Engineering Justification Paper

Industrial & Commercial Automated Meter Reading Equipment Replacement Programme

Final Version

Date: December 2019

Classification: Highly Confidential

1. Table of Contents

2 Introduction

2.1 General Background

This workstream aims to address the ageing automated meter reading (AMR) assets within SGN. SGN are proposing to request funding to replace the now obsolete and unsupported AMR devices which it currently owns and operates throughout the Scotland, South and South East LDZ's.

SGN's AMR portfolio of 3592 devices (as of 20th June 2019) is essential to allow SGN to develop End User Categories and Demand Models of the gas network.

2.2 Site Specific Background

This is a programme of works and covers multiple sites across the SGN AMR portfolio. These meters are predominately located on industrial and commercial sites.

3 Equipment Summary

AMR devices across eight gas consumption bands provide us with daily demand data which assists decisions relating to; Security of Supply, PRI capacity requirements, Bio-Methane Capacity Studies, seasonal contract / nexus Enquiries, mains replacement analysis, reinforcement analysis, connections enquiries, Network Validation, MOD 390 annual reviews. In short, the data provided is critical to most investment decisions on the network.

The AMR devices are predominantly utilised with end users who operate outside of the standard demand estimation models. The devices provide real world demand and profiling data that underpin every decision made within the Network Directorate, and subsequently most investments made by SGN. The information is fundamental to the accuracy of the Network Models and as such is key to decisions relating to Security of Supply investments, Network reinforcement, Bio-Methane injection potential and Capacity analysis amongst others

4 Problem Statement

Why are we doing this work and what happens if we do nothing?

SGN's current supplier of AMR devices has discontinued production and therefore supply of the equipment is extremely low. Furthermore, most units currently installed are approaching the end of their asset life and are due for replacement as they were initially installed prior to the GD1 price control period. This project will look to address these supply issues and replace faulty and unsupported/obsolete assets to enable us to improve performance against aggregate AMR portfolio targets.

To ensure continued meter read availability, SGN will be looking to steadily replace our current AMR portfolio with newly procured equipment. SGN will be proposing to request funding to replace 50% of the existing AMR units in the field, and this would allow SGN to hold enough spares for those units which will remain in service.

What is the outcome that we want to achieve?

To undertake this replacement programme, investment will also be required to upgrade and change our current support software.

As a Gas Transporter SGN is required under The Gas Act (1986), Gas Safety (Management) Regulations – 1996 (GSMR), to provide accurate metering. As part of network analysis and modelling potential forecasting it is imperative that SGN have effective equipment when metering gas. This aids the Network Analysis team in providing accurate models of what future gas demand may look like.

How will we understand if the spend has been successful?
SGN will be able to continue to provide the existing service to its commercial and industrial portfolio of customer with the infrastructure in place (enough spares) to continue to operate and maintain the asset portfolio.

4.1 Narrative Real-Life Example of Problem

Example 1 – Reinforcement
Several potential housing developments and industrial developments were identified for the Elgin Area in the Moray Council Local Plan. Through engagement with Moray Council it was confirmed that these developments were going ahead. The forecast models for the existing Elgin – Fochabers system (Figure 3) predicted that reinforcement would be required – See Figure 3 CPM6814 circa 2.3km if 12" ST / 355mm HDPE – to be able to maintain security of supply with these new loads connected.

The Elgin – Fochabers IPMP system supplies a significant number of large non-domestic customers (Table 1). These customers are modelled with a calculated peak demand, or where available an SHQ as nominated by the shipper (see DDS Demand column).

What Table 1 demonstrates is that by analysing the available data for these industrial/commercial customers we were able to identify the actual peak usage for the sites. By analysing the data for several years we could further demonstrate trends in the usage for the sites and therefore take confidence in any assumptions we made around gas usage on the network.

By analysing the available AMR logger data for the network we were able to reduce the industrial / commercial demand on our models. This released capacity on the system that could be utilised by the new developments. The required reinforcement was deferred on the back of these assumptions. The cost of the reinforcement was estimated at £1.8m.

Table 1: Commercial Confidentiality

Figure 1: Security

Figure 2: Security

Example 2 – Biomethane NEP – Capacity Study – IP Connection

Requests from Bio-Methane plant developers for network entry connections post unique challenges for the network. The sites don't have an on / off switch. They produce gas at a relatively constant rate and therefore need to either inject the gas into the distribution system, or the gas gets vented which has both financial and environmental impacts.

It is therefore essential that any commitment to accept gas SGN give a developer is accurate and reliable. Potential injection levels into a system correlate with the levels of demand taking gas out of a system. Accurate profiling of demand is essential, however traditional demand models can be inaccurate for individual end users. A large non-domestic user would be profiled as having high peak / low off peak usage, but actual logger data may demonstrate that this user in fact operates at a constant level 24 hours a day. If logger data is available for multiple sites on a system we can combine the reads and build up a picture of actual non-domestic usage on the system. This gives us a solid foundation from which to make a commitment to the developer.

4.2 Spend Boundaries

The spend related to this project will replace ageing AMR assets currently in use and update the out-of-support IT software. No provisions were made in GD1 to replace faulty assets and ensure replacement hardware and software is available as the current equipment is obsolete to allow SGN to achieve non-daily meter targets set by the Central Data Service Provider (CDSP)

This programme excludes any corrector work.

The Central Data Service Provider (CDSP, commonly referred to as Xoserve), have recently approached all the Gas Distribution Networks regarding the potential for them to take on AMR portfolio management as a service provider. At this point in time, Xoserve have been unable to present in any detail the costs or scope of this service and so we have been unable to assess whether this would be an option which would be taken by SGN in the future.

What are the key areas for decision/discussion

An area to be discussed is the approach to this replacement project. Third party service providers are now readily available and competitively priced which could generate longer term savings. The decision of a contractor or internal led replacement programme would be subject to the outcome of a procurement event and business case.

Key legislative Compliance:

The Uniform Network Code (UNC) comprises a legal and contractual framework to supply and transport gas. It has a common set of rules for all industry players which ensure that competition can be facilitated on level terms. Under the UNC Transportation Principle Document, Section H specifically refers to SGN's obligations to obtain data at Supply Meter Points comprised of Non-Daily Metered Supply Points. As a result, SGN has installed and operates remote meter reading equipment to fulfil this obligation and shares the data with the CDSP.

5 Probability of Failure

The majority of SGN's current Metretek GSM24 AMR devices, as shown in Figure 1 Below, were installed 10 years ago, prior to GD1, and have since been discontinued. In order to manage gas consumption across the network, it is essential we replace faulty devices and achieve aggregate targets set by the CDSP Committee.

From the end of 2015 to 2019, there has been a recorded 542 faults across the full network. reported on the Metretek device. These faults have been identified by E&I Operations and logged on SGN's fault/1 forms. The nature of these defects are most notably loss or poor communications of the device. This can be caused by a number of issues such as low battery, faulty BT line or ageing parts. The average mean time between failures for this equipment from 2015-2019 is 80.8 hours for which has required E&I Operations to attend site for each fault.

Figure 3: SGN's current AMR Device – Security

5.1 Probability of Failure Data Assurance

SGN utilise a maintenance management systems called MAXIMO which has a schedule of annual maintenance work orders for these data loggers. E&I Operations within SGN attend these maintenance visits, and if there are any failures they are recorded on a Fault/1 forms and returned to a dedicated E&I faults inbox.

These faults and failures are recorded and tracked from a central locations.

6 Consequence of Failure

Loss of Supply to Customers

Maintaining an AMR portfolio across our networks is essential to determine demand for gas. AMR equipment is installed across a range of End User Categories to build mathematical models which estimates daily demand at system exit points. These mathematical models subsequently determine Supply Point Capacity and establish nominations and daily offtakes and allocations of Unidentified Gas.

Whilst AMR analysis is extremely important for modelling accurate gas demand levels, if SGN suffered failures with logging data, this would not lead to a loss of customers as the gas supply would not be affected. However, it would impact SGN in a negative way as un-metered gas means a loss of revenue for the company.

Safety Impact of Failure
As per clause 1.6 of the 'Uniform Network Code – Transportation Principal Document, Section H – Demand Estimation and Demand Forecasting', gas transporters must obtain data as to daily offtakes of gas at the Supply Meter Points comprised of NDM Supply Points in each relevant LDZ. Our portfolio of AMR devices are placed at Supply Points we have selected from a pool of candidate NDM Supply Points identified by the CDSP having different Annual Quantities and geographical locations.

Degradation or failure of an AMR system should not provide any safety issues to both SGN staff or customers. The AMR is simply a data logging system and any failures would not have an impact on human life.

Environmental Impact
Without the data provided by our AMR portfolio, the CDSP would be unable to accurately build demand forecasting models for gas which could lead to greater risk to end consumer security of supply or a more inefficient gas network.

SGN have previously not had any environmental issues due to failures with regards to AMR's and therefore do not envisage any future impact that would be of concern.

7 Options Considered

Replace on Failure
This option is the least cost effective, as each repair would need to be on an ad-hoc basis. This means that cost savings associated with bulk buying/tendering or savings through bulk installations cannot be obtained and potentially inflated costs due to emergency works and potentially outsourcing works at higher rates if resourcing becomes an issue.

Repair on Failure
This option is not considered as the equipment is now obsolete and spares/parts aren't available come 2022, therefor repair on failure would not be possible, and replacement would become the default action required.

Pre-emptively replace
This is the most cost-effective option, as procurement of equipment and installation could be packaged up and the greatest cost discounts could be achieved.

Two variations of this option have been considered in the cost benefit analysis of this paper, those being full 100% replacement or 50% replacement during the GD2 period.

Pre-emptively Repair
This option is not considered as the equipment is now obsolete and spares/parts aren't available come 2022, therefore repair would not be possible, and replacement would become the default action required. The most cost-effective replacement option would be for 50% replacement and 50% made available for spares

Do Nothing
Do nothing is not an option, as this is a legal obligation from OFGEM. The Do nothing (or base case) option will be as a minimum the "Replace on Failure" with the preferred and most cost-effective option being "Pre-emptively replace" option.

7.1 Replace on Failure Option Summary

The technical detail of the option i.e. capacity, system rating, availability etc.
This option is to replace the AMR's when they fail. This would result in a loss of metering data and a non-compliance with SGN's Uniform Network Code obligations.

The basis for the cost estimate/unit cost
This is the least cost-effective options as it will result in an increase in costs as E&I operative would have to plan an unscheduled visit to site to carry out the replacement works. It will also result in a higher cost as SGN will need to procure the replacement AMR on an individual basis, so economies of scale discounts cannot be applied.

The perceived benefits of the option
SGN do not see the benefits of this option, is the same costs for software and back office will still be required. This is because the new AMR's require new software, so regardless of if we replace the AMR's for new on replacement or pre-emptively the same costs will still exist.

Delivery timescales
This could be over a number of years, depending on how the failures are spread across the coming years. In terms of delivery timescales of a replacement – this could be months of no data logging depending on lead time for procurement and scheduling an install date.

Key assumptions made
Assumption is that SGN would have procured new software to allow SGN in install the new AMR assets.

Any other items that differentiate the option from the others considered
This is to replace AMR's on failure. The other two options are to proactively replace all or 50% of hem over a five year period.

7.2 Pre-emptively Replace All AMR's Option Summary

The technical detail of the option i.e. capacity, system rating, availability etc.
This option is to replace all AMR's over the five-year GD2 period. These would be replaced during the routine maintenance and inspection visit, so there would be minimal downtime. As this is a pre-emptive program of works, materials would be on hand and delivery timescale of AMR replacement would not result in any loss of record or noncompliance with UNC obligations.

The basis for the cost estimate/unit cost
The costs for these units have been provided for by using the cost per unit for the data loggers and building in contract labour and project management and on-site commissioning costs.

The perceived benefits of the option
This option delivers cost savings through tendering processes and also achieving greater discounts on materials through economies of scales purchasing and also allows for a reduction in labour as the install can be done during routine maintenance visits.

Delivery timescales
This would be delivered during the five-year GD2 time period.

Key assumptions made
It is assumed SGN have enough spares holding to manage through to the GD2 price control period before having to opt using the new AMR devices. The replacement volume may be decreased if SGN need to begin this process pre GD2.

Any other items that differentiate the option from the others considered
The is to pre-emptively replace 100% of AMR assets, whereas the other two options are to replace 50% or replace on failure.

7.3 Pre-emptively Replace 50% of AMR's Option Summary

The technical detail of the option i.e. capacity, system rating, availability etc.
This option is to replace 50% AMR's over the five-year GD2 period. These would be replaced during the routine maintenance and inspection visit, so there would be minimal downtime. As this is a pre-emptive program of works, materials would be on hand and delivery timescale of AMR replacement would not result in any loss of record or noncompliance with UNC obligations. This would be a reduced capex outlay and provide SGN with enough spare holding to allow to manage the portfolio of assets post GD2.

The basis for the cost estimate/unit cost
The costs for these units have been provided for by using the cost per unit for the data loggers and building in contract labour and project management and on-site commissioning costs.

The perceived benefits of the option
This option delivers cost savings through tendering processes and also achieving greater discounts on materials through economies of scales purchasing and also allows for a reduction in labour as the install can be done during routine maintenance visits.

Delivery timescales
This would be delivered during the five-year GD2 time period.

Key assumptions made
It is assumed SGN have enough spares holding to manage through to the GD2 price control period before having to opt using the new AMR devices. The replacement volume may be decreased if SGN need to begin this process pre GD2.

Any other items that differentiate the option from the others considered
The is to pre-emptively replace 50% of AMR assets, whereas the other two options are to replace 100% or replace on failure.

7.4 Options Technical Summary Table

Table 2: Options Technical Summary

Option	First Year of Spend	Final Year of Spend	Volume of Interventions	Equipment / Investment Design Life	Total Cost
Scotland LDZ					
Replace on Failure	2022	2026	1192	25	5.50
Pre-emptively Replace 100%	2022	2026	1192	25	4.15

Pre-emptively Replace 50%	2022	2026	596	25	3.07
South of England LDZ's					
Replace on Failure	2022	2026	2184	25	8.96
Pre-emptively Replace 100%	2022	2026	2184	25	6.47
Pre-emptively Replace 50%	2022	2026	1092	25	4.47

7.5 Options Cost Summary Table

Table 3: Options Cost Summary

Option	Cost Breakdown	Total Cost (£m)	
		Scotland LDZ	South of England LDZ's
Replace on Failure		5.50	8.96
Pre-emptively Replace (100%)		4.15	6.47
Pre-emptively Replace (50%)		3.07	4.47

8 Business Case Outline and Discussion

As can be seen in the cost benefit analysis for both the Scotland and South networks show that the proactive replacement of 50% of the obsolete AMR devices is the most cost effective solution.

For this reason, it has been judged that the most cost effective solution would be to opt for Option number two, Proactive replacement of 50% of assets as this delivers the lowest viable cost solution.

8.1 Key Business Case Drivers Description

Table 4: Summary of Key Value Drivers

Option No.	Desc. of Option	Key Value Driver
1	Replace on failure	• Least cost-effective option • Potential noncompliance with OFGEM requirements
2	Repair on failure	• This is not an option and parts are obsolete and spared for repair are not available
3	Pre-emptive replacement	• One off cost for design and appraisals • Scheduled replacement over a period • Reduced operational cost • Reduced probability of failure • Cost effective
4	Pre-emptive repair	• This is not an option and parts are obsolete and spared for repair are not available
5	Do nothing	• Not an option as this business function is an obligatory requirement to OFGEM.

Table 5: Summary of CBA Results

NPVs based on Payback Periods (absolute, £m)								
Option No.	Desc. of Option	Preferred Option (Y/N)	Total Forecast Expenditure (£m)	Total NPV	2030	2035	2040	2050

Scotland LDZ								
Baseline	Replace on Failure	N	-5.50	-7.09	-3.73	-4.24	-4.59	-5.94
1	Pre-emptively Replace 50% Absolute NPV	Y	-3.07	-3.92	-2.10	-2.39	-2.58	-3.31
1	Pre-emptively Replace 50% NPV Relative to Baseline	Y	-3.07	-3.92	1.63	1.86	2.01	2.64
2	Pre-emptively Replace 100% Absolute NPV	N	-4.15	-5.34	-3.90	-3.90	-3.90	-5.05
2	Pre-emptively Replace 100% NPV Relative to Baseline	N	-4.15	-5.34	-0.16	0.34	0.69	0.90
South of England LDZ's								
Baseline	Replace on Failure	N	-8.96	-11.66	-6.48	-7.16	-7.64	-9.97
1	Pre-emptively Replace 50% Absolute NPV	Y	-4.47	-5.77	-3.25	-3.59	-3.83	-4.96
1	Pre-emptively Replace 50% NPV Relative to Baseline	Y	-4.47	-5.77	3.23	3.57	3.81	5.02
2	Pre-emptively Replace 100% Absolute NPV	N	-6.47	-8.39	-4.69	-5.18	-5.52	-7.18
2	Pre-emptively Replace 100% NPV Relative to Baseline	N	-6.47	-8.39	1.79	1.98	2.11	2.79

8.2 Business Case Summary

Under the UNC Transportation Principle Document, Section H specifically refers to SGN's obligations to obtain data at Supply Meter Points comprised of Non-Daily Metered Supply Points. As a result, SGN has installed and operates remote meter reading equipment to fulfil this obligation and shares the data with the CDSP.

The preferred proposal is to replace 50% of the AMR assets during the GD2 period, thus allowing SGN to hold a suitable spares stock for the remaining AMR's in use.

Table 6: Business Case Matrix

	Pre-emptively replace 50%	Pre-emptively replace 100%	Pre-emptively replace 50%	Pre-emptively replace 100%
	Scotland		South of England	
GD2 Capex (£m)	3.07	4.15	4.47	6.47
Number of Interventions	596.00	1192.00	1092.00	2184.00
Carbon Savings ktCO2e (GD2)	0.00	0.00	0.00	0.00
Carbon Savings ktCO2e /yr	0.00	0.00	0.00	0.00
Carbon Emission Savings (35yr PV, £m)	0.00	0.00	0.00	0.00
Other Environmental Savings (35yr PV, £m)	0.00	0.00	0.00	0.00

Safety Benefits (35yr PV, £m)	0.00	0.00	0.00	0.00
Other Benefits (35yr PV, £m)	0.00	0.00	0.00	0.00
Direct Costs (35yr PV, £m)	2.94	1.26	5.54	3.08
NPV (35yr PV, £m)	2.94	1.26	5.54	3.08
High Carbon Scenario				
Carbon Emission Savings (35yr PV, £m)	0.00	0.00	0.00	0.00
High Carbon NPV (35yr PV, £m)	2.94	1.26	5.54	3.08

9 Preferred Option Scope and Project Plan

9.1 Preferred option

The preferred option is Option Two – Proactive replacement of 50% of AMR assets.

9.2 Asset Health Spend Profile

Table 7: Spend Profile

Asset Health Spend Profile (£m)					
Pre-emptively replace	2021/22	2022/23	2023/24	2024/25	2025/26
Scotland LDZ	0.91	0.52	0.51	0.55	0.59
South of England LDZ	1.22	0.79	0.79	0.80	0.88

9.3 Investment Risk Discussion

Table 8: Investment Risk

Risk Description	Impact	Likelihood	Mitigation/Controls
Budget	Overspend	>20% & <=40%	SGN will package up the works to achieve the greatest discounts on design and materials
Resource	Delayed	>20% & <=40%	As there is a large workload in GD2, it is a risk that SGN will not have a resource to deliver this workload. To mitigate against this, Major Construction Projects have early vision of GD2 workload, and resource planning can begin pre-GD2 and E&I Ops will be supporting the site works for this work stream.

Table 9: Sensitivity Results

	Scotland LDZ			South of England LDZ's		
	Low	**Mid**	**High**	**Low**	**Mid**	**High**
GD2 Capex (£m)	2.46	3.07	3.69	3.58	4.47	5.37
Number of Interventions	596	596	596	1092	1092	1092
Carbon Savings ktCO2e (GD2)	-	-	-	-	-	-
Carbon Savings ktCO2e /yr	0	0	0	0	0	0
Carbon Emission Savings (35yr PV, £m)	0.0	0.0	0.0	0.0	0.0	0.0

Other Environmental Savings (35yr PV, £m)	0	0	0	0	0	0
Safety Benefits (35yr PV, £m)	0.0	0.0	0.0	0.0	0.0	0.0
Other Benefits (35yr PV, £m)	0.0	0.0	0.0	0.0	0.0	0.0
Direct Costs (35yr PV, £m)	2.4	2.9	3.5	4.4	5.5	6.6
NPV (35yr PV, £m)	2.4	2.9	3.5	4.4	5.5	6.6

Project payback has not been carried out as part of this analysis due to the effect of the Spackman approach. For a cash-flow traditional project payback period please see scenario 4 of our Capitalisation Sensitivity table.

Network E&I believe the preferred option is pre-emptive replacement of 50% of AMR's. For the purpose of sensitivity analysis, the following has been applied to the preferred option of pre-emptive replacement for 50% of AMR's:

Low Case: SGN have applied a reduction of 20% CAPEX costs – this can be applied if SGN achieve greater than expected discounts on material purchase and also if greater efficiencies can be achieved for delivery, in this case if E&I operations are able to install the units efficiently with minimal time on site.

Mid Case: no changes have been applied, this is the expected output required for the GD2 time period.

High Case: SGN have applied an additional 20% on the CAPEX expenditure, as this is believed to be the potential cost increase if SGN do not go to tender and achieve best possible market prices. This could also be impacted by difficulties to gain access to site which can delay delivery plans

Capitalisation Sensitivity

Consumers fund our Totex in two ways – opex is charged immediately though bills (fast money – no capitalisation) and capex / repex is funded by bills over 45 years (slow money – 100% capitalisation). The amount deferred over 45 years represents the capitalisation rate. Traditionally in 'project' CBA's the cashflows are shown as they are incurred (with the investment up front which essentially is a zero capitalisation rate). Therefore, we have developed scenarios that reflect both ways of looking at the investment – from a consumer and a 'project'.

The scenarios are summarised as follows:

- Scenario 1 - we have used the blended average of 65%, used in previous iterations of this analysis.
- Scenario 2 - we have represented the Capex and Opex blend for the two networks, as per guidance.
- Scenario 3 - addresses our concerns on capitalisation rates whereby Repex and Capex spend is deferred (100% capitalisation rate) and Opex is paid for upfront (0% capitalisation rate).
- Scenario 4 - this reflects the payback period in 'project' / cash-flow terms and provides a project payback.

We have taken a view of the NPV in each of the scenarios, with the exception of scenario 4, at the 20, 35 and 45 Year points, to demonstrate the effect of Capitalisation Rate on this value.

Table 10: Capitalisation Rate Sensitivity Results - Scotland

Scenario	1	2 SC	3	4
Capex (%)	65	46	100	0
Opex (%)	65	46	0	0
Repex (%)	100	100	100	0
Output				
NPV (20yr PV, £m)	1.94	2.03	1.77	

NPV (35yr PV, £m)	2.83	2.94	2.62	
NPV (45yr PV, £m)	3.09	3.13	3.03	
Payback	0.00	0.00	0.00	0.00

Table 11: Capitalisation Rate Sensitivity Results – South of England

Scenario	1	2 SO	3	4
Capex (%)	65	38	100	0
Opex (%)	65	38	0	0
Repex (%)	100	100	100	0
Output				
NPV (20yr PV, £m)	3.60	3.84	3.28	
NPV (35yr PV, £m)	5.24	5.54	4.86	
NPV (45yr PV, £m)	5.73	5.82	5.61	
Payback	0.00	0.00	0.00	0.00

Appendix A - Acronyms

Table 12: Table of Acronyms

Acronym	Description
ACOP	Approved Code of Practice
BNEF	Biomethane Network Entry Facility
CP	Cathodic Protection
CIP	Close Interval Protection
CDSP	Central Data Service Provider
CV	Calorific Value
DSEAR	Dangerous Substances and Explosive Atmospheres Regulations 2002
E & I	Electrical and Instrumentation
E, I & C	Electrical, Instrumentation and Control
EAWR	Electricity at Work Regulations 1989
GC	Gas Chromatograph
GCC	Gas Control Centre
GSMR	Gas Safety Management Regulations 1996
HPMIS	High Pressure Metering Information System
HSE	Health and Safety Executive
HSL	Health and Safety Laboratory
HV	High Voltage
IACS	Industrial Automation Control System
IT	Information Technology
LDZ	Local Distribution Zone
LGT	Local Gas Treatment
LV	Low Voltage
OP	Operational Technology
PCBs	Polychlorinated Biphenyls
PLC	Programmable Logic Controller
PRS	Pressure Reduction Station
RTU	Remote Telemetry Unit
SGN	Scotia Gas Networks
TR	Transformer Rectifier
PRS	Pressure Reduction System
UHF	Ultra-High Frequency (300MHz to 3 GHz)
UNC	Uniform Network Code - Joint Office of Gas Transporters