

May 2019

## **Objection to Petroleum Licence Application PLA2/16 submitted by Tamboran Resources (UK) Limited**

Friends of the Earth objects to the above Petroleum Licence application for the reasons given below.

### **Climate change**

Climate change is the greatest threat facing humanity. The science is very clear. We must significantly reduce our greenhouse gas emissions in the next few years if we are to avoid catastrophic climate change. We have seen an increase of more than 1°C above pre-industrial temperatures, and the impacts are already becoming evident - heat waves, wild-fires, floods, severe storms, and droughts. These impacts will only get worse as temperatures continue to rise.

International emissions reductions pledges for the Paris Agreement are projected to result in a 3°C rise<sup>1</sup>. In order to avoid catastrophic climate change, we must make drastic cuts very soon.

In May 2019 the Committee on Climate Change (CCC) published its recommendations for climate change policies<sup>2</sup>. They included a target of net-zero greenhouse gas emissions by 2050. The report recommends greater energy efficiency to reduce energy demand, and a rapid transition to electricity for heating, beginning before 2030. Both policies would dramatically reduce the demand for fossil fuels

The Intergovernmental Panel on Climate Change Special Report on 1.5°C warming, published in October 2018<sup>3</sup>, asserted that we have just 12 years to make dramatic cuts in greenhouse gas emissions if we are to avoid catastrophic climate change.

In its licence application, Tamboran Resources states, *“In real terms, this would mean a natural gas supply and energy security for Northern Ireland lasting until the end of this century.”* This projected timescale is wholly incompatible with the transition timescales outlined in the CCC and IPCC reports.

### **Carbon budget**

In order to have a good chance of staying below a 2°C temperature rise, the planet as a whole is limited to around 800 billion tonnes of CO<sub>2</sub> (GtCO<sub>2</sub>). If we are to stay below 1.5°C, the preferred target in the Paris Agreement, we cannot emit more than about 400GtCO<sub>2</sub>. If we were to burn all of the known reserves of fossil fuels, it would produce around 2,600GtCO<sub>2</sub><sup>4</sup>. In other words, almost all of the known reserves of fossil fuels must remain in the ground.

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<sup>1</sup> <https://www.un.org/press/en/2017/sgsm18543.doc.htm>

<sup>2</sup> <https://www.theccc.org.uk/publication/net-zero-the-uks-contribution-to-stopping-global-warming/>

<sup>3</sup> <https://www.ipcc.ch/2018/10/08/summary-for-policymakers-of-ipcc-special-report-on-global-warming-of-1-5c-approved-by-governments/>

<sup>4</sup> <http://priceofoil.org/2016/09/22/the-skys-limit-report/>, Table 1 and Figure 2.

Proponents of shale gas describe it as a low-carbon fuel, making it an attractive energy option. However, this calculation doesn't take into account fugitive emissions, methane lost during the fracking and extraction phases. A US study found that emissions from unconventional gas could be similar to, or higher than, those from coal<sup>5</sup>. Methane is a potent greenhouse gas, up to 34 times stronger than CO<sub>2</sub> at a 100 year time frame.

Northern Ireland's per capita emissions are higher than the UK average, accounting for 4.4% of the UK's total emissions<sup>6</sup>. In addition, Northern Ireland's emissions are falling significantly lower than the UK average, achieving just 16% reduction compared to the UK's 41%. If Northern Ireland is to do its fair share in tackling climate change, there is simply no room in the carbon budget for new fossil fuel exploitation.

### **Restricts future climate action**

There is currently no operational Assembly, and no Ministers in post. The Northern Ireland (Executive Formation and Exercise of Functions) Act 2018 gives civil servants the authority to make decisions in the absence of Ministerial oversight. However, awarding petroleum licences aren't mundane or routine decisions. They have the potential to set Assembly policy for many decades, and could make it difficult and costly for a future Assembly to move to a low-carbon economy should licence holders sue for compensation. We believe the Department would be acting outside of its authority if it approved this licence application in the absence of a Minister being in post.

### **Environmental impacts**

Fracking, including the exploration phase, is associated with several significant environmental impacts. Experience in the US suggests there is high risk of water contamination, air pollution, and earthquakes, and without adequate assessment, the whole licencing regime is likely to be unlawful.

### **No Strategic Environmental Assessment**

Fracking brings many environmental risks, as outlined by the UN Environment Program<sup>7</sup>. These risks have been considered in a report for the European Commission, which assessed the cumulative impact of fracking at several sites as having a high risk of causing local environmental problems including groundwater contamination, surface water contamination, water resource use, and air pollution<sup>8</sup>.

Despite these risks, no Strategic Environmental Assessment has been carried out for the licencing regime. Consequently, Friends of the Earth asserts the licencing regime, and all licences issued under it, are in breach of the European Strategic Environmental Assessment Directive, and the Environmental Assessment of Plans and Programmes Regulations (Northern Ireland) 2004.

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<sup>5</sup> Howarth and Ingraffea, Methane and the greenhouse-gas footprint of natural gas from shale formations, Cornell University 2010 <http://frackfreescotland.files.wordpress.com/2012/09/howarth-et-al-2011.pdf>

<sup>6</sup> <https://www.daera-ni.gov.uk/publications/northern-ireland-greenhouse-gas-inventory-1990-2016-statistical-bulletin>

<sup>7</sup> UNEP (2012) *op cit*

<sup>8</sup> AEA Technology for the European Commission (2012) Support to the identification of potential risks for the environment and human health arising from hydrocarbons operations involving hydraulic fracturing in Europe' <http://ec.europa.eu/environment/integration/energy/pdf/fracking%20study.pdf>

## Water contamination

There is considerable evidence of contamination from both methane and fracking chemicals. One study of aquifers overlying the Marcellus and Utica shales in the north-eastern US found “*systematic evidence of methane contamination of groundwater associated with shale gas extraction*”<sup>9</sup>.

The industry claims that fracking is a proven technology, widely used for 60 years. Although it is true that the first well was fracked in 1947, this involved a small volume of liquid pumped at relatively low pressure into a vertical well half a mile deep. The situation today is radically different. The technology has changed hugely in the last decade with the development of horizontal drilling, using much greater volumes of fluid at much higher pressures and drilling several wells from one well-pad. Fracking as proposed in the UK is at best a decade old development based on new technologies that are still being refined.

How much of the water pumped down the well comes back to the surface (known as ‘produced water’ or ‘waste water’) can vary from 20% to 80%, depending on the local circumstances.

This means that 20-80% of the water also remains underground and, “*once underground, fracking fluid mixes with the naturally occurring brines and is subject to geological forces and chemical processes over the long term, from years to decades. How far and how fast this blend can travel, and how it might change chemically, is impossible to know and control*”<sup>10</sup>.

Methane and fracking fluid may escape and contaminate water via a number of different routes:

- Migration down naturally occurring fractures in the rock or via extension of fractures created by fracking or via nearby abandoned wells
- Leaks via well-casings that have been inadequately completed or which have subsequently failed
- Leaks or spills of fracking fluid or ‘produced water’ above ground

A major problem is that there is limited data on the chemicals that have been used for fracking. This is because US law excludes fracking from federal regulation by the Environmental Protection Agency<sup>11</sup>. However, disclosure is required by some US states and some companies are posting the composition of the fracking fluid they are using online<sup>12</sup>. In Northern Ireland, companies should be required to publish the contents of fracking fluid.

An assessment<sup>13</sup> of 353 chemicals known to be used in fracking in the US found that:

- 25% could cause cancer
- 40 - 50% could affect the nervous system, immune and cardiovascular systems
- more than 75% could affect the skin, eyes and respiratory system.

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<sup>9</sup> Osborn et al (2011) ‘Methane contamination of drinking water accompanying gas-well drilling and hydraulic fracturing’ [www.pnas.org/content/early/2011/05/02/1100682108.full.pdf+html](http://www.pnas.org/content/early/2011/05/02/1100682108.full.pdf+html)

<sup>10</sup> Food & Water Watch Fracking: the new global water crisis  
<http://documents.foodandwaterwatch.org/doc/FrackingCrisisUS.pdf>

<sup>11</sup> This is known as the Halliburton loophole, after the company who were one of the early users of fracking. The loophole was negotiated by then US Vice President Dick Cheney, a former chief executive of Halliburton.

<sup>12</sup> See <http://fracfocus.org>

<sup>13</sup> Colborn et al (2011) ‘Natural Gas Operations from a Public Health Perspective’  
<http://cce.cornell.edu/EnergyClimateChange/NaturalGasDev/Documents/PDFs/fracking%20chemicals%20from%20a%20public%20health%20perspective.pdf>

The shale gas industry says that chemicals are a very small percentage of the liquid pumped underground, but given the enormous quantities of water used, this still represents a huge quantity of chemicals. Fracking a shale gas well takes approximately 15 million litres of water; if you assume that the chemicals are just 0.5% of the water used, then this means that each fracking operation involves about 75,000 litres of chemicals. If there are six wells per drilling pad (a typical number) and each well is fracked twice, then the total volume of chemicals used is almost a million litres. That equates to an Olympic swimming pool of chemicals for every three drilling pads.

In addition to the chemicals, fracking waste water may also contain substances from deep underground such as strontium, benzene, toluene and Naturally Occurring Radioactive Material (NORM) such as Radium 226<sup>14</sup>. An investigation by the New York Times found that nearly three-quarters of the wells studied in the north east US produced waste water with high levels of radiation, including at least 116 wells with levels that were hundreds of times the US EPA's drinking water standard, and at least 15 wells with levels thousands of times the standard<sup>15</sup>.

Water contamination is a particular concern in Northern Ireland. The petroleum license area include wetlands, river catchments, Lough Erne, and has a transboundary connected to coastal zones. Contamination of the Northern Ireland environment could have serious and far-reaching implications not just here but for the Republic of Ireland.

The cross-border issue is particularly problematic. The Tamboran licence, and the whole licencing regime, may be in breach of the Espoo Convention on transboundary environmental impacts.

### **Air pollution**

Fracking for shale gas has also been linked to increased levels of air pollution and associated health problems. Air pollution was identified as a 'high risk' by the European Commission study mentioned above.

Monitoring of air quality near fracking sites in western Colorado found over 50 non-methane hydrocarbons (NMHCs) near shale gas wells. Of these, 44 have health impacts including 35 which affect the brain and nervous system. Some of these were found at levels which could potentially harm children exposed pre-birth<sup>16</sup>. Although the pollution was not conclusively linked to the gas wells, there is little other industry and not much traffic in the area monitored.

Emissions from shale gas wells can also cause photochemical smog: levels of ozone in Sublette County in rural Wyoming where there is a high concentration of gas wells have been recorded as higher than Los Angeles<sup>17</sup>. And there is also evidence of health impacts: *"a Texas hospital serving six counties near drilling sites reported asthma rates three times higher than the state average; one quarter of young children in the community had asthma"*<sup>18</sup>.

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<sup>14</sup> Food & Water Watch (2012) 'Fracking: the new global water crisis'  
<http://documents.foodandwaterwatch.org/doc/FrackingCrisisEU.pdf>

<sup>15</sup> New York Times 26<sup>th</sup> February 2011 'Regulation Lax as Gas Wells' Tainted Water Hits Rivers'  
[www.nytimes.com/2011/02/27/us/27gas.html?pagewanted=all&\\_r=0](http://www.nytimes.com/2011/02/27/us/27gas.html?pagewanted=all&_r=0)

<sup>16</sup> Colborn et al (2012) 'An Exploratory Study of Air Quality near Natural Gas Operations'  
[www.endocrinedisruption.com/files/HERA12-137NGAirQualityManuscriptforwebwithfigures.pdf](http://www.endocrinedisruption.com/files/HERA12-137NGAirQualityManuscriptforwebwithfigures.pdf)

<sup>17</sup> 34 Food & Water Watch 'The case for ban on gas fracking' <http://www.foodandwaterwatch.org/reports/the-case-for-a-ban-on-gas-fracking/> p8

<sup>18</sup> *ibid*

## Earthquakes

The recent huge rise in concern about fracking in the UK started when test-fracking by Cuadrilla in Lancashire triggered low-level earthquakes. After the well casing was deformed at Preese Hall, the traffic light system was introduced to ensure that local residents and the local environment were not put at undue risk from fracking-induced earthquakes.

Cuadrilla started fracking in Lancashire on October 15<sup>th</sup> 2018. Within three weeks, there had been 35 seismic events, of which four had caused fracking to stop under the traffic light system. Cuadrilla's response was to say that the regulations risked strangling the fracking industry at birth and calling for the 'red light' threshold to be raised to magnitude 2.0. Under the logarithmic scale used to measure earthquakes, this would permit earthquakes 177 times stronger in terms of energy release than under the current system<sup>19</sup>.

Despite the fracking industry dismissing the risks from smaller earthquakes at surface level, the most significant risks are from impacts underground, where the tremors could damage the integrity of the well-casings, typically made of steel and cemented in place, designed to reduce or eliminate the possibility of leaking methane or flowback water. Professor Stuart Haszeldine of Edinburgh University has said:

*“The practical significance is not whether these tremors are felt at the surface or not, but in the potential to damage the borehole, and the potential to create gas pathways from the shale towards larger faults, towards shallower aquifers, and to the surface”<sup>20</sup>.*

Evidence from the US shows that the Lancashire experience is not unique. Several US states have experienced seismic activity following shale gas drilling and fracking in areas where this has not previously happened. Although a clear causal link has not been proved in all cases, a close correlation between fracking and earth tremors can be seen<sup>21</sup>. There have also been problems in the US with earthquakes triggered by the injection underground of fracking waste water<sup>22</sup>. According to the US Geological Survey's Earthquake Science Center, in the US, *“the future probably holds a lot more in induced earthquakes as the gas boom expands”<sup>23</sup>.*

Not only can smaller earthquakes cause problems underground in themselves, academics from Stanford University studying seismic activity and fracking in the US have found that tiny tremors caused by fracking could be early signs of conditions underground that could destabilise faults and trigger larger earthquakes. The study's lead author Professor William Ellsworth commented:

*“These small earthquakes may act like canaries in a coalmine. When they happen, they should be viewed as cautionary indicators of underground conditions that could lead to larger earthquakes”<sup>24</sup>.*

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<sup>19</sup> <https://earthquake.usgs.gov/learn/topics/calculator.php>

<sup>20</sup> Science Media Centre, 24 October 2018, 'Expert reactions to Lancashire earth tremors'

<http://www.sciencemediacentre.org/expert-reaction-to-the-lancashire-earth-tremors/>

<sup>21</sup> <https://drillordrop.com/2018/08/16/geologists-challenge-oil-companies-comments-on-surrey-earthquakes/>

<sup>22</sup> See for example <http://stateimpact.npr.org/pennsylvania/2011/08/26/how-fracking-causes-earthquakes-but-not-the-one-in-virginia/>

<sup>23</sup> Technology Review December 14<sup>th</sup> 2012 'Studies link earthquakes to wastewater from fracking'

[www.technologyreview.com/news/508151/studies-link-earthquakes-to-wastewater-from-fracking/](http://www.technologyreview.com/news/508151/studies-link-earthquakes-to-wastewater-from-fracking/)

<sup>24</sup> Stanford University, December 12 2017, 'Small earthquakes at fracking sites may be early indicators of bigger tremors to come, say Stanford scientists' <https://news.stanford.edu/2017/12/12/small-earthquakes-fracking-sites-may-indicate-bigger-tremors-come/>

## **Strategic Planning Policy Statement**

The Strategic Planning Policy Statement (SPPS) includes a presumption against the extraction of hydrocarbons<sup>25</sup>. Tamboran contends this presumption applies to the extraction phase only, and not to the exploration phase. While this may be true, it does raise the question, why bother with the exploration phase if the extraction phase is likely to be refused? There would need to be a very good reason for proceeding to over-ride the presumption against extraction. The pressing need to reduce emissions quickly and significantly sets an extremely high bar, so it's difficult to see what this over-riding argument is.

## **Social licence**

Tamboran has no social licence to proceed with its plans to drill. On every occasion that exploratory drilling has been attempted, significant local, cross-community opposition has formed. Tamboran's previous exploratory drill attempt in Belcoo resulted in a protest camp appearing in front of the drill site, and frequent road blockages, go-slows, and other disruptive activity.

Not only have oil and gas exploration operations no social licence, but they also cost the tax payer. InfraStrata's drilling operation at Woodburn Forest, Carrickfergus, resulted in a policing overtime bill of £326,903, with an estimate total cost in excess of £1m<sup>26</sup>. The disruption to the lives of local people, and the cost to the public purse, indicate that this licence application should be refused

## **Economic case**

Tamboran claims impressive economic benefits of shale gas extraction. These claims don't stand-up to scrutiny though.

## **Resource**

In 2010, when Tamboran first applied for a licence, it estimated the resources in its licence area could secure supply up to 2050 at current rates of Northern Ireland gas consumption<sup>27</sup>. Now it is claiming it can secure supply until the end of the Century. The company offers no explanation of how it has managed to nearly double the gas resource, but merely asserts it to be true. Indeed, Tamboran claims, without justification, that the reserves maybe triple what it originally claimed. This is a dubious claim rebutted by evidence from elsewhere.

- Estimates of shale gas reserves in Poland were cut by 85% in 2012, based on analysis of data from wells drilled between the 1950s and 1980s<sup>28</sup>.
- The US Energy Department cut estimates of technically recoverable gas in the Marcellus Shale, one of the most mature shale gas plays, by 66% in January 2012, citing improved data on drilling and production<sup>29</sup>.

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<sup>25</sup> Policy 6.157, page 78 [http://www.planningni.gov.uk/index/policy/spps\\_28\\_september\\_2015-3.pdf](http://www.planningni.gov.uk/index/policy/spps_28_september_2015-3.pdf)

<sup>26</sup> <https://www.belfasttelegraph.co.uk/news/northern-ireland/woodburn-forest-psni-accused-of-squandering-1m-on-policing-oil-drill-protest-34868712.html>

<sup>27</sup> [www.tamboran.com/wp-content/uploads/2011/09/Tamboran-NI-Update-Jan-11-2012.pdf](http://www.tamboran.com/wp-content/uploads/2011/09/Tamboran-NI-Update-Jan-11-2012.pdf)

<sup>28</sup> Bloomberg 26<sup>th</sup> March 2012 'Shale boom in Europe fades as Polish wells come up empty' [www.bloomberg.com/news/2012-03-26/shale-boom-in-europe-fades-as-polish-wells-come-up-empty-energy.html](http://www.bloomberg.com/news/2012-03-26/shale-boom-in-europe-fades-as-polish-wells-come-up-empty-energy.html)

<sup>29</sup> Bloomberg 23<sup>rd</sup> January 2012 'US cuts estimate for Marcellus Shale gas reserves by 66%' [www.bloomberg.com/news/2012-01-23/u-s-reduces-marcellus-shale-gas-reserve-estimate-by-66-on-revised-data.html](http://www.bloomberg.com/news/2012-01-23/u-s-reduces-marcellus-shale-gas-reserve-estimate-by-66-on-revised-data.html)

## Gas prices

In its licence application Tamboran made the claim that shale gas can lead to cost cuts to consumers. The company cited the example of the US energy market.

However there is great scepticism among experts that this will be the case. A report by consultants Poyry for OFGEM concluded that only a shale gas boom in Europe would lead to significantly lower gas prices in the UK, and such a boom was a “*a low probability outcome*”<sup>30</sup>. Also, the impact on gas prices depends on what happens elsewhere in Europe: Northern Ireland production is not significant in this respect.

Shale gas production costs in Northern Ireland are likely to be higher than in the US. Reasons for this include less promising geology, higher population density and associated problems of land availability, the lack of a competitive onshore drilling and services industry and tougher environmental regulation<sup>31</sup>. Factors such as these led the International Energy Agency (IEA) to conclude that operating costs in Europe will be 30-50% higher than in the US<sup>32</sup>.

Claims of cheaper gas prices also ignore global market dynamics. Demand for gas is rising fast, particularly from China, India and other emerging economies. This growing demand is likely to soak up new gas supplies, potentially keeping supply constrained and prices high, meaning that “*UK households and industry would be tied to a highly unpredictable roller coaster of gas prices that are generally high and can spike higher due to volatility*”<sup>33</sup>.

Bloomberg New Energy Finance has estimated that “*the cost of shale gas extraction in the UK will be between \$7.10 and \$12.20/MMBtu... similar to the range of market prices for natural gas seen in the UK during the course of 2012*” and concluded that hopes that shale gas will lead to lower energy prices for the UK “*should be treated as wishful thinking*”<sup>34</sup>. The IEA’s analysis shows that gas prices in Europe will be around 40% higher than at the time of writing in 2035<sup>35</sup>.

## Jobs and the local economy

The shale gas industry paints an overwhelmingly positive picture of its local economic impact through job creation. Previously Tamboran has claimed that it would create 600 jobs in Fermanagh by 2025<sup>36</sup>. Now it is claiming up to 3000 jobs could be created.

However US experience shows that such claims should be treated with scepticism: numbers can be over-stated<sup>37</sup>; UK job projections have been reduced by a third<sup>38</sup>; most employment

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<sup>30</sup> Poyry for OFGEM (2011) ‘The impact of unconventional gas on Europe’  
[www.poyry.co.uk/sites/www.poyry.uk/files/The\\_Impact\\_of\\_Unconventional\\_Gas\\_on\\_Europe.pdf](http://www.poyry.co.uk/sites/www.poyry.uk/files/The_Impact_of_Unconventional_Gas_on_Europe.pdf)

<sup>31</sup> Chatham House (2010) #The shale gas revolution: hype and reality’  
[http://www.chathamhouse.org/sites/default/files/public/Research/Energy,%20Environment%20and%20Development/r\\_0910stevens.pdf](http://www.chathamhouse.org/sites/default/files/public/Research/Energy,%20Environment%20and%20Development/r_0910stevens.pdf)

<sup>32</sup> International Energy Agency (2012) ‘Golden Rules for a Golden Age of Gas’ op cit

<sup>33</sup> Paul Ekins New Scientist 6th December 2012 ‘The UK’s new dash for gas is a dangerous gamble’  
[www.newscientist.com/article/dn22594-the-uks-new-dash-for-gas-is-a-dangerous-gamble.html](http://www.newscientist.com/article/dn22594-the-uks-new-dash-for-gas-is-a-dangerous-gamble.html)

<sup>34</sup> Bloomberg New Energy Finance 21st February 2013 ‘UK shale gas no “Get Out Of Jail Free” card’  
<http://about.bnef.com/press-releases/uk-shale-gas-no-get-out-of-jail-free-card/>

<sup>35</sup> International Energy Agency (2012) ‘Golden Rules for a Golden Age of Gas’ op cit

<sup>36</sup> [www.tamboran.com/wp-content/uploads/2011/09/Tamboran-NI-Update-Jan-11-2012.pdf](http://www.tamboran.com/wp-content/uploads/2011/09/Tamboran-NI-Update-Jan-11-2012.pdf)

<sup>37</sup> Research for Cuadrilla shows that the number of jobs created at around 1,600 in Lancashire and 5,600 in the UK for four years from 2016 to 2019, falling to under 200 from 2022 onwards. Regeneris Consulting Economic impact of shale gas exploration & production in Lancashire and the UK

<sup>38</sup> Research for Cuadrilla shows that the number of jobs created at around 1,600 in Lancashire and 5,600 in the UK for four years from 2016 to 2019, falling to under 200 from 2022 onwards. Regeneris Consulting Economic impact of shale gas exploration & production in Lancashire and the UK

is in the drilling phase, which only lasts around a year<sup>39</sup>; and many jobs go to transient workers who move from one well to another, with 70% of gas well drilling jobs in Pennsylvania going to people from out of state. Northern Ireland has no expertise in drilling for shale gas, so it is very likely that the technical, well-paid jobs will go to people already working in the industry.

Nor has any estimate been made of potential negative impacts on other economic sectors:

- Tamboran is proposing to drill in an area where agriculture is an important sector. Experience in the US shows that fracking can create problems for local agriculture, including the loss of agricultural land and concerns about water resources<sup>40</sup>. Nationwide Mutual, the largest US farming insurance underwriter, announced that *“from an underwriting standpoint we do not have a comfort level with the unique risks associated with the fracking process to provide coverage at a reasonable price”*<sup>41</sup>.
- Tourism is a significant driver of the economy in the area where Tamboran is proposing to drill, bringing in over £36 million a year. What would be the impact on tourism of hundreds of shale gas wells and associated infrastructure? In Australia, local tourism bodies are among the opponents of unconventional gas development<sup>42</sup>.

Research from the US shows that investing \$1 million in renewable energy creates more than two to three times as many jobs as investing the same amount in gas<sup>43</sup>. The Northern Ireland Green New Deal group published research that suggests energy efficiency and renewables could be major employers, with the potential to create 10s of 1000s of skilled and semi-skilled long-term jobs<sup>44</sup>. It is to these, low-carbon technologies and methods that we should be looking, not more climate changing fossil fuels.

## Conclusion

Tamboran Resources states, *“A rational and informed decision about future operations, based on the facts, can then be made.”* Friends of the Earth agrees with this statement. Given the urgent need to slash our carbon emissions, the incompatible timelines, the lack of a Strategic Environmental Assessment (rendering the licencing regime unlawful), the dubious economics, and the question mark over the possibility of moving to full exploitation, the rational decision should be to refuse to issue the exploration licence.

Friends of the Earth is a collective name for Friends of the Earth Trust, registered charity 281681, company number 1533942, and Friends of the Earth Limited, company number 1012357, both of which may use the above information. In both cases the registered office is at 26-28 Underwood Street, London N1 7JQ Tel: 020 7490 1555 Fax: 020 7490 0881 Email: info@foe.co.uk Website: www.foe.co.uk , company number 1012357 © Friends of the Earth 2016. All rights reserved.

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<sup>39</sup> ENR New York March 7<sup>th</sup> 2011 ‘Hydrofracking offers Short-Term Boom, Long-Term Bust’  
[http://newyork.construction.com/opinions/viewpoint/2011/0307\\_HydrofrackingOffers.asp](http://newyork.construction.com/opinions/viewpoint/2011/0307_HydrofrackingOffers.asp)

<sup>40</sup> Food & Water Watch ‘Fracking and the food system’  
<http://documents.foodandwaterwatch.org/doc/FrackingFoodSystem.pdf>

<sup>41</sup> Nationwide Mutual 13<sup>th</sup> July 2012 Nationwide statement regarding concerns about hydraulic fracturing  
[www.nationwide.com/newsroom/071312-FrackingStatement.jsp](http://www.nationwide.com/newsroom/071312-FrackingStatement.jsp)

<sup>42</sup> Northern Rivers Echo 31<sup>st</sup> May 2012 ‘Tourism joins calls to halt CSG’  
<http://www.echonews.com.au/news/tourism-joins-call-to-halt-coal-seam-gas/1399596/>

<sup>43</sup> Investing \$1 million dollars in gas creates 5 jobs compared to 13 for wind, 14 for solar and 17 for building retrofits from the same amount of investment. Political Economy Research Institute, University of Massachusetts ‘The economic benefits of investing in clean energy’  
[www.peri.umass.edu/fileadmin/pdf/other\\_publication\\_types/green\\_economics/economic\\_benefits/economic\\_benefits.PDF](http://www.peri.umass.edu/fileadmin/pdf/other_publication_types/green_economics/economic_benefits/economic_benefits.PDF)

<sup>44</sup> The Green New Deal for Northern Ireland, <https://research-repository.st-andrews.ac.uk/bitstream/handle/10023/2219/sdc-2009-ni-green-deal.pdf>