



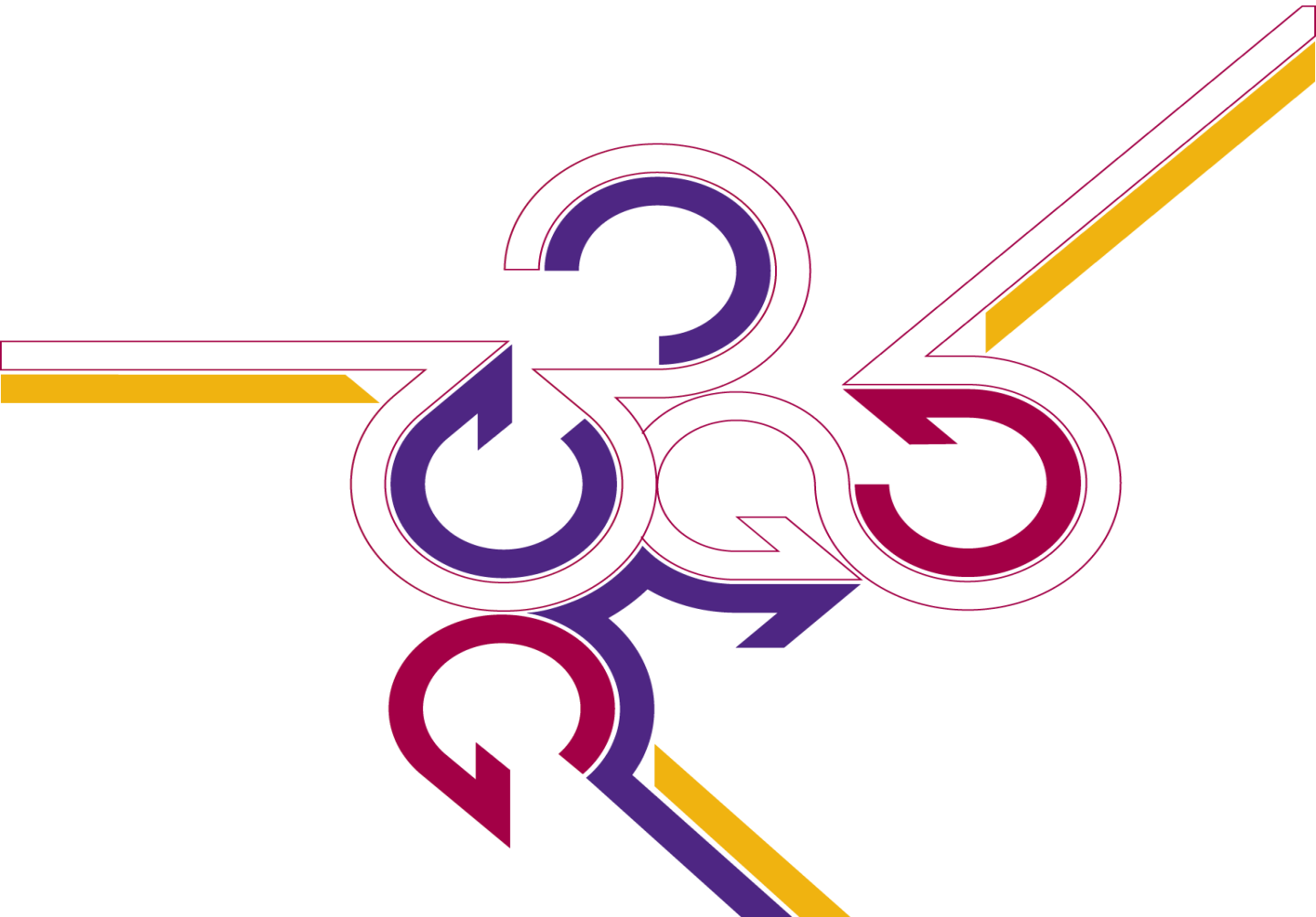
**Grant Thornton**

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# Powering Northern Ireland

**A report exploring SONI's role in the economy**

October 2016



# Contents

<b>Section</b>	<b>Page</b>
Foreword	3
Executive summary	4
Understanding the market	6
A closer look at SONI's contribution in Northern Ireland	10
Appendix and Glossary	17





# Foreword


While there is a general awareness of how the electricity market works in Northern Ireland, less is known about the role that some of the key market participants play in enabling and contributing to the local economy.

For this reason during 2016, Grant Thornton undertook research to understand the role of the System Operator for Northern Ireland (SONI) within both the electricity market and the economy of the region. This research was supported by interviews with key market stakeholders as listed in the appendix.

Grant Thornton is ultimately aware of SONI's responsibility to provide for the safe, secure and efficient operation of the high voltage electricity system. However, we have found that SONI's role and importance are not widely understood, nor appreciated.

At a point in time when the energy sector is striving to deliver the competing priorities of energy security, sustainability and affordability, SONI is under growing pressure to remain agile while continuing to deliver a high quality service to consumers.

It is hoped that this report will highlight the challenges facing the market, how SONI is responding to them and how it benefits the economy in Northern Ireland.



*"We take it for granted  
that it (SONI) is  
there."*

Stakeholder Group



# Executive summary

*SONI plays an important role in the economy of Northern Ireland. Through the provision of a secure electricity supply, SONI is responsible for ensuring that the lights stay on for homes and businesses across the region. However, consistently delivering this can be more challenging than appreciated.*

As Northern Ireland is on a journey to reduce its carbon emissions and to increase generation from renewable sources, some forms of fossil fuel generation are being scaled back or ceased. Although electricity demand in Northern Ireland is expected to see only modest growth in the coming years, **the reduction in fossil fuel generation will contribute to a potential generation deficit post 2020.**

**SONI is proactively responding to this risk to security of supply with the development of a second North-South Interconnector.** This connection will allow Northern Ireland more reliable access to electricity generated in the Republic of Ireland (RoI), in the scenario where it can't produce enough to meet demand.

Sustaining a reliable supply of electricity is not just important for existing consumers, it is also crucial to attracting Foreign Direct Investment (FDI). **SONI enables Northern Ireland to have high quality electricity on par with Tokyo, Germany and the United States (US).** However, without longer term security of supply, investors will be cautious about establishing themselves in the region. This further highlights the importance of the additional North-South Interconnector.

SONI's contribution to the economy of Northern Ireland extends beyond maintaining a reliable supply of electricity. As a key facilitator to the growth of sustainable energy, **SONI has helped to expand renewable energy as a component of the electricity fuel mix.** SONI will continue to have a role on the journey towards reduced carbon emissions in Northern Ireland.

This presents SONI with a unique challenge. **It must balance the need to invest in sustainable energy developments, with the challenge of delivering a secure electricity supply, at prices that consumers can afford.** This is a difficult equilibrium to achieve but as Northern Ireland is more costly for electricity than the EU-15 average, the need for affordable electricity is undeniable.

**Accounting for just 1% of the total cost of electricity,** SONI is not a key component of the energy prices in Northern Ireland **but it does contribute to the careful management and minimisation of the total cost of electricity, both directly and indirectly.**

As the energy market in Northern Ireland faces a period of great change, an understanding of and support for core electricity market participants such as SONI is more important than ever.

**Investing in SONI and the energy infrastructure in Northern Ireland, is an investment in the future security and affordability of supply in Northern Ireland.**



# SONI - Powering Northern Ireland



## Attracting Investment

- ensures **reliability** of supply **on par with Tokyo and Taiwan**; and
- maintains **quality** of electricity **on par with the US and Germany**.

## Keeping the power on

- keeps the lights on for **838,000** homes and businesses; and
- will help sustain a **secure electricity supply** with the new interconnector.



## Retaining talent in Northern Ireland

- provides **1 in 12 jobs** in the sector; and
- retains a **highly-skilled workforce** in Northern Ireland.



## Saving consumers money

- accounts for just **1%** of the cost of electricity;
- saves consumers money through **avoided constraint costs**; and
- helps achieve **further cost savings through influence on other components of the cost of electricity**.



## Generating power for the future

- has helped to **grow renewable energy** as part of the energy fuel mix; and
- is **enabling the journey towards reduced carbon emissions** supported by the DS3 Programme.

# Understanding the market





# The Northern Ireland electricity market

In Northern Ireland, the electricity grid consists of a number of core components:

- transmission lines;
- substations; and
- distribution lines.

275 kilovolts (kV) and 110 kV transmission lines transport electricity from where it is generated over long distances. From here the electricity goes to substations where it is converted, using transformers, to lower voltages and then travels across distribution lines to consumers.

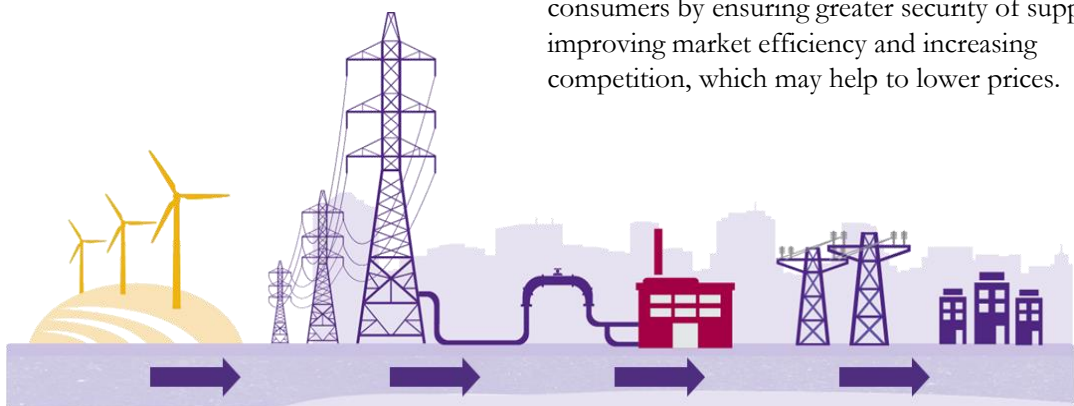
The **Northern Ireland transmission system is operated by SONI** and owned by Northern Ireland Electricity Networks (NIE Networks), who also own and operate the distribution system. In the Republic of Ireland, the transmission network is operated by EirGrid and owned by the Electricity Supply Board (ESB) Networks, who also owns and operates the distribution network. **SONI is a part of the EirGrid Group**, while NIE Networks is a part of ESB.

In this market, generators sell electricity into the combined electricity pool, otherwise known as the Single Electricity Market (SEM). Suppliers purchase electricity from the SEM and then pay to transport it across the grid to their customers.

The costs incurred in facilitating and operating this market are approved by the Utility Regulator (UR) and are then added to the costs incurred by the suppliers in order to create the final price charged to consumers.

By combining what were previously two separate jurisdictional electricity markets, the SEM became one of the first of its kind in Europe when it went live in 2007. **The SEM itself is operated by the Single Electricity Market Operator (SEMO), a joint-venture between EirGrid and SONI.** The SEMO is responsible for administering the market, including paying generators for electricity produced and invoicing suppliers for electricity bought. It exists to facilitate a competitive, sustainable and reliable market.

**The SEM will transition to the European Target Model for electricity**, otherwise referred to as the Integrated Single Electricity Market (I-SEM), **in the coming months.** The main objective of the European Target Model is to accommodate free trade of electricity and gas across member state borders. This should benefit consumers by ensuring greater security of supply, improving market efficiency and increasing competition, which may help to lower prices.





# What is SONI's role in the market?

*As Transmission System Operator (TSO) for Northern Ireland, SONI is responsible for the safe, secure and efficient operation of the high voltage electricity network. It ensures the safe movement of power from where it is generated across the high voltage network/ transmission lines and onto the low voltage network/ distribution lines.*

SONI has responsibility for **planning the transmission network** up to the construction phase. It is also the **Market Operator (MO) of the SEM** in conjunction with EirGrid.

In recent years, SONI's span of responsibility has grown considerably. It is now also accountable for:

- developing the network to ensure that reasonable demands for electricity can be met for consumers across Northern Ireland. SONI is helping to achieve this by **developing a second interconnector between Northern Ireland and the Republic of Ireland;**
- upgrading the physical network and associated operational procedures in order to facilitate the transmission of greater levels of renewable energy. SONI is currently **implementing a programme called 'Delivering a Secure Sustainable Electricity System' (DS3)** in order to develop solutions **for managing the changing energy fuel mix;** and
- **delivering the transition** from the all-island single electricity market **to an integrated single electricity market** in order to more closely align to the European Target Model. In order to deliver this large scale change SONI is actively changing how it works, installing new IT systems and working with the industry to rewrite the trading rules, which will be approved by the regulatory authority.

Although SONI does not provide a service directly to the public, it does facilitate the overall operation of the electricity market, for which it is remunerated. As TSO, it operates in a natural monopoly. In order to ensure that consumers pay fair prices for the services delivered, the UR determines what revenue SONI is allowed to generate. SONI collects this revenue through the **System Support Services (SSS) Tariff** in each electricity bill. The tariff **allows SONI to earn an income of an amount of about 1% of the total cost of electricity.**

While SONI operates the transmission system, the physical transmission network is owned by NIE Networks. The only assets SONI owns are its office premises and Information Technology (IT) infrastructure. This **light asset base** is reflected in SONI's operating expenses which sit across three key areas:

Cost line	% of total operating costs <sup>1</sup>
Payroll	64.7%
Other operating costs	18.8%
IT and telecoms	16.5%

Due to the increasing workload it faces in the coming years and an associated increase in costs, SONI submitted a request to the UR to increase the SSS tariff by £27m from 2015 to 2020. However, the UR instead decided on a c. £7m reduction in SONI's pre-existing tariff amount.

<sup>1</sup> [http://www.uregni.gov.uk/uploads/publications/2016-2-22\\_SONI\\_PC\\_Final\\_Determination\\_2015-2020\\_Final.pdf](http://www.uregni.gov.uk/uploads/publications/2016-2-22_SONI_PC_Final_Determination_2015-2020_Final.pdf)





# What is SONI's role in the market?

As an independent body, Grant Thornton considers investment in the energy infrastructure of Northern Ireland to be vitally important. As a fundamental enabler for the economy, the electricity network and those that operate it must be supported to adapt to the changing needs of the market they serve. **Investment, while sometimes costly to consumers in the short term, is likely to lead to greater cost efficiencies over the longer term.**

# A closer look at SONI'S contribution in Northern Ireland





# Keeping the power on

## The TSO is central to maintaining a secure, reliable electricity supply in Northern Ireland.

SONI helps to ensure that the lights stay on for 838,000 homes and businesses across the region, but this is becoming an increasingly challenging task.<sup>2</sup>

The global drive to achieve lower carbon emissions is causing **traditional energy fuel sources**, such as coal and oil, **to be gradually scaled back or ceased**. As this happens, renewable energy generation from wind, hydro, solar and biomass sources, needs to compensate for any generation shortfall.

## SONI enables the growth in renewable generation to cover any such potential gap.

It achieves this by ensuring that first preference on the dispatch of electricity goes to renewable generation, as well as leveraging network connections (interconnectors) with the RoI and Scotland to compensate for potential remaining deficits.

Even with continued reliance on the two existing interconnectors, **SONI forecast a generation deficit in Northern Ireland by 2021**.<sup>3</sup> This highlights the extent of Northern Ireland's reliance on imports from its neighbours across the border in the RoI and across the Irish Sea.



<sup>2</sup> <https://www.gov.uk/government/collections/sub-national-electricity-consumption-in-northern-ireland>

<sup>3</sup> [http://www.eirgridgroup.com/site-files/library/EirGrid/Generation\\_Capacity\\_Statement\\_20162025\\_FL\\_NAL.pdf](http://www.eirgridgroup.com/site-files/library/EirGrid/Generation_Capacity_Statement_20162025_FL_NAL.pdf)

<sup>4</sup> <http://www.blackout-simulator.com/>

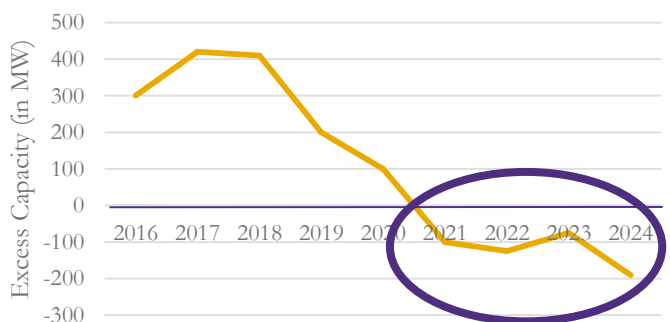
A shortfall or failure in supply could cost the Northern Ireland economy between **£5.53 million per hour upwards to £11.65 million\*** per hour at peak demand times and would be detrimental to the economy.<sup>4</sup>

**With this risk in mind, SONI is proactively working with EirGrid to put a second North-South Interconnector in place.** There is currently only one interconnector between Northern Ireland and the RoI and it is a bottleneck to the free flow of electricity. The second interconnector will alleviate this issue and enable the market to operate more efficiently.

According to the Confederation of British Industry (CBI), the business community view the second **interconnector** as the **No.1 energy infrastructure investment** for the region.

The new interconnector is also expected to decrease network constraint costs across the island, which will result in lower overall electricity prices. However, its main benefit remains its role in **keeping the lights on in Northern Ireland for years to come.**

SONI's Generation Capacity vs Demand Forecast\*\*



\*Please note that the sterling amounts quoted above have been converted from Euro on a €1 = £0.90 exchange rate as of 26 October 2016.

\*\*Excludes potential generation/supply accessible via the second North-South Interconnector.



# Attracting investment

In 2014, **Belfast ranked as the most business friendly city of its size.**<sup>5</sup> With a lower corporate tax rate on the horizon, Northern Ireland is set to become even more attractive as a destination for investment, and a strong energy infrastructure will be central to securing any such opportunities.

At present, SONI enables Northern Ireland to have **reliability of electricity supply on par with Tokyo and Taiwan** and **quality of supply on par with the United States and Germany.**<sup>6</sup> Combining this high quality infrastructure with **SONI's facilitation of new connections onto the grid**, makes the transmission network a core component for attracting and securing FDI for Northern Ireland.

While **Northern Ireland** is an attractive market for investors, it **is still not seeing the same level of investment as the RoI.** This difference in FDI between the RoI and Northern Ireland may be **partly attributable to different electricity prices and the projected fragility of supply in Northern Ireland.** In contrast, the RoI has no imminent threat to its supply of power.

The cost of electricity in Northern Ireland could hopefully be reduced by leveraging **the new integrated SEM to access lower costs of production** on mainland Europe. Similarly, intelligent **network investment decisions, such as the second North-South Interconnector, could help negate concerns regarding security of supply and attract more investment** to Northern Ireland.

The ability to attract investment may remain a challenge as a result of Brexit, making Northern Ireland's high quality and reliable electricity supply even more important as a point of attraction for investors. While the potential value of additional investment to the economy is difficult to quantify, such **investment would help reduce the cost of electricity** by sharing core costs across a larger group.

Please see below a sample of recent investments in the RoI which help illustrate the **monetary and employment benefits** that Northern Ireland could aim to replicate.

## Data Centre Investment Announced in the RoI in 2015<sup>7\*\*\*</sup>



## Data Centre Investment announced in Northern Ireland in 2015

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<sup>5</sup> <http://www.investni.com/news/belfast-the-number-one-business-friendly-city.html>

<sup>6</sup> <http://reports.weforum.org/global-competitiveness-report-2014-2015/rankings/>

<sup>7</sup> <https://www.morganmckinley.ie/article/new-year-look-back-foreign-direct-investment-ireland-2015>

*\*\*\*Please note that the sterling amounts quoted above have been converted from Euro on a €1 = £0.90 exchange rate as of 26 October 2016.*



# Saving consumers money

The price of electricity is front of mind for consumers. This was abundantly clear from the stakeholder interviews carried out by Grant Thornton and according to the Utility Regulator's Q2 2016 Transparency report, electricity prices in Northern Ireland are in fact higher than the EU-15 average.

The discrepancy in cost versus other European countries is partly driven by the fact that the island of Ireland is more heavily reliant on foreign energy imports. **Northern Ireland's resulting high cost of energy likely makes it less attractive for FDI.** It also makes it **difficult for businesses** already existing in the market **to be competitive and profitable.**

For context, electricity charges include all the costs associated with the generation and transmission of electricity, as well as government levies and supplier charges.

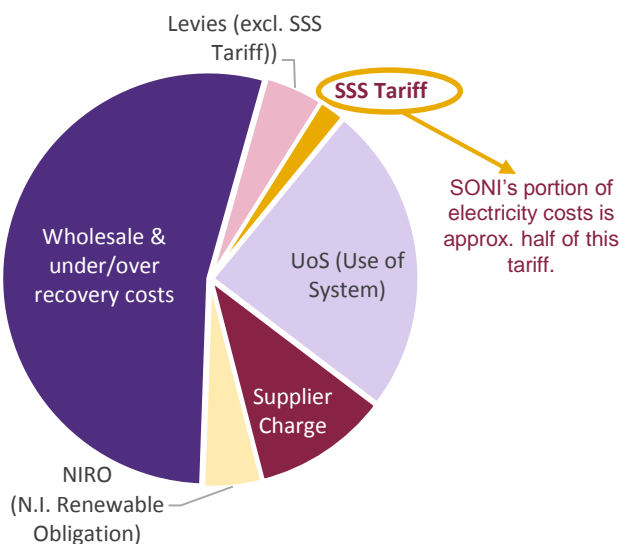
Whilst researching for this report, it became evident that SONI's influence on the cost of electricity is not clearly understood. Contrary to common belief, as expressed by many of those interviewed by Grant Thornton, **SONI itself accounts for just 1% of the total cost of electricity.** This income is collected through part of the System Services Support Tariff (SSS Tariff).

Although it accounts for a small portion of final electricity costs, **SONI has a wide span of influence and helps achieve cost savings across numerous parts of the electricity supply chain.**

For this reason, it is important to not underinvest in the grid or the tools used to operate it. Although affordability is a key consumer concern, cautious investment in the short term, could over the longer term be detrimental to the overall state of the electricity infrastructure, and impactful for customers. In fact, **a small investment in SONI and the grid, given the breadth of their influence, could yield significant savings for consumers.**

The table on the next page specifically explores some of the ways in which SONI positively influences the cost of electricity in Northern Ireland.

## Electricity cost components<sup>8</sup>





# Saving consumers money

Area	SONI's influence	% of total electricity costs****
<b>Constraint costs</b>	Constraint, or dispatch balancing costs, are used to compensate generators when they are restricted from generating at full capacity. SONI's highly experienced staff are pivotal in minimising these costs as they forecast demand and plan network outages in such a way as to minimise the impact on generators. The <b>avoided constraint payments</b> from these efforts have been shown to <b>save consumers as much as £3.85 million*** per annum.</b> <sup>9</sup>	10%
<b>Generation charges</b>	SONI operates the market to try and <b>ensure that the most cost effective sources of generation</b> available on the island <b>are used to meet consumer demand.</b> This ensures that the fuel mix is as affordable as possible within existing market constraints. Generation charges are collected as part of the wholesale component of electricity costs.	40-45%
<b>Network transmission</b>	By ensuring that the transmission network is functioning properly, <b>SONI enables the cheapest electricity generated in the SEM to travel uninterrupted to where it is needed.</b> This helps to minimise the cost of transmission as captured by the UoS charge.	<5%
<b>SSS tariff</b>	<b>SONI generates revenue through the SSS tariff</b> in order to cover its operating costs. Revenue collected is used to fund payroll, IT and other related operating expenses necessary for SONI to function. <b>Half of this tariff accounts for pass through costs not retained by SONI.</b>	<2% total
<b>Management of SEM</b>	As the market prepares to transition from an all-island market to an Integrated Single Electricity Market within Europe, SONI will also <b>help Northern Ireland suppliers access the lowest cost generation available,</b> either from the island of Ireland or further afield. It is expected that any savings realised through this change will result in lower costs for consumers.	
<b>North-South Interconnector</b>	Developing <b>the second North-South Interconnector</b> will help consumers in Northern Ireland avail of potentially lower electricity prices available in the SEM. The UR estimates these <b>savings to be approximately £7 million per annum for consumers in Northern Ireland.</b> <sup>10</sup> This infrastructure will also help businesses avoid the cost implications of a failure in supply.	Contributing factors to the overall cost of electricity.
<b>Renewable energy generation</b>	Establishing the DS3 programme with EirGrid will allow SONI to continue to support greater levels of renewable energy on the network. <b>Increased levels of renewable energy will place a downward pressure on the overall price of electricity</b> which is largely driven by the costs of traditional generation.	

9 <https://www.semcommittee.com/sites/semcommittee.com/files/media-files/SEM-16-050%20-%20Imperfections%20Charge%202016-17%20and%20Incentive%20Outturn%202014-15%20Decision%20Paper.pdf>  
10 [http://www.uregni.gov.uk/uploads/publications/20130612\\_Electricity\\_security\\_of\\_supply\\_paper.pdf](http://www.uregni.gov.uk/uploads/publications/20130612_Electricity_security_of_supply_paper.pdf)

\*\*\*Please note that the sterling amount quoted above have been converted from Euro on a €1 = £0.90 exchange rate as of 26 October 2016. This figure represents 25% of total savings made on the island of Ireland in the 2014/15 reporting period.  
\*\*\*\* As estimated by SONI Ltd.



# Retaining talent in Northern Ireland

SONI employs a highly-skilled group of people. Its team ranges from electrical engineers to commercial analysts, each with in depth technical training and a strong knowledge of the market.

With 111 staff, **SONI provides employment for approximately 1 in 12 workers in the electric power sector** when assessed against 2013 census data.<sup>11</sup> This makes SONI **a small but significant, employer** in Northern Ireland.

The SONI talent pool spans graduates through to very experienced staff. It offers rewarding careers at all levels in the organisation and makes great efforts to specifically nurture emerging talent through its Graduate Development Programme for newly qualified engineers and its an annual intake of IT and engineering students.

In the past, there has been commentary about the salaries paid to SONI staff. As its employees have **specialist technical knowledge and possess intellectual capital which cannot be easily replaced**, SONI offers competitive remuneration packages. According to the UR, employees are compensated with an **average salary of £52,500 per annum**, including a bonus.

The staff working for SONI are highly-trained with niche industry knowledge and experience. The **reward packages offered by SONI are intended to retain these employees**, ensuring that the organisation can continue to deliver on its commitments to consumers. This is especially important as it faces an increasingly complex operating environment over the coming years.

This employment contributes to the economy not only in terms of jobs but also in terms of rental income, mortgage payments, and other investments and purchases made by its staff in Northern Ireland. In retaining staff, SONI is helping to **keep talent within Northern Ireland**.

**As a critical service provider SONI will sustain, and continue to create beneficial employment opportunities for workers in the region.**

*“... recognises that there are challenges in finding the right benchmark for a company like SONI.”*

Utility Regulator

<sup>11</sup> <https://www.economy-ni.gov.uk/publications/census-employment-publications-and-tables>



# Generating power for the future

There is a prevalent global trend towards investment in renewable energy. This is being driven in part by climate change agendas but also to reduce reliance on fossil fuels.

Northern Ireland is also on this journey. **A rapidly increasing portion of the electricity generated and consumed in this region now comes from renewable sources.** SONI, in its role as system operator and network planner, has enabled this development.

As the electricity fuel mix evolves in this way, the **system will be required to integrate and manage greater and greater volumes of renewables.** This evolution is something that SONI is required to deliver while also continuing to operate a secure electricity system.

**In order to deliver on this task SONI, together with EirGrid, have developed the DS3 programme.** It is hoped that this programme and the work it supports will enable Northern Ireland to be a world leader in the integration of renewable energy.<sup>12</sup>

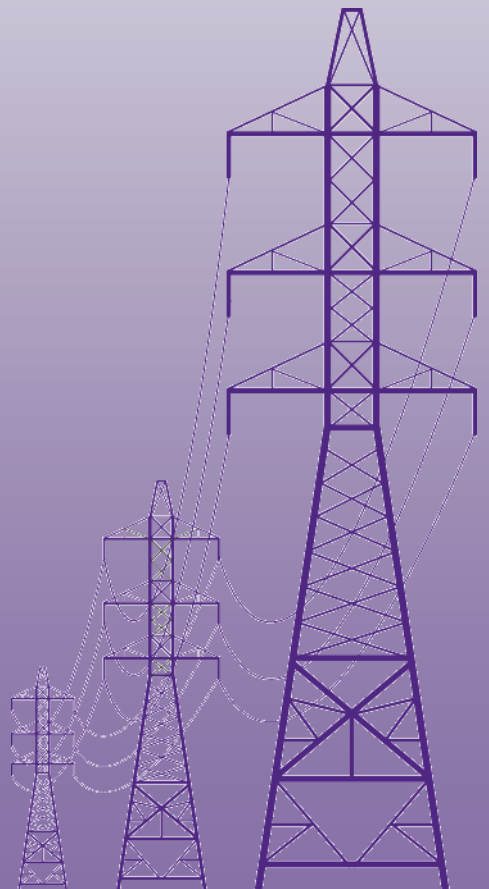
Over the coming years and decades, the renewable or clean energy agenda will continue to be front of mind for energy policy makers. This means that connection applications for renewable energy generators will have an ongoing presence and **SONI, as network planner, will continue to have a fundamental role in enabling the renewable energy agenda for the region.**

<sup>12</sup> <http://www.eirgridgroup.com/site-files/library/EirGrid/DS3-Programme-Brochure.pdf>





# Appendix and glossary





# Appendix

## Stakeholder engagement

In order to ensure that this report presents an accurate assessment of the economic contribution of the high voltage grid on the economy, Grant Thornton consulted SONI as subject matter experts. SONI welcomed the opportunity to avail of external commentary on its role within the economy and agreed to provide insight to inform this report. Please note that all commentary in relation to SONI has been prepared independently by Grant Thornton.

In preparation of this report Grant Thornton interviewed a number of key market stakeholders representing industry, consumer and professional groups. The interviews uncovered areas of consensus amongst those interviewed while also highlighting areas where viewpoints differed greatly. The findings uncovered will be referred to throughout this report and a list of the organisations engaged can be found below.

Organisation
Consumer Council
Confederation of Business Industry
EirGrid
Institute of Civil Engineers
Manufacturing N.I.
SONI
University of Ulster



# Glossary

Abbreviation	Definition
Brexit	Withdrawal of the United Kingdom from the European Union
CBI	Confederation of British Industry
DS3	Delivering a Secure Sustainable Electricity System
ESB	Electricity Supply Board
EU	European Union
FDI	Foreign Direct Investment
I-SEM	Integrated Single Electricity Market
IT	Information Technology
kV	Kilovolt
NIE Networks	Northern Ireland Electricity Networks
NIRO	Northern Ireland Renewable Obligation
MW	Megawatts
PSO	Public Service Obligation
RAB	Regulatory Asset Base
SEM	Single Electricity Market
SEMO	Single Electricity Market Operator
SONI	System Operator for Northern Ireland
SSS	System Support Services
TSO	Transmission System Operator
UoS	Use of System
UR	Northern Ireland Authority for Utility Regulation/Utility Regulator
US	United States



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