

# WPD Long Term Methodology work

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# Summary of progress

- Work undertaken with the University of Bath from March 2005 to May 2006 to establish core methodology
- Presentations made to ISG on work with University of Bath
- Consultation undertaken in January 2006 to inform user about our work
- Further consultation issued 14<sup>th</sup> July proposing significant change to our UoS Methodology

# Areas identified in last update needing more work

- Security factors
- Lower voltage networks
- Demands/generation infeeds to be used in base model
- Need for 'minimum' demand period to be considered

# Current consultation

- Summarises the responses to our January consultation
- Details the proposed methodology
- Explains why the revision better meets the licence objectives
- Contains indicative prices and compares these to existing prices
- Contains a change marked methodology statement
- Provides information of how to obtain a model of the methodology allowing inputs to be varied

# Overview of methodology

- Proposing to use a hybrid LRIC/DRM method
- LRIC applies to the EHV network with DRM continuing to apply to the lower voltage networks

# Main inputs to LRIC

- EHV network from our LTDS
- Assessment of security factor for each asset
- MEA valuation of each asset
- Winter peak and summer minimum demands/generation output
- Demand/generation growth forecast
- Parameters to determine reinforcement costs

# Main inputs to DRM

- Main change to the existing DRM approach is that the EHV/HV transformation and above parts of the yardstick are now produced from the LRIC model

# Revenue reconciliation

- Allocation of required revenue between voltage levels is implicit in the existing DRM approach
- Given the key nature of assets driving costs in distribution, an MEA network valuation has been used to split required revenue between the LRIC and DRM approaches
- In the S West the current DRM gives a 39:61 split between EHV and lower voltage networks whilst an MEA approach gives a 28:72 split
- In the S Wales the current DRM gives a 37:63 split between EHV and lower voltage networks whilst an MEA approach gives a 28:72 split

# Part of current yardstick

Example of Yardstick	Profile 1	WPD South West		
kWh/kW	3662	£/kW/yr	p/kWh	Coincidence
132kV System		14.27	0.355	0.911
132kV System Losses	@	8.0%	0.028	
132/33kV Substation		2.48	0.057	0.911
132/33kV Losses	@	7.3%	0.004	
33kV System		4.99	0.115	0.911
33kV System Losses	@	6.6%	0.008	
33/11kV Substation		6.26	0.145	0.911
33/11kV S/S Losses	@	5.9%	0.009	
11kV System		18.26	0.422	0.911
11kV System Losses	@	5.0%	0.021	
11kV/LV Substation		4.60	0.121	0.950
11kV/LV S/S Losses	@	3.4%	0.004	
LV System		6.97	0.168	0.950
LV System Losses	@	1.1%	0.002	
Total 500MW Model Costs			1.459	
Power Factor Deviation Cost			-0.073	
Service Cost		0.77	0.009	1.000
Subtotal			1.394	

# Tariff structures

- Proposed method allocates the required revenue between users it does not require a change to the structure of the charge
- We are not proposing to change the structure of the charges as part of this process
- No need to modify billing systems or industry processes

# Spreadsheet model

- Model developed that allows users to vary:
  - Growth rate forecasts
  - Parameters that determine future reinforcement costs
  - Split of revenue between the LRIC and DRM parts of the model
  - With more detailed intervention an indication of the effect of specific assets being uprated or the security factor changing
- We require users to enter into a confidentiality agreement before releasing the model

# Some results

- Following results use the following inputs:

<b>Assumptions</b>	
Load growth	1.00%
reinforcement factor - substations	0.5
reinforcement factor - 33kV circuits	2.0
reinforcement factor - other circuits	1.5
Rate of return	6.90%

# S. West – Main prices

TABLE 1		2006/07	2006/07		
Profile	Tariff	Actual Price	Indicative		
		p/kWh	LRIC_DRM approach	% change	
		p/kWh	p/kWh	% change	
profile 1	domestic unrestricted	1.92	1.93	0.3%	
profile 2	economy 7				
		day	2.23	2.23	0.0%
profile 2	economy 7	night	0.43	0.49	13.1%
profile 3	non domestic unrestricted		1.55	1.54	-0.8%
profile 4	non domestic economy 7	day	2.14	2.10	-1.7%
profile 4	non domestic economy 7	night	0.41	0.43	5.9%
profile 5 to 8	low voltage supplies with substation		1.32	1.27	-3.5%
profile 5 to 8	low voltage supplies		1.63	1.69	3.8%
HHM	High voltage supplies		0.70	0.63	-10.2%
HHM	low voltage supplies with substation		1.06	1.01	-4.3%
HHM	low voltage supplies		1.31	1.34	1.7%
UMS	NHHM		1.78	1.82	2.5%
UMS	HHM		1.70	1.77	4.2%

# S West – EHV Sites

<b>TABLE 2</b>	2006/07	2006/07			
<b>EHV Designated Sites</b>	Actual Price	Indicative LRIC_DRM approach		2006/07 Current method without capping	% difference from LRIC_DRM approach
<b>Load Sites</b>	£s	£s	% change		
South West Large Customer 1	30,061	28,284	-5.9%	17,362	63%
South West Large Customer 2	42,704	31,812	-25.5%	24,665	29%
South West Large Customer 3	50,985	65,085	27.7%	29,448	121%
South West Large Customer 4	180,702	158,381	-12.4%	104,368	52%
South West Large Customer 5	322,765	253,241	-21.5%	186,420	36%
South West Large Customer 6	37,064	80,762	117.9%	21,407	277%
South West Large Customer 7	995,603	1,732,393	74.0%	1,044,890	66%
South West Large Customer 8	201,057	343,104	70.7%	274,800	25%
South West Large Customer 9	607,984	194,763	-68.0%	423,299	-54%
South West Large Customer 10	51,210	238,393	365.5%	6,532	3550%
South West Large Customer 11	76,263	26,261	-65.6%	64,553	-59%
South West Large Customer 12	536,900	1,117,779	108.2%	386,569	189%
<b>Total</b>	<b>3,133,297</b>	<b>4,270,258</b>		<b>2,584,312</b>	

# S West – Generator charges

<b>TABLE 4</b>	
<b>EHV Designated Sites</b>	<b>Illustrative Charge Only</b>
<b>Generation Sites - for info only</b>	<b>2006/07 (£s)</b>
South West Large Generator 1	38,208
South West Large Generator 2	-2,040
South West Large Generator 3	15,449
South West Large Generator 4	42,067
South West Large Generator 5	3,308
South West Large Generator 6	-640
South West Large Generator 7	22,992
South West Large Generator 8	6,067
South West Large Generator 9	464
South West Large Generator 10	623,181
South West Large Generator 11	3,350
South West Large Generator 12	54,568
South West Large Generator 13	-3,364
South West Large Generator 14	-8,567
South West Large Generator 15	-4,440
South West Large Generator 16	2,082
South West Large Generator 17	4,754
South West Large Generator 18	6,171

# S West – some sensitivities

**TABLE 3**

<b>Comparison of Different Revenue Reconciliation Approaches</b>		Proposed Method: scaled to EHV asset allowed revenue split	scaled to DRM determined EHV revenue allocation	unused recovery - £/kVA approach	proposed method with 2% growth
		p/kWh	p/kWh	p/kWh	p/kWh
profile 1	domestic unrestricted	1.93	1.89	1.93	1.93
profile 2	economy 7 day	2.23	2.20	2.23	2.23
profile 2	economy 7 night	0.49	0.44	0.49	0.49
profile 3	non domestic unrestricted	1.54	1.52	1.54	1.54
profile 4	non domestic economy 7 day	2.10	2.09	2.11	2.11
profile 4	non domestic economy 7 night	0.43	0.42	0.43	0.43
profile 5to8	low voltage supplies with substation	1.27	1.29	1.27	1.27
profile 5to8	low voltage supplies	1.69	1.63	1.69	1.69
HHM	High voltage supplies	0.63	0.70	0.63	0.63
HHM	low voltage supplies with substation	1.01	1.02	1.01	1.01
HHM	low voltage supplies	1.34	1.29	1.34	1.34
UMS	NHHM	1.82	1.74	1.82	1.82
UMS	HHM	1.77	1.70	1.77	1.77

# S West – some sensitivities

**TABLE 3**

<b>Comparison of Different Revenue Reconciliation Approaches</b>	Proposed Method: scaled to EHV asset allowed revenue split	scaled to DRM determined EHV revenue allocation	unused recovery - £/kVA approach	proposed method with 2% growth
	£	£	£	£
South West Large Customer 1	28,284	30,631	26,715	31,541
South West Large Customer 2	31,812	35,438	28,398	32,304
South West Large Customer 3	65,085	83,909	65,697	53,320
South West Large Customer 4	158,381	213,026	149,820	179,322
South West Large Customer 5	253,241	340,977	240,502	299,310
South West Large Customer 6	80,762	107,287	86,697	65,051
South West Large Customer 7	1,732,393	2,333,781	1,750,646	1,576,049
South West Large Customer 8	343,104	465,270	242,816	433,186
South West Large Customer 9	194,763	192,425	12,980	233,088
South West Large Customer 10	238,393	321,292	244,564	195,055
South West Large Customer 11	26,261	25,882	20,944	26,479
South West Large Customer 12	1,117,779	1,517,415	1,198,848	859,579
Total EHV sites recovery	4,270,258	5,667,331	4,068,628	3,984,285

# S Wales – main prices

TABLE 5		2006/07	2006/07	
Profile	Tariff	Actual Price	Indicative	% change
		p/kWh	LRIC_DRM approach p/kWh	
profile 1	domestic unrestricted	2.24	2.31	3.1%
profile 2	economy 7 day	2.59	2.65	2.2%
profile 2	economy 7 night	0.30	0.36	18.7%
profile 3	non domestic unrestricted	1.73	1.73	0.2%
profile 4	non domestic economy 7 day	2.24	2.20	-2.0%
profile 4	non domestic economy 7 night	0.35	0.41	18.2%
profile 5to8	low voltage supplies	1.69	1.71	1.0%
HHM	High voltage supplies	0.81	0.72	-10.5%
	low voltage supplies	1.43	1.49	4.2%
UMS	NHHM	1.84	2.07	12.6%
	HHM	1.86	1.96	5.6%

# S Wales – EHV Sites (part)

TABLE 6 EHV Designated Sites	2006/07	2006/07			
	Actual Price	LRIC_DRM approach	% change	2006/07 Current method without capping	% difference from LRIC_DRM approach
Load Sites	£s	£s	% change		
South Wales Large Customer 1	73,522	-26,443	-136.0%	86,000	-131%
South Wales Large Customer 2	380,447	381,337	0.2%	311,154	23%
South Wales Large Customer 3	219,548	37,253	-83.0%	98,495	-62%
South Wales Large Customer 4	189,008	244,666	29.4%	34,634	606%
South Wales Large Customer 5	152,665	389,584	155.2%	288,221	35%
South Wales Large Customer 6	112,088	132,214	18.0%	216,490	-39%
South Wales Large Customer 7	186,190	18,699	-90.0%	152,435	-88%
South Wales Large Customer 8	517,139	35,626	-93.1%	826,548	-96%
South Wales Large Customer 9	39,497	31,165	-21.1%	37,640	-17%
South Wales Large Customer 10	264,112	297,036	12.5%	261,379	14%
South Wales Large Customer 11	1,090,401	448,543	-58.9%	714,727	-37%
South Wales Large Customer 12	321,357	64,911	-79.8%	381,295	-83%
South Wales Large Customer 13	445,592	279,155	-37.4%	560,593	-50%
South Wales Large Customer 14	60,827	522,887	759.6%	38,203	1269%
South Wales Large Customer 15	79,902	53,782	-32.7%	159,234	-66%

# S Wales – EHV sites (part)

TABLE 6 EHV Designated Sites	2006/07	2006/07			
	Actual Price	LRIC_DRM approach	% change	2006/07 Current method without capping	% difference from LRIC_DRM approach
Load Sites	£s	£s			
South Wales Large Customer 16	58,028	-108,493	-287.0%	63,974	-270%
South Wales Large Customer 17	543,032	390,448	-28.1%	473,077	-17%
South Wales Large Customer 18	199,673	47,366	-76.3%	301,558	-84%
South Wales Large Customer 19	194,370	82,845	-57.4%	188,414	-56%
South Wales Large Customer 20	127,119	57,314	-54.9%	145,261	-61%
South Wales Large Customer 21	176,193	44,202	-74.9%	34,952	26%
South Wales Large Customer 22	83,549	86,381	3.4%	28,281	205%
South Wales Large Customer 23	94,769	136,198	43.7%	141,989	-4%
South Wales Large Customer 24	836,033	391,130	-53.2%	597,147	-35%
South Wales Large Customer 25	20,863	37,920	81.8%	25,214	50%
South Wales Large Customer 26	138,379	11,611	-91.6%	29,350	-60%
South Wales Large Customer 27	63,298	34,190	-46.0%	67,503	-49%
South Wales Large Customer 28	82,474	274,564	232.9%	79,035	247%
South Wales Large Customer 29	77,117	17,625	-77.1%	16,375	8%
Total	6,827,190	4,413,715		6,359,175	

# S Wales – generator charges

<b>TABLE 8</b>	
<b>EHV Designated Sites</b>	<b>Illustrative Charge Only</b>
<b>Generation Sites - for info only</b>	<b>2006/07 (£s)</b>
South Wales Large Generator 1	4,020
South Wales Large Generator 2	337,427
South Wales Large Generator 3	9,961
South Wales Large Generator 4	4,693
South Wales Large Generator 5	4,258
South Wales Large Generator 6	9,591
South Wales Large Generator 7	-370
South Wales Large Generator 8	-35
South Wales Large Generator 9	27,699
South Wales Large Generator 10	1,414,265
South Wales Large Generator 11	6,857
South Wales Large Generator 12	7,018

# S Wales – some sensitivities

TABLE 7

## Comparison of Different Revenue Reconciliation Approaches

Proposed method:  
scaled to  
EHV asset  
allowed  
revenue  
split

scaled to DRM  
determined  
EHV revenue  
allocation

unused  
recovery  
- £/kVA  
approac  
h

proposed  
metho  
d with  
2%  
growth

p/kWh

p/kWh

p/kWh

p/kWh

profile 1	domestic unrestricted		2.31	2.27	2.31	2.30
profile 2	economy 7	day	2.65	2.61	2.65	2.64
profile 2	economy 7	night	0.36	0.33	0.36	0.36
profile 3	non domestic unrestricted		1.73	1.72	1.74	1.72
profile 4	non domestic economy 7	day	2.20	2.21	2.20	2.18
profile 4	non domestic economy 7	night	0.41	0.38	0.41	0.41
profile 5 to 8	low voltage supplies		1.71	1.71	1.71	1.71
HHM	High voltage supplies		0.72	0.78	0.73	0.72
HHM	low voltage supplies		1.49	1.46	1.49	1.48
UMS	NHHM		2.07	2.01	2.07	2.06
UMS	HHM		1.96	1.91	1.97	1.95

# S Wales – some sensitivities

TABLE 7

Comparison of Different Revenue Reconciliation Approaches	Proposed method: scaled to EHV asset allowed revenue split	scaled to DRM determined EHV revenue allocation	unused recovery - £/kVA approach	proposed method with 2% growth
	£s	£s	£s	£s
South Wales Large Customer 1	-26,443	-34,590	-28,846	-22,667
South Wales Large Customer 2	381,337	471,812	371,452	428,880
South Wales Large Customer 3	37,253	47,628	-2,775	61,713
South Wales Large Customer 4	244,666	311,280	240,521	295,659
South Wales Large Customer 5	389,584	467,490	384,569	398,604
South Wales Large Customer 6	132,214	166,608	125,676	74,637
South Wales Large Customer 7	18,699	21,871	14,563	-15,256
South Wales Large Customer 8	35,626	37,472	12,623	122,523
South Wales Large Customer 9	31,165	34,972	30,874	31,166
South Wales Large Customer 10	297,036	370,070	294,487	395,558
South Wales Large Customer 11	448,543	562,663	434,081	336,033
South Wales Large Customer 12	64,911	80,704	58,057	139,017
South Wales Large Customer 13	279,155	356,903	270,365	414,369
South Wales Large Customer 14	522,887	662,821	526,737	431,259
South Wales Large Customer 15	53,782	66,304	50,216	66,984

# S Wales – some sensitivities

TABLE 7

Comparison of Different Revenue Reconcilliation Approaches	Proposed method: scaled to EHV asset allowed revenue split	scaled to DRM determined EHV revenue allocation	unused recovery - £/kVA approach	proposed method with 2% growth
	£s	£s	£s	£s
South Wales Large Customer 16	-108,493	-139,333	-115,327	-101,432
South Wales Large Customer 17	390,448	467,953	382,175	489,604
South Wales Large Customer 18	47,366	58,596	42,231	135,591
South Wales Large Customer 19	82,845	103,884	81,384	86,485
South Wales Large Customer 20	57,314	69,599	52,042	98,939
South Wales Large Customer 21	44,202	49,401	42,657	44,981
South Wales Large Customer 22	86,381	86,755	85,362	99,183
South Wales Large Customer 23	136,198	169,230	128,977	192,335
South Wales Large Customer 24	391,130	429,577	374,573	581,536
South Wales Large Customer 25	37,920	38,994	36,892	50,719
South Wales Large Customer 26	11,611	11,795	9,140	21,777
South Wales Large Customer 27	34,190	43,699	33,601	44,056
South Wales Large Customer 28	274,564	348,676	275,065	297,894
South Wales Large Customer 29	17,625	20,078	12,986	77,696
Total EHV sites recovery	4,413,715	5,382,913	4,224,360	5,277,843

# Next steps

- Consultation closes 25<sup>th</sup> August
- Consider responses
- Decide what modification is needed to our methodology statement
- Submit changes to Ofgem for approval
- If approved in time, set prices using the revised methodology in December 2006
- Implementation from April 2007

# Any Questions

# WPD Long Term Methodology work

Nigel Turvey