

EDF Energy PAS 55 Experience

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EDF Energy

Save today. Save tomorrow.



Agenda

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- 2 What are the PAS 55 requirements (related to us)
- 3 Asset Management in EDF Energy
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- 6 How did we implement PAS 55
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- 9 How has PAS 55 become embedded
- 10 Was it worth it?
- 11 Questions/Topics of particular interest



2 What are the PAS 55 Requirements (related to us)

- Scope of original BEGEN PAS 55

“This part of PAS 55 specifies the requirements for an asset management system for physical infrastructure assets including components thereof, e.g. generators, transformers, pumps, rolling stock, and any software code that is critical to the delivery of the function of the asset. The management of physical infrastructure assets is inextricably linked to the management of all other aspects of a business. These other aspects are only considered where they have a direct impact on the management of physical infrastructure assets.

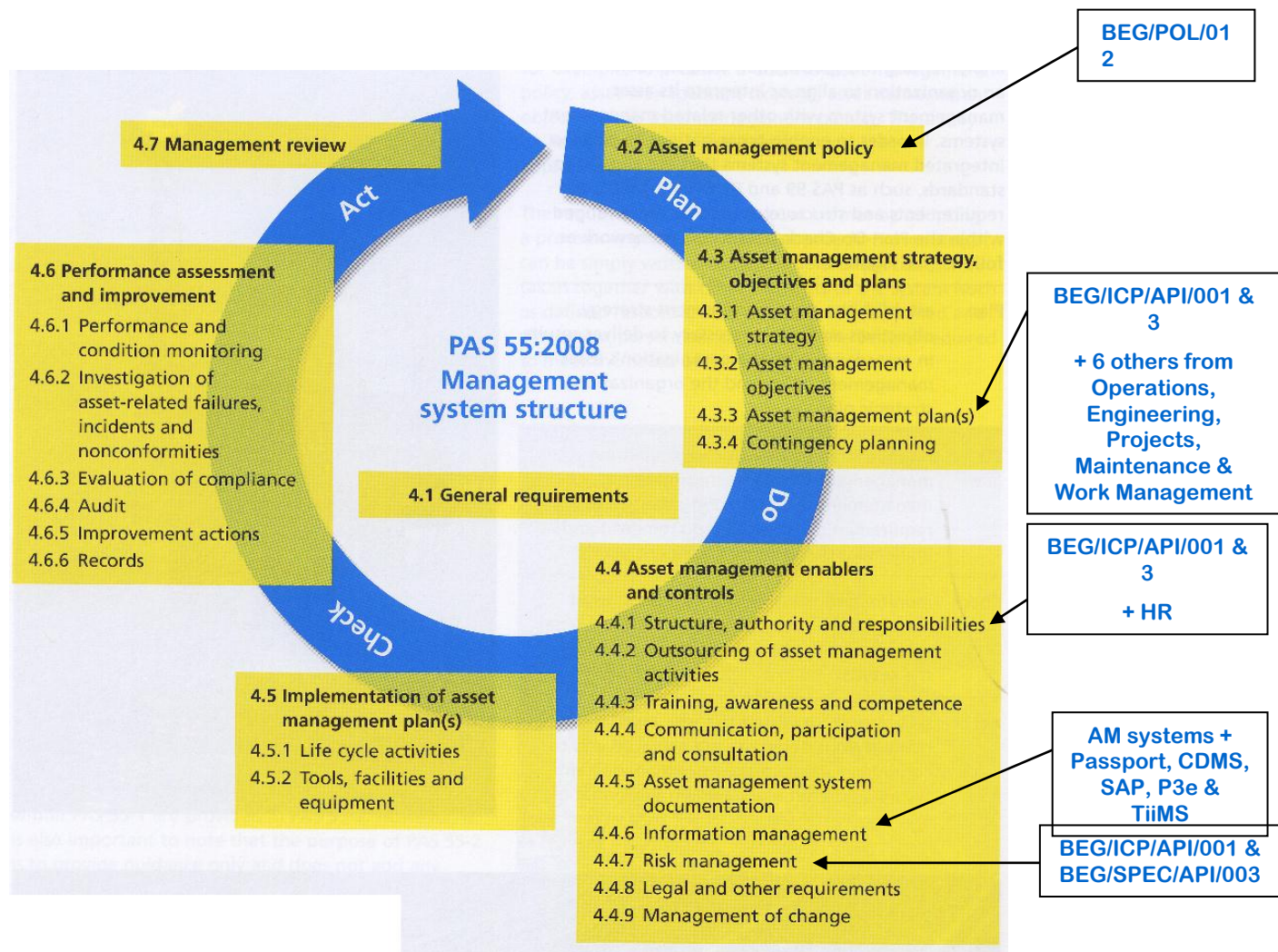
PAS 55 is not applicable to the management of other assets, e.g. reputation, knowledge, finance.”

- Current words on the EDF Energy Certificate

“Provision of support to the EDF Energy Nuclear Generation Limited fleet in the safe and effective management of the maintenance of plants and associated assets”

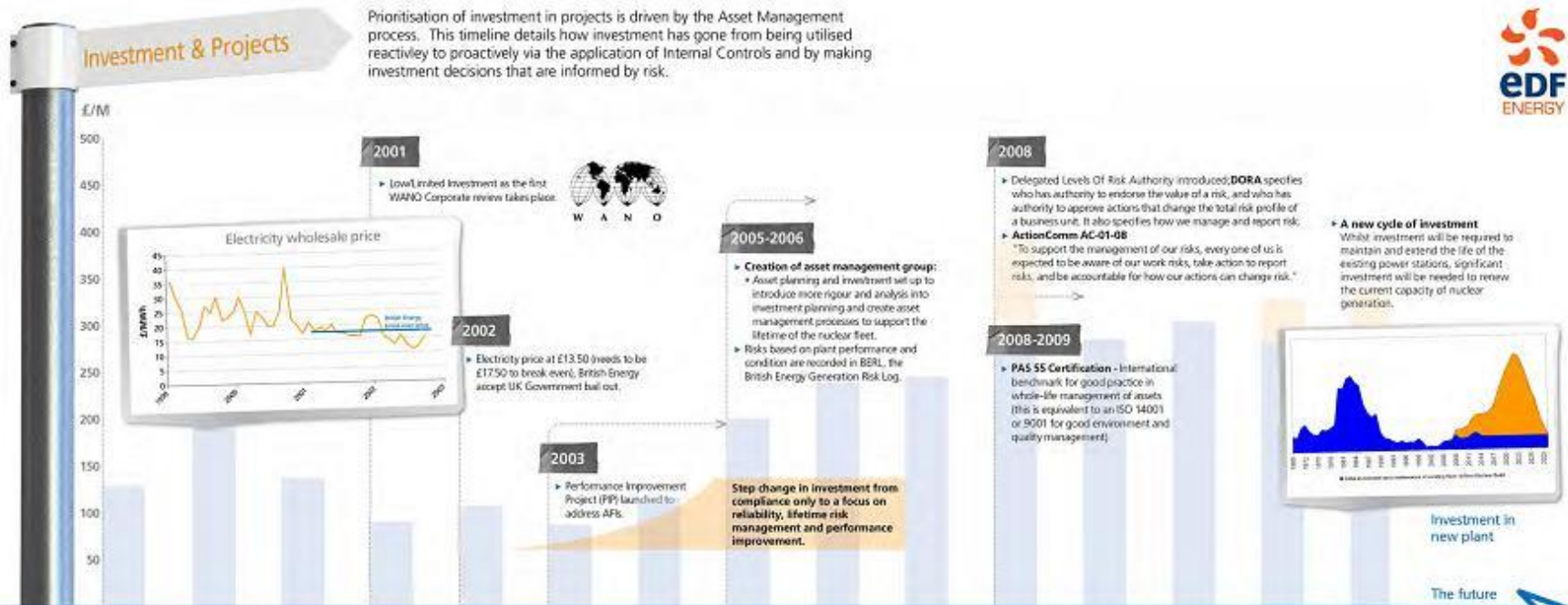


2 What are the PAS 55 Requirements (related to us)



• A good deal of relevant documentation existing within organisation already. Out of 42 documents referenced against PAS55 in the Management System Manual only 4 are Asset Management specific documents

3 Asset Management in EDF Energy



Asset Management is...

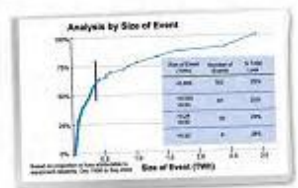
...supporting our business by the delivery of safe, reliable nuclear generation, by lowering (or at least stabilising) electric risk and internal Controls processes across the fleet. Achieving this involves:

- Enhance and direct the effective management of plant on business risk.
- Assess the effectiveness of systems, processes and procedures to drive improvement.
- Optimise and plan (short, medium and long term) fleet asset investment.

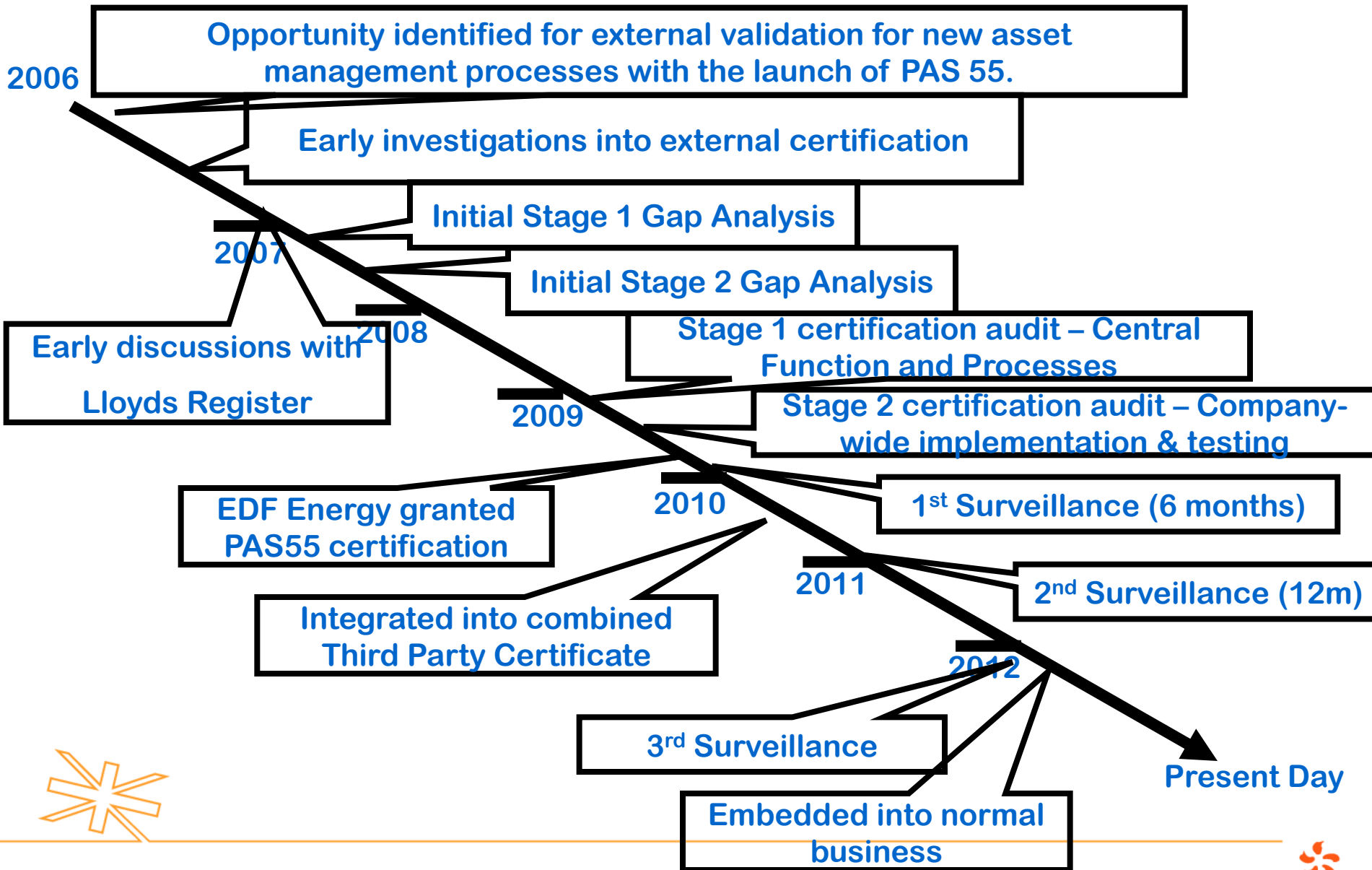


Prior to 2005

► Over 90% of the numbers of losses are <0.24TWh (that's 1 reactor down for around a fortnight). These are typically related to conventional (non-nuclear island) plant breakdown. The fleet also has major losses (>0.24TWh) relating to major component failure (e.g. stator or generator transformer) or inspection/safety case led losses (e.g. cost iron replacement, Boiler Closure Unit at HYA/HRA).



4 The EDF Energy PAS 55 Timeline



5 Why did we go for PAS 55

- Perceived benefits of certification

- Benefits
 - Contributes to continuous improvement culture and identification of opportunities for improvement
 - External benchmarking and experience
 - External recognition and value
 - Would be first UK generator to achieve certification
 - Demonstrable competence in new build arena

- Perceived potential drawbacks from certification

- Cost (external) – however this is small (average <18k per annum)
- Cost (internal) – however the PAS 55 audits could be integrated with existing audit programmes
- One way street (once certified, failure to remain certified would be difficult to sustain)



7 What were the major Gaps

- Gap Analysis identifies gaps between BE processes and PAS 55 requirements
- First gap analysis (March 07)
 - concentrated on API
 - Learning process for BE
 - Significant shortfalls
 - Identified need for preparation and understanding
- Second gap analysis (July 07)
 - BEGEN wide
 - Preparation of company wide evidence pack (by API)
 - Good spectrum of staff interviewed from across the business
 - Visit to Heysham 2 site
- Certification audit
 - Stage 1 4 Minor Non-Conformances Raised
 - Stage 2 2 Minor Non-Conformances raised

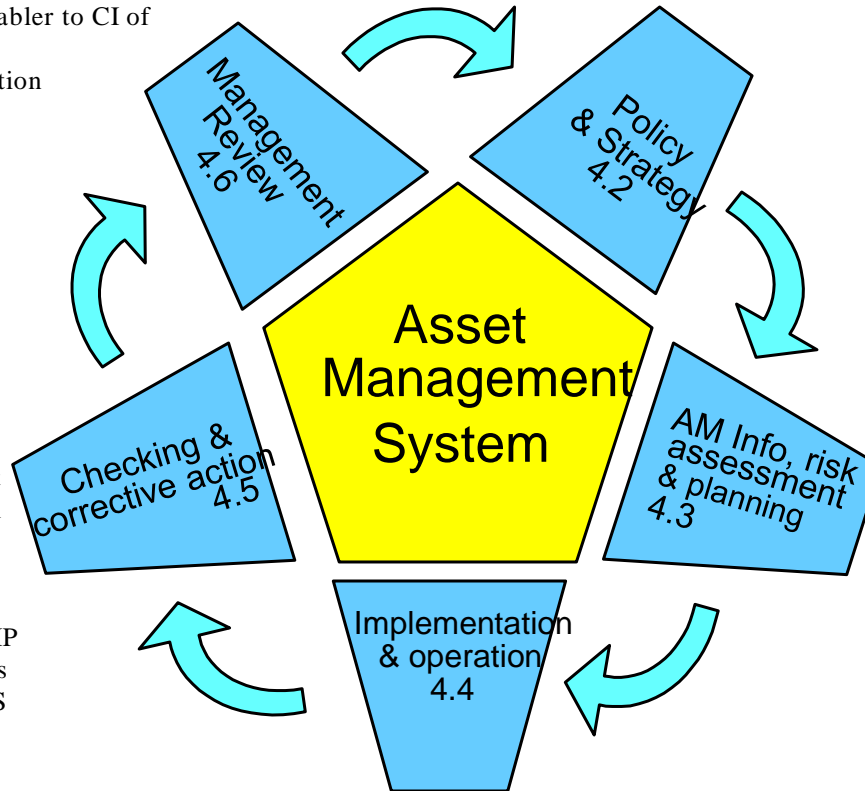


Following the 2 Gap Analysis audits only a small number of minor non-conformances remained to be closed on Certification

7 What were the major Gaps

- Too many initiatives, need to prioritise
- Procedure/ review AM system should be established. Should be considered as enabler to CI of AM system and mechanism for engagement of organisation

- **Absence business strategic plan, communicated to staff**
- Absence or limitations of AM policy and strategy



- Fire fighting culture
- Proposal to prioritise investment based on failures and commercial implications best practice
- Probabilistic models of failure best practice
- Review needed BERL/ CAP/ SHIP for consistency and key messages
- Data quality issues in BERL/ IMS
- **No AM audit process**

- BERL good but still to be proven
- **Inconsistency/ lack of integration of AM information systems**
- Lack of clarity in reporting mechanisms and demonstrable effective actions
- Target and personal objective setting linked to AM strategy patchy/ non existent
- Whole organisation not bought into prioritisation process

- **Lack of senior appointment specifically with overall responsibility for pan organisation AM**
- Weaknesses in top down and bottom up communication
- **Lack of understanding/ application AM documentation, use of draft documents**
- Need to assure gated process embedded and matures



8 How much effort did it take

- Costs

External (Lloyds Register) Costs

- Initial audit
~ £40k
- Surveillance visit (annual)
~£13k
- Certification audit
~£30k

Annual average cost about £18k



8 How much effort did it take

- Resources

Certification

- AM – One Senior Member full time for 6 months prior to phase 2 certification
- Support functions – approx 20mandays each
- Stations – Approx 30mandays each

Surveillance

- AM – One Senior Member full time for 15days prior to audit
- Support functions – approx 2mandays each
- Stations – Approx 5mandays each



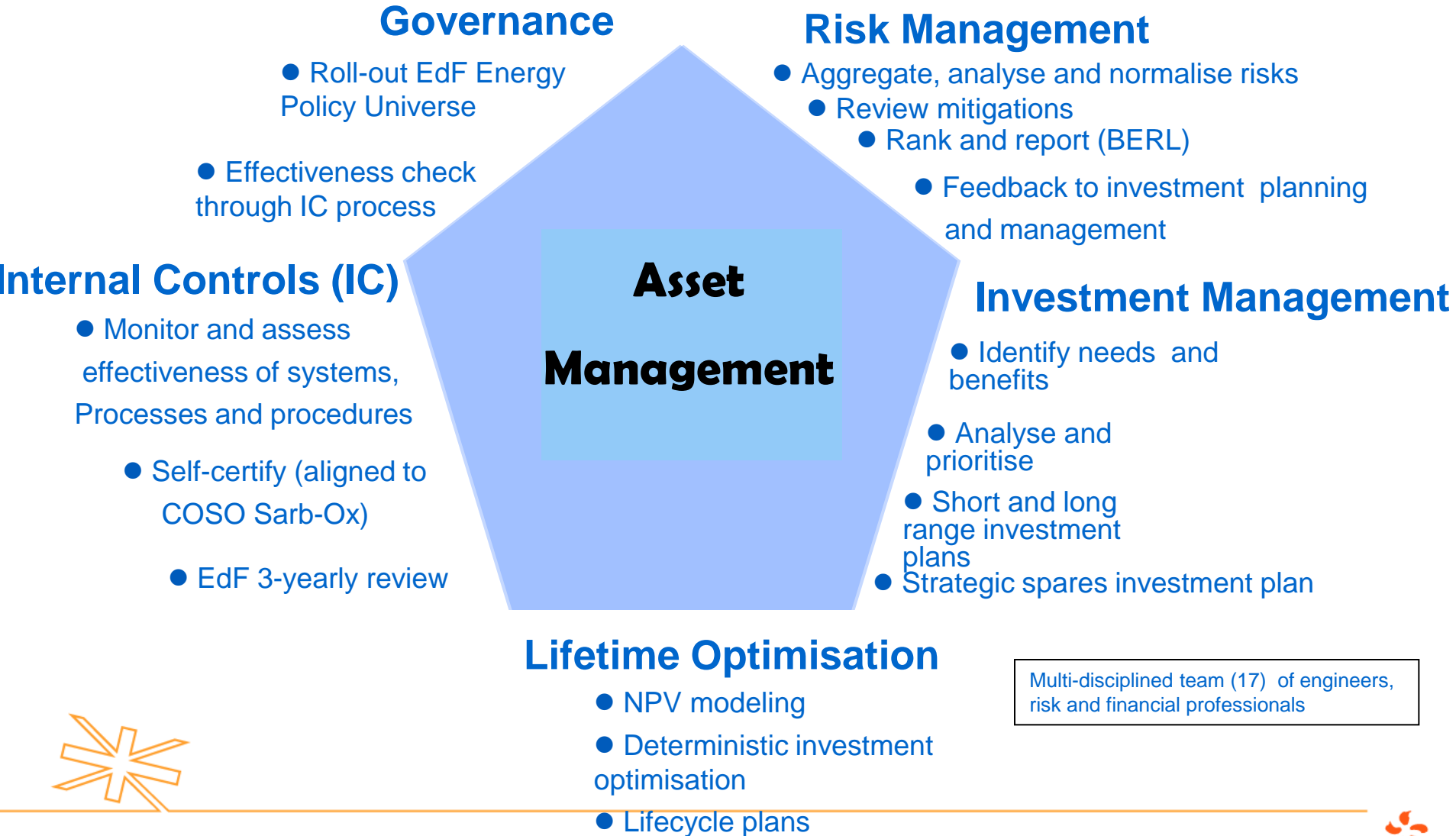
9 How has PAS 55 become embedded

- Originally AM led surveillance activity
- Rolled into the Third Party Certification Project
- QA lead, supported by AM as required
- Audit management and corrective actions, all now embedded as normal business



9 How has PAS 55 become embedded

– The Function

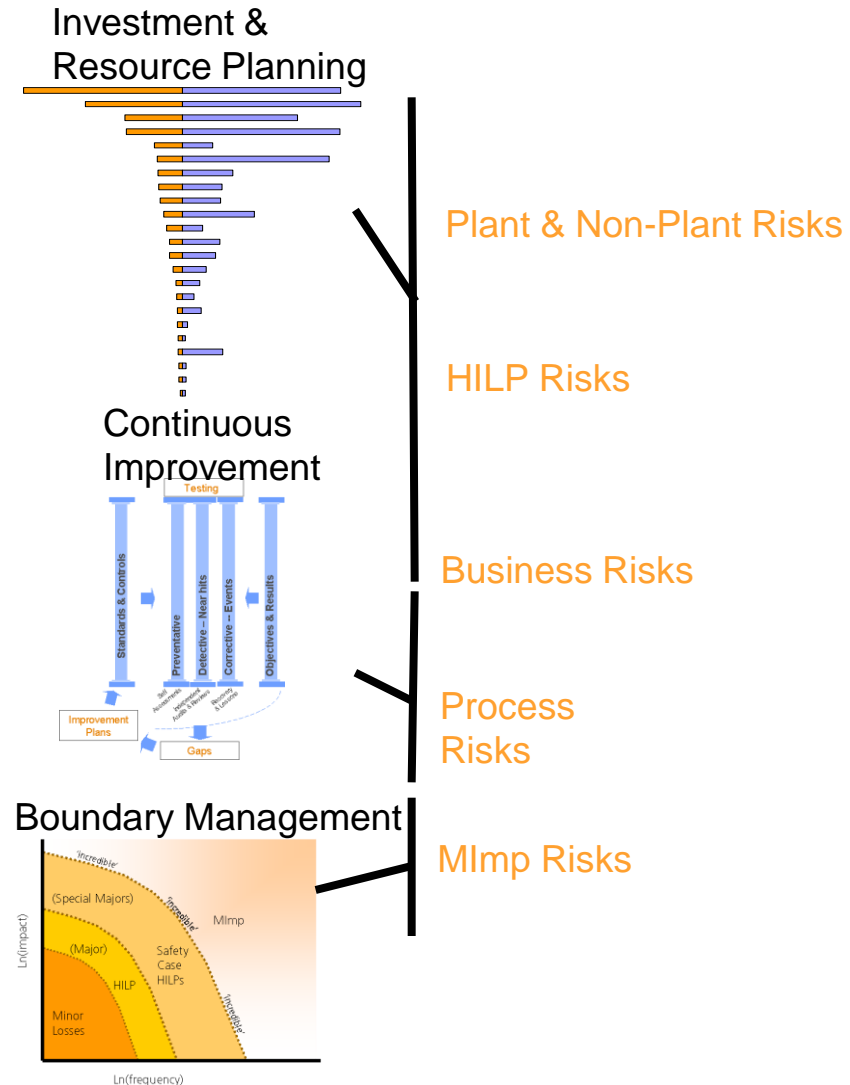


9 How has PAS 55 become embedded

- Our Asset Management Philosophy

Good asset management is:

- *Knowing and understanding your risks*
- *Managing your controls*
- *Delivering your mitigations*

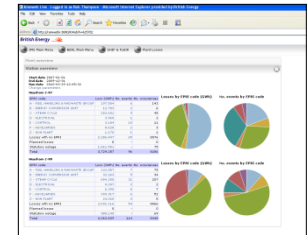


9 How has PAS 55 become embedded

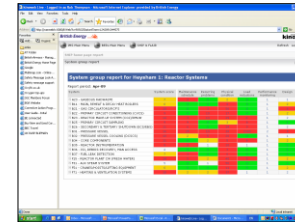
- The Tools

- Plant Losses Module – past loss events
- FLAIR – current state of the plant
- BERL – what might happen in the future (risk information)
- IMS – mitigations to address current and future risks to plant, people and the environment

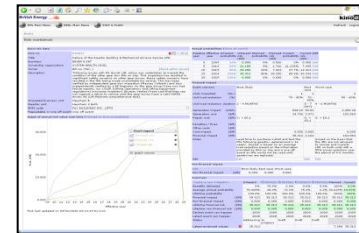
Plant Losses



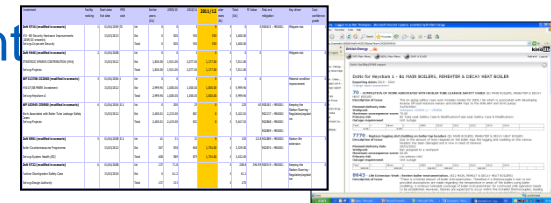
FLAIR – System Performance



BERL



IMS



the tools..... to support **MANAGEMENT JUDGEMENT**

9 How has PAS 55 become embedded

System Summary report

Change parameters
Facility Torness
EPR1 A1 - FUEL HANDLING
Number of years 6
Lifetime issues only No

SHIP

EPR1 code	Jun-11	Jul-11	Aug-11	Sep-11	Oct-11	Nov-11	Avg
A11 - FUEL MACHINE	11	10	9	10	9	11	10.3
A12 - NEW FUEL STORAGE & HANDLING	3	3	5	5	5	7	3.8
A13 - SPENT FUEL STORAGE & HANDLING	7	10	10	11	7	7	8.8
A14 - SPENT FUEL STORAGE & DISPOSAL	6	7	6	7	5	6	6.2
A15 - MAINTENANCE FACILITIES	3	5	6	7	5	5	1.5

Risks

Systematic risk value: Current £352.035m, Planned £261.290m
 Top 5 risks by lifetime value (change to annual value)

Risk number	Title	Lifetime current risk	Lifetime planned risk	Lifetime Investments
R06936	Failure of Fuel Route Reypak Control System	80.965	8.457	
R04792	Fuel Handling Constrained due to excessive build up of Radiolytic Deposit in Fuel Decay Store at TOR	75.000	75.000	WP 331778 2-A694 / GE3279
R00057	Fuel route performance - General Unreliability	70.892	64.230	WP 322866 2-A666 / GE3180, WP 328954 GE3274, WP 335944 2-A720 / GE3190
R04052	Carbon deposition dust in Fuel Route (.TOR) causes smaller repeatable generation loss events	61.436	55.490	WP 102688 2-A661 / GE3079, WP 341482 2-B427
R02781	Fuel Route Obsolescence	60.079	57.951	DoN 9048, WP 318955 2-A889 / GE3236

Investments

Total in plan - £k

Top 5 investments by lifetime value (change to annual value)

Investment	Title	In plan	Overall Start/End	Lifetime	2011	2012	2013	2014	2015	2016	Planning Budget (£k)
WP 322866 2-A666 / GE3180	Fuel Route General unreliability improvements	Yes	01/01/2008 31/12/2028		2,200	2,300	2,200	2,200	2,200	500	21,257.77
WP 335944 2-A720 / GE3190	Fuel Route Improvement 2011 TOR	No	01/01/2011 31/12/2016		2,200	2,200	2,200	2,200	2,200		13,200.00
WP 341002 2-B431	Fuel Route General Unreliability	No	01/01/2012 31/12/2016		0	1,427	2,984	2,839	2,721	2,634	12,605.00
WP 341482 2-B427	Deposition - Clean Up & Mitigation	Yes	01/01/2012 31/12/2017		0	200	1,580	2,480	1,672	0	5,932.00
WP 318955 2-A889 / GE3236	ReyPack/DMS Replacement	Yes	01/01/2007 31/12/2017		900	580	930	930	341	0	5,862.00

Plant losses

Losses GWh

Top 5 loss events

Loss event	Type	EPR1 code	Start	Finish	Total Loss (GWh)
CR 309000 - UATR during re-seating operation on fuelling M/c Grab underload protection	Auto Trip	A11 - FUEL MACHINE	28/01/2006	20/02/2006	161.388
CR 304928 - Unplanned automatic trip due to underload of DSRT during LPR	Auto Trip	A11 - FUEL MACHINE	31/12/2005	08/01/2006	101.092
A1-CR00362211 - Manual trip due to load trace anomaly during LPR	Man Trip	A11 - FUEL MACHINE	18/11/2006	21/11/2006	28.961
CR00576189/CR00579250 - LPR postponed due to hoist stop during exchange of L85 (Event Recovery entered) and consequent load restrictions	Reduct'n	A11 - FUEL MACHINE	28/11/2009	15/12/2009	15.324
CRs 308164; 306809 - Problems encountered during planned LPR of 6 channels/reduced to 4 - IMUS Service ring not making torque limit switch, Snagged Tie Bar in IFD2 & Fault on DSRT.	Other	A11 - FUEL MACHINE	16/01/2006	26/01/2006	15.010

System action plans



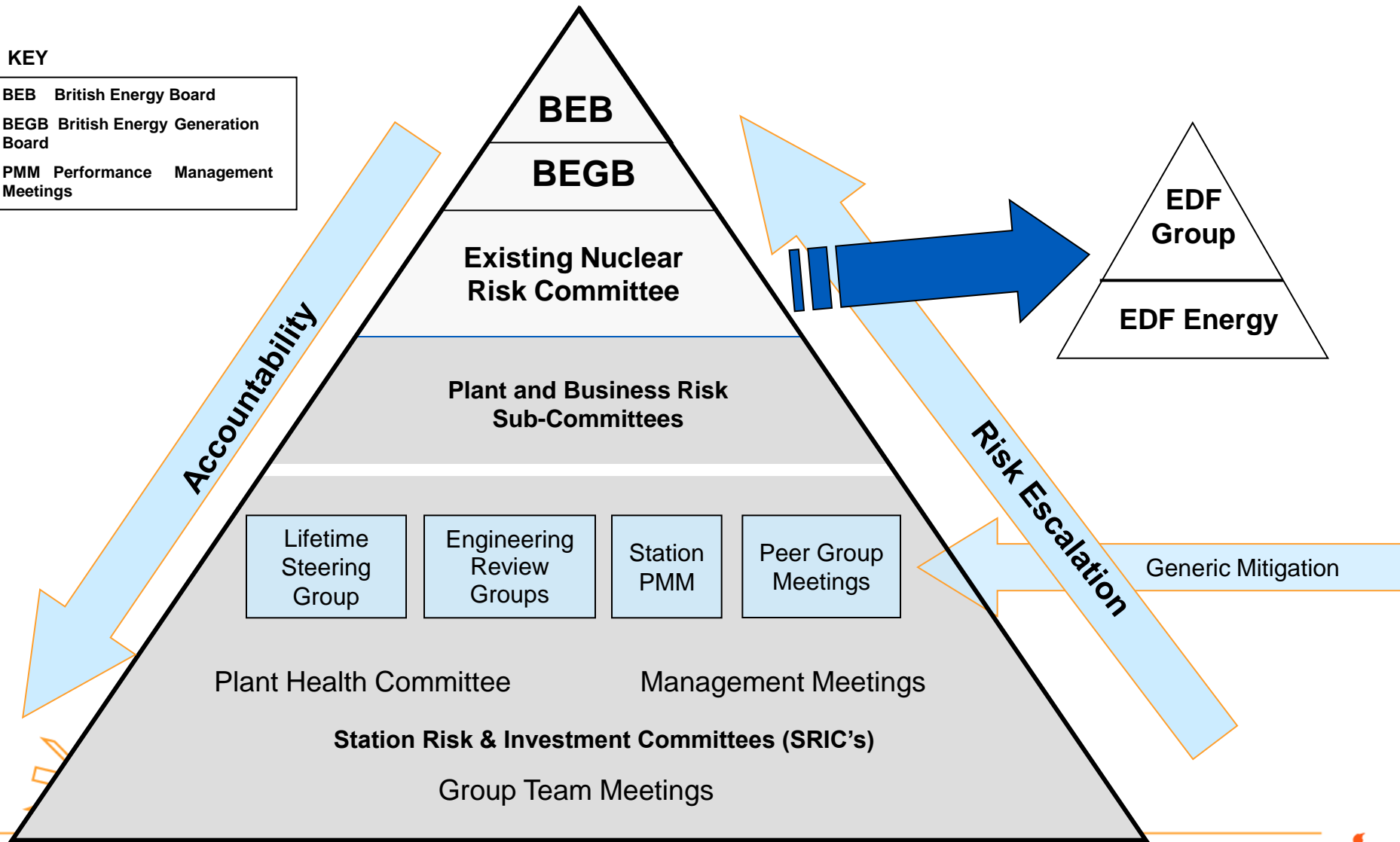
System Summary Report now provides a single page view of all asset related information including Plant Losses & System Health (SHIP) information.

9 How has PAS 55 become embedded

- The Governance

KEY

- BEB British Energy Board
- BEGB British Energy Generation Board
- PMM Performance Management Meetings



10 Was it worth it?

YES!!

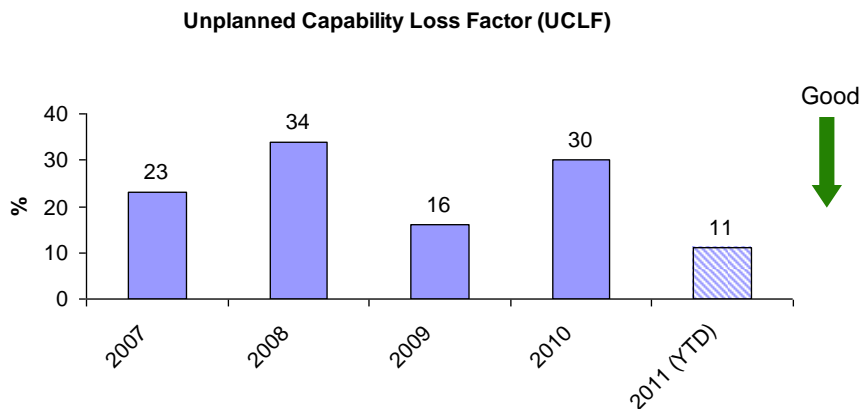
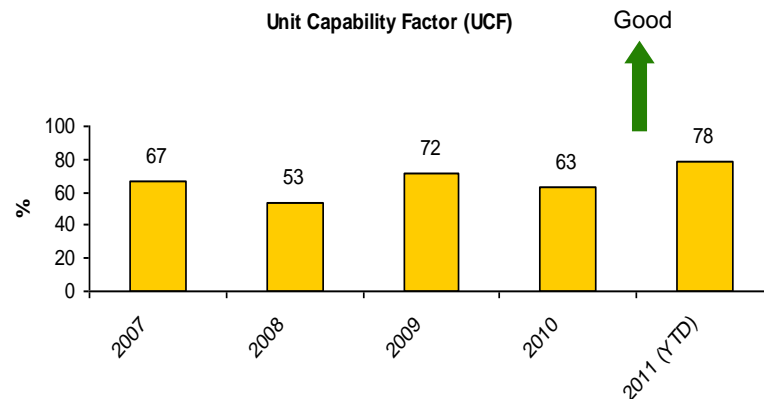
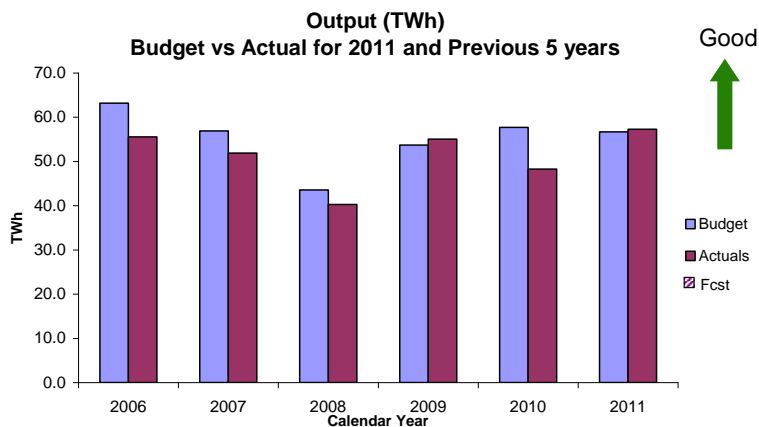
Achieving PAS55 certification has delivered the following benefits:

- Credibility from External Stakeholders
- Credibility from EDF Energy
- Wider ownership and support for Asset Management Activities
- Improved Governance from Senior Management
- Momentum for continual improvement
- Better governance, processes and tools
- Confidence in the AM function to deliver professional, appropriate solutions without too much fuss!



10 Was it worth it?

2007-2011 plant performance



A focused investment programme, maintaining or improving the output and reliability performance of an ageing fleet has a direct impact on the bottom line



11 Questions/Topics of particular interest



Thank you