.8	100.0%	83.1%	85.2%
Equity Budget (P50)	35.5	3,839,014	190.00	8.5	100.0%	94.8%	95.0%
Banking Budget (P75)	32.3	3,485,308	245.00	8.5	100.0%	93.4%	95.0% ¶

¶

Table 5: Summary of monthly production data per turbine¶



Was it worth the effort? (1)

- **Benefits**
  - Reporting now generally stress free
  - Weekly data on engineer’s desk on Monday morning – Issued by Noon
  - Effort is now focused on turbine performance not background data
  - Business opportunities – More cost effective service to Clients

- **Surprises**
  - Moving from real computers to virtual hosting was transparent (+)
  - Record keeping and documentation poor in many organisations (-)
    - OEMs – Software / database documentation
    - Developers – Who checked the “As built” files?

- **Disappointments**
  - Cost about 10% over original realistic budget
  - Insufficient early dialogue with key stake-holders
  - Erratic data retrieval from sites on dial-up modems

Was it worth the effort? (2)

- Lessons learned
  - Specify:
    - Ask probing questions early
    - Drill through supplier hype and reputation
  - Budget:
    - It’s a software project – Be realistic – Think optimistic x Pi
    - Late changes in requirements or core team will cost €€€
  - Interfaces to data:
    - Even in this connected world this is still not trivial
    - Beware of legacy turbines and interfaces
    - The data read from the OEM SCADA will NOT always be right!
  - Acceptance Testing:
    - Test Plan
    - Define clearly pre-contract