Building Regulations Part L 2013 Wales
Wider Engagement Event

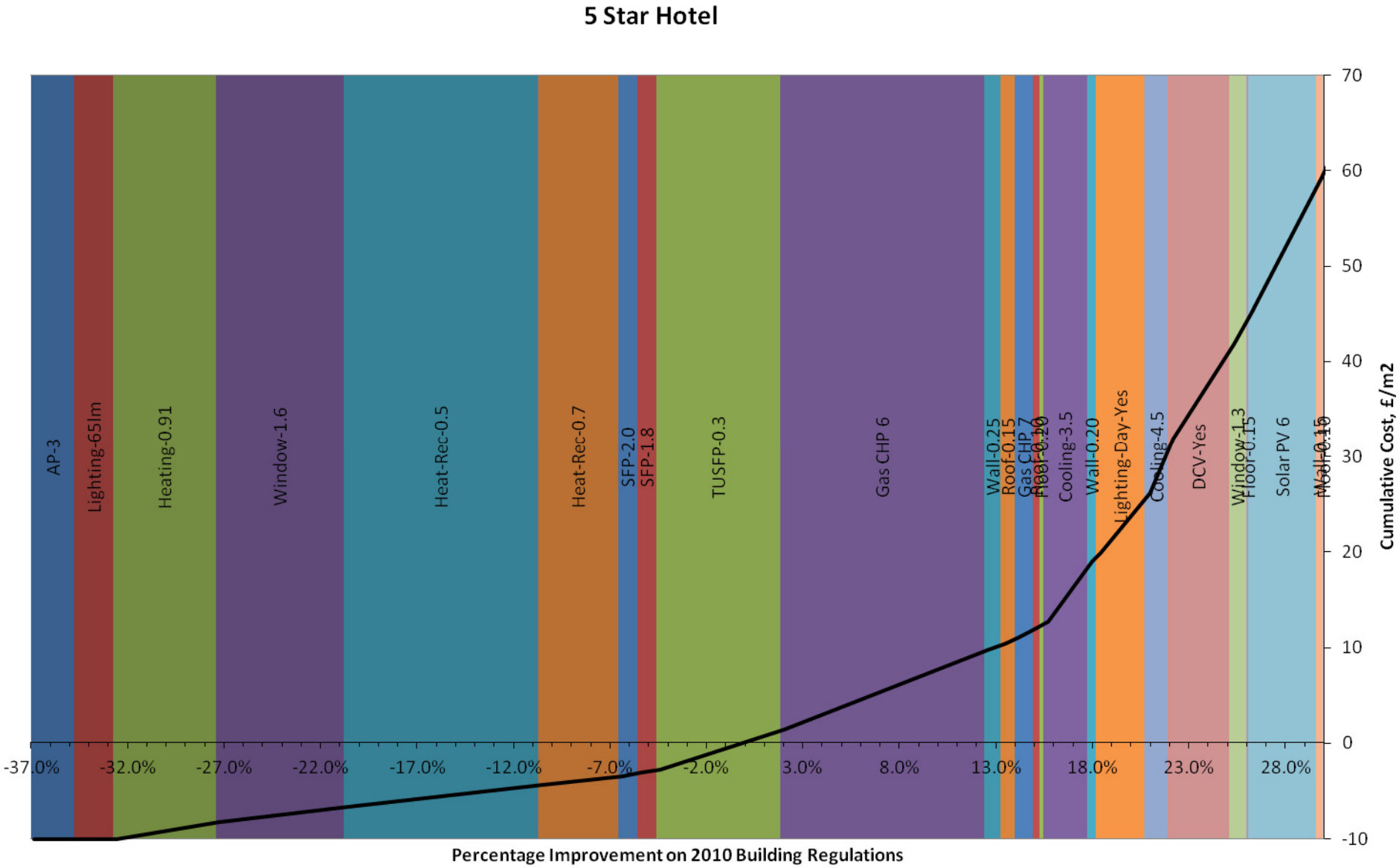
Approach to Cost Modelling

Jim Proctor

Energy Team, Davis Langdon, an AECOM Company

AECOM

Reminder of Carbon Abatement Cost Curve
Built up element by element



Base Cost Plans

Base cost plans for each building type to Building Regulations 2010

- Primary school, 3,043m^2
- Community hospital, 2,128m2
- Hotel, 1,459m2
- Naturally ventilated office, 919m2
- Supermarket, 1,248m2
- Warehouse, 5,322m2
- Nursing home, 1,935m2

Cost data from Davis Langdon Cardiff office and in-house benchmark data adjusted for Wales

AECOM

Extra Over costs

- Extra over costs of improving the key parameters to fabric and services modelled (using in house data and talking to directly to manufacturer's where necessary)

- Extra over costs of plant and equipment replacement and annual maintenance over a 60 year period modelled (using in house data from our FM team, published guidelines and discussions direct with manufacturers where necessary)

AECOM

Extra over costs – Community Hospital
Fabric Measures

	Element	Capital £/m2 Element	Maintenance £	Life Expectancy Year
Floor U-value W/m2.K	Floor-0.25	0.0	0	60
	Floor-0.20	5.5	0	60
	Floor-0.15	10.2	0	60
	Floor-0.10	15.73	0	60
Roof U-value W/m2.K	Roof-0.25	0.0	0	60
	Roof-0.20	5.34	0	60
	Roof-0.15	8.01	0	60
	Roof-0.10	9.79	0	60
Wall U-value W/m2.K	Wall-0.35	0.0	0	60
	Wall-0.25	9.77	0	60
	Wall-0.20	14.32	0	60
	Wall-0.15	20.56	0	60
Window U-value W/m2.K	Window-2.0	0.0	0	60
	Window-1.6	22.35	0	60
	Window-1.3	73.4	0	60
	Window-0.9	121.17	0	60
Air permeability m3/m2/hour	AP-10	0.0	0	60
	AP-7.5	0.0	0	60
	AP-5	1.25	0	60
	AP-3	1.88	0	60

AECOM

Extra over costs – Community Hospital
Building Services Measures

	Element	Capital £/m2 GIFA	Maintenance £	Life Expectancy Years
Luminaire efficiency Luminaire lumens / watt	Lighting-55lm	0.0	Under review	20
	Lighting-65lm	2.12	Under review	20
Lighting Occupancy Control	Lighting-Occ-No	0.0	Under review	15/20
	Lighting-Occ-Yes	5-10	Under review	15/20
Lighting Daylight Control	Lighting-Day-No	0.0	Under review	15/20
	Lighting-Day-Yes	5-10	Under review	15/20
Boiler Efficiency	Heating-0.84	0.0	Under review	15
	Heating-0.86	0.38	Under review	15
	Heating-0.88	0.65	Under review	15
	Heating-0.91	0.94	Under review	15
Heat recovery Yes (70%) / No	Heat-Rec-0	0.0	Under review	20
	Heat-Rec-0.7	6.72	Under review	20
Cooling SEER	Cooling-2.5	0.0	Under review	20
	Cooling-3	2.47	Under review	20
	Cooling-3.5	3.62	Under review	20
	Cooling-4	5.0	Under review	20
Central AHU Specific Fan Power w/l/s	SFP-2.2	0.0	Under review	20
	SFP-2.0	0.6	Under review	20
	SFP-1.8	2.25	Under review	20
Terminal Unit Specific Fan Power w/l/s	TUSFP-0.8	0.0	Under review	15
	TUSFP-0.5	4.2	Under review	15
	TUSFP-0.3	6.0	Under review	15

AECOM

Consistency of Cost

Costs of increasing efficiencies of some of the services elements (most notably those below) vary between manufacturer's and their product ranges, and need to be carefully considered in order to provide a representative view when looking at the step increases in efficiencies

- Lighting
- Boilers
- Chillers
- AHU & terminal unit SFP

Low and Zero Carbon Technologies

Technologies being considered, including the effect of learning rates:

- Solar PV
- Solar Thermal
- Gas CHP (CCHP in the case of the hospital)
- Wind Power (although limited by location)

Use of Welsh specific costs for LZC technologies or are these similar to England.....this depends on the size and scale of the installation, which may affect the materials and labour costs.

Discussions with local suppliers and installers to establish the effect of this.

AECOM

Low and Zero Carbon Technologies- Typical Base costs (£/unit varies), 2010 and Learning Rates (under review)

	per kW(e)	per m2	per m2	per kW
Size	Gas CHP	Solar Thermal	Solar PV	Wind
0.6	3289	1505	1750	13542
2.5	3289	744	775	5573
5	3289	583	552	4792
6	3289	513	534	4010
10	3289	513	534	3490
15	3289	513	517	2917
20	3289	513	517	2917
30	3289	513	517	2917
40	2741	507	517	2917
50	2193	507	400	2917
60	1974	507	400	2917
70	1645	507	390	2917
80	1425	507	390	2917
90	1316	507	380	2917
100	1206	507	380	2917
110	1206	507	370	2917
120	1096	507	370	2917
130	1096	507	370	2917
140	987	507	360	2917
150	987	507	360	2396
160	987	507	360	2396
170	987	507	350	2396
180	987	507	350	2396
190	877	507	350	2396
200	877	507	350	2396

	Gas CHP	Solar Thermal	Solar PV	Wind
2008	100%	100%	100%	100%
2009	100%	100%	100%	99%
2010	100%	100%	100%	97%
2011	91%	100%	83%	96%
2012	87%	100%	75%	95%
2013	83%	98%	69%	94%
2014	80%	93%	63%	93%
2015	78%	91%	60%	92%
2016	76%	89%	57%	91%
2017	75%	87%	56%	90%
2018	73%	86%	53%	89%
2019	72%	85%	51%	89%
2020	70%	84%	50%	88%
2021	69%	84%	49%	87%
2022	68%	83%	48%	86%
2023	67%	82%	47%	86%
2024	65%	82%	45%	85%
2025	64%	81%	44%	84%

AECOM