



Roinn Cumarsáide, Gníomhaithe  
ar son na hAeráide & Comhshaoil  
Department of Communications,  
Climate Action & Environment

# Exploration Offshore Ireland

## AAPG, San Antonio, 2019

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Petroleum Affairs Division

Department of Communications, Climate Action and Environment

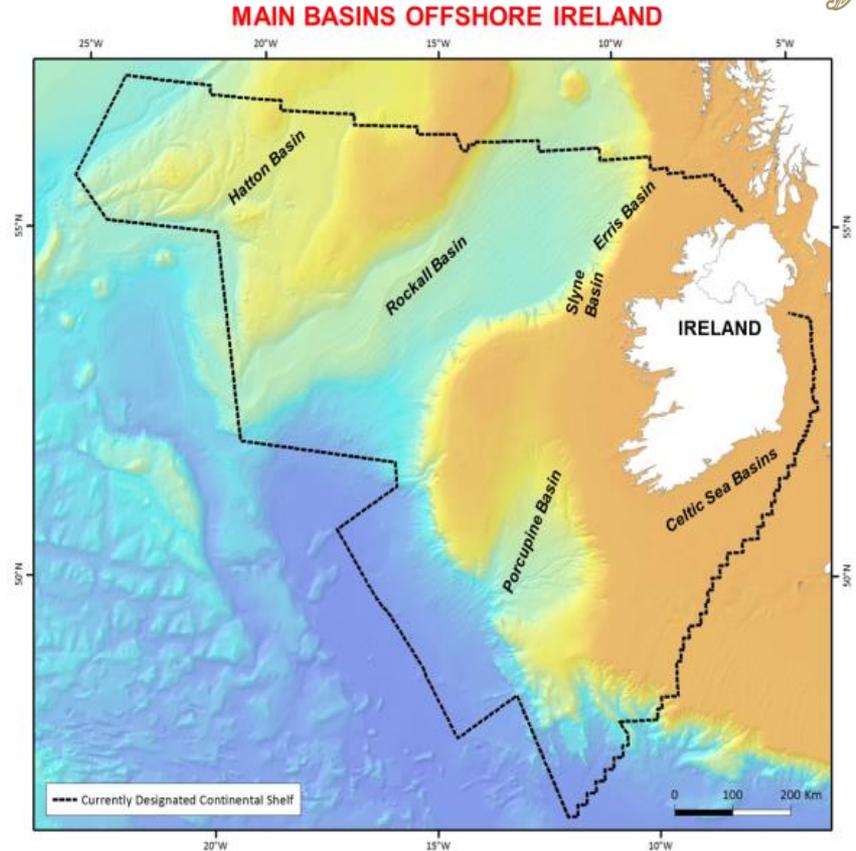
# Main Basins Offshore Ireland



Designated area 700,000 km<sup>2</sup>

Proven working petroleum systems  
in all main offshore basins

Exploration ongoing for 50+ years but  
Atlantic Margin under-explored



# Producing fields

## Discoveries

- Gas /Condensate
- Oil

## Commercial Fields

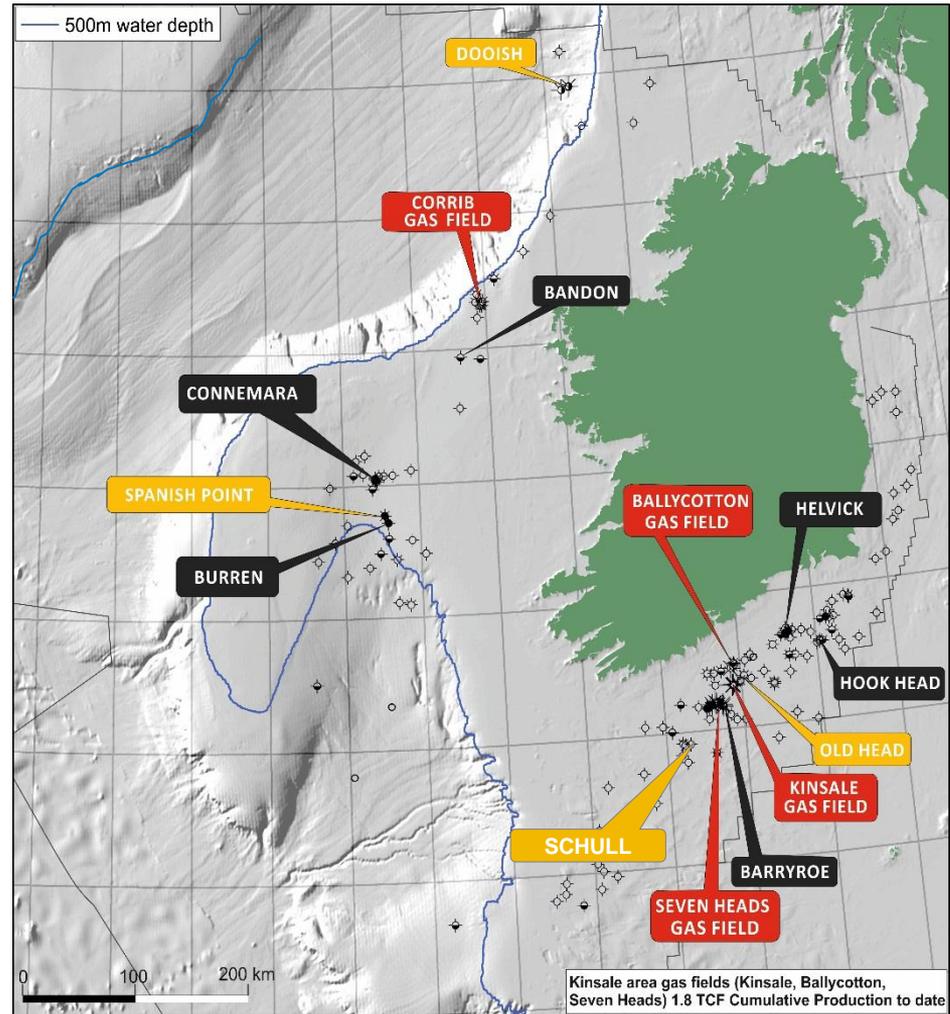
- Gas Field

### Corrib gas field

Slyne Basin

### Kinsale gas field complex

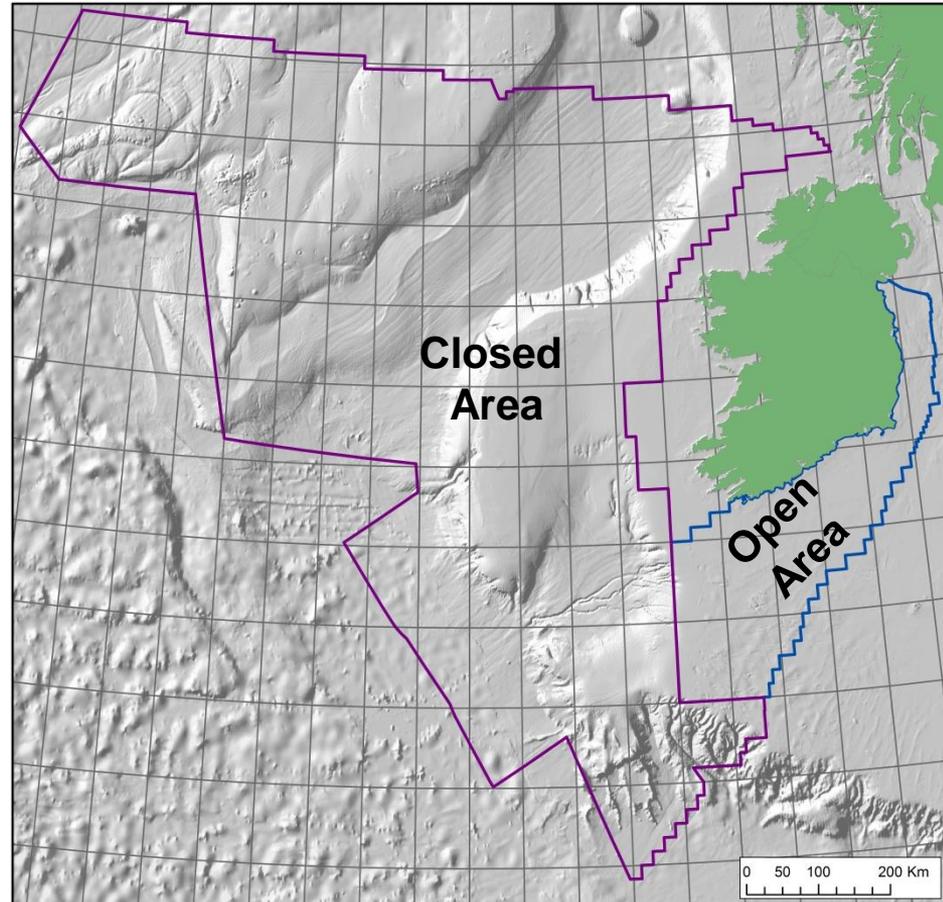
North Celtic Sea Basin



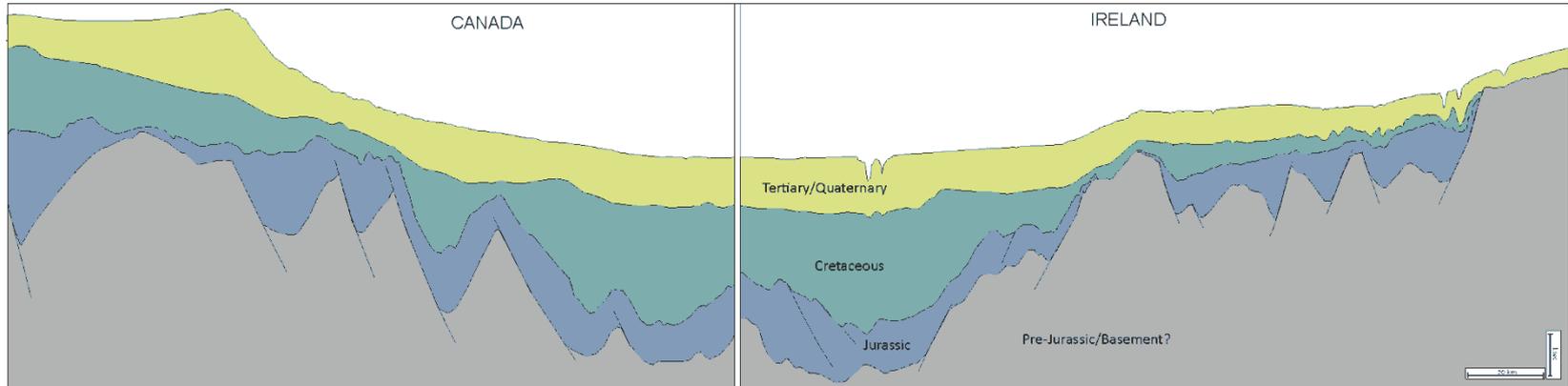
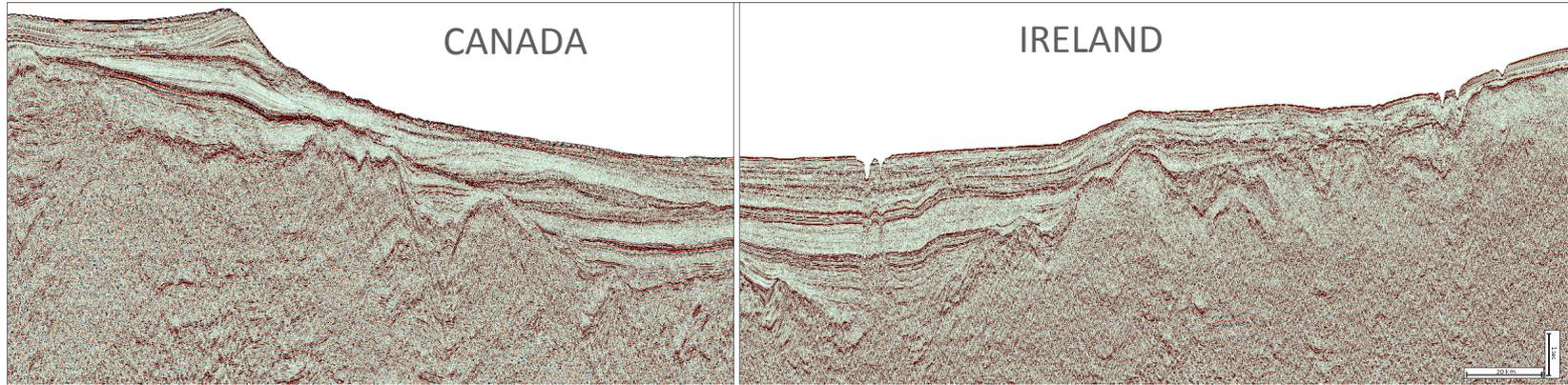
# Licensing Offshore Ireland



- Large Offshore Area - 10 times the size of Ireland's land mass.
- Celtic Sea Open Area - Applications Anytime.
- Atlantic Closed Area - Licensing Rounds (Farm-In opportunities available).
- 2015 Atlantic Ireland Licensing Round most successful round to date.
- 2 zones largely influential in the success of the round.

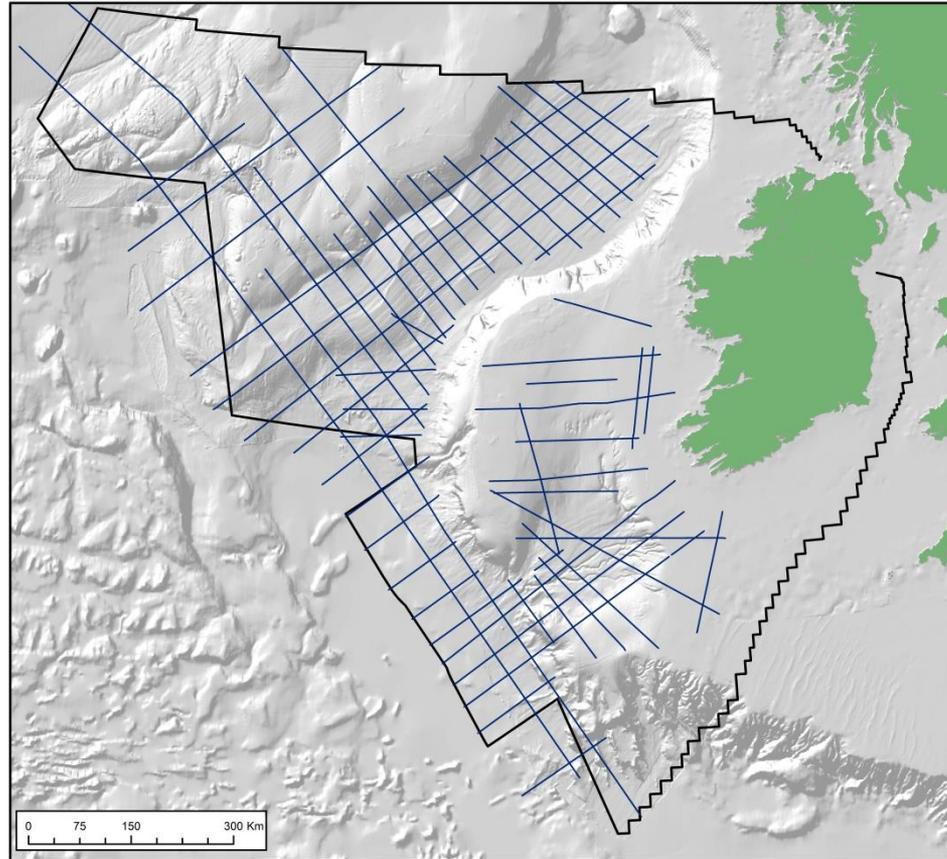


# 1. Canada – Ireland Conjugate Margin



Conjugate Margin Success

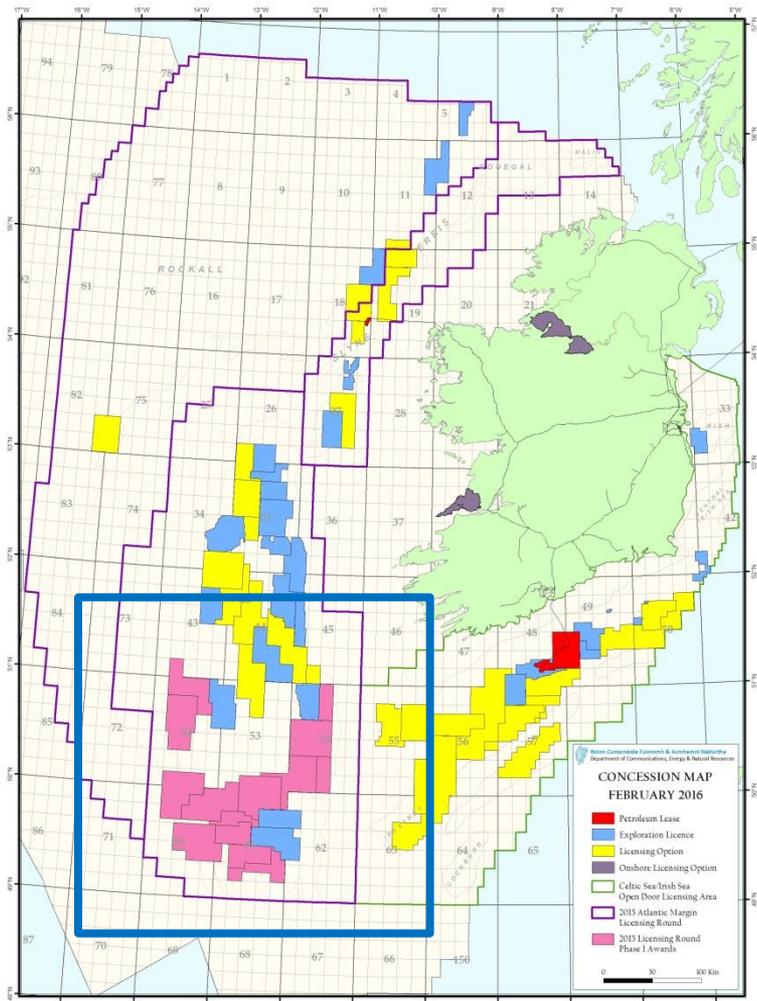
## 2. PAD/ENI Regional Seismic 2013-2014



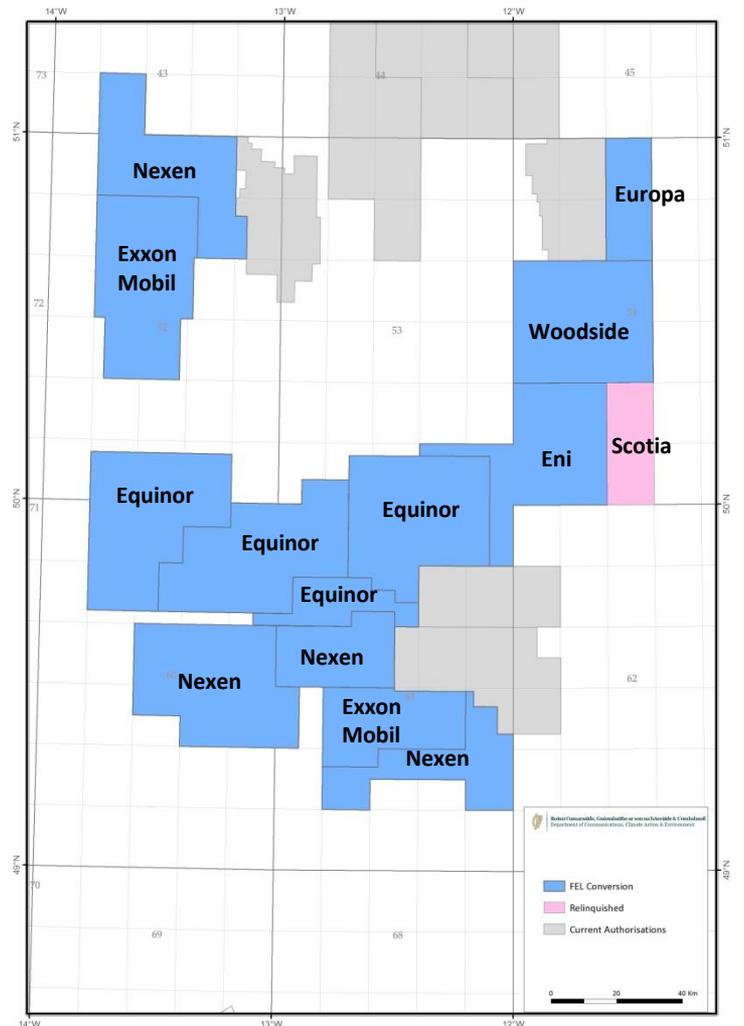


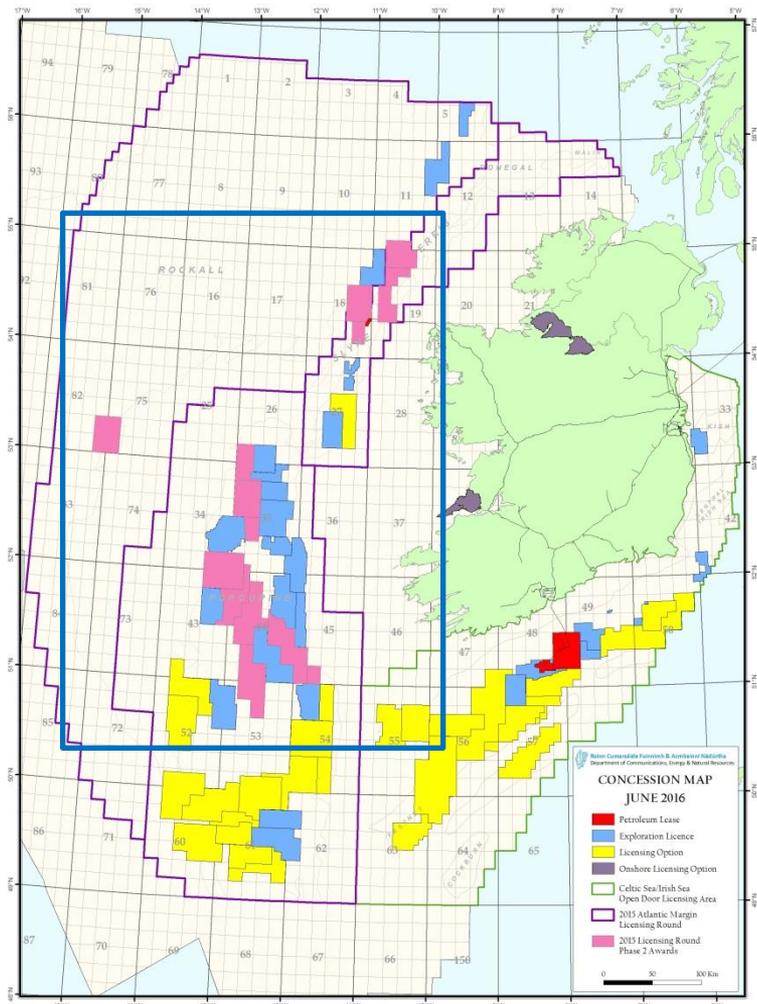
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# Current Activity Offshore Ireland

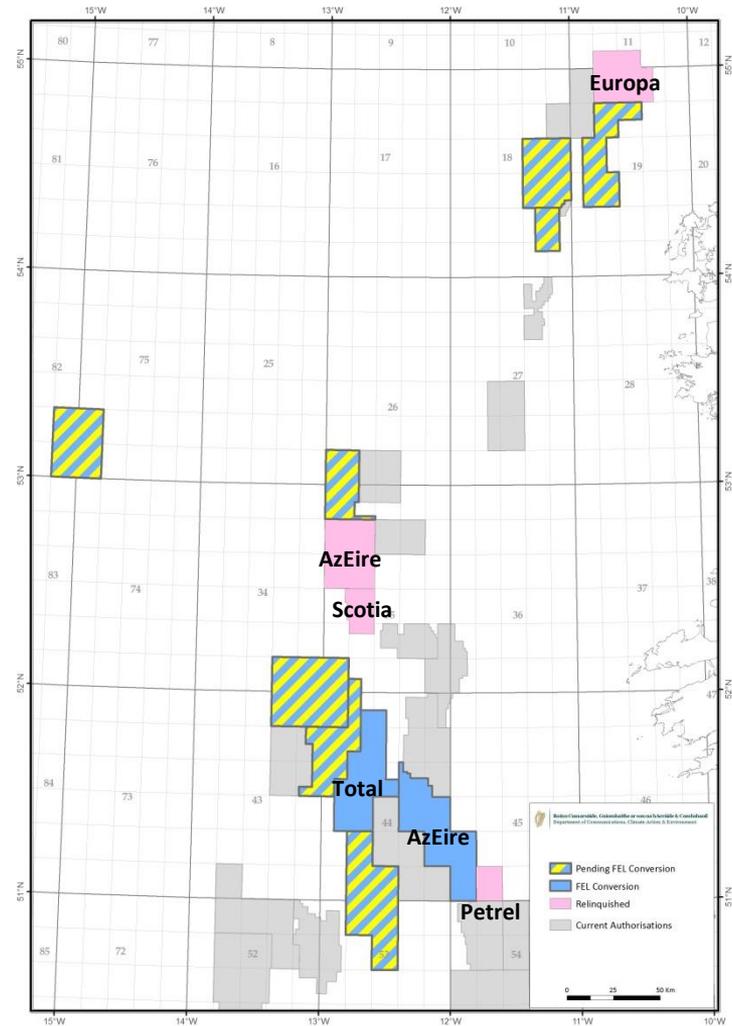


# Phase 1

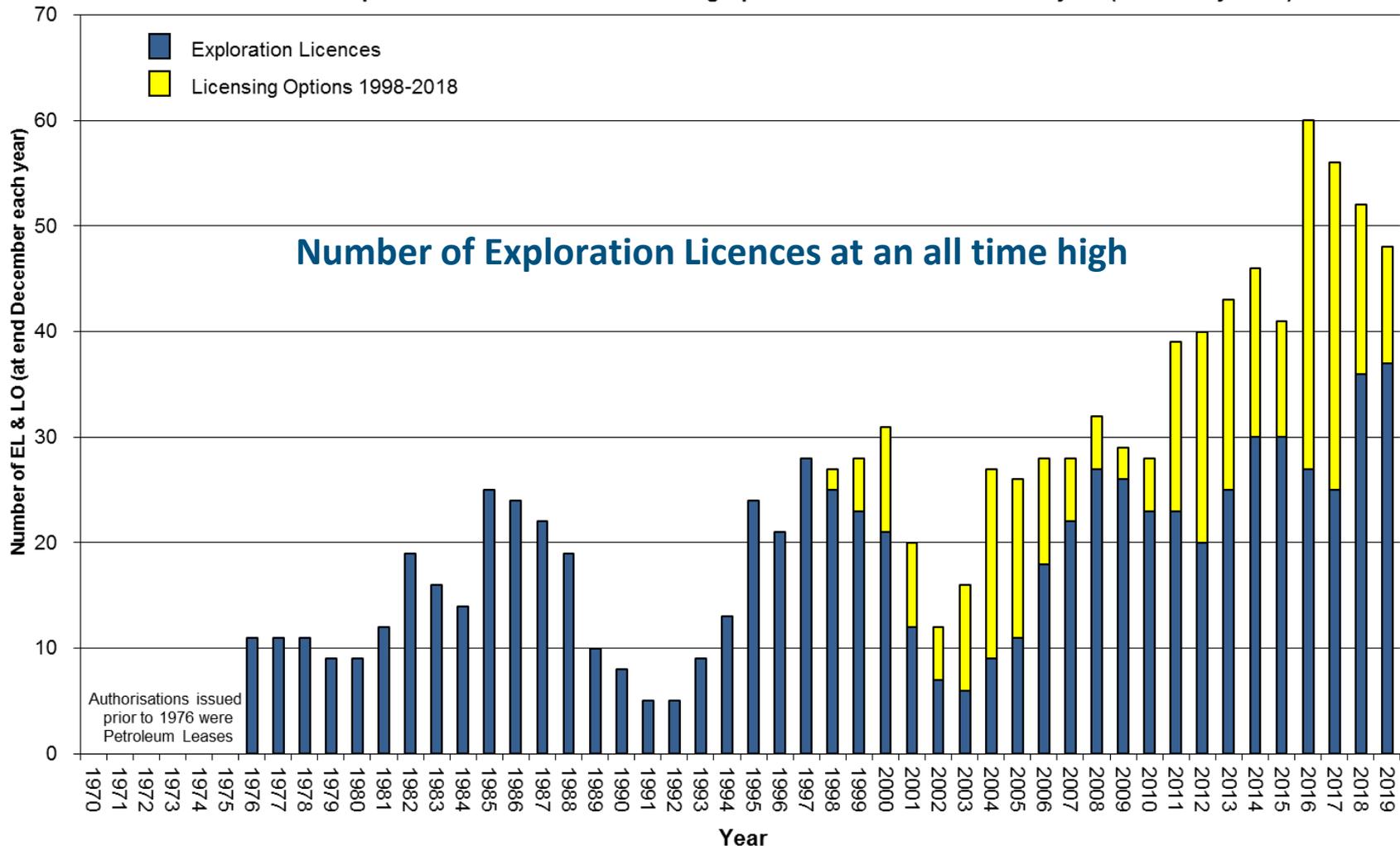




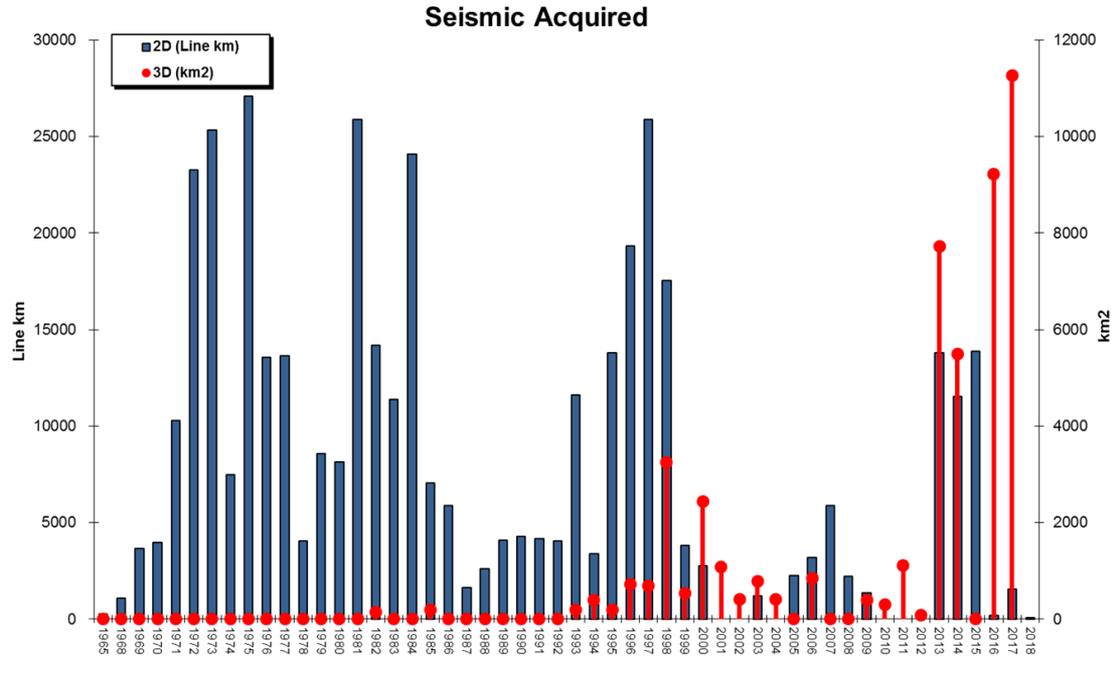
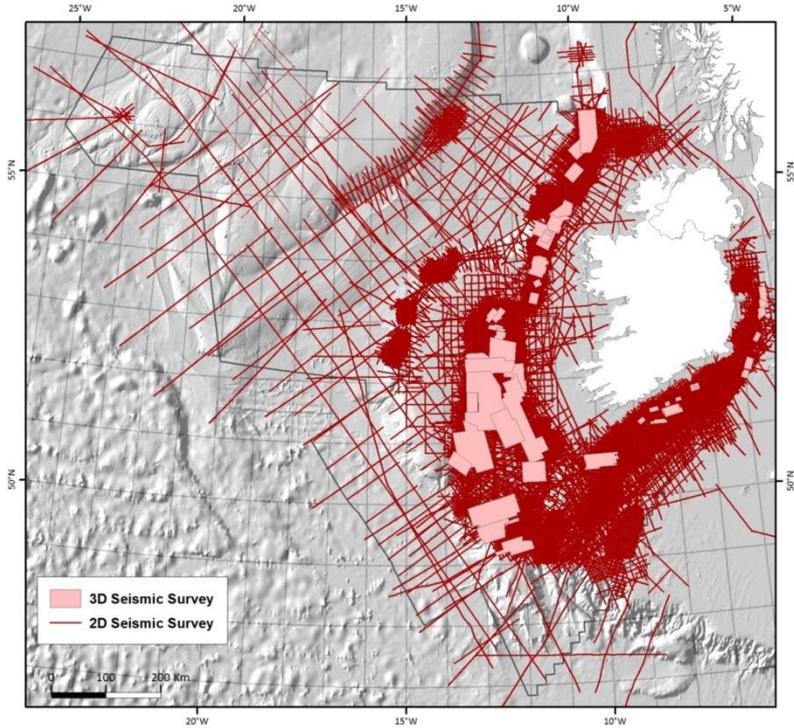
## Phase 2 Update



# Number of Offshore Exploration Licences and Licensing Options at end December each year (1970 - May 2019)

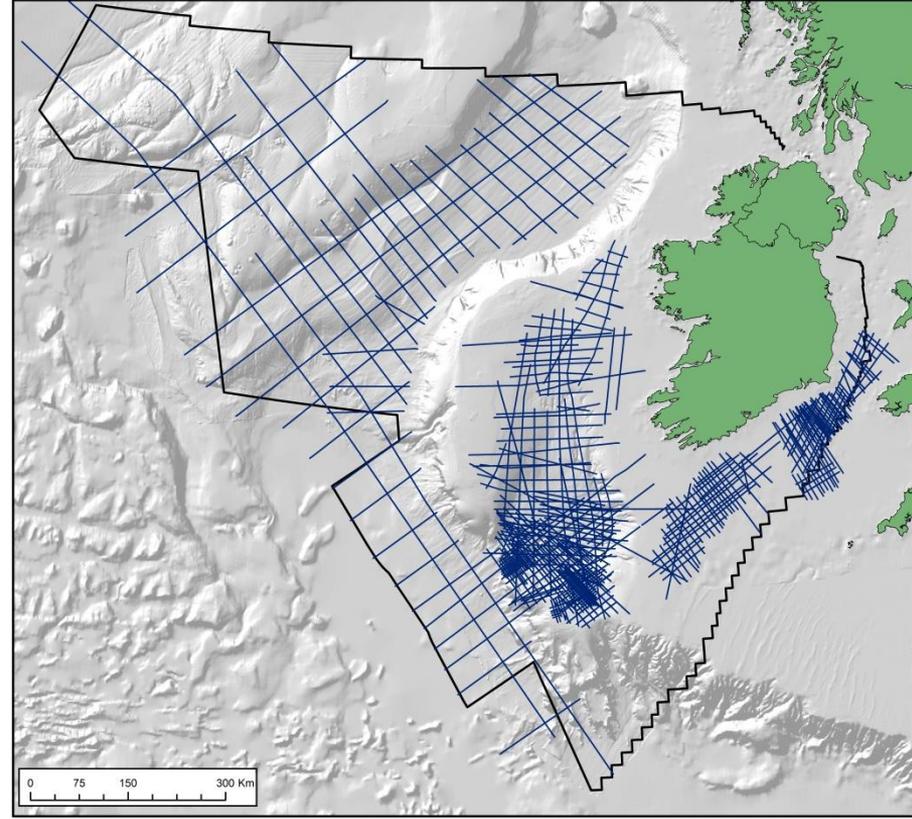
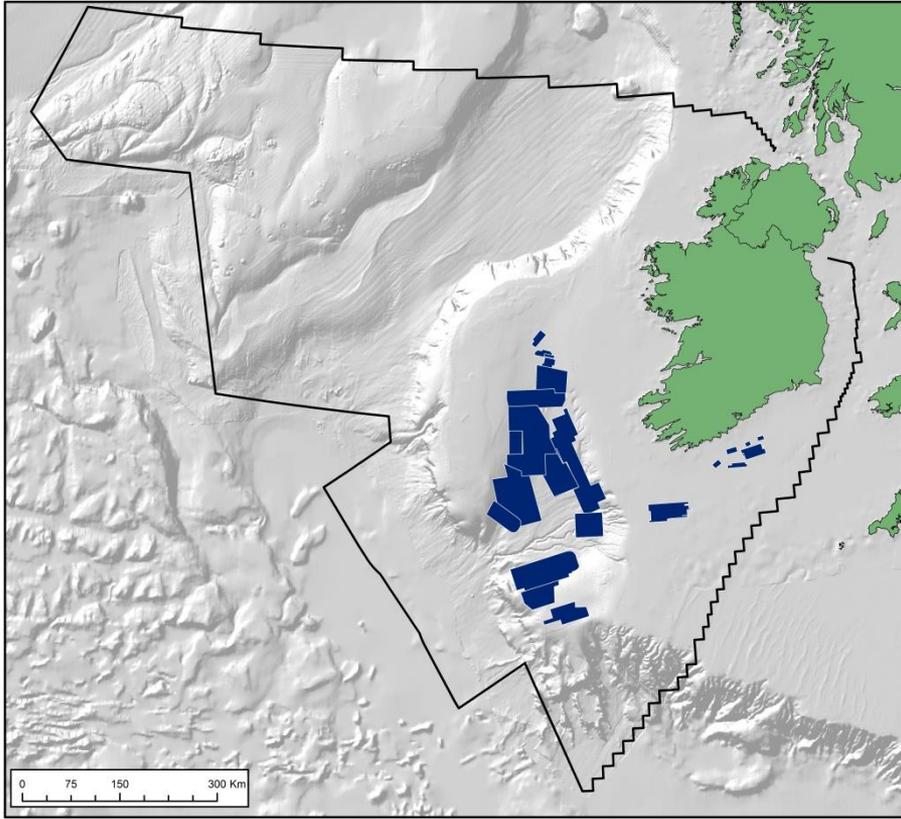


# Seismic

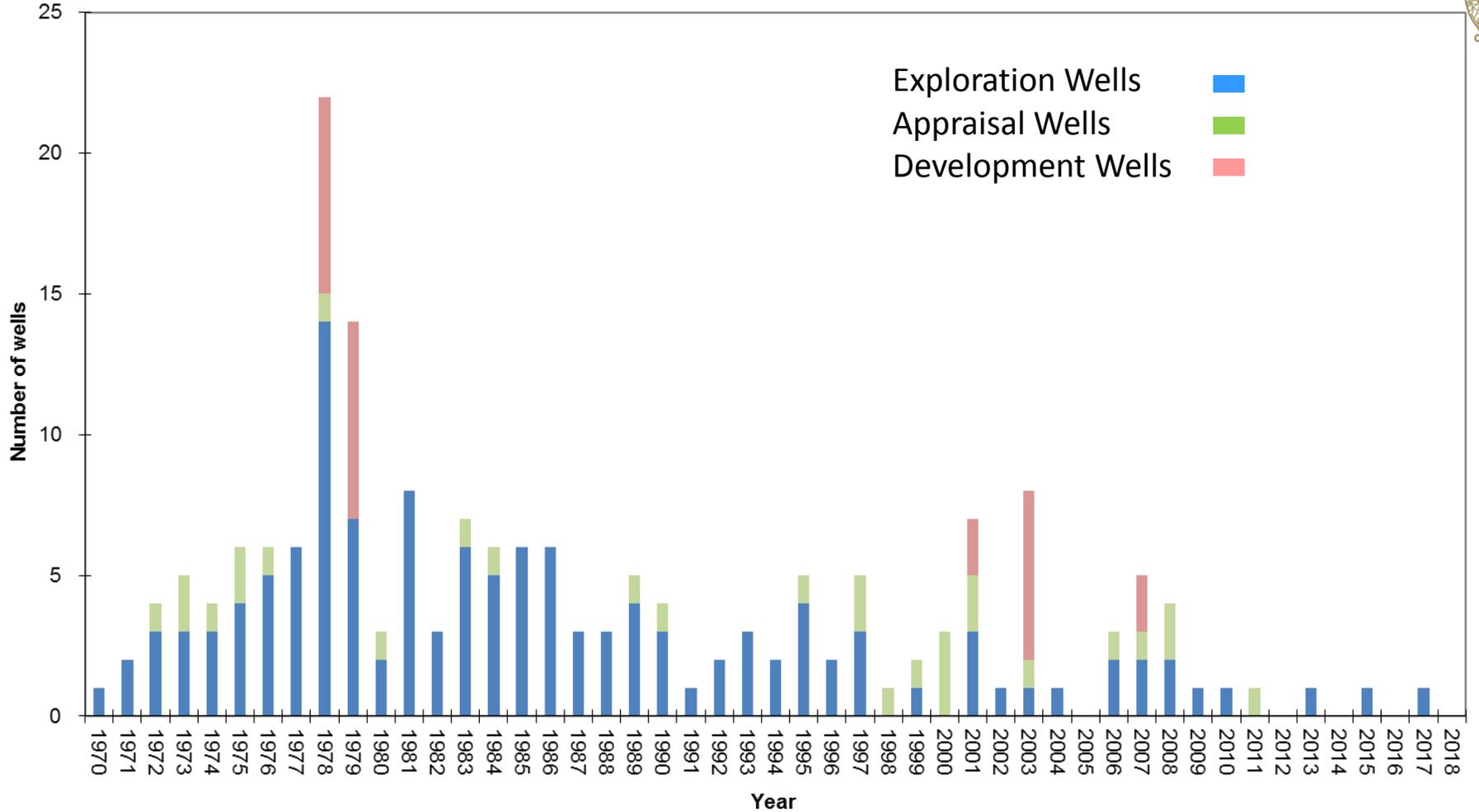


# New Seismic Data Acquired

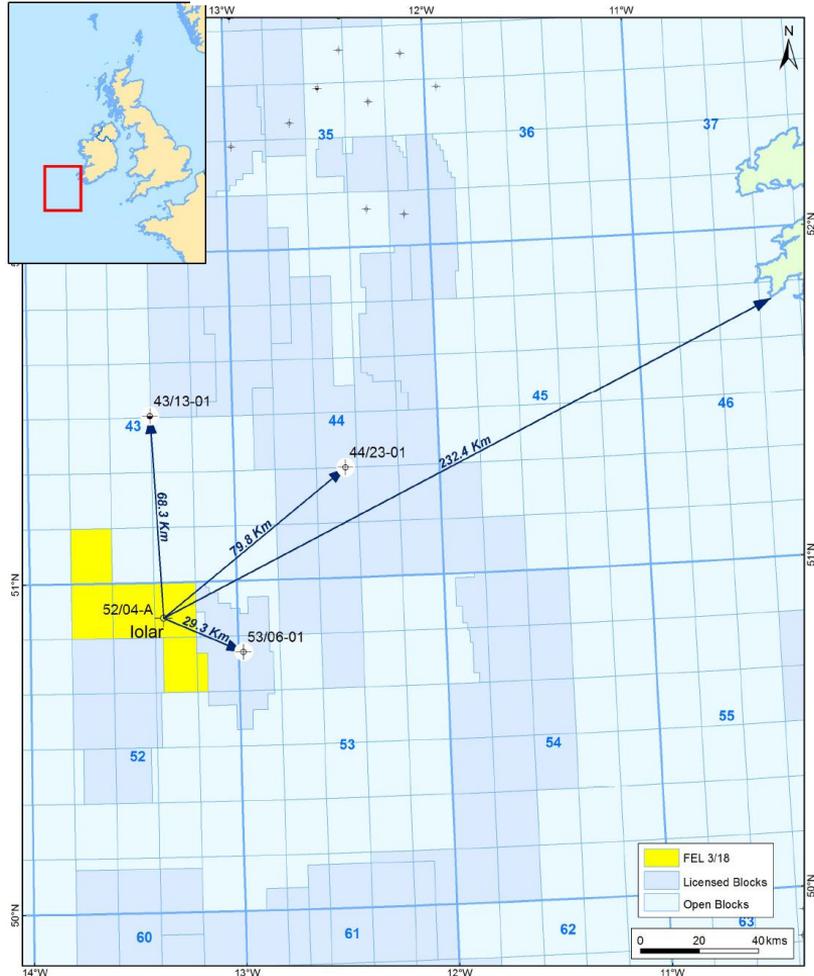
Since 2011 the Irish Offshore has seen extensive acquisition of long offset high quality seismic data - both regional 2D and large 3D surveys



# Wells



# Wells



An application by CNOOC to drill an exploration well in the Porcupine Basin in 2019 is currently under consideration.

- 'Iolar' exploration well 52/4-A in Frontier Exploration Licence FEL3/18
- Located approximately 230km of the southwest coast of Ireland
- Water depth approximately 2160m
- Drilling unit – Stena ICEMax

FEL3/18 comprises:

CNOOC Petroleum Europe Limited (Operator) – 50%

ExxonMobil Exploration and Production Ireland (Offshore South) Limited – 50%



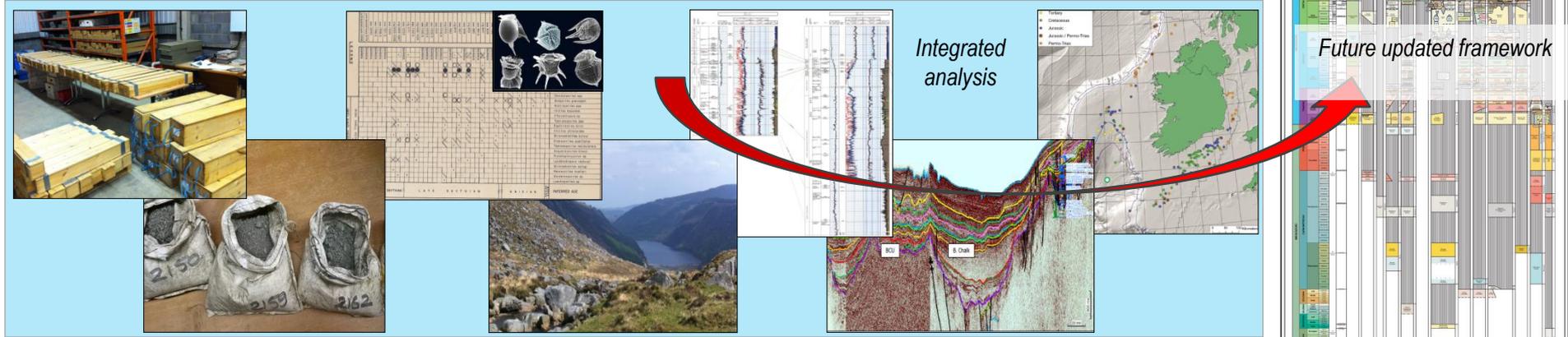
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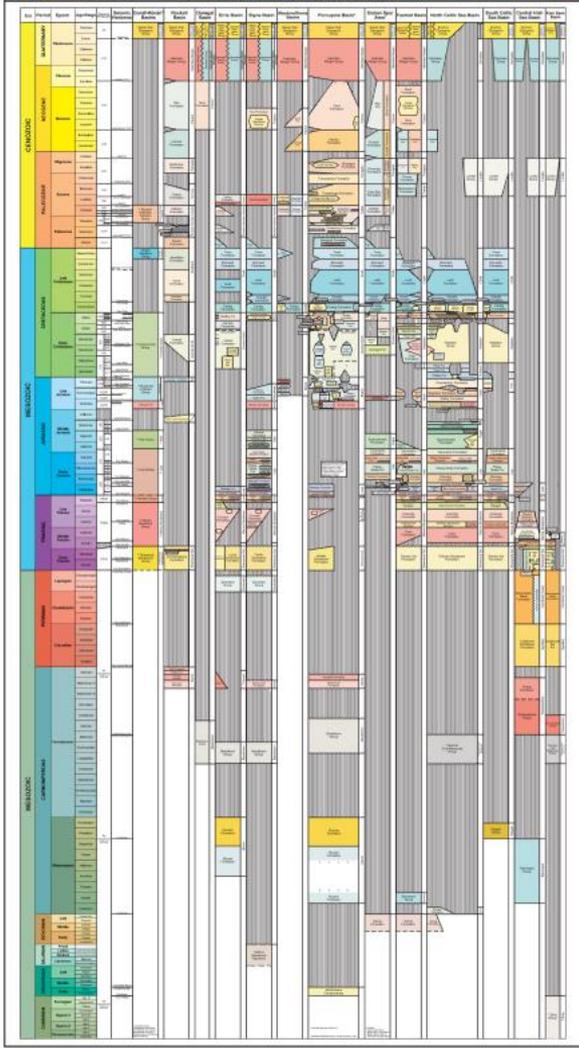
# Research



- Ongoing initiative to construct an updated stratigraphic framework for all basins offshore Ireland.
- Integrated analysis of lithology, biostratigraphy and seismic data currently underway by Merlin Energy Resources Consortium. The project is funded by PIP and is supported and steered by members of PIP, PAD and academia.
- Long-awaited project to improve our understanding of the offshore basins, and aid in future exploration and research initiatives.
- **Atlas to be released as a PAD Special Publication in 2019**

## Study nearing completion





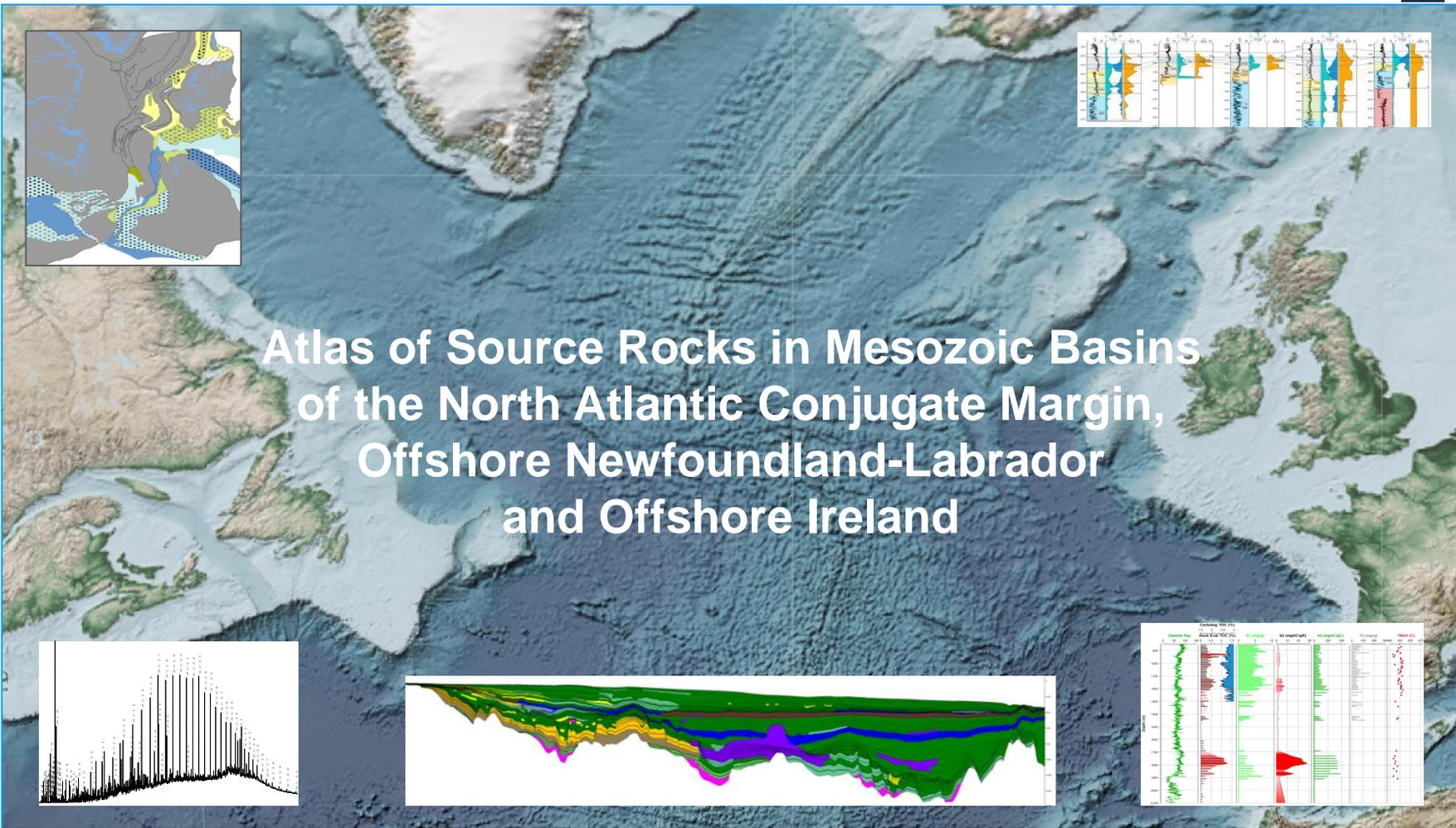
# New Lithostratigraphic Framework for Offshore Ireland



Age	Nomenclature Theme
<b>Neogene and Quaternary</b>	Irish artefacts/jewellery
<b>Paleogene</b>	Irish bays and harbours
<b>Upper Cretaceous</b>	Fish in Irish waters
<b>Lower Cretaceous</b>	Fish in Irish waters – fresh water for Celtic Sea, salt water for west of Ireland
<b>Upper Jurassic</b>	Irish headlands (west and south coast as appropriate to basins)
<b>Middle Jurassic</b>	Irish Birds
<b>Lower Jurassic</b>	Irish lakes for new names. Existing Hebrides and south of England nomenclature possible at group level and three formations
<b>Triassic</b>	Historical and archaeological features and Irish musical instruments for west of Ireland basins.  Existing south of England/Bristol Channel nomenclature for Celtic Sea; existing East Irish Sea nomenclature for Irish Sea basins.
<b>Permian</b>	Use 'Zechstein Group' for west of Ireland, and 'Manchester Marl Formation' and 'Collyhurst Sandstone Formation' for Kish Bank and Irish Sea basins
<b>Upper Carboniferous</b>	Native Irish plants
<b>Lower Carboniferous</b>	Sea shells
<b>Devonian</b>	Irish colours/translations of key features for new names
<b>Igneous events</b>	<b>Irish Folklore, underworld</b>

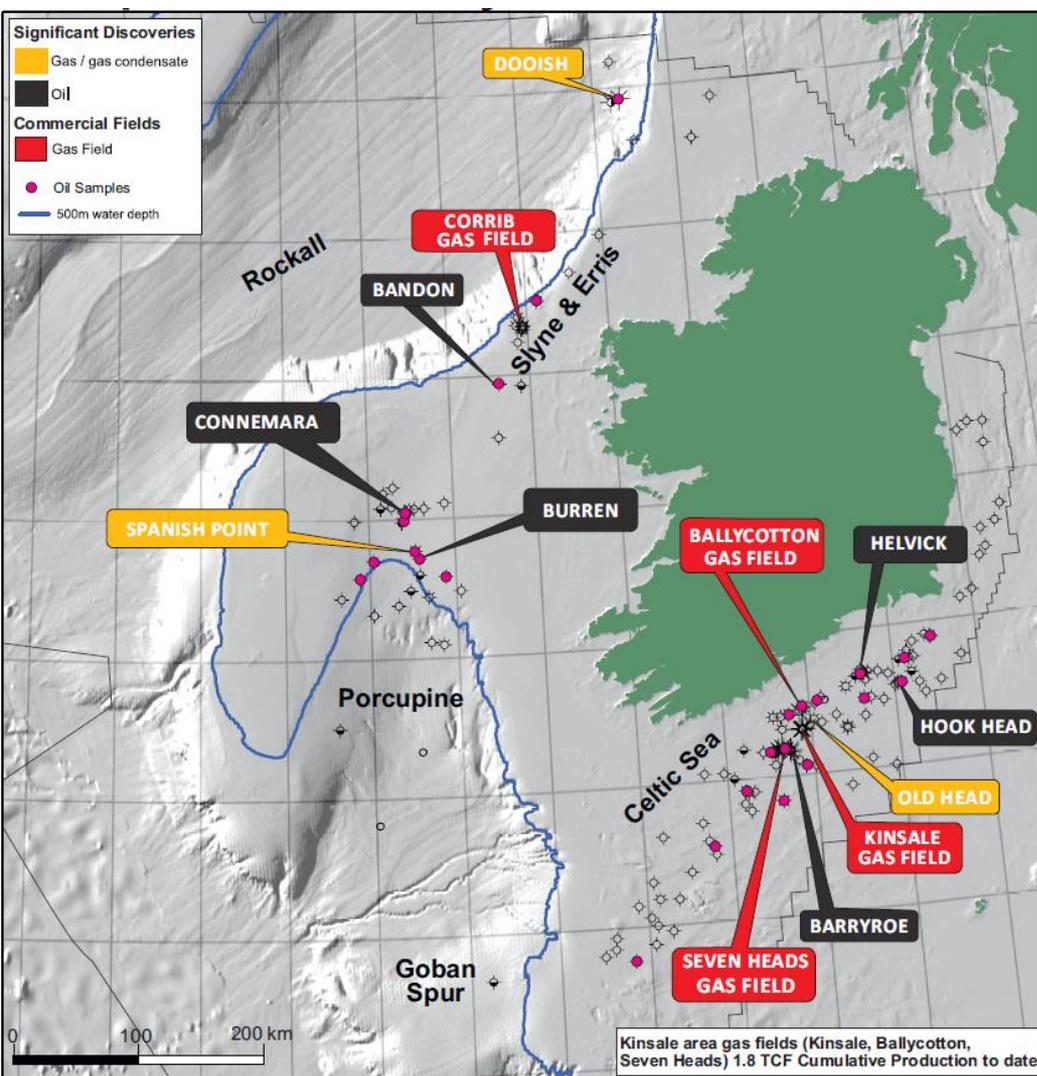
A Stratigraphy Committee was established to develop a formal lithostratigraphic nomenclature scheme, covering the whole drilled stratigraphic interval from Lower Palaeozoic to Quaternary. The new scheme will be used as the standard across the Irish offshore area.

**Available on USB at Ireland Booth (238) in International Pavilion**





The Irish database includes **27 wells with oil samples** plus numerous extracted oil shows.



Newfoundland - Labrador			Ireland		
Basin	Number of Wells with Geological Data	Number of Wells with Geochemical Data*	Basin	Number of Wells with Geological Data	Number of Wells with Geochemical Data*
AVALON UPLIFT	1	0	DONEGAL	2	2
BALTIMORE CANYON TROUGH	2	2	ERRIS	3	2
CARSON BASIN	4	4	FASTNET	18	12
FLEMISH PASS BASIN	13	5	GOBAN SPUR	1	1
GEORGES BANK BASIN	9	8	NORTH CELTIC	81	36
GRAND BANK	2	1	PORCUPINE	30	27
HOPEDALE BASIN	20	18	ROCKALL	4	4
HORSESHOE BASIN	1	1	SLYNE	11	8
JEANNE D'ARC	107	65	SOUTH CELTIC	3	1
ORPHAN BASIN	12	9			
OUTER RIDGE COMPLEX	5	5	* excluding AFTA and Fluid Inclusion data		
SAGLEK BASIN	10	8			
SCOTIAN BASIN	2	2			
SOUTH WHALE	15	9			
ST ANTHONY BASIN	1	1			
WHALE BASIN	10	5			
<b>TOTAL</b>	<b>214</b>	<b>143</b>	<b>TOTAL</b>	<b>153</b>	<b>93</b>

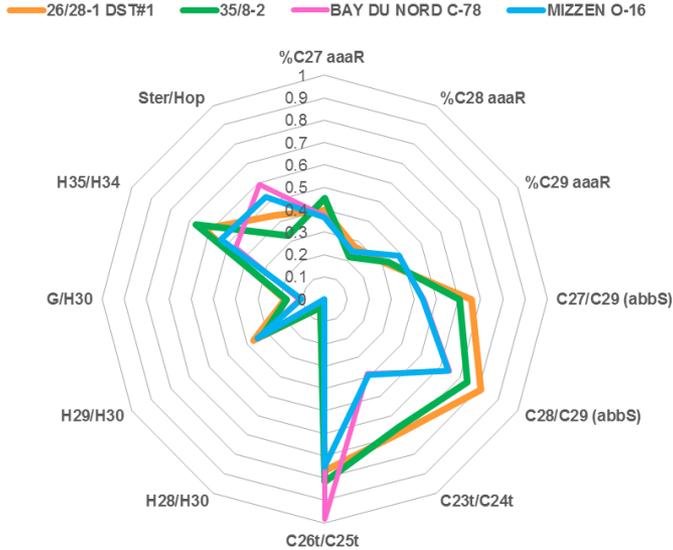
Following a data gap analysis a **new analytical programme** was undertaken

- **Source Rock** - Rock Eval pyrolysis for new evaluation and to confirm previous analysis, augmented by log-derived TOC analysis.
- **Oil** - (oil samples and source rock extracts) including SARA analysis, carbon isotopes, whole oil High Resolution Gas Chromatography, GC-MS plus Kerogen Elemental Analysis, source rock kinetics, GC-MS/MS and CSIA on selected samples.
- **Biostratigraphy** to clarify the ages attributed to potential organic rich intervals.

# Trans-Atlantic Relationships – Porcupine / Flemish Pass & Jeanne d’Arc Oils



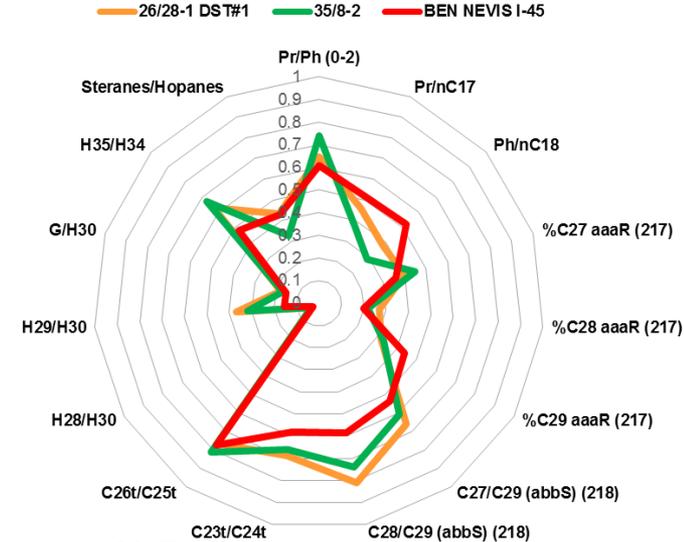
Porcupine Family C Oils vs Flemish Pass Oil



Armstrong 2017



Porcupine Family C vs Ben Nevis I-45 Oil  
(Jeanne d’Arc A3)



Armstrong 2017

The oils of the Connemara Field (specifically 26/28-1) and Spanish Point (35/8-2) make up of Porcupine Family C and show close relations as illustrated by CG-MS biomarker and gas chromatography ratios with both oil of the Flemish Pass (Bay du Nord C-78 and Mizen O-16 and particularly with the Jeanne d’Arc Family A3 (represented by Ben Nevis I-45).

# ObSERVE Data



The baseline aerial and acoustic data acquisition (2015 - 2017) of the ObSERVE programme is completed and results and impact are currently being analysed.

Data is now publically available from DCCA

Acoustic and aerial environmental baseline programme of marine wildlife



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Department of  
Culture, Heritage and the Gaeltacht





# Climate Emergency Measures Bill 2018

*“The Minister shall not grant a license, undertaking or lease, if on the date of the application for the license, undertaking or lease, the monthly mean level of atmospheric carbon dioxide exceeds 350 parts per million”*

# Government Strategy



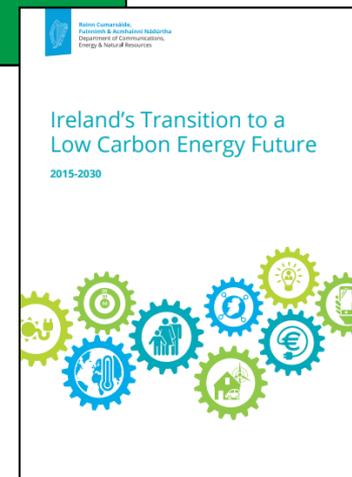
## National Mitigation Plan: Climate Action

- Context for climate objective
- Clarifies level of greenhouse gas mitigation ambition
- Establishes processes to achieve decarbonisation goals



## Energy White Paper: Transition

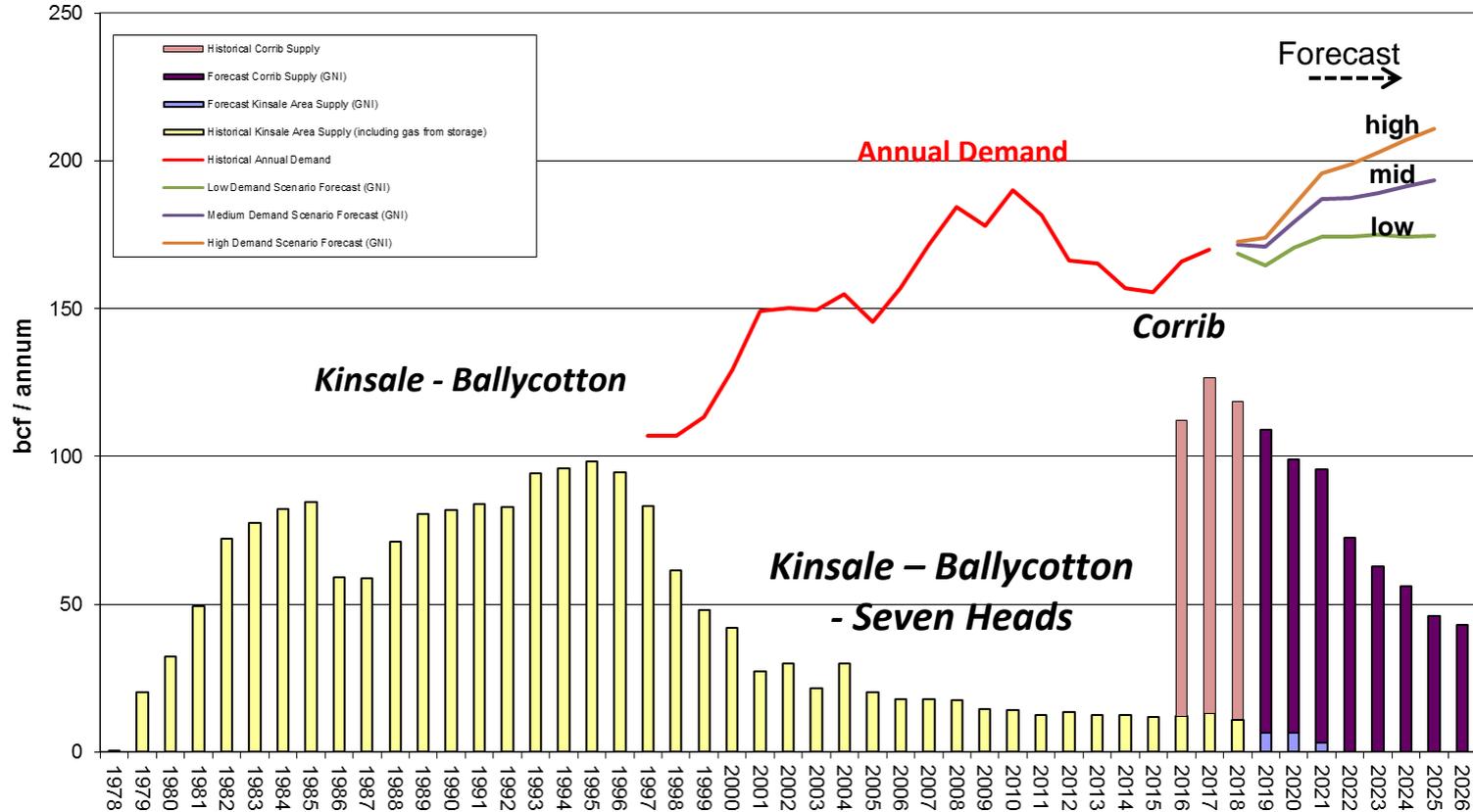
- Security: mix of sources; reliability; to meet current and future demand.
- Accessibility & Affordability
- Environmental Sustainability



# Production from Offshore Gas Fields



## Ireland's Annual Gas Demand and Indigenous Supply



**Even in low case demand scenario, demand significantly exceeds supply**

# Climate Emergency Measures Bill 2018



## What the Bill will not do

- It will not cut Irelands emissions
- It will not help Ireland reach our 2020 or 2030 emissions targets
- It does not change Irelands use of fossil fuels
- It does not drive renewable energy or energy efficiency
- It does not address the future needs of a population which will grow by one million by 2050

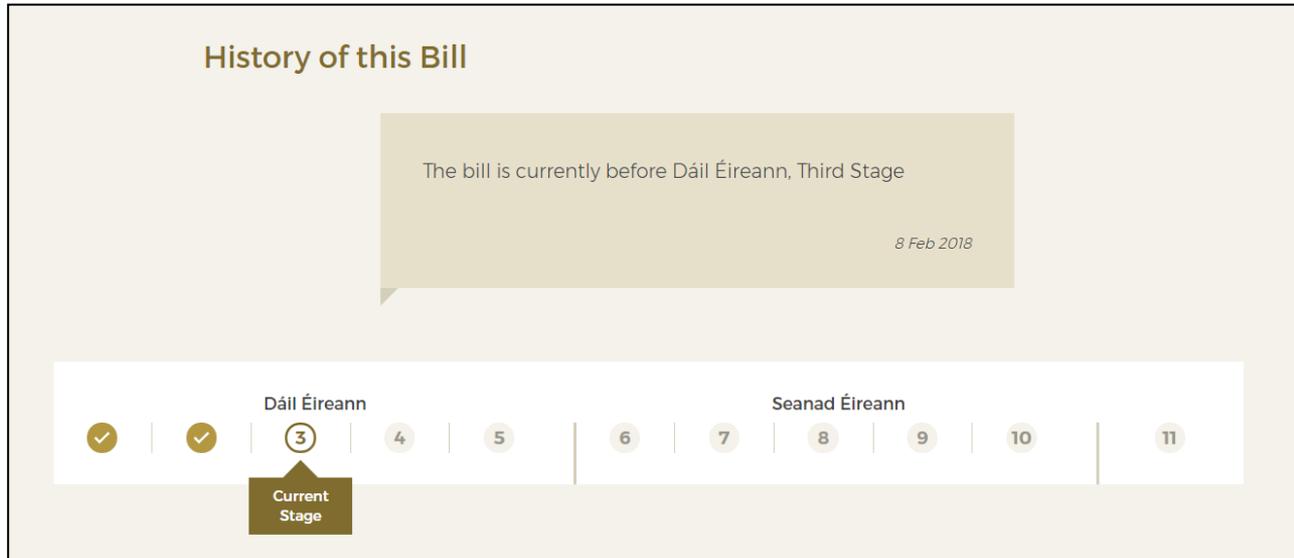
## What the Bill will do

- It will force Ireland to progress to only importing its energy at a time when EU production is declining rapidly
- It will potentially increase emissions as we will have to import our oil and gas needs
- France has a prohibition like this but France relies on nuclear energy.
- It will ensure Ireland foregoes potential economic opportunity and fiscal return

# Climate Emergency Measures Bill 2018



- The Bill remains a legislative proposal
- Committee Stage (Third Stage) scheduled for 11 June
- Government policies in respect of climate action, energy and offshore exploration, and the application of such policies remain unchanged



# International Energy Agency 2019 Review



## Recommendations (Natural Gas)

The government of Ireland should:

- Ensure a stable and streamlined regulatory framework, and conduct regular licensing rounds, to encourage exploration activities and, subsequently, develop domestic reserves.
- Optimise the role of gas in the transition to a low-carbon-energy system, including encouraging, through appropriate regulation and policy, the development of an LNG import facility and seasonal gas storage. A cost benefit analysis should be used when deciding on any public infrastructure investments and developing programmes for gas demand in the heating and transport sectors.
- Subject to a cost and benefit analysis, introduce and promote, through a robust support scheme, the production of biomethane as an indigenous and sustainable form of gas that will contribute to the security of supply and sustainability targets.

# Conclusions



- The Government is committed to support exploration for oil and gas in Ireland's offshore.
- Exploration interest in Ireland's offshore basins remains strong. Of the 25 two year Licensing Options awarded in 2016 as a result of the 2015 Atlantic Margin Licensing Round 80% have applied to convert to Frontier Exploration Licences.
- Ireland offshore is under-explored in terms of drilling. The quality of seismic data has improved significantly in recent years and evaluation of the new seismic data acquired highlights the petroleum prospectivity of the basins.



# Ireland Petroleum Affairs

# International Pavilion Booth 238

 Ireland

**WHAT IRELAND HAS TO OFFER**

- Large offshore areas
- Good geology
- Proven gas fields
- Underground storage
- Accessibility
- Comprehensive data
- Strong market demand
- Infrastructure

... and all based on rich, well-located gas reserves



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**OFFSHORE IRELAND DATA, DISCOVERIES & GAS DEMAND**



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**New Basins: Geologic, Chronostratigraphic, Lithostratigraphic & Sequence Stratigraphic Frameworks for Offshore Ireland**



Merlin

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**Atlas of Seismicity in the Mesozoic Basins of the Connemara Region, West of Ireland**



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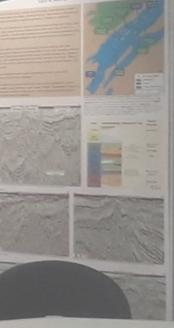
**GLYDE SEA & TERTIARY BASINS**



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**WHAT**



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