

# Mod 0391 Workgroup Assessment of Charging Options



Steve Armstrong, National Grid Distribution

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# Comparison of Three Main Charging Options

## Entry Facilities provided and operated by DN

Assumptions		DN Entry-specific costs	
Biomethane Flow Facility	<b>500</b> m3 per hour	Full entry facility capital cost	<b>£300,000 one-off</b>
Annual Flow	<b>44,000</b> MWh/annum	Entry opex (odorant injection, maintenance)	£10,000 per ann
Assumed Load Factor	<b>90%</b>	Annuitisation Factor (25 years, 5.99%)	14.28
Connection at Low Pressure tier.		NPV Opex for 25 years	<b>£142,800 NPV</b>

Option 1		
Deep Connection including annuitised opex with allowance for annuitised Transp credit		
Current Transportation (no entry charge or credit)		
	Annual	NPV
Entry & Compression capex	£300,000	
Entry opex capitalised	£142,800	
Transp credit allowance	<b>-£247,176</b>	
<b>C: Overall Connection Charge</b>	<b>£195,624</b>	
T: Annual entry	£0	£0
<b>Total for Distributed Gas</b>	<b>£195,624</b>	

Option 1b		
Deep Connection covering entry facility and reinforcement capital cost		
Entry Transp charge/credit covering entry facility opex and lower system usage		
	Annual	NPV
<b>C: Entry &amp; Comp capital cost</b>		<b>£300,000</b>
Entry facility opex	£10,000	£142,800
Transportation credit	<b>-£17,309</b>	<b>-£247,176</b>
<b>T: Annual Entry Credit</b>	<b>-£7,309</b>	<b>-£104,376</b>
<b>Total for Distributed Gas</b>		<b>£195,624</b>

Option 3		
Shallowish Connection for entry facility and related system costs		
Entry Transp charge/credit covering entry facility capital, opex and lower system usage		
	Annual	NPV
<b>C: Entry Connection charge</b>		<b>£0</b>
Entry&Comp cost annuitised	£21,008	£300,000
Entry facility opex	£10,000	£142,800
Transportation credit	<b>-£17,309</b>	<b>-£247,176</b>
<b>T: Annual Entry Charge</b>	<b>£13,699</b>	<b>£195,624</b>
<b>Total for Distributed Gas</b>		<b>£195,624</b>

C: Connection charge    T: Transportation charge

# Comparison of Three Main Charging Options

## Entry Facilities provided and operated by Connectee

Assumptions		DN Entry-specific costs	
Biomethane Flow Facility	<b>500</b> m3 per hour	Minimum connection capital cost	<b>£50,000</b> one-off
Annual Flow	<b>44,000</b> MWh/annum	Entry opex (odorant injection). Any maintenance?	£0 per ann
Assumed Load Factor	<b>90%</b>	Annuitisation Factor (25 years, 5.99%)	14.28
Connection at Low Pressure tier.		NPV Opex for 25 years	<b>£0 NPV</b>

Option 1		
Deep Connection including annuitised opex with allowance for annuitised Transp credit		
Current Transportation (no entry charge or credit)		
	Annual	NPV
Minimum entry connection		£50,000
Transp credit allowance		-£247,176
<b>C: Overall Connection Credit</b>		<b>-£197,176</b>
T: Annual entry	<b>0</b>	£0
<b>Total for Distributed Gas</b>		<b>-£197,176</b>

Option 1b		
Deep Connection covering entry facility and reinforcement capital cost		
Entry Transp charge/credit covering entry facility opex		
	Annual	NPV
C: Minimum entry connection		<b>£50,000</b>
T: Annual Entry Credit	<b>-£17,309</b>	-£247,176
<b>Total for Distributed Gas</b>		<b>-£197,176</b>

Option 3		
Shallowish Connection for entry facility and related system costs		
Entry Transp charge/credit covering entry facility		
	Annual	NPV
C: Entry Connection charge		<b>£0</b>
Entry facility cost annuitised	£3,501	£50,000
Transportation credit	-£17,309	-£247,176
T: Annual Entry Credit	<b>-£13,808</b>	-£197,176
<b>Total for Distributed Gas</b>		<b>-£197,176</b>

C: Connection charge    T: Transportation charge

Note: For simplicity, this assumes that all the entry facilities are provided and operated by connectee. Some DNs may not support third party operation of some activities.

# Assessment of Invoicing Costs for Options

Billing Party	Option 1	Option 1b	Option 3
	Deep Connection including annuitised opex with allowance for annuitised Transp credit  Current Transportation (no entry charge or credit)	Deep Connection covering entry facility and reinforcement capital cost  Entry Transp charge/credit covering entry facility opex and lower system usage	Shallowish Connection for entry facility and related system costs  Entry Transp charge/credit covering entry facility capital, opex and lower system usage
<b>Xoserve, for entry transportation charge</b>	None	£0.8 to £1.5m development cost estimated	£0.8 to £1.5m development cost estimated
<b>DN, for connection charging</b>	Small incremental cost within current connection charging process	Small incremental cost within current connection charging process	None
<b>Shippers</b>	None	?	?

## Assessment of Charging Options – Option 3

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- Move to a shallowish connection regime
- Key benefit is reduction of up-front cost to connectee
  - However, anticipated reduction in level of costs for entry facility equipment to ~£300k reduces this benefit
- Drawbacks outweigh benefit:
  - Recovery of entry capital costs through transportation charges introduces stranding risk for other users
  - Charges would apply to shipper; less transparent locational charging signal for connectee
  - Could distort decision on facility ownership for connectee
  - Less obviously consistent with basis of RHI for Biomethane
- Conclusion: drawbacks outweigh benefits

# Assessment of Charging Options – Option 1 vs Option 1b

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- Under both options any entry facility and associated deep reinforcement capex by DN would be reflected in connection charge to connectee
- Key difference is treatment of entry opex costs and credit related to lower network usage of distributed gas relative to NTS-sourced gas
  - Under Option 1 estimated future value is capitalised and charged/credited to connectee
  - Under Option 1b values are reflected each year in entry transportation charge/credit to shipper
- Option 1b is preferable pure charging approach
  - Opex and credit are ongoing annual values so most appropriate to reflect in annual transportation charges
  - Capitalisation of values would introduce risk to other users if connectee is not there for full assessment period
  - Assessment of future opex costs over 20 year period is inherently difficult
  - Any credits provided are a means of adjusting for existing exit-based transportation charges which assume gas is transported from NTS, so most appropriate to handle as transportation charge and to apply to shippers rather than connectee
  - Provision of a capitalised credit would effectively increase DN costs, requiring complex price control adjustment under RIIO proposals to leave DN neutral – any adjustments would probably be made over many years giving less transparency
- Option 1b charging approach should better facilitate development of distributed gas than Option 1
- However, Option 1b will lead to additional development costs for Xoserve, initially estimated at £0.8m to £1.5m

# Assessment of Charging Options – Wider Considerations

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- Potential level of credit for the example shown, where the facilities are provided by connectee (Slide 3) is around £17k under Option 1b, converted to capitalised payment to connectee of around £250k under Option 1.
- For a small number of such distributed entry points, the additional invoicing cost of Option 1b would not seem justified.
- However, need to consider potential future number of distributed entry points.
- Meeting DECC target for 2020 of 7 TWh low carbon gas would require around 160 of such sized distributed entry connections – actual number would depend on size of connected facilities
- With this number of distributed gas connections at 2020:
  - Annual credits under Option 1b could be £2.8 million
  - Equivalent capitalised value would be around £40 million
- Substantial further growth in number of distributed gas connections is expected beyond 2020
- Charging approach adopted now would also apply to distributed gas connections for:
  - Shale gas
  - Coal bed methane
  - Any other entry connections to distribution system
  - Potential size of such individual gas connections is substantially larger than example used
- Conclusion  
Additional cost of providing the most appropriate charging approach, Option 1b, is justified by the benefits expected over the longer-term with regards to facilitation of distributed gas

# Cost Elements of Entry Transportation Charge/ Credit under Option 1b Approach

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- Opex related to DN-operated entry facilities and any deep entry-related reinforcement/equipment
  - E.g. odourisation opex, within-network compression opex
  - Assessed individually for each entry point
- Credit related to lower system usage of gas entering directly to the distribution system
  - Partial offset for exit-based transportation charge which assumes that gas enters distribution system from NTS
  - Reflects:
    - NTS Exit capacity costs (with reliance factor) – use average ECN charge value and assumed reliance factor
    - Costs of distribution system tiers upstream of entry connection tier - use tier costs underlying LDZ System charges



# Proposed Form of Entry Transportation Charge/Credit under Option 1b Approach

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- Propose Entry Commodity Charge/Credit only
- Entry facility opex such as odourisation opex and within-network compression costs best relate to throughput
- Commodity form is best for credit for lower system usage
  - Commodity form is a robust basis for determining a credit which avoids potential gaming issues of capacity basis
  - Capacity for distributed gas entry connections is difficult to determine in a robust manner
- Entry commodity invoicing may be cheaper to develop than entry capacity charging (which present Xoserve estimate is based upon) since entry throughput is already measured
- Entry commodity transportation charge/credit provides a clear signal of the relative value of distributed gas relative to NTS-sourced gas for the shipper and connectee
- Entry commodity form for Distributed Gas may in future also be utilised for entry commodity rebate of NTS Exit commodity charges

## Example of Level of Commodity Charge

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- For example load as shown in Slide 3
  - 500 m<sup>3</sup> per hour biomethane flow
  - Connected to Low Pressure tier
  - Entry facilities provided and operated by connectee
  - 44,000 MWh/annum entry throughput of gas
  - Net entry credit of £17,309 per annum
  - Invoiced as 0.0393 p/kWh credit to shipper at entry point
    - Equivalent to 1.2 p/therm credit
- Entry capex, e.g. £50,000, invoiced to connectee as connection charge

## Ongoing Determination of Distributed Entry Commodity Charges

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- Entry charge/credit value would be updated each year by reference to:
  - Standard LDZ System charge level tier components
  - Forecast entry-related opex
- Individual calculation for each Distributed Gas entry point since dependent on:
  - Tier of connection
  - Forecast opex
- For DN, entry transportation credits provided would form part of Distribution LDZ System transportation revenue and so impact on level of standard LDZ System charges