Future Billing Methodology

1. Challenges of the FWACV Billing Regime
2. Proposal for 2017 NIC Project on Future Billing Reform

June 2016

1. Challenges of FWACV Billing

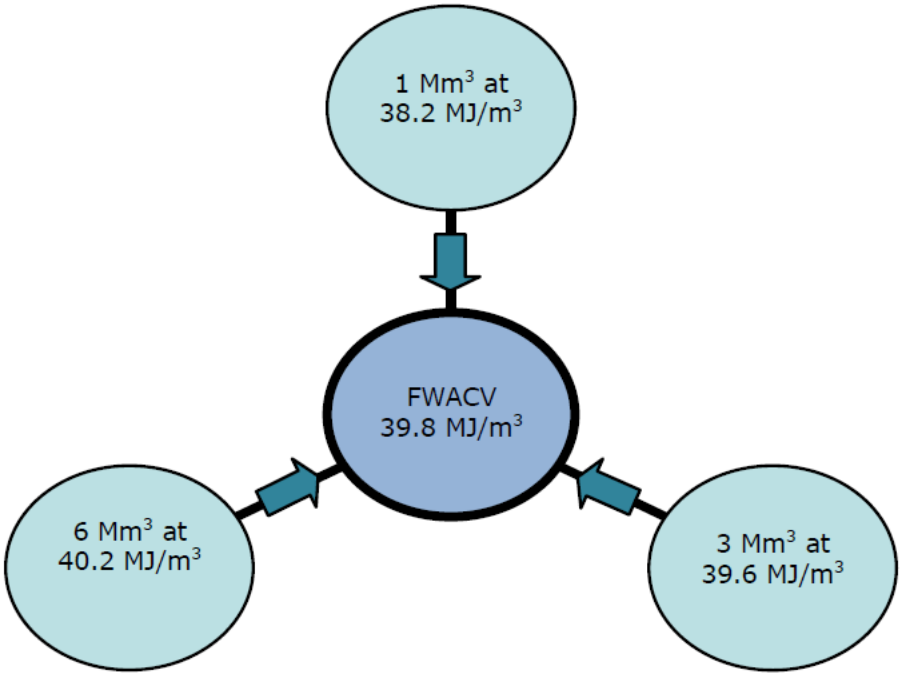
Future Billing Methodology - Project Aim

- Investigate the FWACV billing regime to facilitate the injection of volumes of gas with calorific values (CV) that are significantly higher or lower than the prevailing FWACV on the network.

Issue

- Currently, low CV gas is invoking the cap of 1 MJ/m^3 resulting in:
  - Increased levels of CV shrinkage gas
  - Differences between consumers' delivered and billed CV
  - Increased costs over the gas transportation chain

Recap – How the FWACV Cap Operates



$$FWACV = \frac{(1x38.2)+(3x39.6)+(6x40.2)}{(1+3+6)}$$

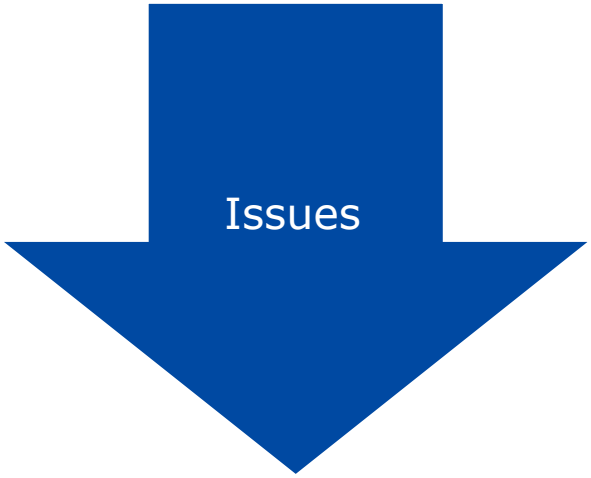
$$= 39.8 \text{ MJ/m}^3$$

$$\text{Capped FWACV} = (38.2 + 1) \text{ MJ/m}^3$$

$$= 39.2 \text{ MJ/m}^3$$

FWACV – How Low CV Gas is Currently Accommodated

Increase in "green" gas
Add propane to prevent CV Cap
FWACV billing restored
Minimal CV shrinkage

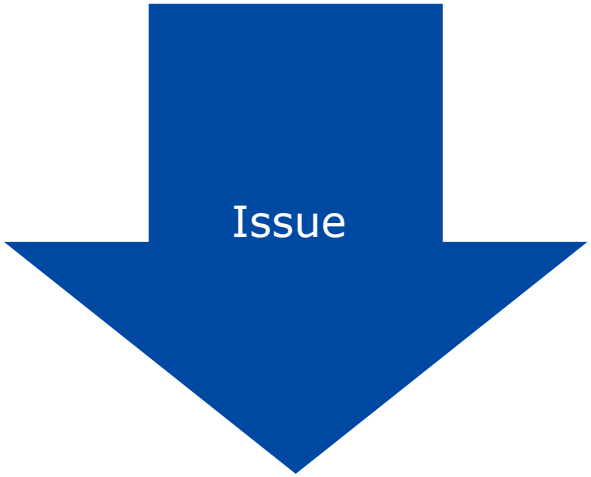


RHI incentive for propane costs
Increase in high carbon gas
All gas consumers pay more
Cross subsidy

FWACV Cap – Impact if no Propane Addition to Low CV Gas

All consumers pay less (disadvantaged still pay too much)

No propane costs



NTS buys increased CV shrinkage gas

All consumers pay more

Insignificant volumes have significant impact on billing

Cross subsidy

FWACV Tipping Point – When does the cost of propane….

Equal the cost of a better solution?

Equal the cost of CV shrinkage gas?

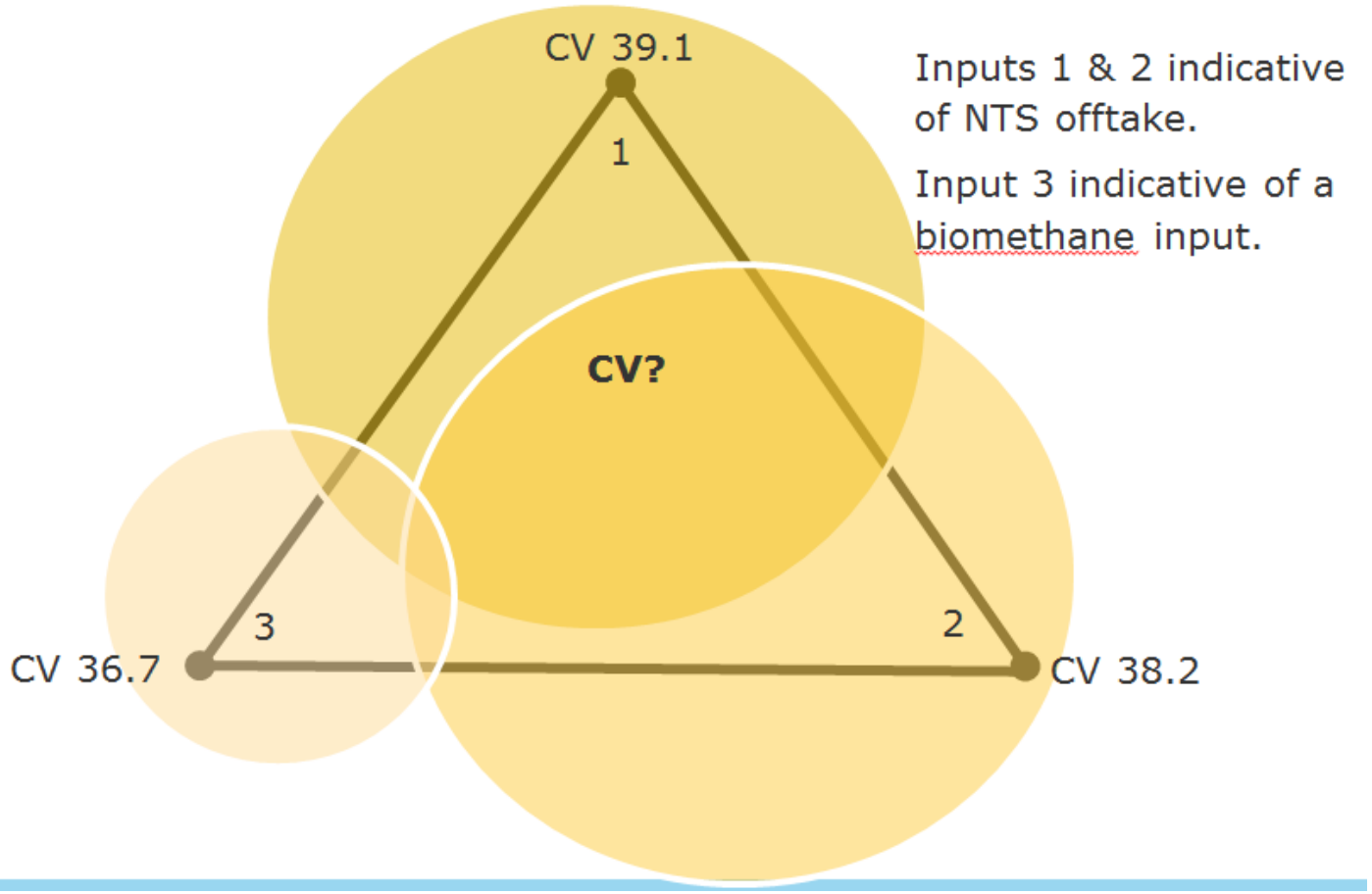
FWACV Tipping Point – Other Influences

Availability and price of propane

RHI – under constant political review

Cross subsidy – Regulatory concern

Average Consumer – 13,500 kWh per year



Average Consumer – 13,500 kWh per year and £0.0486/kWh

Input	1	2	3a	3b
Gas type	NTS	NTS	Low CV + propane	Low CV (no propane)
Actual CV	39.10	38.20	38.00	36.70
FWACV	38.65	38.65	38.65	
Capped CV	37.70	37.70		37.70
Consumer Bill				
Scenario 1 FWACV	£663.23	£678.86	£682.43	
Scenario 2 capped CV	£646.93	£662.17		£689.24
Scenario 3 actual CV	£670.95	£670.95		£670.95
Capped - FWACV	-£16.30	-£16.69	£6.81	
Actual - FWACV	£7.72	-£7.90	-£11.48	

Quantification of FWACV – Model One Year in GB Networks

- Mathematical model to demonstrate the overall impact on consumer bills

Key Assumptions / Simplifications

- The different gas flows into an LDZ do not mix
  - Consumers see one of the gases entering the LDZ that day
- Number of MPRNs in an LDZ according to Xoserve
  - MPRNs are allocated each day to each gas flow according to proportion of LDZ energy
- Overall LDZ energy stays the same as low CV gas increases
  - All other supplies are displaced on a pro-rata basis

Quantification of FWACV – Model One Year in GB Networks

- Model of CV Billing
  - Daily volume, energy and average CV at all LDZ entry points (& inter-LDZ flows)
  - Used data for GB from 2011 (for comparison with Ofgem approved T/P correction study on consumer meters)
- For day 1…
  - From volume flows and daily average CV calculate true energies
  - From volume flows and FWACV calculate billed energies
  - Calculate over/under-billed energies for each entry point
  - Calculate over/under-billing per MPRN for each entry point assuming average domestic price of gas
- Repeat for days 2-365 and sum over the year

Quantification of FWACV – Model One Year in GB Networks

Cowpen Bewley -£16.07 pa
Weston Point -£10.49 pa
Lockerbie -£8.94 pa

Isle of Grain £24.44 pa
Coldstream £15.49 pa
Humbleton £15.43 pa

Quantification of FWACV – Model One Year in GB Networks

When does cost of propane enrichment equal cost of shrinkage gas?

- Add low CV gas to each LDZ – the same amount each day
- Day 1:
  - Calculate unbilled energy for GB as a whole as before (capping always occurs for CV 37 MJ/m^3)
  - Calculate cost of unbilled energy from average price of shrinkage gas over last 12 months
  - Calculate cost of propane (simplified model of enrichment) assuming 16 p/litre (2.27 p/kWh).
  - Cost of shrinkage gas – average over last 12 months at 1.74 p/kWh
  - Adjust flow of low CV gas until cost of shrinkage gas and propane are equal
- Repeat for days 2-365

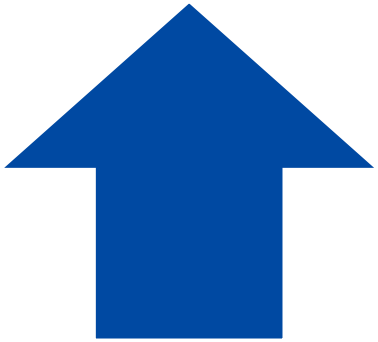
Tipping Point at Current Shrinkage Prices is £135m

Propane 2.27 p/kWh

Low CV gas = 19.3% of GB energy

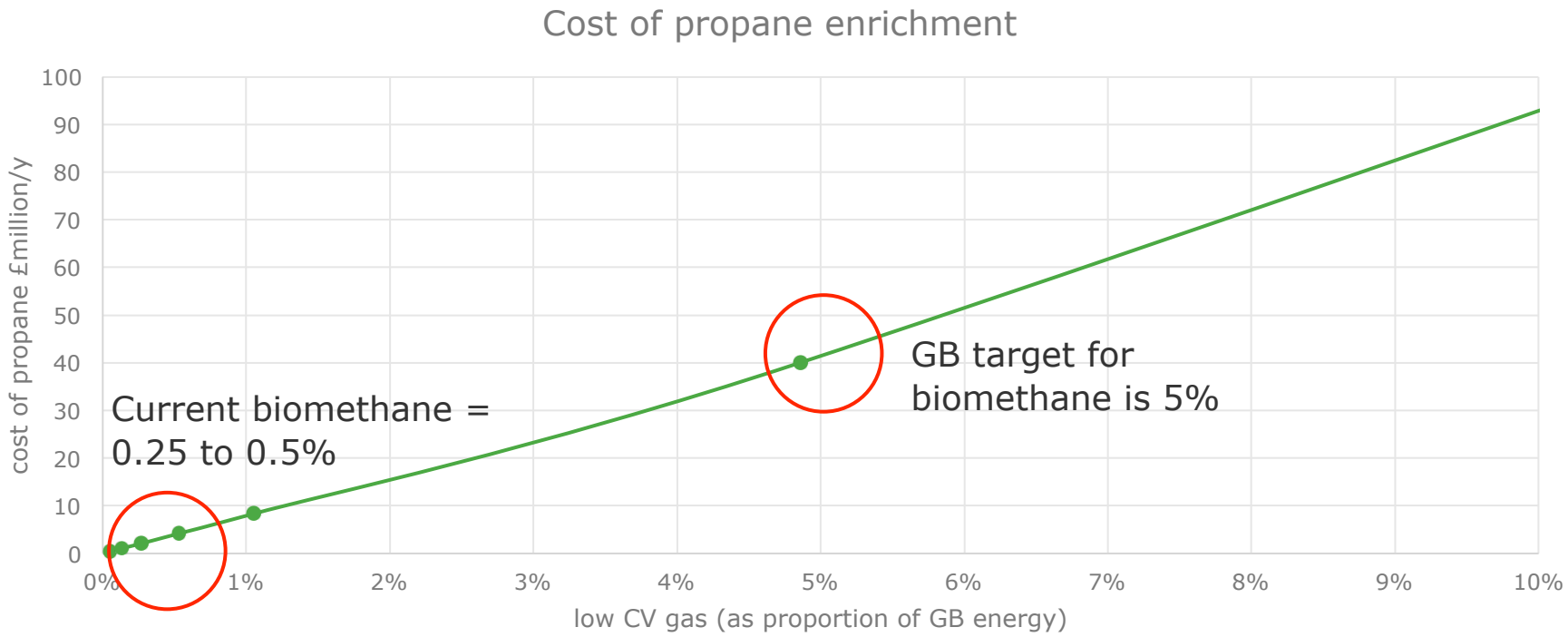
Shrinkage gas 1.74 p/kWh

Cost of shrinkage gas



Tipping Point for Propane Addition & FWACV Billing Reform

- Cost of enrichment is around £2 million pa when low CV gas accounts for 0.25% of GB energy. Propane assumed to cost 2.27 p/kWh



CV Billing Quantification of Issues

Preliminary Conclusions

- Over/under-billing varies from around +£24.44 to -£16.07 pa

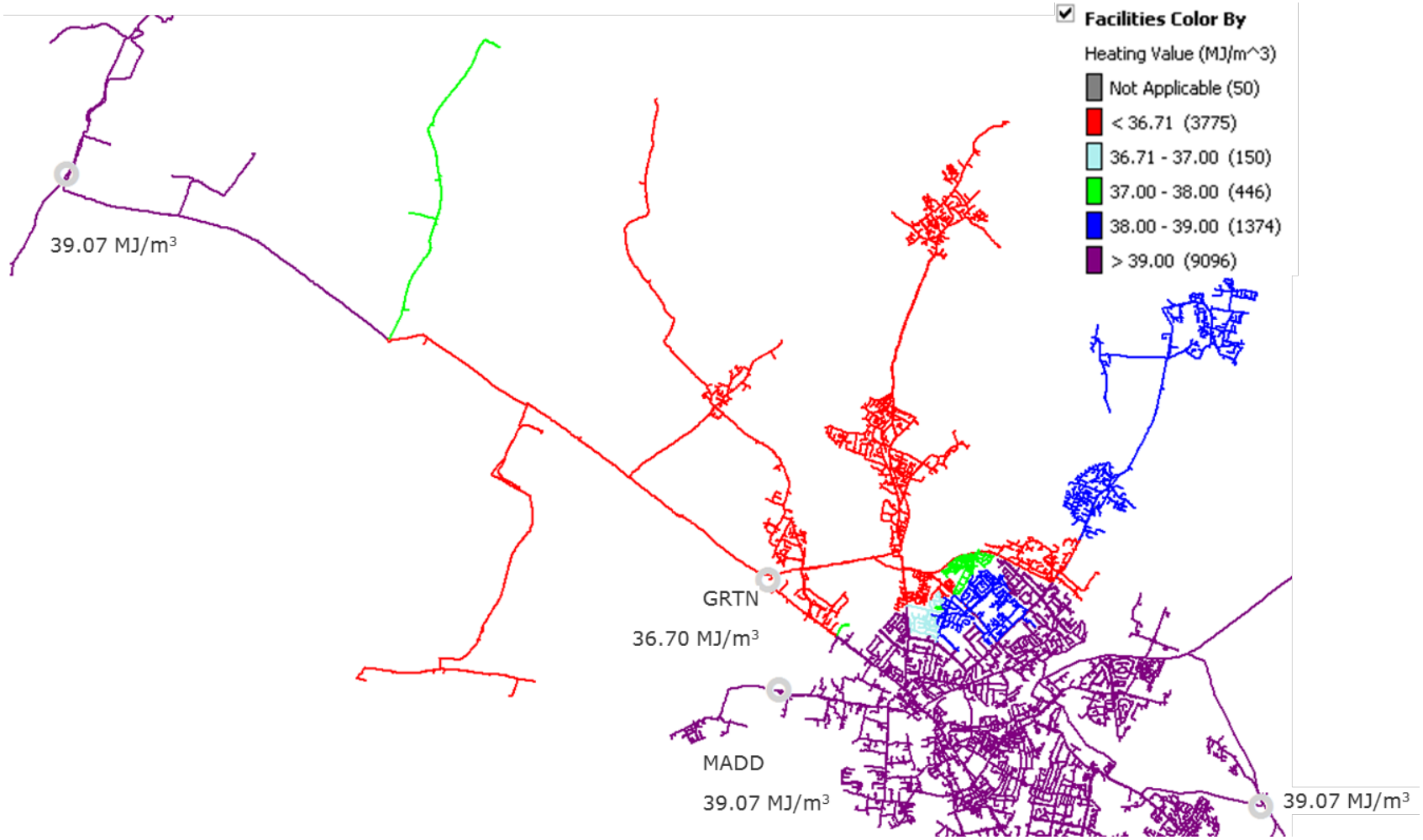
- Cost of GB shrinkage around £135 million/year
  - All LDZs would be capped to 38 MJ/m^3
  - Relatively insensitive to low CV gas volume

- Cost of enrichment
  - Around £2 million/year when low CV gas accounts for 0.25% of GB energy

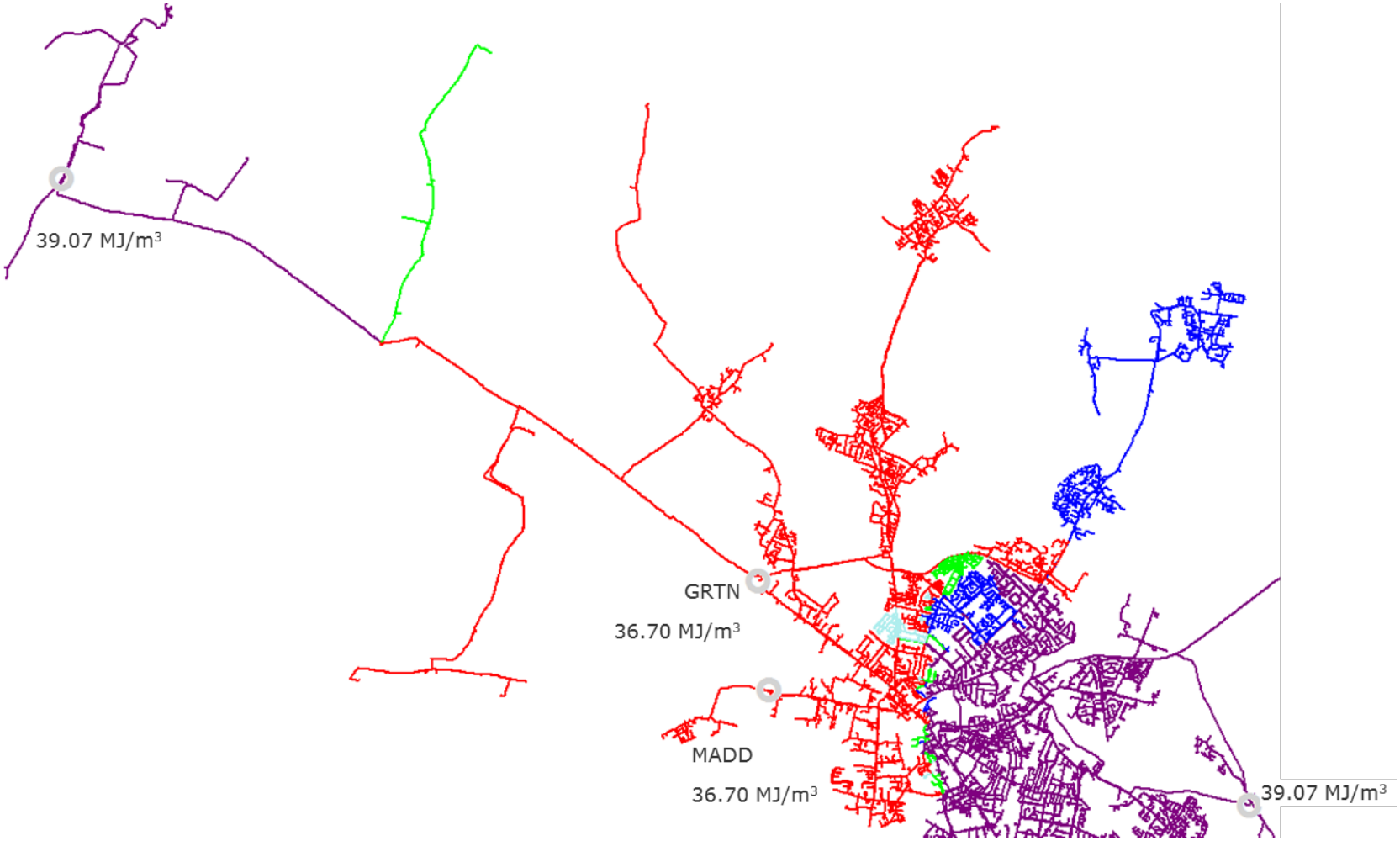
2. Proposal for 2017 NIC Project

Billing Reform Methodology

Cambridge - IP/MP/LP High Network Demand Flow Conditions



Cambridge - IP/MP/LP Low Network Demand Flow Conditions



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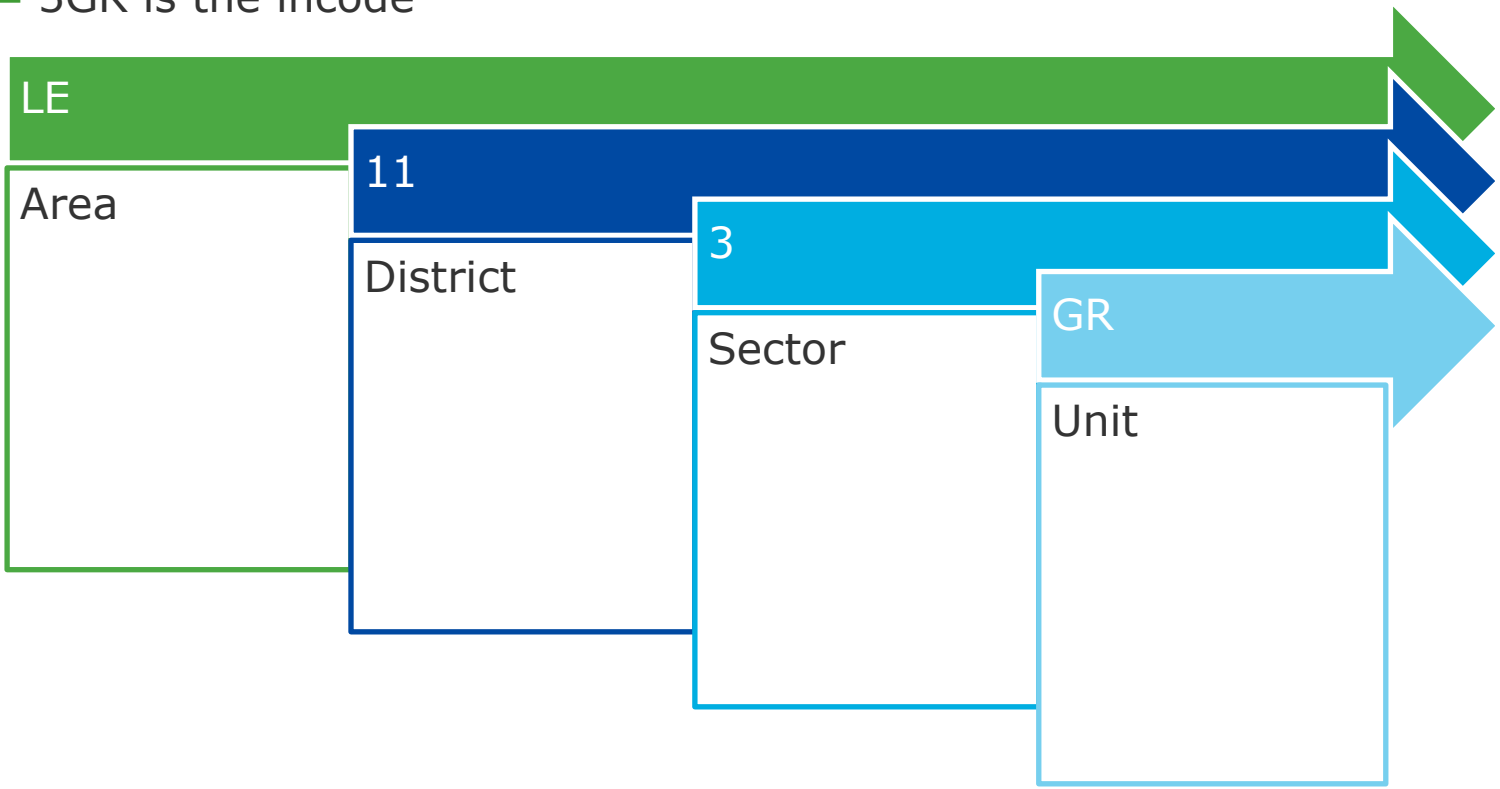
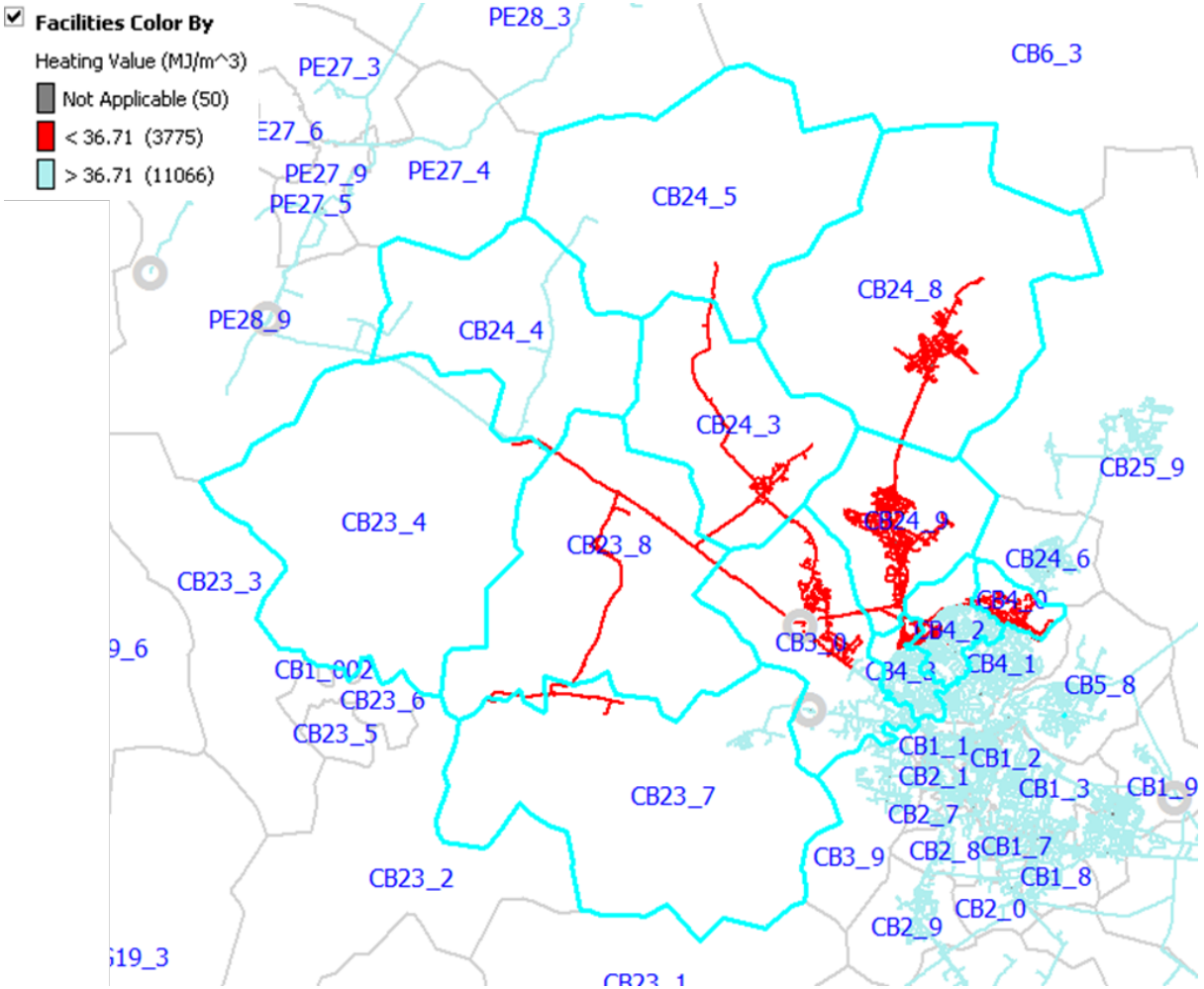
Initial Concepts Using Postal Zones

- LE11 3GR
  - LE11 is the outcode (approximately 5000)
  - 3GR is the incode



Cambridge – High Network Demand Flow Conditions



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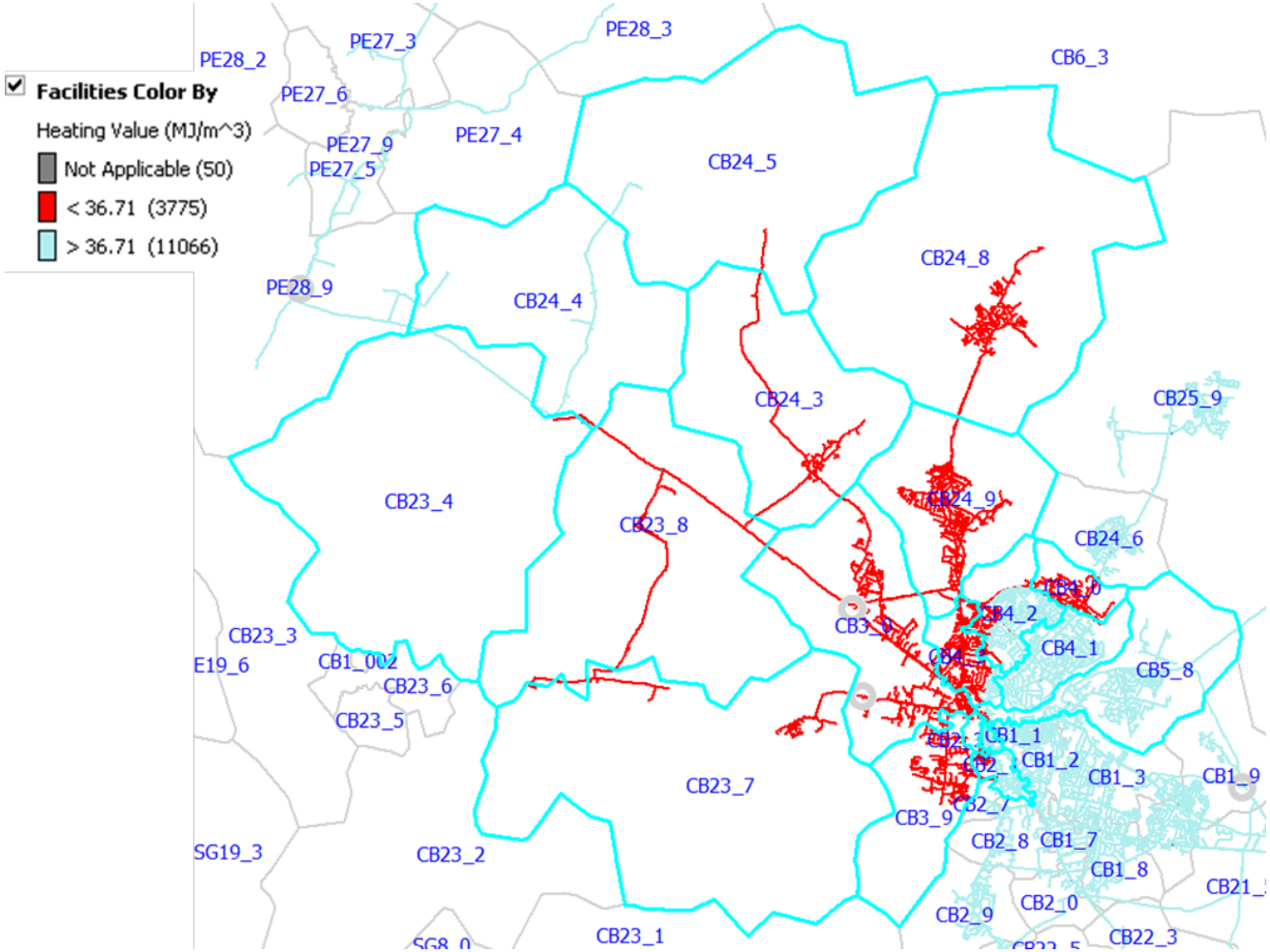
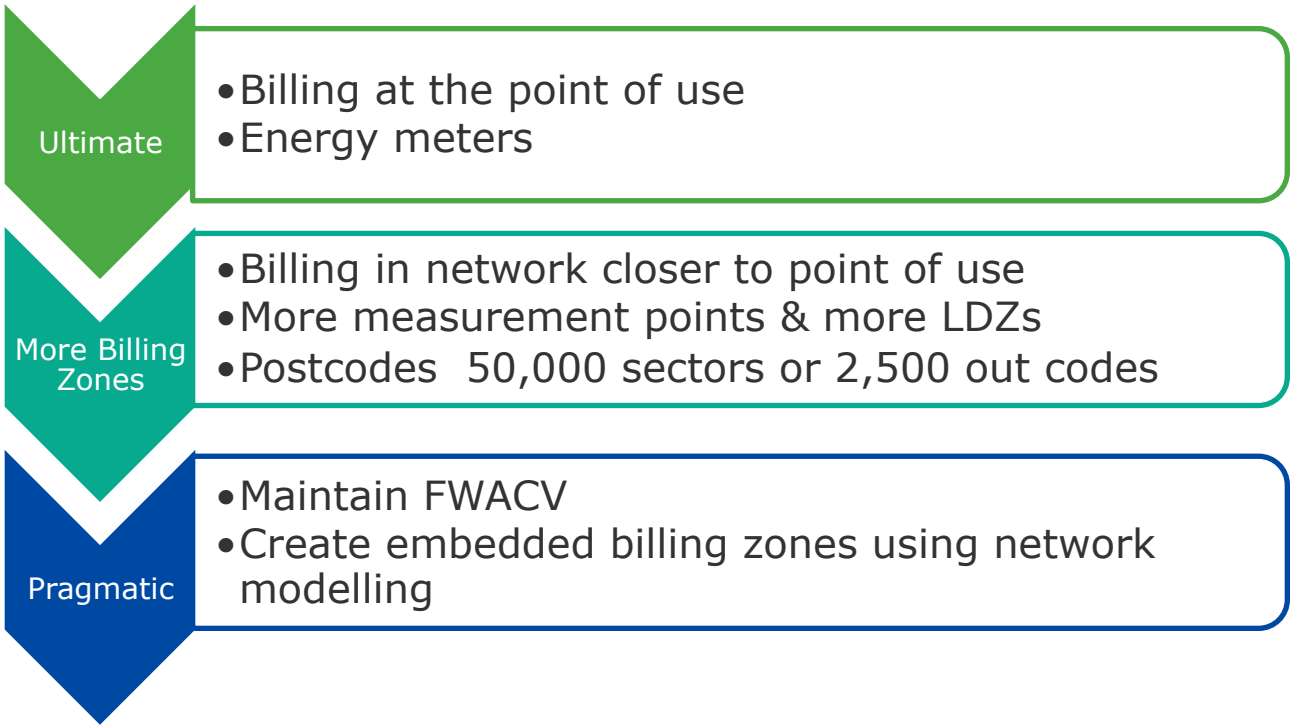
Cambridge – Low Network Demand Flow Conditions



Opportunity to Investigate Fairer Billing under NIC

- Benefits many stakeholders including GB gas consumer
- Addition of propane is not a sustainable solution under FWACV
  - Becomes increasingly uneconomic and inefficient
  - Additional burden to the UK renewables targets



Scenario 1 - Bill on Received CV

Benefits

- The market is opened up to more gas producers as CV can vary
- Less costly to gas producers as operating costs reduced
- Fair billing based on received CV
- Reduce volume of unbilled energy
- No change to the Gas Act
- No longer using the RHI cross-subsidy

Issues

- Cost of installing CV measurement at each meter
- Cost of a change the billing system to allow individual CVs per MPRN
- Change to Ofgem governance processes
- Probably not yet achievable but should be ultimate goal

Scenario 2 – More Measurement Points Based on Post Codes

Benefits

- The market is opened up to more gas producers
- 50,000 measurement points based on postcode sector level to give an average CV for smaller billing area
- *Alternatively use post-out-code; fewer approximately 2500*
- Fairer billing
- No change to the Gas Act
- No longer using the RHI cross-subsidy

Issues

- Determine level of postcode to use – out-code or sector code?
- Change to billing system
- Change to Ofgem governance
- Measurement points within the network; cost associated with this 50,000 x £200(??) = £1m (for 50,000 sector codes), plus data collection & maintenance.
- Additional work required to assign a postcode with a billing CV
- Reconciliation across shippers

Scenario 3 – Create Embedded Charging Zones

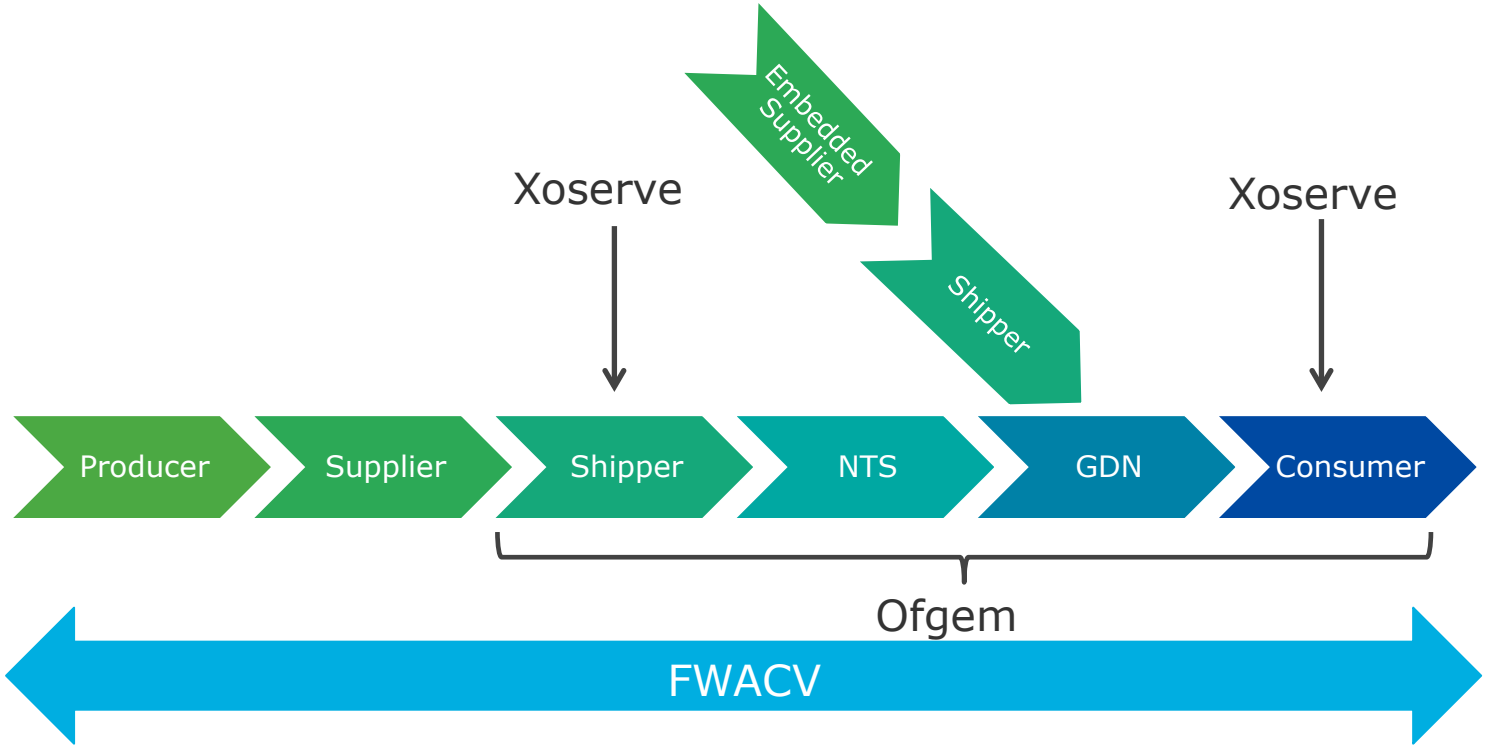
Benefits

- Market opened up to more gas producers within limitations of GS(M)R
- Operating costs for suppliers are reduced
- Maintain principle of FWACV
- Fairer billing for those receiving gas outside agreed target, consumers not over billed
- No additional measurement point in the system
- Allows for more equitable billing in areas fed by high CV embedded sites as well as low CV sites
- No change to the Gas Act

Issues

- Define agreed limits of CV (as present?)
- Change the billing system to allow different CVs (based on area defined by postcode?)
- Additional network analysis required at time of quotation / connection for identification of FWACV 'exception' postcode zones for billing
- Change to Ofgem governance processes
- RHI cross-subsidy if propane used

Stakeholders



Thank You

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