Structure of Charges project
WPD workshop

WESTERN POWER DISTRIBUTION
Serving the South West and Wales

Agenda

- Background to project
- Overview of LRIC/FCP common methods
- Differences between the common LRIC method and that currently implemented in WPD
- Issues with the common methods
- Results of applying the methods to WPD's networks
- Boundary between CDCM and EDCM and the importance of scaling decisions
- Treatment of pre 2005 generation
- How will we choose between LRIC and FCP ?

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Background to project

- Common licence requirement to introduce a common LRIC charging methodology at EHV was blocked by the distribution businesses of Scottish Power and Scottish & Southern Energy in October 2008
- Ofgem decided to allow distributors to choose between a common LRIC or FCP methodology – SLC50A was introduced in September 2009
- DNOs have been jointly developing the two methodologies since September 2009

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Overview of LRIC/FCP common methods

Overview of LRIC/FCP common methods – LRIC marginal charges

1. Identify spare capacity on each branch supplying each output node
2. For each branch calculate a £/kVA/annum charge by assessing the brought forward or deferred cost of adding an increment of demand or generation at the output nodes
3. Sum the relevant branch charges to calculate nodal charges for conditions where peak demand dominates the reinforcement decision and for where minimum demand conditions dominate the reinforcement decision
4. Feed these into a common spreadsheet that deals with other costs, scaling and final tariff structure

Overview of LRIC/FCP common methods – FCP marginal charges

1. Network groups are chosen
2. Reinforcements required due to load growth over the next 10 years are identified and costed
3. Zonal £/kVA/annum demand charges are derived
4. Additional generation charges are assessed using a test sized generator applied to the network group source busbar
5. Feed these into a common spreadsheet that deals with other costs, scaling and final tariff structure

Overview of LRIC/FCP common methods – Common spreadsheet

1. Allocates transmission exit charges
2. Allocates operating and other expenditure recovered through sole use asset charges
3. Scaling – ensuring recovery of overall allowed revenue

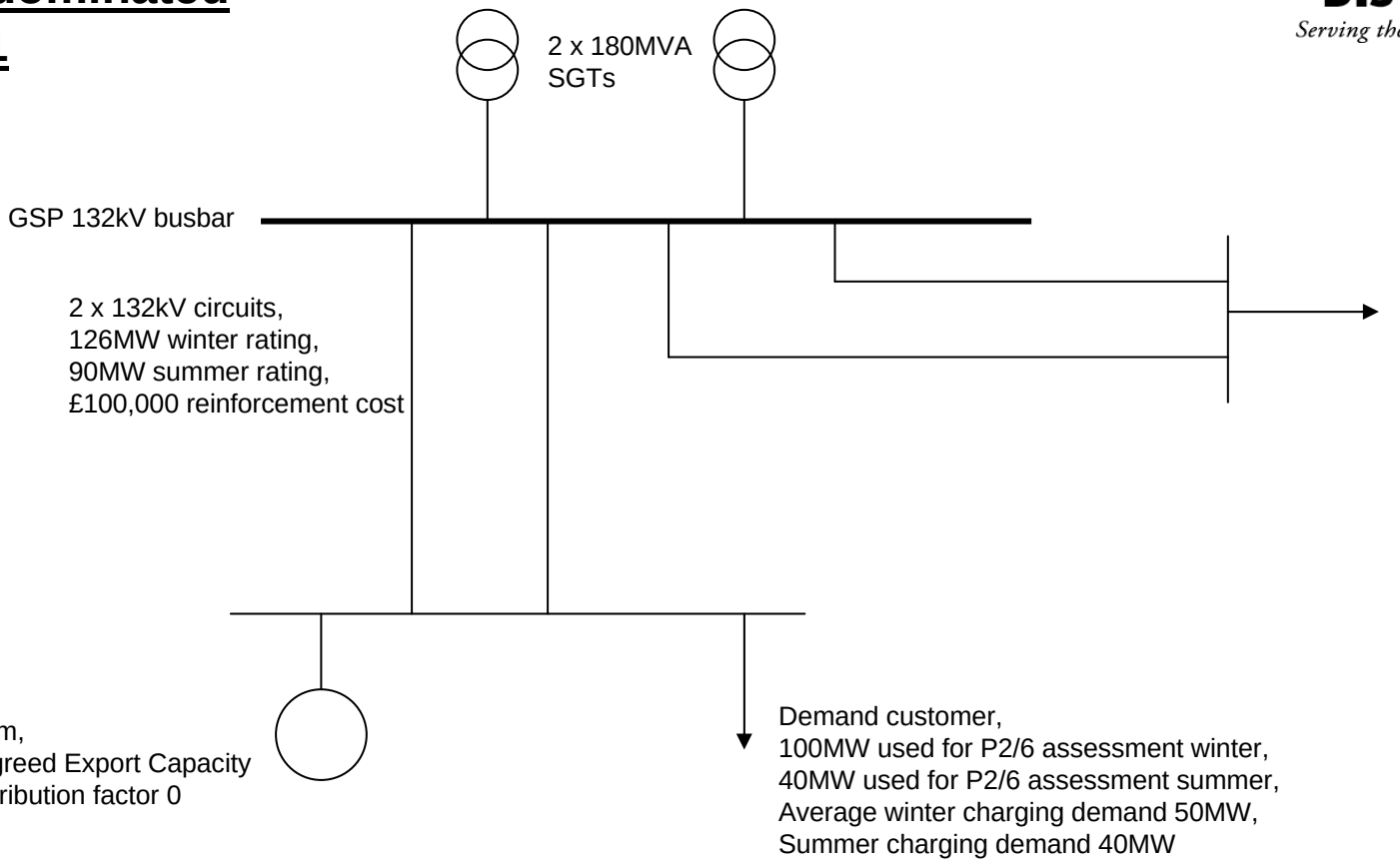
Overview of LRIC/FCP common methods – Scaling

- Two main types of demand revenue scaling have been considered (along with many variants):
  1. Split of total allowed revenue between EHV and lower voltage assets. Under this method where marginal charges are higher the revenue recovered from EHV demand users will be lower.
  2. Split of revenue between EHV and non EHV demand users on basis of capacity used by the two groups. Under this method the total revenue recovered from EHV demand users will be the same and marginal charges just control the relative charges between EHV demand users
- DNO preference is for the second option with two variants (known as options 10 and 11) being considered in detail. Results for a method under the first option (known as option 3) has been developed
- At present, no scaling is applied to generation charges

Overview of LRIC/FCP common methods

- The locational marginal charge element of the charges is best explained by simple examples
- Following examples are designed to be:
  - Realistic enough to be situations that could occur
  - Simple enough to implement in a spreadsheet (available)
  - Relatively extreme to show features of the two methods
- The same 132kV network is used throughout with a generator and a demand customer
- The relative sizes of demand and generation are varied to show both demand and generator dominated networks
- Different P2/6 factors are used for the generation to show the effect of intermittent and non-intermittent generation

Demand dominated network 1



Other parameters:

- Load growth 1% per annum
-Test sized generator for FCP 50MW
- Probability of test sized generator connecting 10%

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LRIC Calculation

	Peak	Off Peak
132kV circuit rating after security factor	63.0	45.0
Pre injection loading	50.0	5.0
Post injection loading	50.1	5.1
No. of years before reinforcement pre increment	23.2	220.8
Present value of future investment	£28,208	£1
No. of years before reinforcement post increment	23.0	218.8
Present value with earlier investment	£28,518	£1
Difference in present values (for 0.1MW increment)	£310	£0
£/MW/year after annuity	£195.94	£0.04

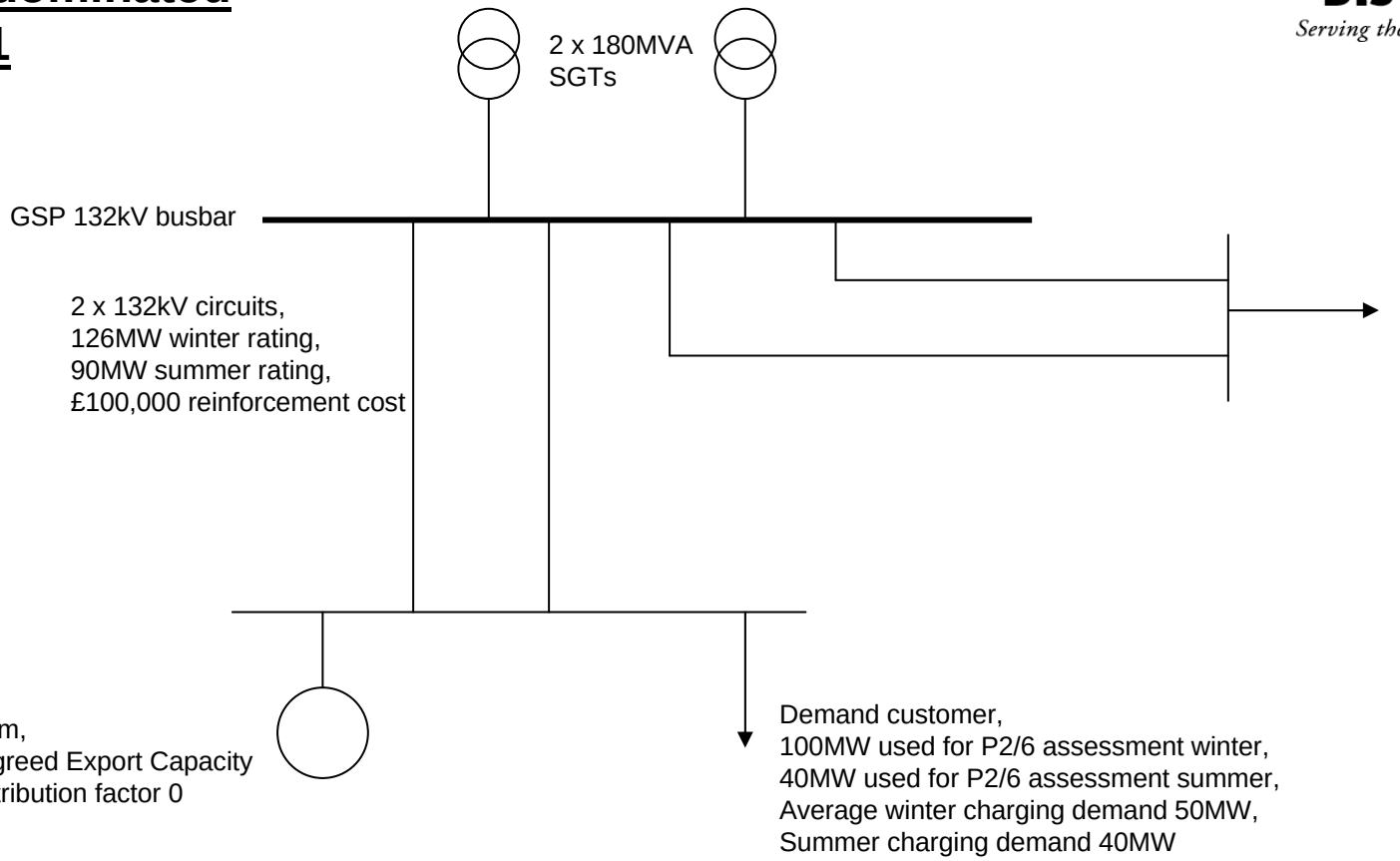
Reinforcement of 132kV circuits is driven by peak conditions so demand marginal charge is the peak charge multiplied by the peak chargeable demand. The generation marginal charge is the negative of the peak charge multiplied by the P2/6 contribution to security.

FCP Calculation

	FCP demand	FCP generation
Demand of network group at which reinforcement will be required	126.0	
Initial demand in group	100.0	
Years to reinforcement	24	
Initial headroom		130.0
Time to reinforcement		26
Charge (£/MVA/annum)	£0	£0

Application of the test size generator (50MW) at the GSP 132kV busbar cannot cause any reinforcement costs as SGTs are not part of distribution system.

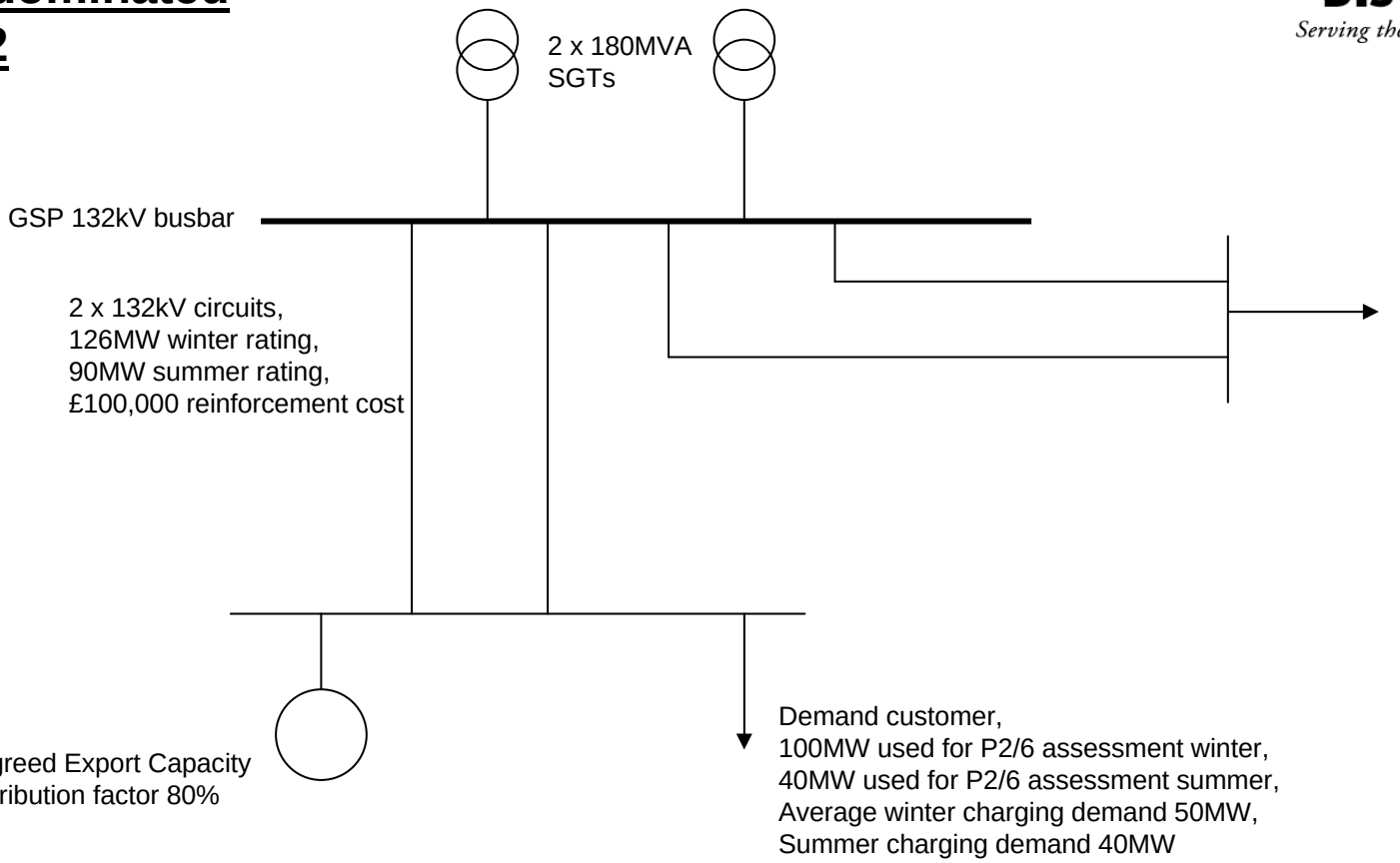
Demand dominated network 1



Other parameters:
- Load growth 1% per annum
-Test sized generator for FCP 50MW
- Probability of test sized generator connecting 10%

	FCP	LRIC
Total marginal charge for Demand customer	£0	£19,594
Total marginal charge for Generation customer	£0	-£0

Demand dominated network 2



Other parameters:

- Load growth 1% per annum
-Test sized generator for FCP 50MW
-Probability of test sized generator connecting 10%

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LRIC Calculation

	Peak	Off Peak
132kV circuit rating after security factor	63.0	45.0
Pre injection loading	30.0	5.0
Post injection loading	30.1	5.1
No. of years before reinforcement pre increment	74.6	220.8
Present value of future investment	£1,720	£1
No. of years before reinforcement post increment	74.2	218.8
Present value with earlier investment	£1,752	£1
Difference in present values (for 0.1MW increment)	£32	£0
£/MW/year after annuity	£19.97	£0.04

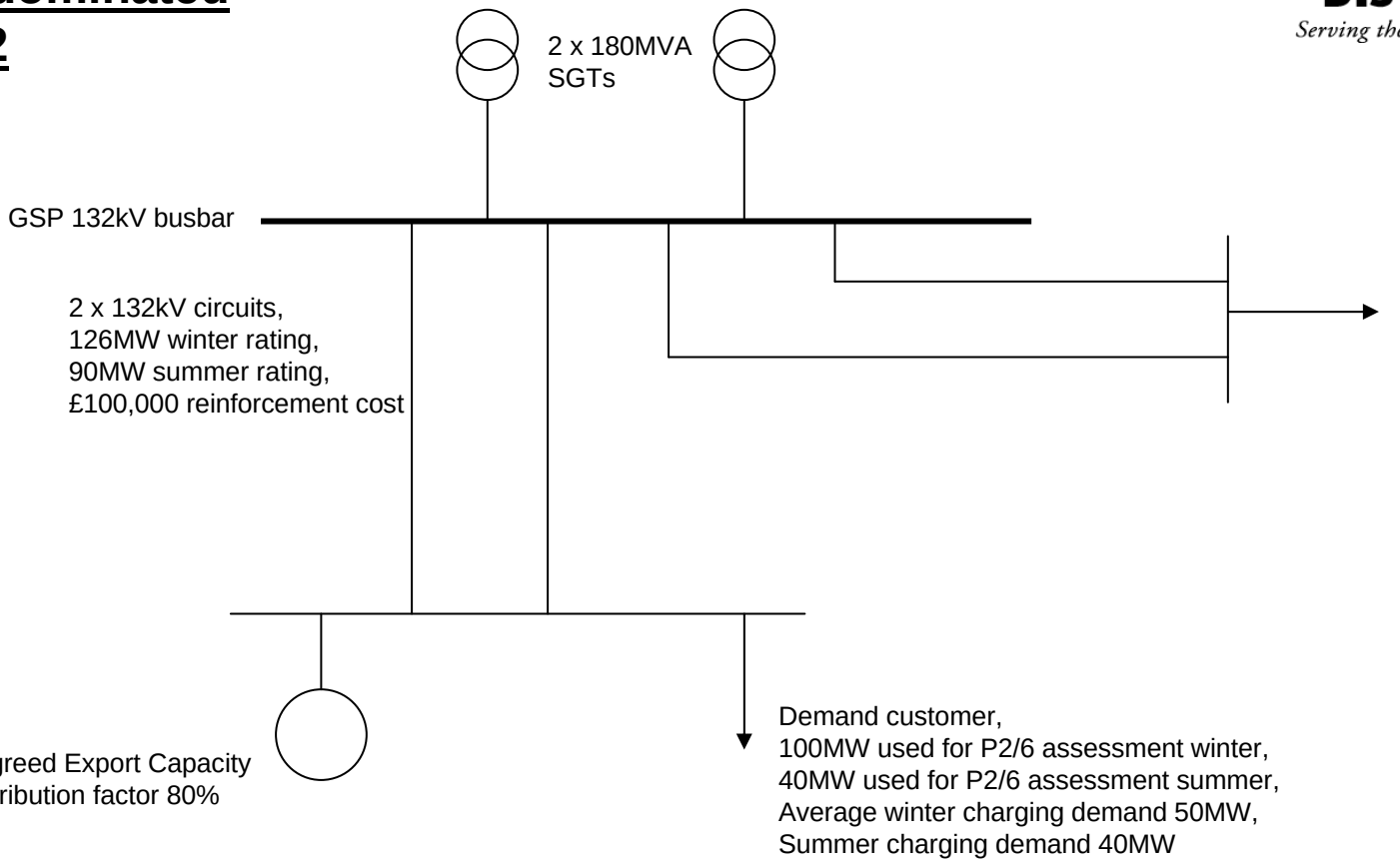
Reinforcement of 132kV circuits is driven by peak conditions so demand marginal charge is the peak charge multiplied by the peak chargeable demand. The generation marginal charge is the negative of the peak charge multiplied by the P2/6 contribution to security.

FCP Calculation

	FCP demand	FCP generation
Demand of network group at which reinforcement will be required	166.0	
Initial demand in group	100.0	
Years to reinforcement	75	
Initial headroom		130.0
Time to reinforcement		26
Charge (£/MVA/annum)	£0	£0

Application of the test size generator (50MW) at the GSP 132kV busbar does not cause any reinforcement costs.

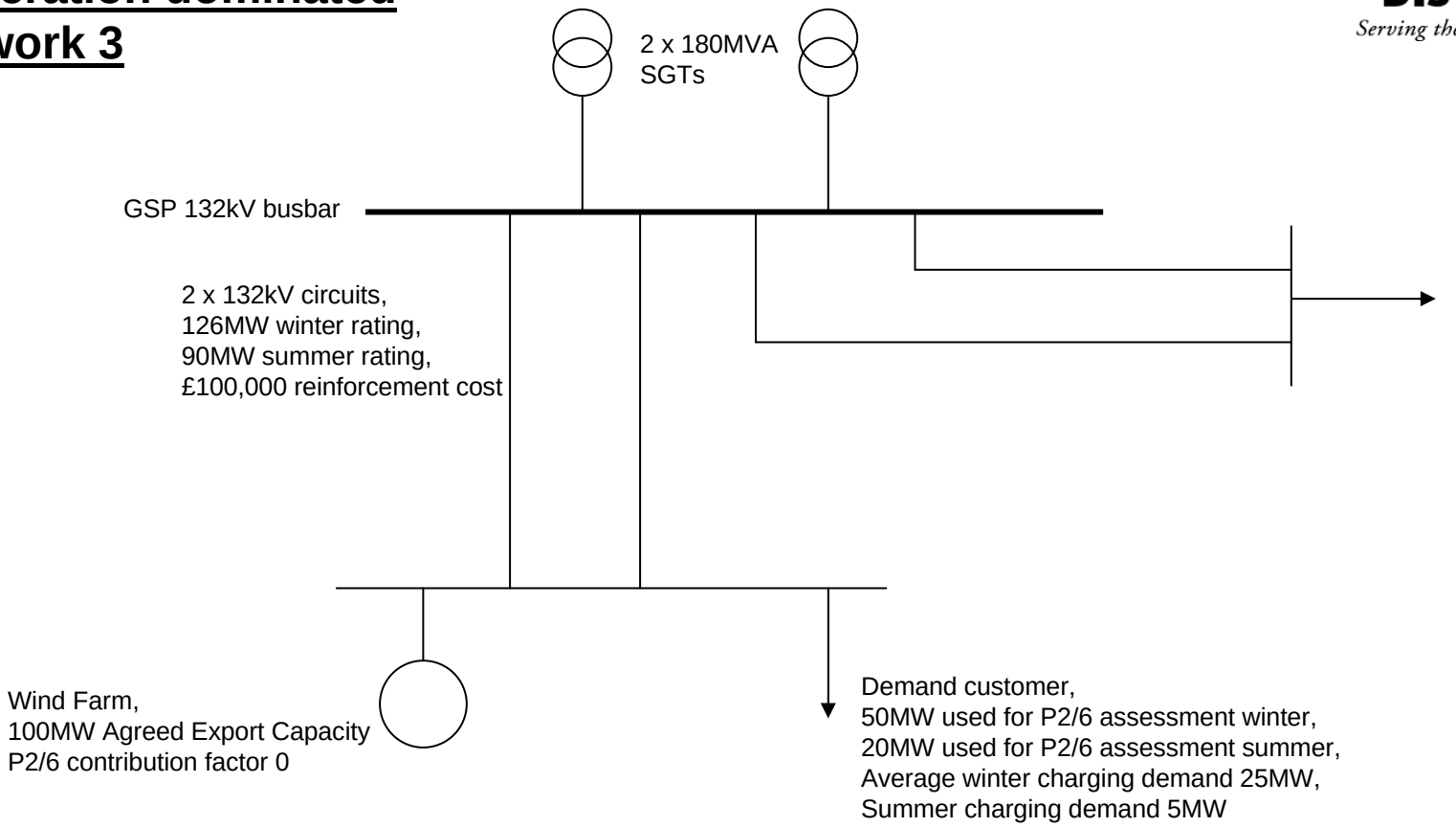
Demand dominated network 2



Other parameters:
- Load growth 1% per annum
-Test sized generator for FCP 50MW
-Probability of test sized generator connecting 10%

	FCP	LRIC
Total marginal charge for Demand customer	£0	£1,997
Total marginal charge for Generation customer	£0	-£1,598

Generation dominated network 3



Other parameters:

- Load growth 1% per annum
-Test sized generator for FCP 100MW
-Probability of test sized generator connecting 10%

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LRIC Calculation

	Peak	Off Peak
132kV circuit rating after security factor	63.0	45.0
Pre injection loading	25.0	40.0
Post injection loading	25.1	40.1
No. of years before reinforcement pre increment	92.9	11.8
Present value of future investment	£634	£52,467
No. of years before reinforcement post increment	92.5	11.6
Present value with earlier investment	£648	£53,190
Difference in present values (for 0.1MW increment)	£14	£722
£/MW/year after annuity	£8.84	£456.07

Reinforcement of 132kV circuits is driven by off peak conditions so demand marginal charge is the negative of the off peak charge multiplied by the summer chargeable demand. The generation marginal charge is the off peak Charge multiplied by the agreed export capacity.

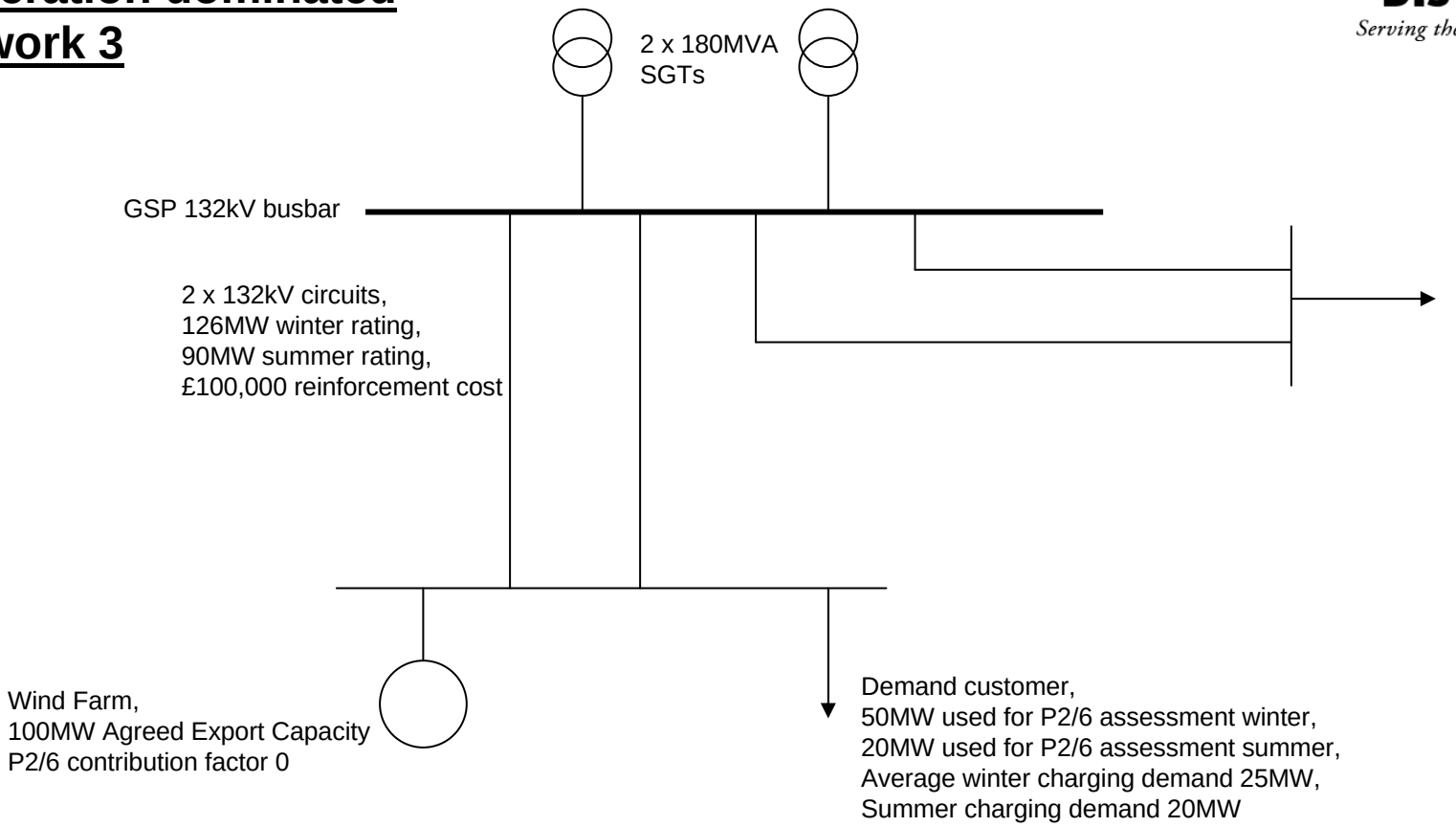
Note: Decision at WSB to not allow credits to Demand incremental charges where the demand benefits the network in the off peak case.

FCP Calculation

	FCP demand	FCP generation
Demand of network group at which reinforcement will be required	126.0	
Initial demand in group	50.0	
Years to reinforcement	93	
Initial headroom		80.0
Time to reinforcement		8
Charge (£/MVA/annum)	£0	£0

Application of the test size generator (100MW) at the GSP 132kV busbar does not cause any reinforcement costs.

Generation dominated network 3

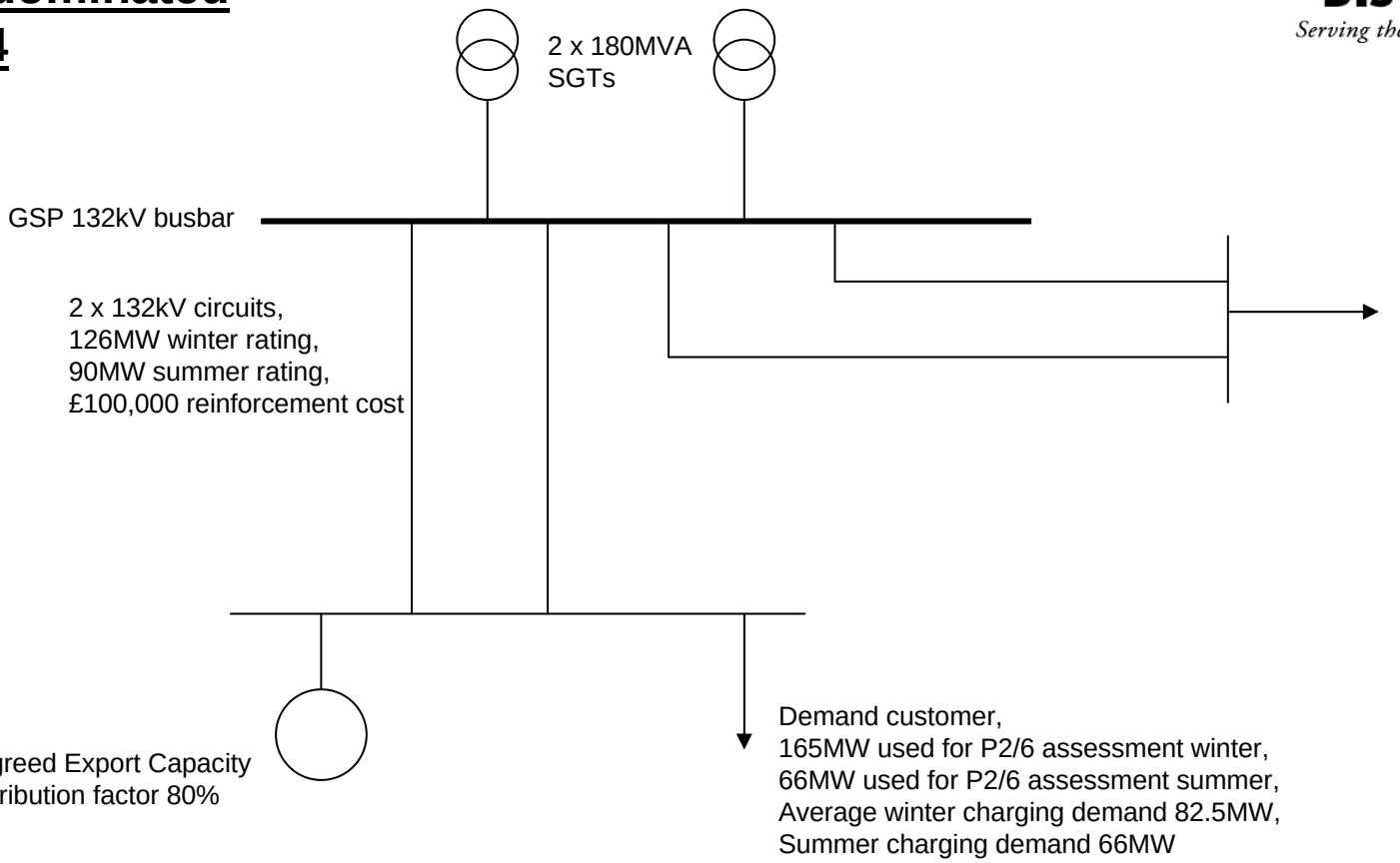


Other parameters:
- Load growth 1% per annum
-Test sized generator for FCP 100MW
-Probability of test sized generator connecting 10%

	FCP	LRIC
Total marginal charge for Demand customer	£0	-£18,243
Total marginal charge for Generation customer	£0	£91,214

Decision at WSB will result in demand LRIC charge being zero removing the incentive for demand to locate near generation

Demand dominated network 4



Other parameters:

- Load growth 1% per annum
-Test sized generator for FCP 50MW
-Probability of test sized generator connecting 10%

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LRIC Calculation

	Peak	Off Peak
132kV circuit rating after security factor	63.0	45.0
Pre injection loading	62.5	8.0
Post injection loading	62.6	8.1
No. of years before reinforcement pre increment	0.8	173.6
Present value of future investment	£95,730	£8
No. of years before reinforcement post increment	0.6	172.3
Present value with earlier investment	£96,572	£8
Difference in present values (for 0.1MW increment)	£842	£1
£/MW/year after annuity	£531.50	£0.35

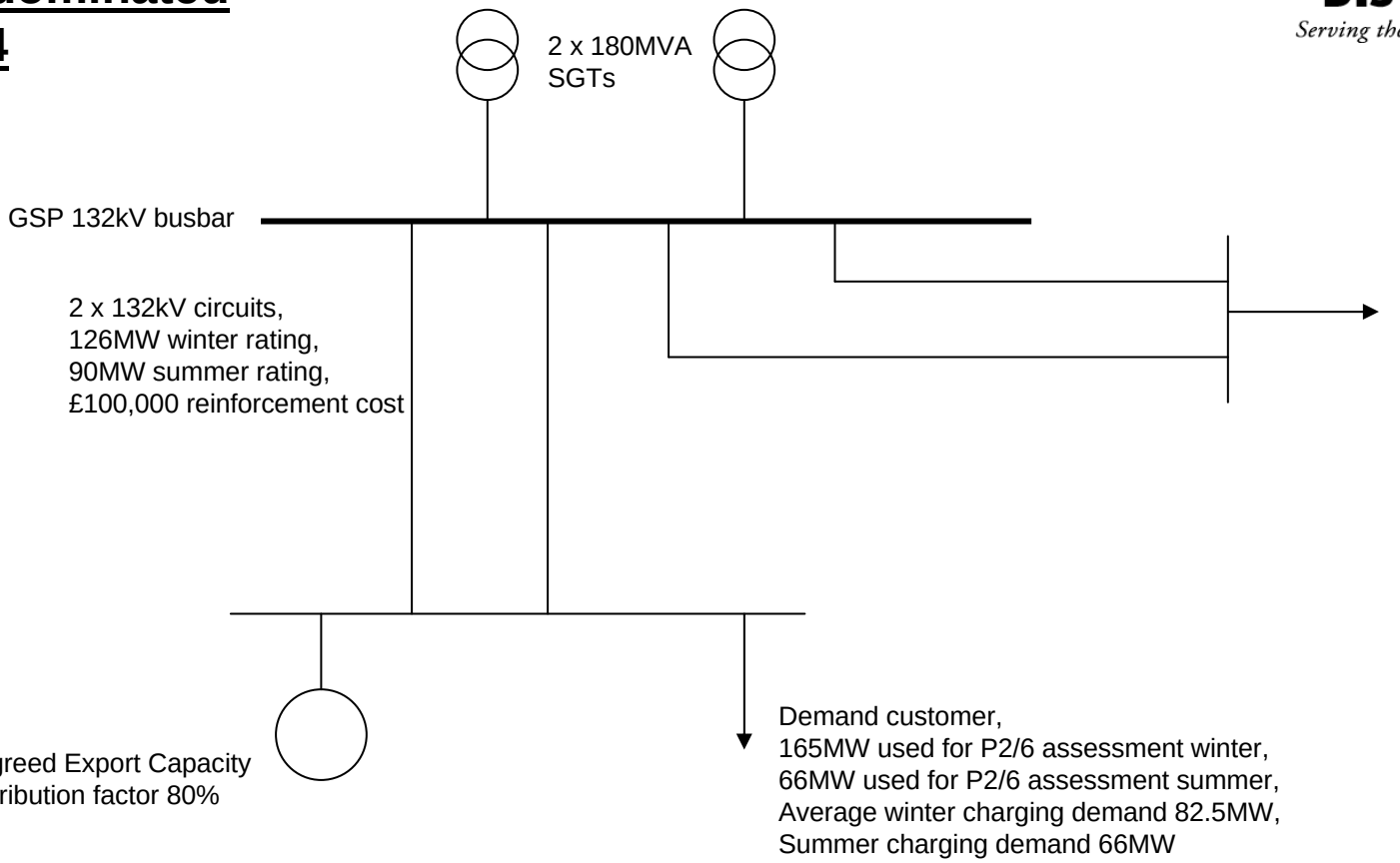
Reinforcement of 132kV circuits is driven by off peak conditions so demand marginal charge is the negative of the off peak charge multiplied by the summer chargeable demand. The generation marginal charge is the off peak Charge multiplied by the agreed export capacity.

FCP Calculation

	FCP demand	FCP generation
Demand of network group at which reinforcement will be required	166.0	
Initial demand in group	165.0	
Years to reinforcement	1	
Initial headroom		130.0
Time to reinforcement		26
Charge (£/MVA/annum)	£141.53	£0

Application of the test size generator (50MW) at the GSP 132kV busbar does not cause any reinforcement costs.

Demand dominated network 4



Other parameters:
- Load growth 1% per annum
-Test sized generator for FCP 50MW
-Probability of test sized generator connecting 10%

	FCP	LRIC
Total marginal charge for Demand customer	£23,352	£87,697
Total marginal charge for Generation customer	-£5,661	-£42,520

Differences between the common LRIC method and that currently implemented in WPD

- Main differences are:

	Current LRIC method	Common LRIC method	Impact
Allocation of revenue between EHV and HV/LV networks	Uses the 500MW model in the CDCM (note that this excludes services and some LV excavation and reinstatement costs)	Uses RRP data (note that this includes services and all trenching and reinstatement costs)	Changes allocation of allowed revenue to EHV from 40% to 20% effectively halving EHV demand charges
Scaling	Revenue split by assets	Revenue split by capacity used	Total revenue from EHV demand customers will not change even if marginal charges change
Use of nodal marginal charges to calculate use of system charges	Treats nodal marginal charges symmetrically for demand and generation	Sets negative demand charges to zero and can set some positive generation charges to zero	Reduces incentive for demand to locate near generation and vice versa (see next slide)
Allocation of NGT exit charges	Included within scaling of demand charges	TEC expressed as an average £/kVA of maximum demand. In demand dominated GSPs the +ve of this is used for demand and the –ve for generation. In generator dominated GSPs the +ve of this is used for both demand and generation.	Reduces generation charges in demand dominated GSPs but increases them in generation dominated GSPs.
Calculation of security factor and incremented flow	May be calculated at either end of asset	Calculated at end of asset with highest flow	Tends to reduce security factor and hence marginal charge in lightly loaded branches

Differences between the common LRIC method and that currently implemented in WPD

Current method for treating branch charges when summing at a node

	Demand charges	Generation charges
Peak demand conditions drive reinforcement (encourage generation and discourage demand)	Peak incremental cost x Peak charging demand	-1 x Peak incremental cost x Level of output that will contribute to network security
Off-peak demand conditions drive reinforcement (encourage demand and discourage generation)	-1 x Off-peak incremental cost x Off-peak charging demand	Off-peak incremental cost x Agreed export capacity

i.e. 8 possible charges (as each box can be either +ve or –ve)

Common method for treating branch charges when summing at a node

	Demand charges	Generation charges
Peak demand conditions drive reinforcement (encourage generation and discourage demand)	Peak incremental cost x Peak charging demand **(if peak incremental cost is –ve this term is zero)**	-1 x Peak incremental cost x Level of output that will contribute to network security **(if peak incremental cost is –ve this term is zero)**
Off-peak demand conditions drive reinforcement (encourage demand and discourage generation)		Off-peak incremental cost x Agreed export capacity **(if off-peak incremental cost is –ve this term is zero)**

i.e. 3 possible charges

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Issues with the common methods

Issues with the common methods - LRIC

- As branch load approaches branch capacity the branch charge rises rapidly – particularly impacts generators sized to existing network capacity
- Potential solutions are:
  - Method used agreed export capacity for generators at minimum demand periods – use of actual diversified generation output consistent with demand has been agreed and reduces the issue
  - Capping of branch charges to the annuity cost of the branch would be a further solution
- Use of security factors in load flow calculation results in errors particularly in branches where the ratio between pre and post fault loading is large
- Potential solutions are:
  - Capping incremental flows to size of increment
  - Checks show that these are generally small and where significant can be identified and corrected
  - Full load flow without security factors is possible but takes over 72 hours to run

Issues with the common methods - LRIC

For example - Use of a 75% diversity for generation in calculating the marginal charges give the following results on the earlier examples

	Demand		Generation	
	Pre Mitigation	Post Mitigation	Pre Mitigation	Post Mitigation
Example 1 – Demand dominated (50MW WF, 100MW demand)	£19,594	£19,594	£0	£0
Example 2 – Demand dominated (50MW CCGT, 100MW demand)	£1,997	£3,977	-£1,598	-£3,182
Example 3 – Generation dominated (100MW generator, 50MW demand)	-£18,243	-£3,418	£91,214	£17,092

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Issues with the common methods - FCP

- Lack of locational cost signal on much of network – with a 1% load growth, network needs to be over 90% loaded to generate any charges
- Potential solution – none a feature of the method
- Non symmetry of the treatment of demand and generation – are the cost drivers different between demand and generation ?
- Potential solution – a feature of the method
- Counter intuitive results from changing the size of the test sized generator – higher charges as the size of the test sized generator is reduced and zero marginal charges at 132kV
- Potential solution – use and application of the test sized generator is being reviewed – multiple tests at lower voltages proposed

Results of applying the methods to WPD's networks

Results of applying the methods to WPD's networks

- Following results are the latest versions of output
- Current DNO preference is for 'Option 10' scaling
- **Both methods are still in development and hence subject to change**

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Results of applying the methods to WPD's S West network

Customer	Current annual LRIC charge	Common method annual LRIC charge (Option 3)	Common method annual LRIC charge (Option 10)	Common method annual LRIC charge (Option 11)	Common method annual FCP charge (Option 3)	Common method annual FCP charge (Option 10)	Common method annual FCP charge (Option 11)
Large customer 1	£246,981	£160,456	£211,107	£242,858	£181,486	£188,171	£234,987
Large customer 2	£132,662	£62,563	£78,230	£150,740	£84,259	£86,236	£144,020
Large customer 3	£134,296	£72,734	£100,886	£119,343	£110,508	£144,256	£134,839
Large customer 4	£6,474	£3,664	£4,561	£5,149	£7,510	£7,685	£8,649
Large customer 5	£171,196	£113,186	£169,448	£96,018	£202,946	£210,805	£118,528
Large customer 6	£20,118	£9,775	£13,646	£16,184	£16,162	£16,640	£19,266
Large customer 7	£19,394	£10,516	£12,100	£13,139	£6,324	£6,519	£7,594
Large customer 8	£30,563	£13,435	£13,504	£13,414	£13,732	£13,749	£13,550
Large customer 9	£11,391	£5,133	£5,297	£5,404	£5,417	£5,442	£5,579
Large customer 10	£366,706	£202,531	£272,739	£181,106	£239,072	£247,895	£144,299
Large customer 11	£132,833	£88,807	£123,971	£78,077	£152,281	£157,125	£100,259
Large customer 12	£8,880	£5,059	£7,120	£8,412	£8,084	£8,345	£10,178
Large customer 13	£56,548	£36,515	£52,566	£62,627	£58,186	£60,164	£74,019
Large customer 14	£52,826	£31,494	£44,438	£52,552	£52,492	£54,190	£66,083
Large customer 15	£34,598	£24,537	£34,981	£41,528	£39,654	£40.983	£50,285
Large customer 16	£146,846	£101,055	£144,068	£171,032	£157,034	£162,383	£199,851
Large customer 17	£5,041	£2,963	£3,876	£4,448	£4,276	£4,392	£5,205

Results of applying the methods to WPD's S West network – post April 2005 connected EHV generators

Customer	Current annual LRIC charge	Common method annual LRIC charge	Common method annual FCP charge
EHV generator 1	£2,454	(£18,720)	(£14,358)
EHV generator 2	(£11,879)	(£15,886)	(£4,119)
EHV generator 3	£5,530	£677	£615
EHV generator 4	(£256)	(£13,004)	(£11,939)
EHV generator 5	£1,926	£852	£852
EHV generator 6	(£19,629)	(£27,867)	(£10,531)
EHV generator 7	£69,350	£11,184	£3,276
EHV generator 8	£17,909	£97	£0
EHV generator 9	£373,775	£76,726	£75,064

Results of applying the methods to WPD's S West network – pre April 2005 connected generators (If these are charged on same basis as post April 2005 generators)

Customer	Current annual LRIC charge	Common method annual LRIC charge	Common method annual FCP charge
EHV generator 10	N/A	£1,966	£1,805
EHV generator 11	N/A	(£136)	(£11,945)
EHV generator 12	N/A	£515	£515
EHV generator 13	N/A	£749	£577
EHV generator 14	N/A	£520	£472
EHV generator 15	N/A	£496	£472
EHV generator 16	N/A	£1,247	£1,131
EHV generator 17	N/A	(£17,257)	(£20,328)
EHV generator 18	N/A	(£80,127)	(£13,270)
EHV generator 19	N/A	(£339,543)	(£118,379)
EHV generator 20	N/A	(£62,098)	(£61,231)
EHV generator 21	N/A	£675	£515

Results of applying the methods to WPD's S Wales network

Customer	Current annual LRIC charge	Common method annual LRIC charge (Option 3)	Common method annual LRIC charge (Option 10)	Common method annual LRIC charge (Option 11)	Common method annual FCP charge (Option 3)	Common method annual FCP charge (Option 10)	Common method annual FCP charge (Option 11)
Large customer 1	£665,574	£446,429	£635,751	£600,227	£637,758	£665,479	£633,421
Large customer 2	£263,779	£166,208	£232,019	£240,084	£227,036	£236,600	£240,281
Large customer 3	£107,857	£93,576	£134,389	£119,488	£144,748	£151,074	£145,248
Large customer 4	£985,441	£616,336	£881,895	£832,066	£1,066,876	£1,113,753	£1,059,543
Large customer 5	£91,525	£69,247	£98,828	£100,419	£100,399	£104,723	£101,960
Large customer 6	£399,286	£200,945	£271,863	£258,556	£262,918	£273,742	£261,225
Large customer 7	£325,588	£216,807	£288,776	£297,596	£263,101	£274,395	£278,740
Large customer 8	£17,437	£9,918	£13,508	£245,813	£10,416	£10,798	£246,128
Large customer 9	£24,907	£15,369	£21,846	£22,640	£24,058	£25,099	£25,500
Large customer 10	£50,609	£33,453	£43,374	£42,292	£51,078	£53,289	£51,252
Large customer 11	£11,125	£6,538	£8,670	£8,931	£11,993	£12,482	£12,670
Large customer 12	£173,836	£62,176	£69,860	£68,418	£57,783	£58,868	£57,613
Large customer 13	£1,376,928	£815,287	£1,130,759	£1,071,565	£1,212,592	£1,261,744	£1,204,903
Large customer 14	£123,388	£78,322	£107,000	£96,530	£102,835	£107,286	£103,186
Large customer 15	£138,871	£86,895	£123,146	£125,097	£134,299	£140,038	£136,372
Large customer 16	£158,504	£112,534	£159,928	£142,625	£131,428	£137,163	£131,881
Large customer 17	£58,058	£36,026	£49,672	£50,406	£50,029	£52,202	£50,814

Results of applying the methods to WPD's S Wales network

Customer	Current annual LRIC charge	Common method annual LRIC charge (Option 3)	Common method annual LRIC charge (Option 10)	Common method annual LRIC charge (Option 11)	Common method annual FCP charge (Option 3)	Common method annual FCP charge (Option 10)	Common method annual FCP charge (Option 11)
Large customer 18	£384,129	£231,742	£327,471	£309,509	£326,238	£340,371	£324,027
Large customer 19	£918,602	£614,540	£772,439	£742,811	£541,969	£565,086	£538,353
Large customer 20	£55,738	£33,090	£47,539	£44,828	£48,759	£50,838	£48,434
Large customer 21	£118,746	£81,178	£115,023	£102,667	£105,907	£110,520	£106,271
Large customer 22	£4,818	£8,546	£10,762	£11,033	£10,398	£10,750	£10,885
Large customer 23	£31,590	£16,233	£18,619	£18,911	£17,766	£18,084	£18,206
Large customer 24	£713,609	£471,815	£649,777	£671,585	£638,850	£667,041	£677,889
Large customer 25	£420,188	£259,540	£366,263	£372,005	£375,563	£391,910	£381,467
Large customer 26	£15,683	£11,683	£14,819	£13,674	£10,605	£11,064	£10,641
Large customer 27	£9,122	£4,949	£6,412	£6,138	£6,933	£7,167	£6,896
Large customer 28	£59,823	£33,564	£43,929	£45,199	£39,081	£40,623	£41,216
Large customer 29	£40,149	£28,633	£36,343	£33,528	£26,529	£27,683	£26,620
Large customer 30	£70,801	£84,336	£113,903	£115,494	£105,203	£109,786	£106,858
Large customer 31	£498,737	£11,437	£13,295	£13,395	£13,770	£14,060	£13,874
Large customer 32	£1,326,852	£65,650	£93,054	£87,912	£83,620	£87,310	£83,043
Large customer 33	£94,500	£56,346	£80,753	£82,066	£78,393	£81,832	£79,635
Large customer 34	£1,483	£1,208	£1,378	£1,316	£910	£933	£912

Results of applying the methods to WPD's S Wales network – post April 2005 connected EHV generators

Customer	Current annual LRIC charge	Common method annual LRIC charge	Common method annual FCP charge
EHV generator 1	(£13,957)	(£15,254)	(£3,192)
EHV generator 2	(£24,504)	(£16,517)	(£3,046)
EHV generator 3	(£19,350)	(£25,832)	(£10,756)
EHV generator 4	£81,552	£20,720	£1,467
EHV generator 5	£114,158	£4,771	£508
EHV generator 6	£663,967	£74,425	£27,680
EHV generator 7	(£14,607)	£1,090	£682
EHV generator 8	£6,275	£2,896	£2,896
EHV generator 9	£79,108	£1,643	£1,643
EHV generator 10	£48,344	(£30,427)	(£62,039)

Results of applying the methods to WPD's S Wales network – pre April 2005 connected generators (If these are charged on same basis as post April 2005 generators)

Customer	Current annual LRIC charge	Common method annual LRIC charge	Common method annual FCP charge
EHV generator 11	N/A	(£22,781)	(£7,208)
EHV generator 12	N/A	£164,750	£13,377
EHV generator 13	N/A	(£13,054)	(£9,268)
EHV generator 14	N/A	£4,467	£3,455
EHV generator 15	N/A	(£16,749)	(£9,086)
EHV generator 16	N/A	(£11,150)	(£4,551)
EHV generator 17	N/A	£5,015	£801
EHV generator 18	N/A	£5,455	£8,339
EHV generator 19	N/A	£3,780	£493
EHV generator 20	N/A	(£10,600)	(£4,172)
EHV generator 21	N/A	£362,278	(£353,324)
EHV generator 22	N/A	£2,343	£2,345
EHV generator 23	N/A	(£6,055)	(£2,777)
EHV generator 24	N/A	£0	£0
EHV generator 25	N/A	(£10,966)	(£3,014)

Results of applying the methods to WPD's networks

- As highlighted earlier in the presentation, the split of allowed revenue between EHV and lower voltage networks is currently based on RRP data
- Basing this split on the CDCM would result in very different scaling and results
- Following results illustrate this impact
- **Both methods are still in development and hence subject to change**

Results of applying the methods to WPD's S West network

Customer	Common method annual LRIC charge (Option 10) RRP	Common method annual LRIC charge (Option 10) CDCM	Common method annual FCP charge (Option 10) RRP	Common method annual FCP charge (Option 10) CDCM
Large customer 1	£211,107	£302,827	£188,171	£280,473
Large customer 2	£78,230	£136,782	£86,236	£143,726
Large customer 3	£100,886	£152,845	£144,256	£166,991
Large customer 4	£4,561	£7,990	£7,685	£11,912
Large customer 5	£169,448	£274,771	£210,805	£322,767
Large customer 6	£13,646	£22,606	£16,640	£25,191
Large customer 7	£12,100	£16,179	£6,519	£10,429
Large customer 8	£13,504	£25,350	£13,749	£25,705
Large customer 9	£5,297	£9,779	£5,442	£9,972
Large customer 10	£272,739	£405,622	£247,895	£375,472
Large customer 11	£123,971	£199,357	£157,125	£235,708
Large customer 12	£7,120	£11,246	£8,345	£12,353
Large customer 13	£52,566	£82,024	£60,164	£87,874
Large customer 14	£44,438	£70,463	£54,190	£80,224
Large customer 15	£34,981	£54,675	£40.983	£60,106
Large customer 16	£144,068	£222,742	£162,383	£237,036
Large customer 17	£3,876	£6,312	£4,392	£6,778

Results of applying the methods to WPD's S Wales network

Customer	Common method annual LRIC charge (Option 10) RRP	Common method annual LRIC charge (Option 10) CDCM	Common method annual FCP charge (Option 10) RRP	Common method annual FCP charge (Option 10) CDCM
Large customer 1	£635,751	£1,426,377	£665,479	£1,392,817
Large customer 2	£232,019	£513,616	£236,600	£494,336
Large customer 3	£134,389	£303,675	£151,074	£315,788
Large customer 4	£881,895	£1,982,318	£1,113,753	£2,332,458
Large customer 5	£98,828	£222,907	£107,723	£218,725
Large customer 6	£271,863	£580,805	£273,742	£570,368
Large customer 7	£288,776	£591,867	£274,395	£573,000
Large customer 8	£13,508	£30,036	£10,798	£22,399
Large customer 9	£21,846	£49,031	£25,099	£52,519
Large customer 10	£47,374	£105,777	£53,289	£111,505
Large customer 11	£8,670	£18,360	£12,482	£26,032
Large customer 12	£69,860	£133,784	£58,868	£119,180
Large customer 13	£1,130,759	£2,528,539	£1,261,744	£2,630,740
Large customer 14	£107,000	£227,246	£107,286	£224,495
Large customer 15	£123,146	£276,868	£140,038	£292,817
Large customer 16	£159,928	£356,946	£137,163	£287,140
Large customer 17	£49,672	£106,761	£52,202	£109,250

Results of applying the methods to WPD's S Wales network

Customer	Common method annual LRIC charge (Option 10) RRP	Common method annual LRIC charge (Option 10) CDCM	Common method annual FCP charge (Option 10) RRP	Common method annual FCP charge (Option 10) CDCM
Large customer 18	£327,471	£728,340	£340,371	£712,248
Large customer 19	£772,439	£1,441,677	£565,086	£1,181,455
Large customer 20	£47,539	£107,434	£50,838	£104,958
Large customer 21	£115,023	£255,653	£110,520	£230,978
Large customer 22	£10,762	£22,267	£10,750	£22,215
Large customer 23	£18,619	£38,713	£18,084	£36,566
Large customer 24	£649,777	£1,384,236	£667,041	£1,397,282
Large customer 25	£366,263	£811,686	£391,910	£820,314
Large customer 26	£14,819	£27,952	£11,064	£23,153
Large customer 27	£6,412	£14,029	£7,167	£14,811
Large customer 28	£43,929	£90,727	£40,623	£84,578
Large customer 29	£36,343	£68,543	£27,683	£57,940
Large customer 30	£113,903	£236,858	£109,786	£229,445
Large customer 31	£13,295	£27,955	£14,060	£28,555
Large customer 32	£93,054	£206,153	£87,310	£182,893
Large customer 33	£80,753	£181,931	£81,832	£171,359
Large customer 34	£1,378	£2,456	£933	£1,906

Results of applying the methods to WPD's networks

- A significant difference between our current LRIC methodology and the common proposal is the exclusion of negative marginal charges
- Including these has some effect on all charges, but a significant effect on some in particular
- Following results illustrate those where the impact is significant (greater than 10%)
- **Both methods are still in development and hence subject to change**

Results of applying the methods to WPD's network

Customer	Current annual LRIC charge	Common method annual LRIC charge (Option 10) RRP **NO** negative marginal charges	Common method annual LRIC charge (Option 10) RRP **WITH** negative marginal charges
S West			
Large customer 4	£6,474	£4,561	£3,718
EHV generator 11	N/A	(£136)	£8,659
EHV generator 17	N/A	(£17,257)	£20,690
S Wales			
Large customer 3	£107,857	£134,389	£106,303
Large customer 5	£91,525	£98,828	£89,203
Large customer 20	£55,738	£47,539	£42,188
EHV generator 21	N/A	£362,278	£1,417,821

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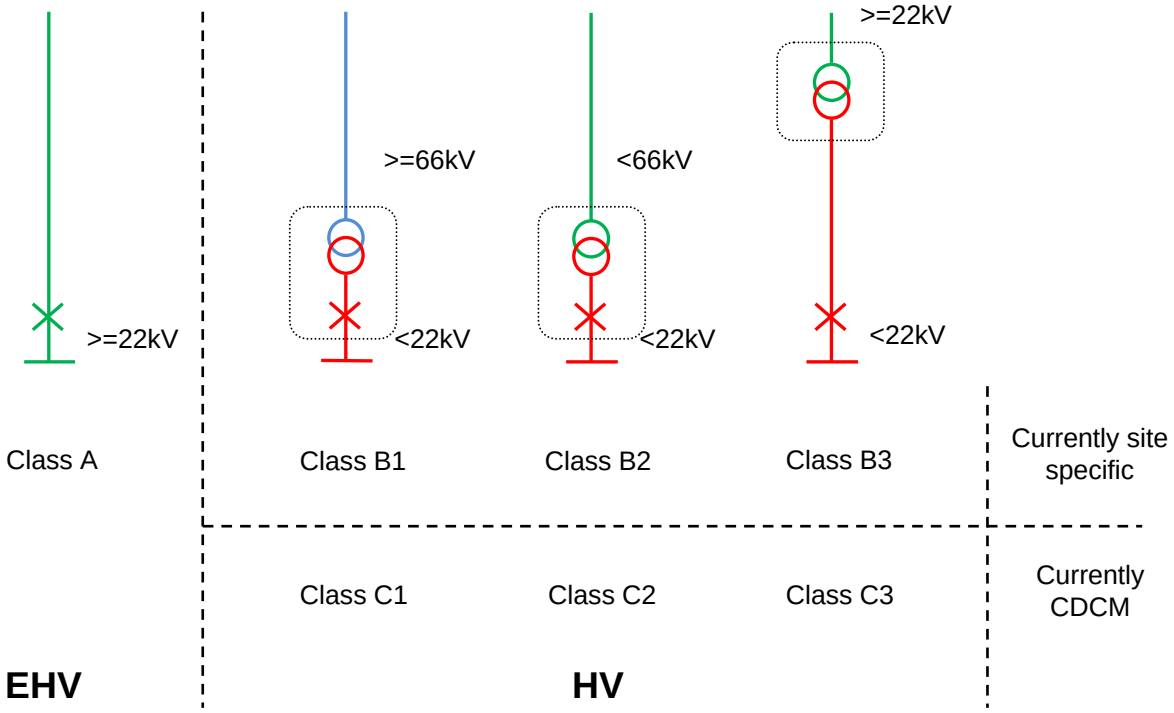
Boundary between CDCM and EDCM and the importance of scaling decisions

Boundary between CDCM and EDCM and the importance of scaling decisions

- Our existing method has those connected at 22kV or above or those which have agreed supply capacities above or near to 10MW being charged under our EHV method – other DNOs use different boundaries
- Ofgem want a common boundary applied in all DNOs between the CDCM and EDCM
- Two main choices:
  - Connected to or above the low voltage busbar of a substation with a primary voltage greater than 22kV
  - Connected at 22kV or above
- With a number of variants (next slide)
- Either method will result in some existing customers being moved between calculation methods with resulting price disturbance

Boundary between CDCM and EDCM and the importance of scaling decisions



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Boundary between CDCM and EDCM and the importance of scaling decisions

- Ignoring who owns the assets, the most efficient network results from connecting customers to the lowest possible voltage as this reduces the number of substations/transformers on the network
- Retaining the lower voltage busbar at a substation as part of the distribution network (rather than it being customer owned) allows additional feeds to local networks reducing future reinforcement costs and improving reliability
- Current target revenue for the EDCM results in low EDCM charges compared to CDCM charges
- Using the same split of target revenue in both the EDCM and CDCM would reduce the difference in charges at the boundary
- Some current output from the models illustrates the issue Note that **methods are still in development and hence subject to change** :

WESTERN POWER DISTRIBUTION
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Boundary between CDCM and EDCM and the importance of scaling decisions – S West

Customer	Current Boundary	Common LRIC charge/CDCM charge at current boundary	Charge if boundary changed to C1, C2 or C3	Charge if boundary changed to B1, B2 or B3
Large customer 1	B2	£211,107	£551,893	N/A
Large customer 12	B2	£7,120	£37,079	N/A
Large customer 13	B3	£52,566	£182,746	N/A
Large customer 14	B2	£44,438	£189,071	N/A
Large customer 15	B2	£34,981	£165,124	N/A
Large customer 16	B2	£144,068	£476,358	N/A
Large customer 17	B2	£3,876	£45,702	N/A
Large customer 18	C2	£227,368	N/A	£55,534
Large customer 19	C2	£130,796	N/A	£28,509
Large customer 20	C2	£85,679	N/A	£32,857
Large customer 21	C2	£18,605	N/A	£7,182
Large customer 22	C2	£145,814	N/A	£61,559
Large customer 23	C2	£148,377	N/A	£38,033
Large customer 24	C2	£1,517	N/A	£232
Large customer 25	C2	£236,053	N/A	£18,536
Large customer 26	C2	£178,087	N/A	£64,214
Large customer 27	C2	£128,465	N/A	£64,664
Large customer 28	C2	£25,634	N/A	£6,952
Large customer 29	C2	£184,814	N/A	£94,448
Large customer 30	C2	£49,971	N/A	£37,296

Boundary between CDCM and EDCM and the importance of scaling decisions – S Wales

Customer	Current Boundary	Common LRIC charge/CDCM charge at current boundary	Charge if boundary changed to C1, C2 or C3	Charge if boundary changed to B1, B2 or B3
Large customer 3	B1	£134,389	£433,979	N/A
Large customer 6	B1	£271,863	£717,915	N/A
Large customer 10	B1	£47,374	£251,850	N/A
Large customer 13	B1	£1,130,759	£3,336,801	N/A
Large customer 14	B1	£107,000	£308,099	N/A
Large customer 16	B1	£159,928	£489,459	N/A
Large customer 19	B1	£772,438	£1,739,067	N/A
Large customer 21	B1	£115,023	£370,939	N/A
Large customer 26	B1	£14,819	£40,935	N/A
Large customer 29	B1	£36,343	£69,524	N/A
Large customer 34	B1	£1,378	£1,567	N/A
Large customer 35	C2	£34,698	N/A	£4,828
Large customer 36	C2	£7,055	N/A	£3,799
Large customer 37	C2	£13,162	N/A	£6,851
Large customer 38	C2	£236,054	N/A	£65,271

Treatment of pre 2005 generation

Treatment of pre 2005 generation

- DPCR5 removed the exemption on pre April 2005 DG from paying use of system charges
- Determination of the appropriate test for ’undue discrimination’ and assessment of the contractual position of these generators is ongoing
- Ofgem have provided no guidance on how ‘undue discrimination’ should be interpreted in this regard
- A review of regulatory and other advice where the issue of undue discrimination has been examined leads to the following general guidance on its application

Treatment of pre 2005 generation

- There is no fully developed doctrine that defines what is of undue or due discrimination;
- Like situations/circumstances are to be treated alike, but equally non-equivalent situations/circumstances may be required to be treated differently;
- No discrimination arises where like situations are treated differently provided that the difference in treatment can be objectively justified (i.e. provided that the difference in treatment is pursuing a legitimate aim and is a proportionate means of achieving that aim or the difference in treatment reflects the differences in costs of supplying those 'persons');
- It is within Ofgem's discretion to decide whether any given class or classes of 'persons' are sufficiently "comparable" or alike;
- Determinations are made on a case-by-case basis;

Treatment of pre 2005 generation

- There is a need to first consider whether any differences in terms and conditions offered to two or more classes of 'persons' reflect differences in those persons' circumstances – differences in circumstances may constitute an objective justification for offering different terms and conditions;
- A difference in treatment could be discriminatory if it has an adverse effect on competition (where the different treatment does not reflect differences in persons' circumstances);
- Where different classes of users are relevantly different, they must be treated differently – competing service providers should be in an equivalent position; and
- Difference in existing users (i.e. pre-April 2005 connected generators) and new users (i.e. post-April 2005 connected generators) – both dealt with alike for incremental capacity, etc.

Treatment of pre 2005 generation

- This results in three areas needing consideration:
  - Are the pre and post 2005 generators ‘like’?
  - Is there an objective justification for different treatment? (what was the objective justification for different treatment in 2005 and how has this changed?)
  - Would there be an adverse effect on competition of continuing with the current arrangements or changing to a new arrangement ?

- We are still working with our lawyers on these areas and the assessment of existing contracts

Treatment of pre 2005 generation

- **If** the assessment is that pre and post 2005 generators are ‘like’ and there is no objective justification for different treatment then we are likely to be back to a modification request similar to that made early this year i.e.
  - Charge post 2005 generators the same as pre 2005 generators discounted for those elements paid as part of the original ‘deep’ connection charge

Treatment of pre 2005 generation

- A modification request to our existing use of system charging methodology will be progressed as soon as possible along with seeking to change any necessary contractual arrangements
- If this is not common with other DNO actions on this issue further changes may be needed as a result of the introduction of the EDCM

How will we choose between LRIC and FCP ?

How will we choose between LRIC and FCP ?

- Our criteria will include:
  - Feedback from affected stakeholders
  - Internal view of method that best reflects costs
  - Method that develops fastest to one that can be approved by Ofgem
  - Ofgem decision that investment by DNOs choosing FCP will be subject to greater scrutiny
  - Our ability to develop systems to deliver either method

Timetable

- Key dates going forward are:
  - 23/04/2010 – DNOs have issued a consultation on the boundary between CDCM and EDCM
  - 06/05/2010 – workshop on treatment of pre 2005 DG
  - 18/06/2010 – DNOs to issue a consultation on the entire EDCM
  - 01/09/2010 – All DNOs to submit EDCM to Ofgem for approval