

Atlantic Ireland 2019

Newfoundland and Labrador Update: Emerging Plays



Acknowledgements



Thank you to the co-authors and members of the Oil and Gas team at Nalcor for their help with preparing this talk.



Thank you to our partners TGS and PGS for allowing us to show images of data acquired offshore Newfoundland and Labrador.



Thank you to Fugro for allowing seabed coring work to be shown.



Thank you to Beicip Franlab for preparing images from their Independent Resource Assessment.

Nalcor's Exploration Role

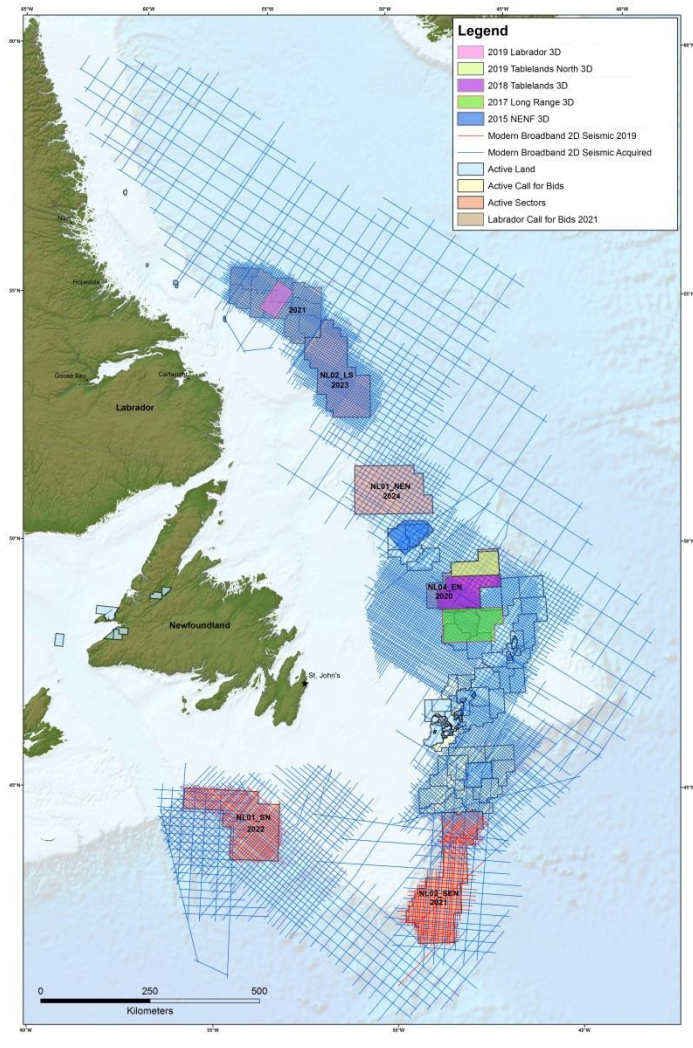
Upstream Exploration/Development Cycle



Pre-Competitive Phase



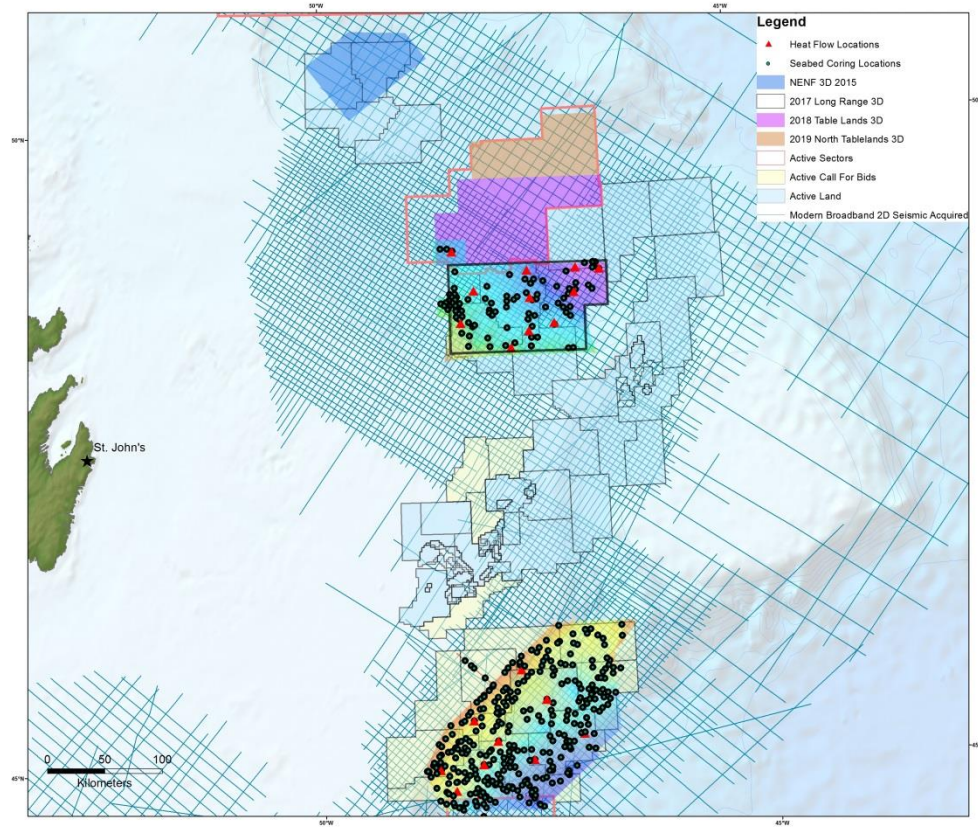
Nalcor is the State Energy Company of Newfoundland and Labrador



NL Seismic Data Investment

- Since 2011 Nalcor has invested in a TGS/PGS regional 2D seismic program.
- The objective is to identify and quantify the resource potential of our frontier basins.
- 186,000 line kms of long offset broadband 2D data has been acquired.
- 31,000 km² of long offset broadband 3D data.

Multibeam, Heatflow and Seabed Coring Programs



- 2017 ~ 10 500 km²
- 11 heat flow locations.
- 99 core locations.
- 2018 ~ 18 000 km²
- 10 heat flow locations.
- 104 core locations.
- Multibeam bathymetry data was used in conjunction with seismic data to determine optimal placement of coring locations.

The map displays the Atlantic Ocean off the coast of North America, showing seismic data and exploration areas. Key features include:

- Geographic Labels:** Labrador, Newfoundland, St. John's, Gully Bay, Canada.
- Legend:**
 - 2019 Labrador 3D (Pink)
 - 2019 Tablelands North 3D (Light Green)
 - 2018 Tablelands 3D (Purple)
 - 2017 Long Range 3D (Green)
 - 2015 NENF 3D (Blue)
 - Modern Broadband 2D Seismic 2019 (Pink line)
 - Modern Broadband 2D Seismic Acquired (Blue line)
 - Active Land (Light Blue)
 - Active Call for Bids (Yellow)
 - Active Sectors (Orange)
 - Labrador Call for Bids 2021 (Brown)
- Exploration Areas:**
 - 2021 (Pink area)
 - NL02 LS 2021 (Blue area)
 - NL01_NEN 2024 (Pink area)
 - NL04_NEN 2020 (Purple area)
 - NL01_NN 2022 (Pink area)
 - NL03_NEN 2021 (Red area)
- Annotations:**
 - Orphan Basin 2020 Sector (Black dot)
 - 2019 Call for Bids (Yellow box)
- Scale:** 0, 250, 500 Kilometers.

- ## OIL AND GAS

Regional Overview

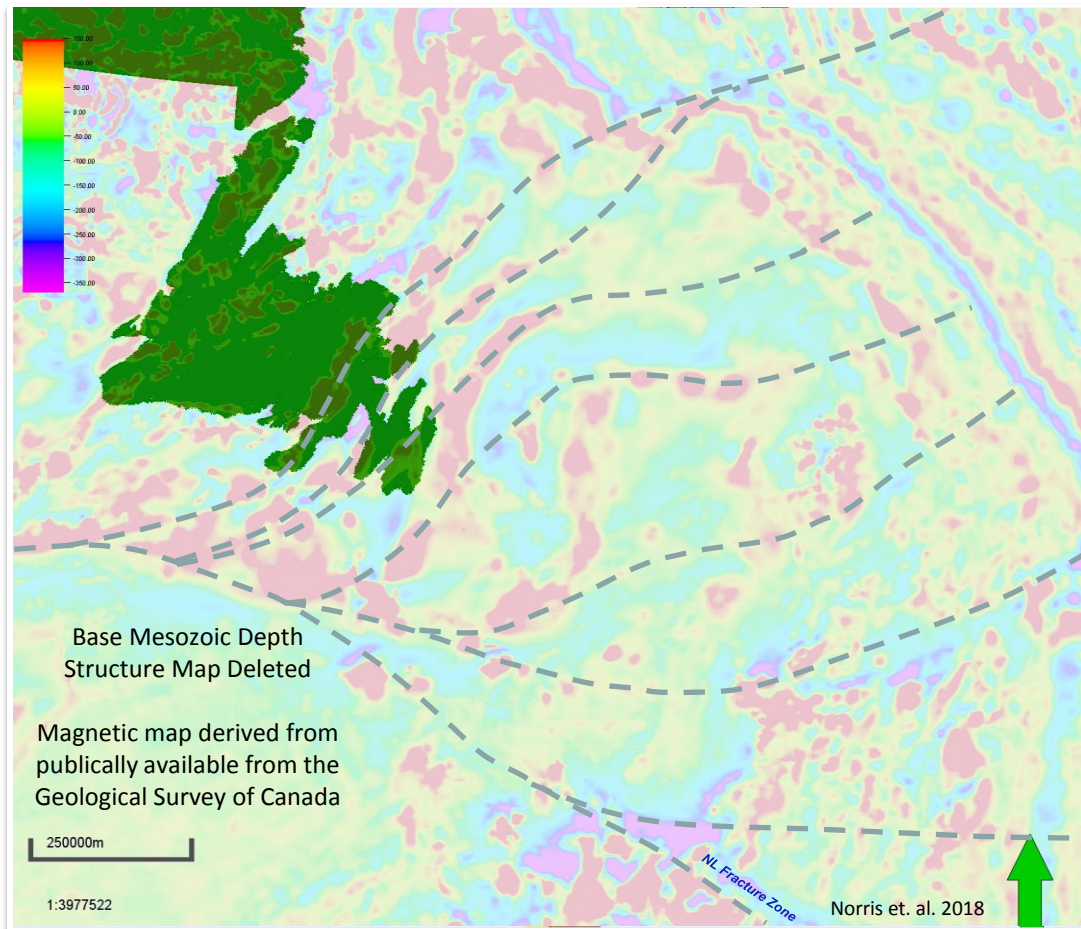
- Base Mesozoic depth structure Map
- Regions of similar structural fabric
- What is the cause of this differentiation?

Base Mesozoic Depth
Structure Map Deleted

Norris et. al. 2018

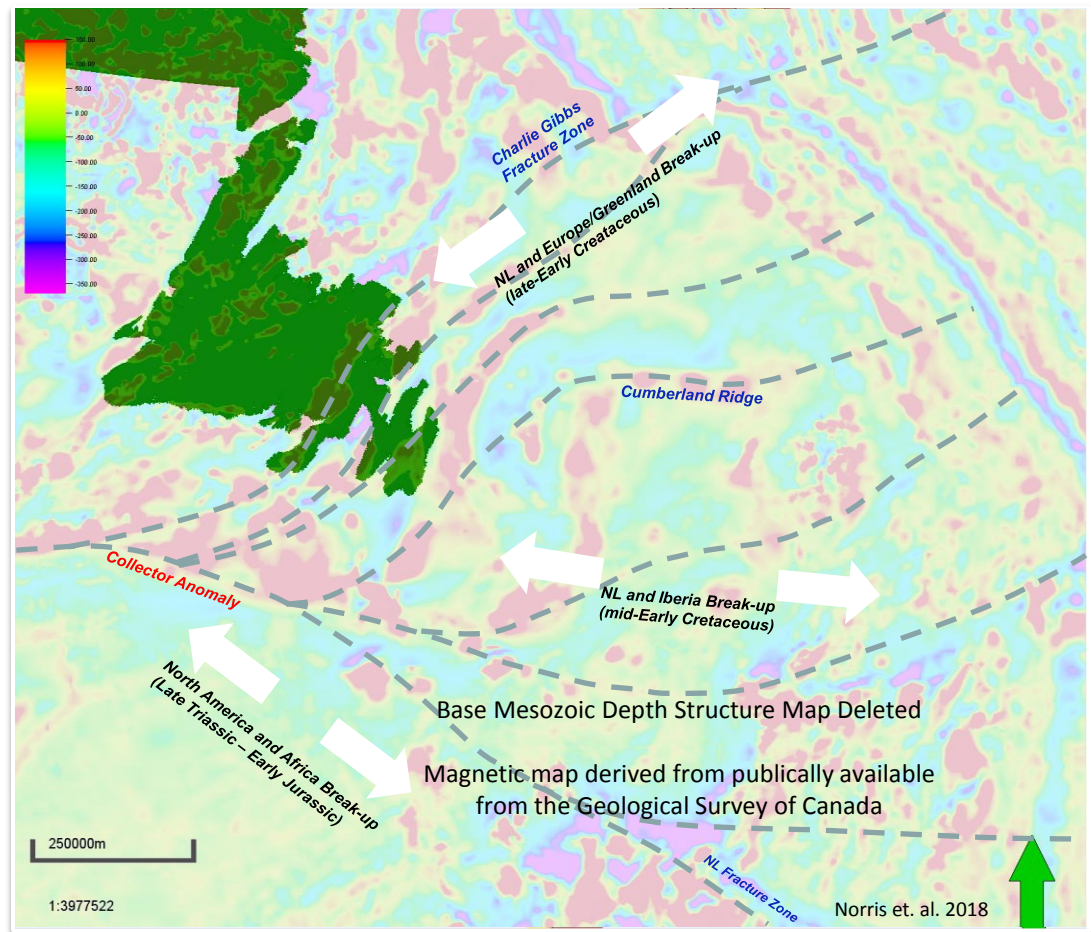
Regional Overview

- Regional Aeromagnetic data define crustal scale lineaments that separate the regions of similar structural fabric.
- Tectonic response to strike-slip motion along lineaments evident in regional structural mapping.

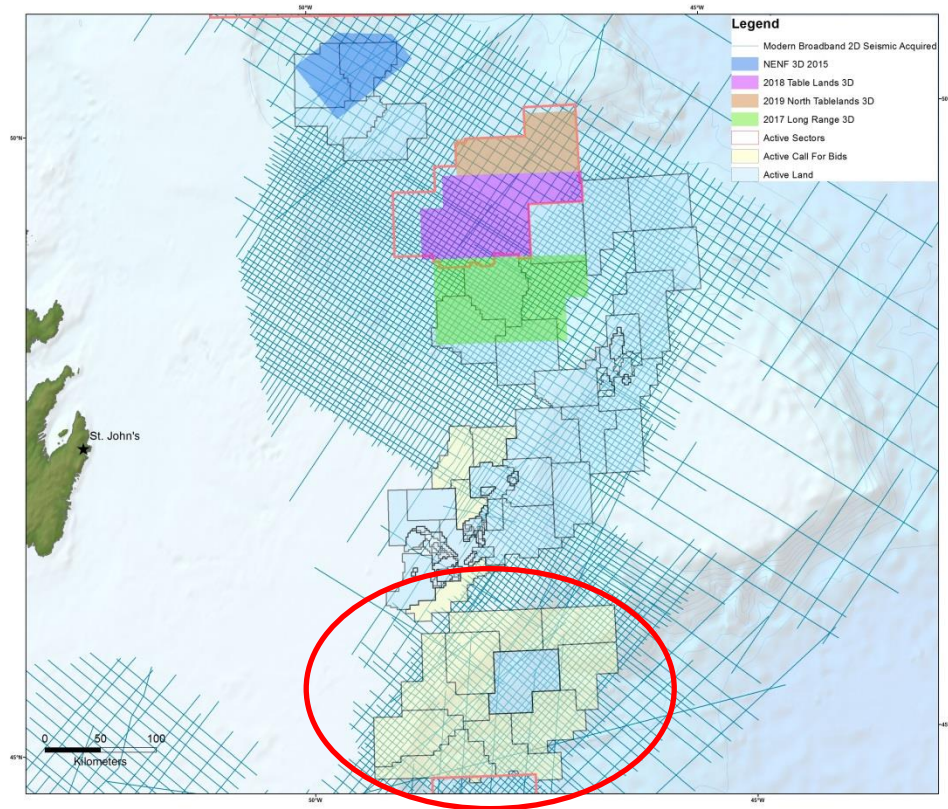


Regional Overview

- Charlie Gibbs Fracture Zone (CGFZ) defines the northern extent of Jurassic deposition.
- Cumberland Ridge (CR) appears to define the extent of Late Triassic-Early Jurassic deposition.
- Lineaments in the Orphan Basin between CR and CGFZ appear to exhibit structural variation.



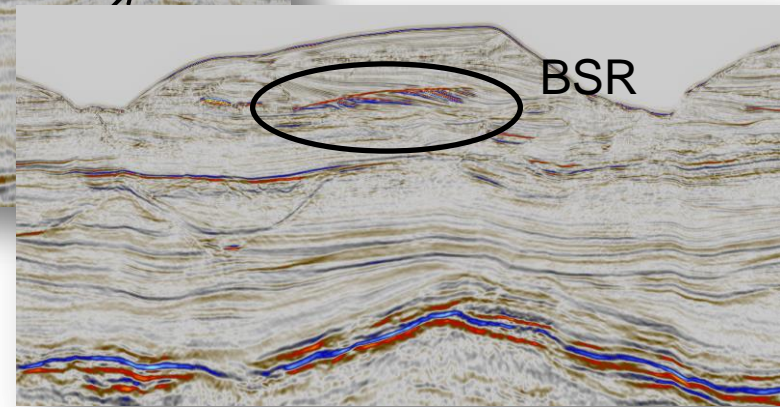
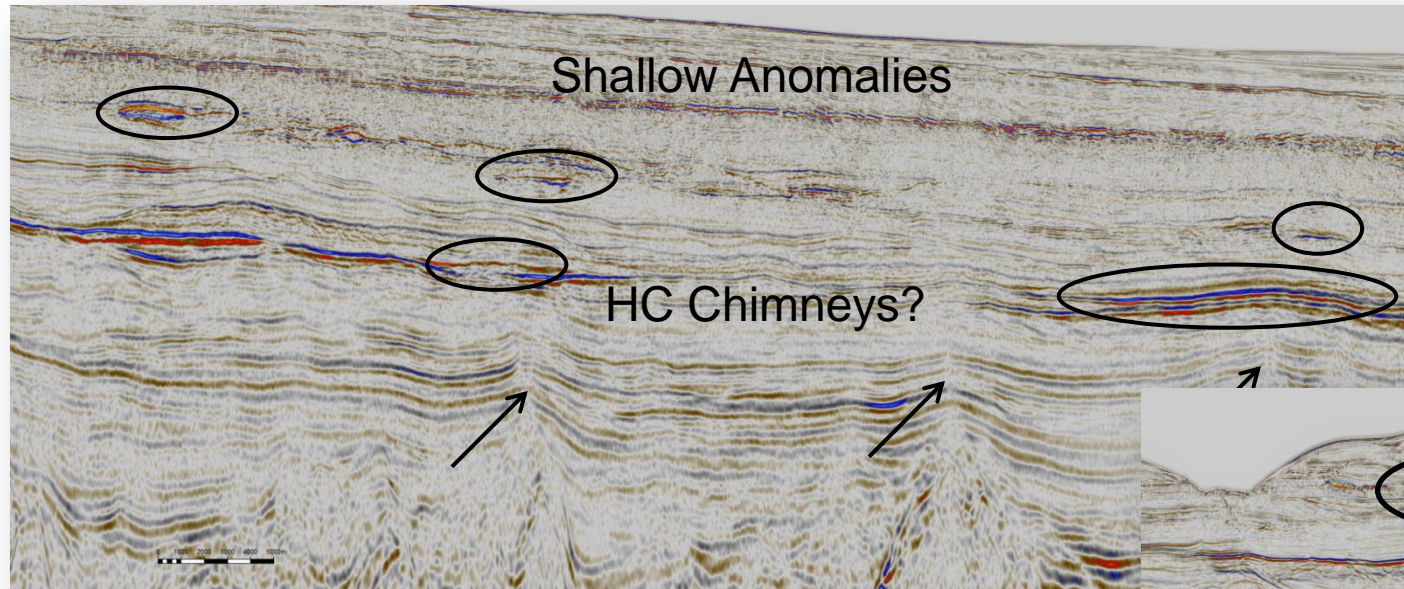
2019 Call for Bids Area



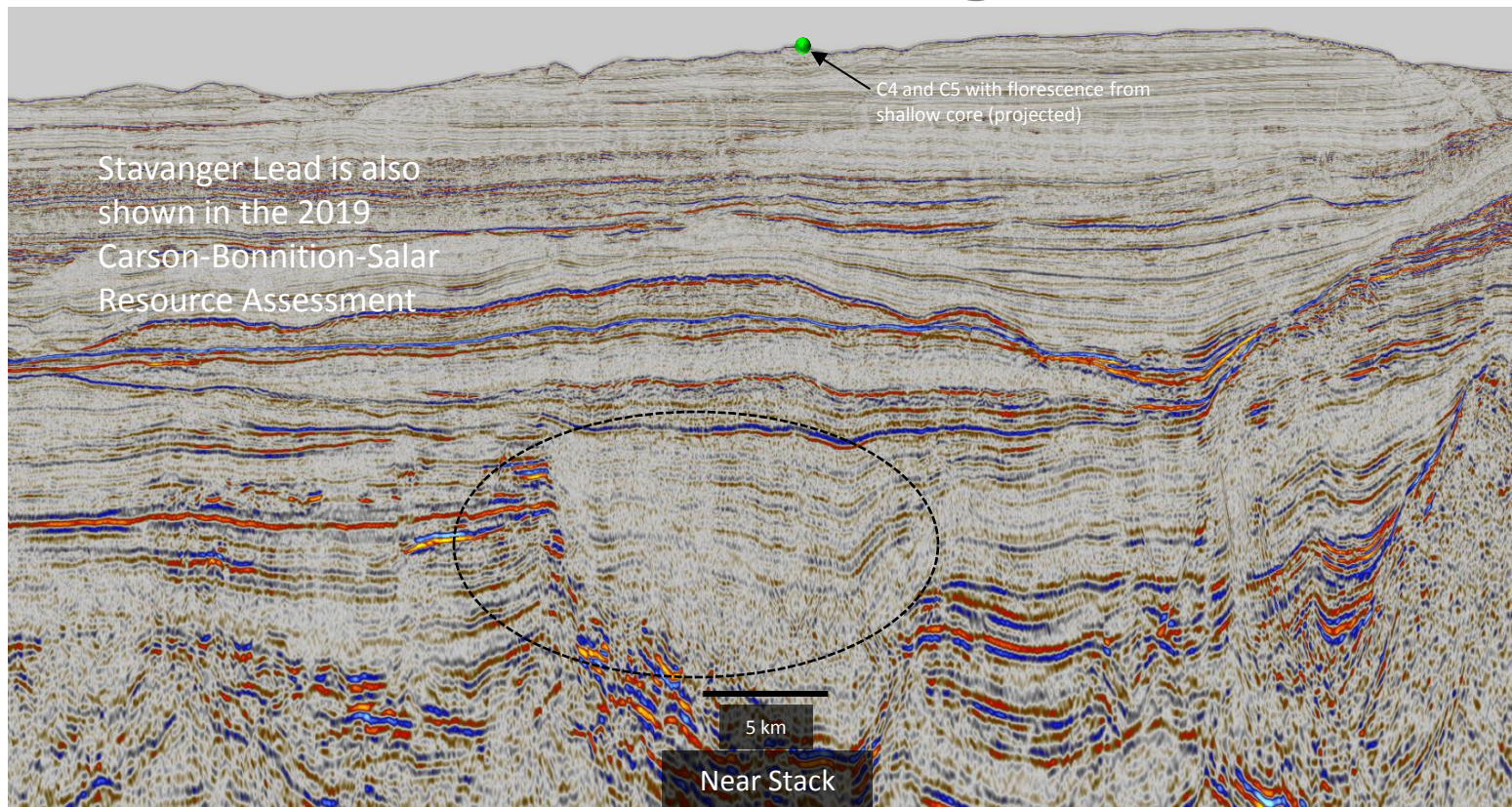
Three main Basins:

- Carson
- Bonniton
- Salar

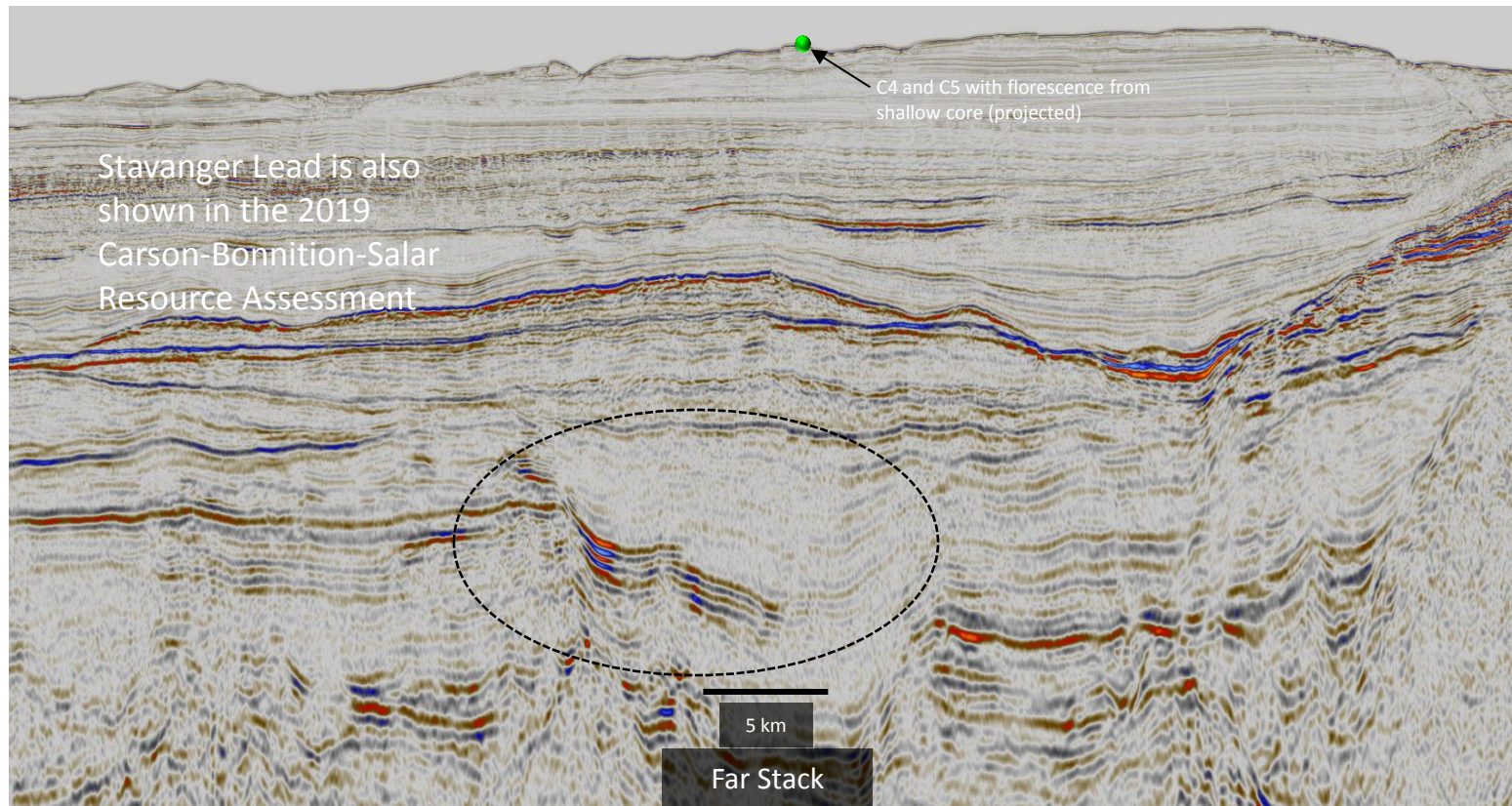
2019 Call for Bids Area



2019 Call for Bids Area – Stavanger Lead



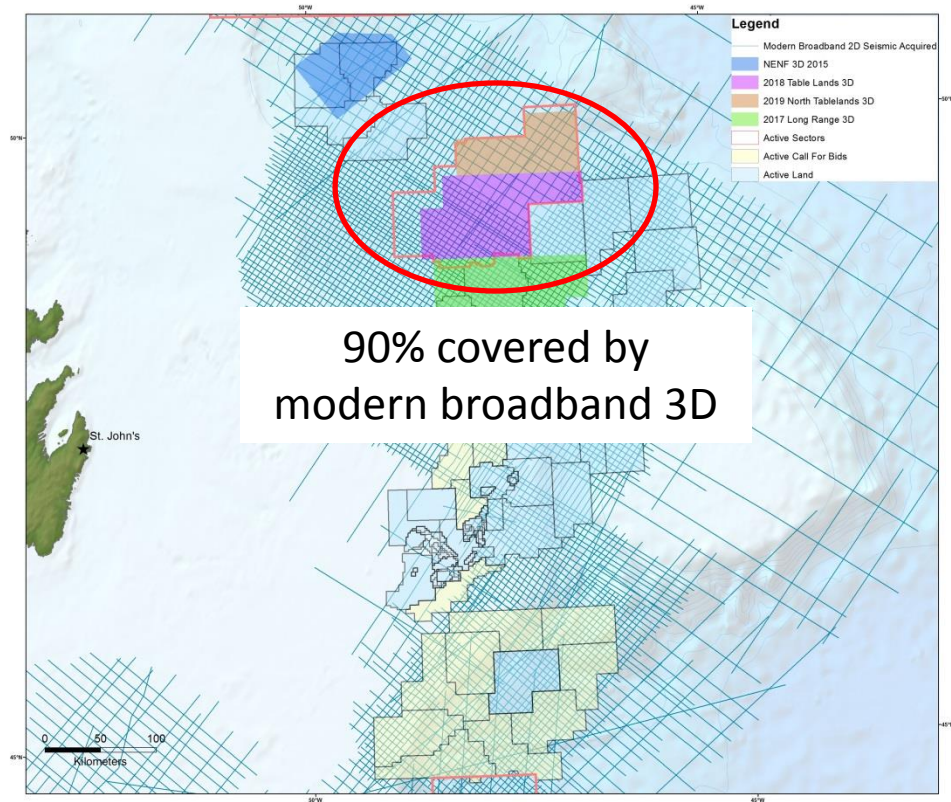
2019 Call for Bids Area – Stavanger Lead



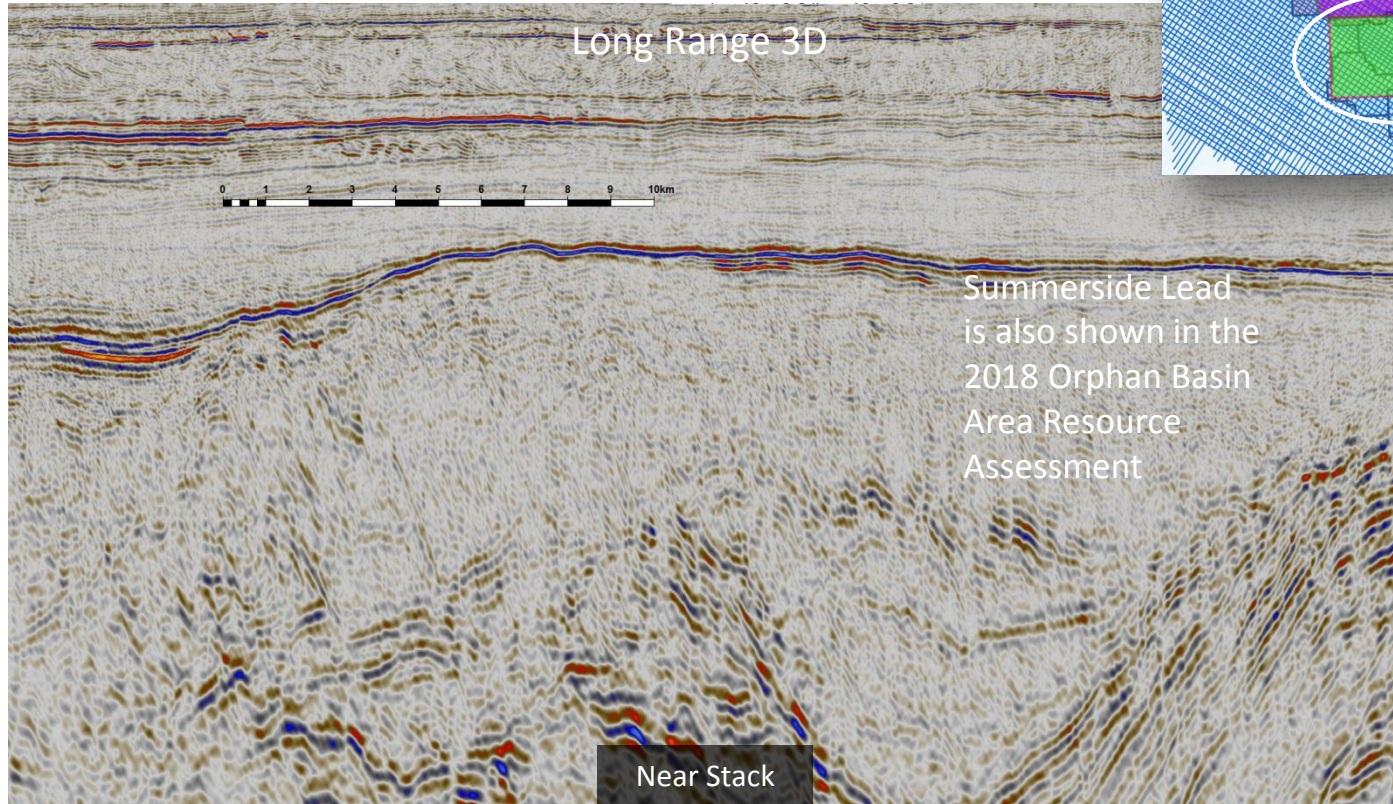
2019 Call for Bids Area

Additional Lead Slides Have Been Removed

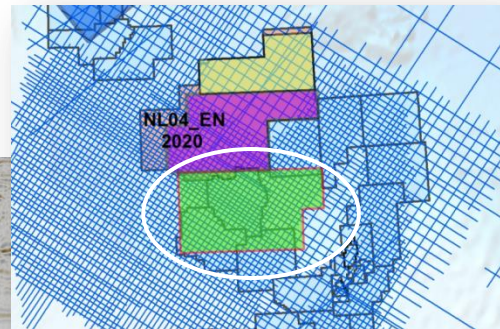
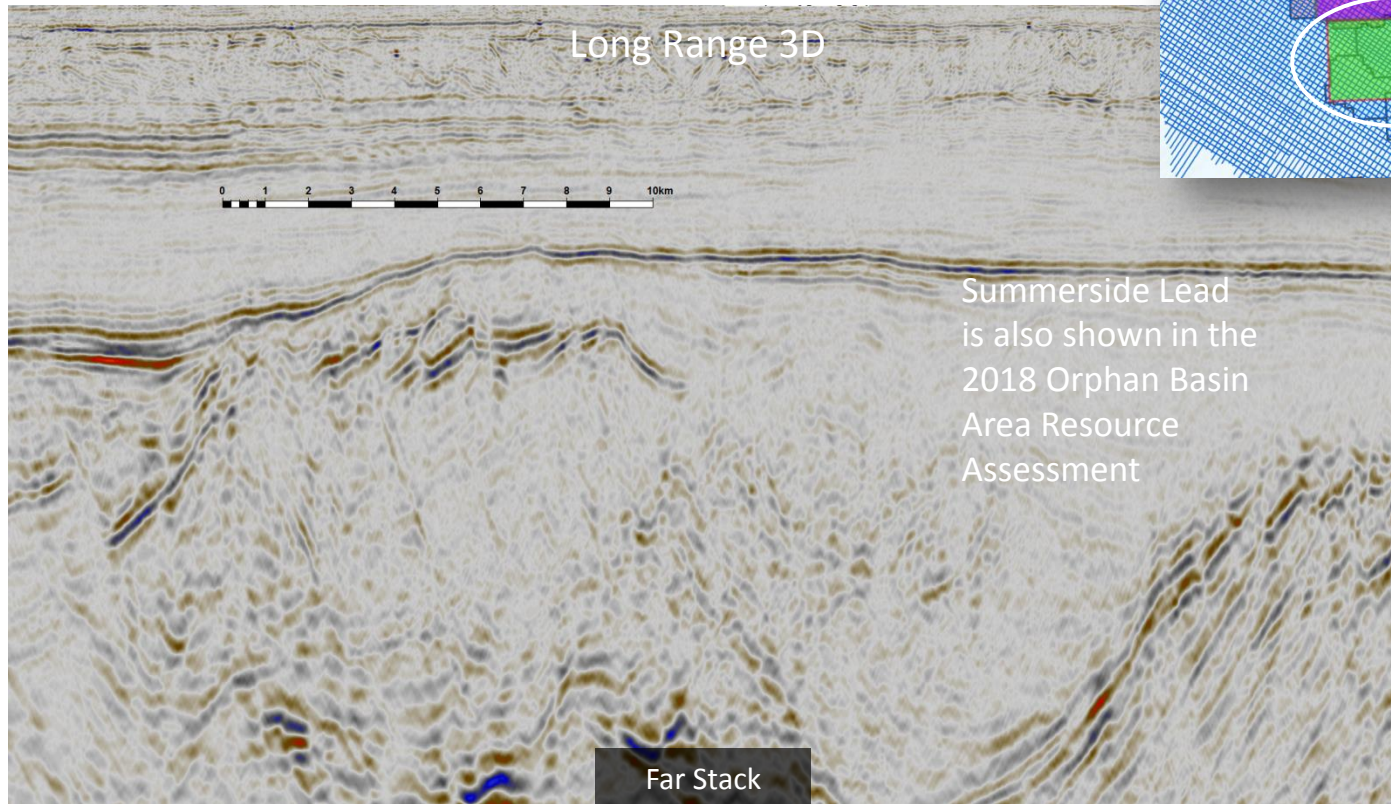
Orphan Basin 2020 Sector



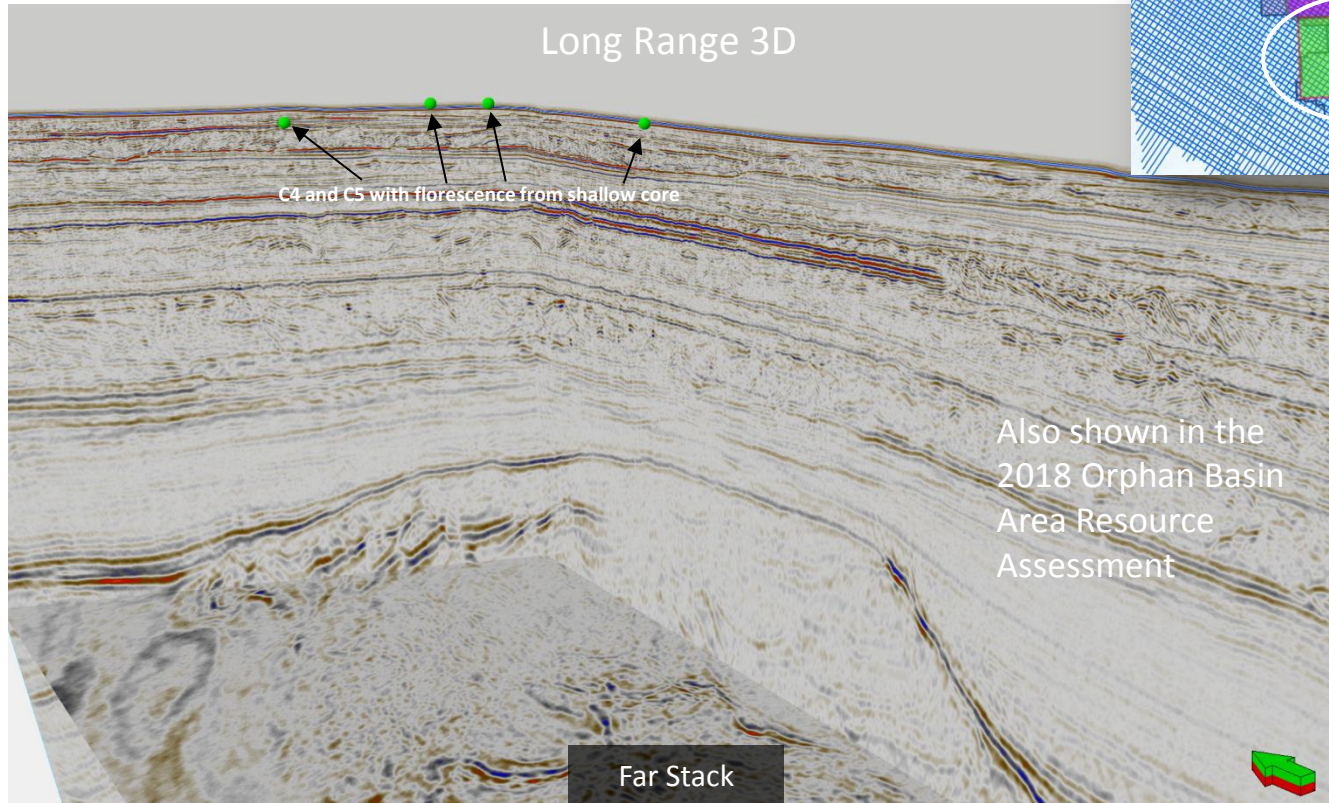
Learnings from 2018 Call-for-Bids



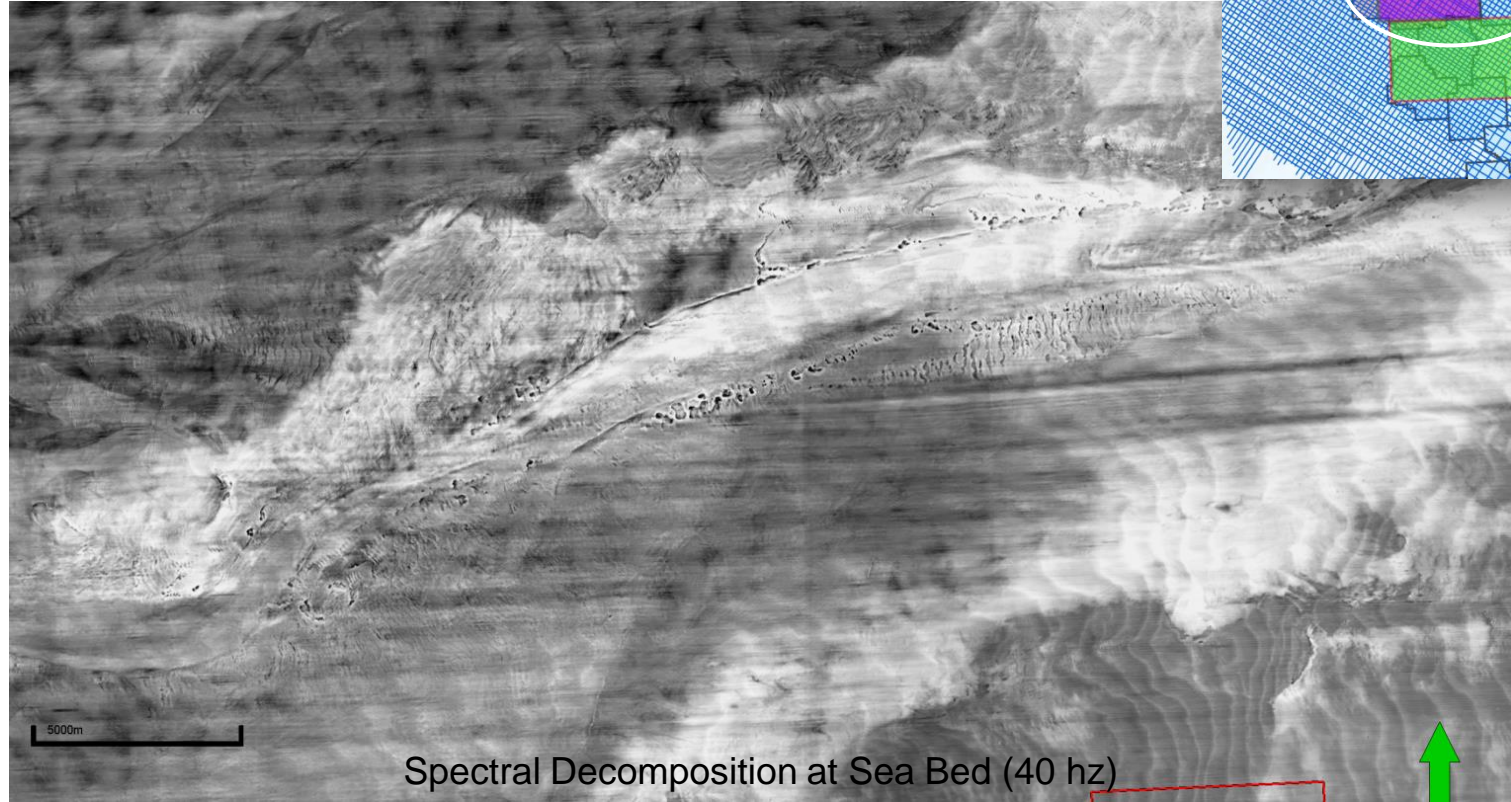
Learnings from 2018 Call-for-Bids



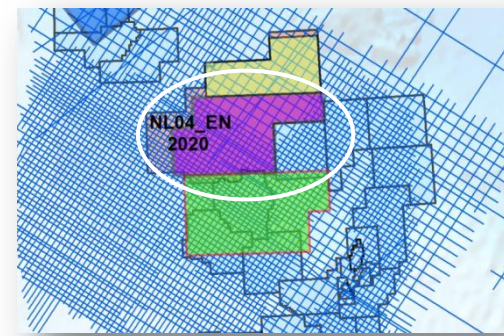
Learnings from 2018 Call-for-Bids



Sea Bed Features – Tablelands 3D



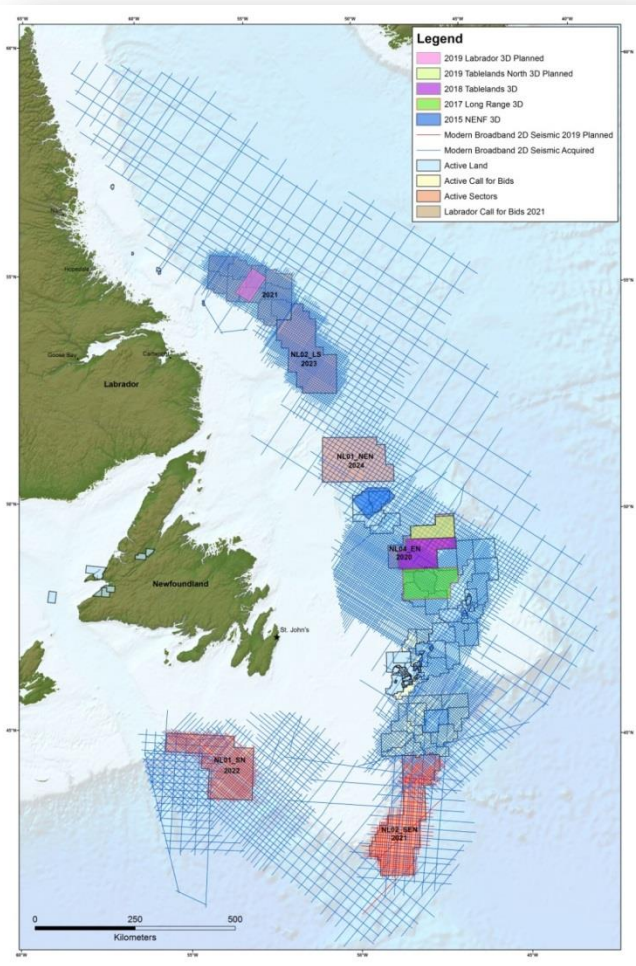
Orphan Basin 2020 Sector

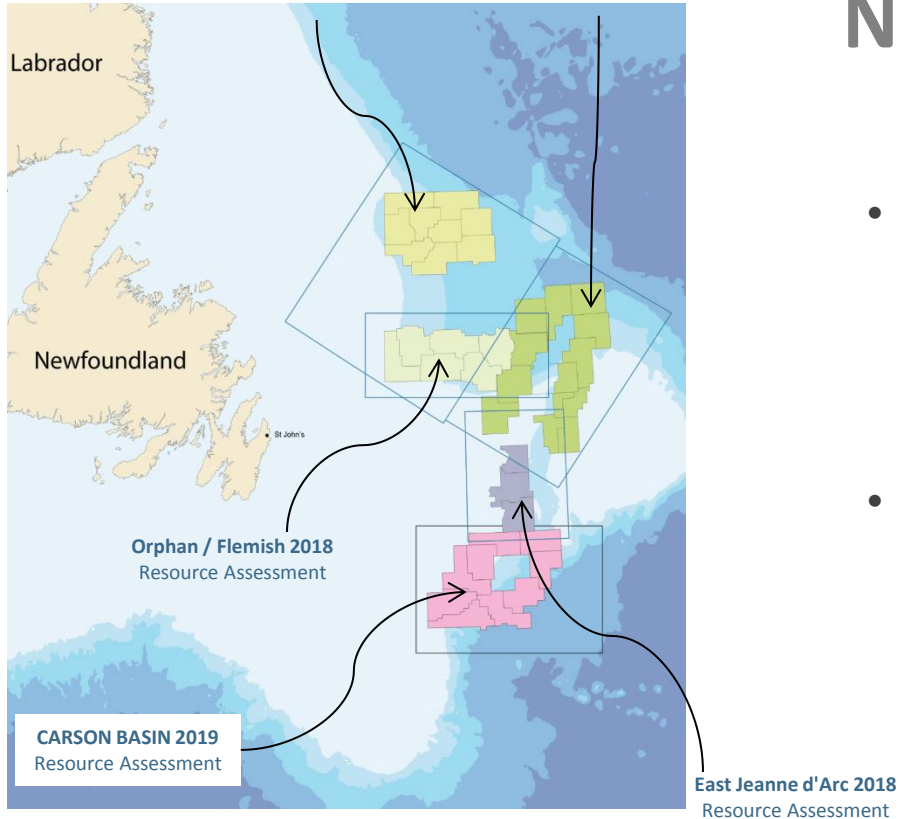


Additional Lead Slides Have Been Removed

NL Resource Assessments

- New data insights highlighted need for new NL Resource Assessment.
- Integration of new data analyzed with scientific objectivity is key.
- Large offshore area demands systematic approach.

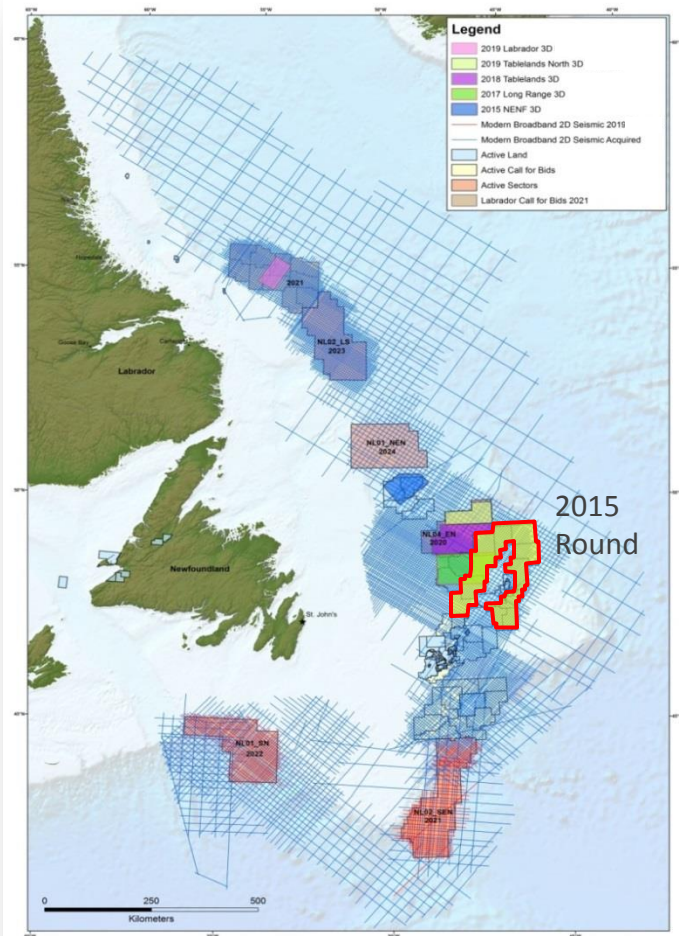




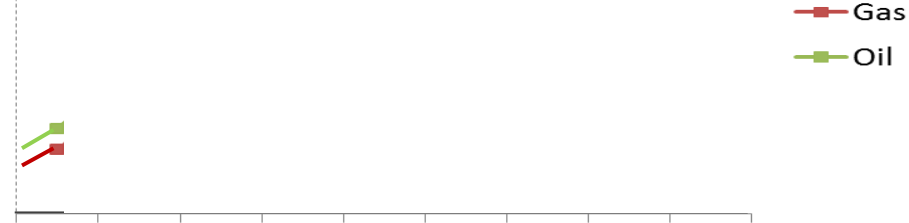
Locations of Previous and Present Studies

NL Resource Assessments

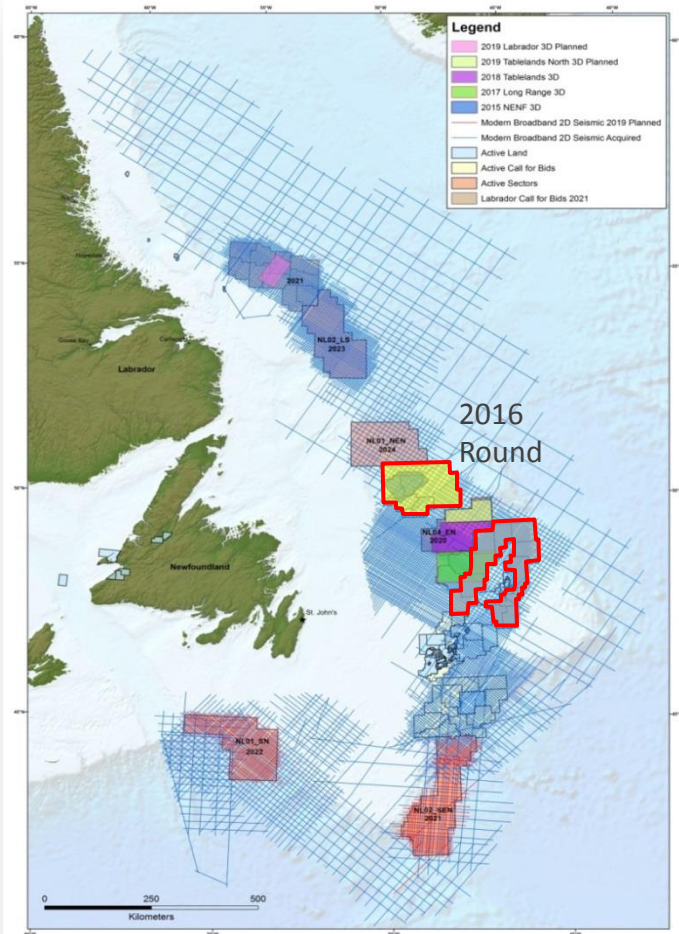
- Five resource assessments have been completed by Beicip Franlab ahead of the scheduled land sales.
- Nalcor will continue to conduct resource assessments and release the results ahead of coming land sales.



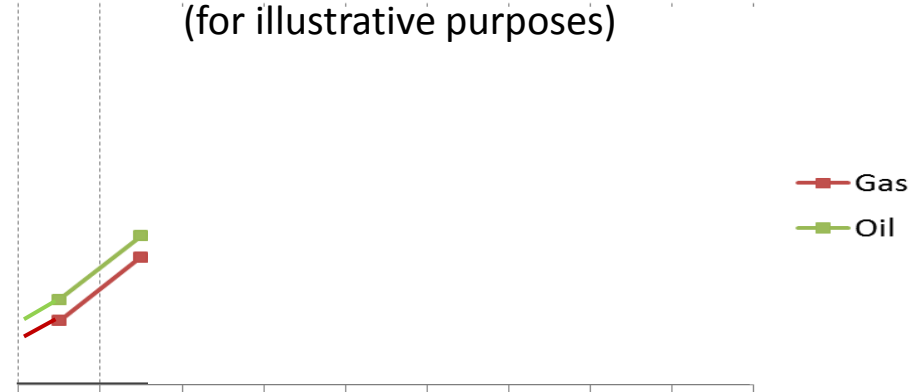
Cumulative NL Frontier Resource Assessment (for illustrative purposes)



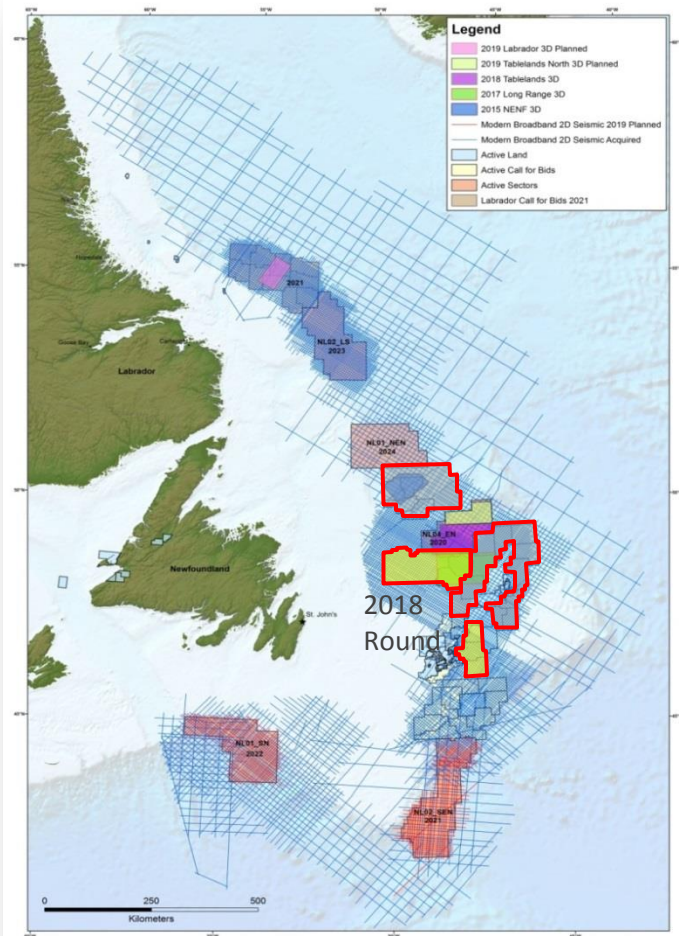
Scheduled License Round/
Call for Bids Areas



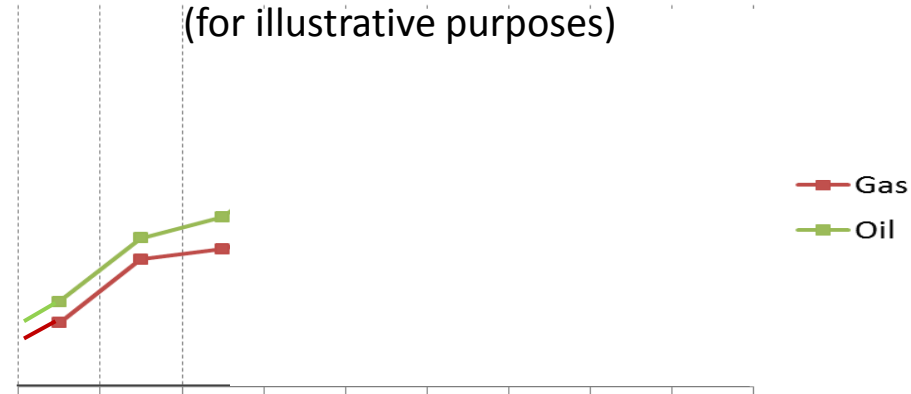
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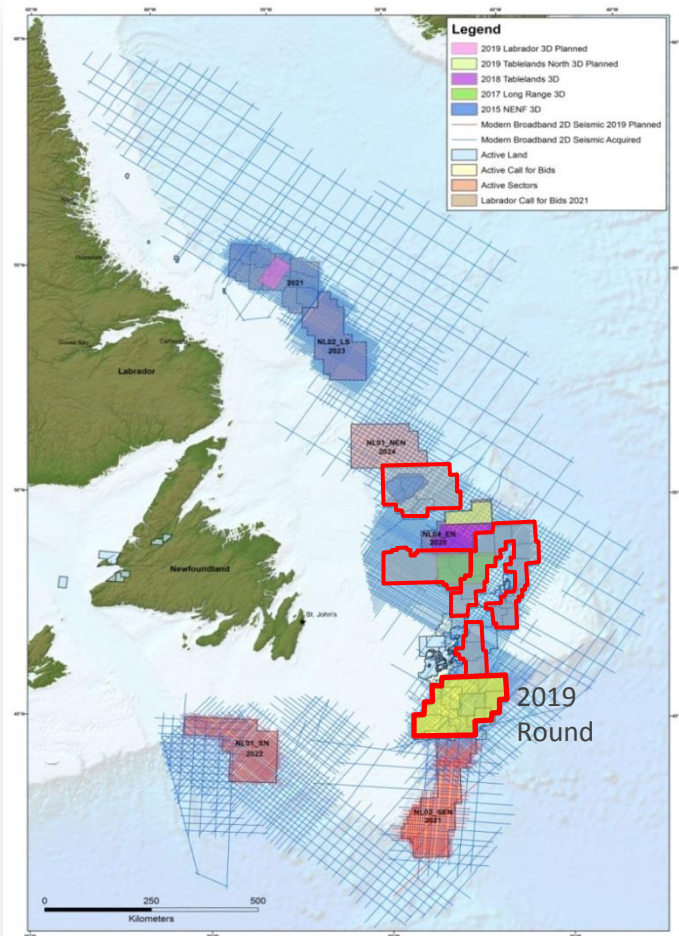
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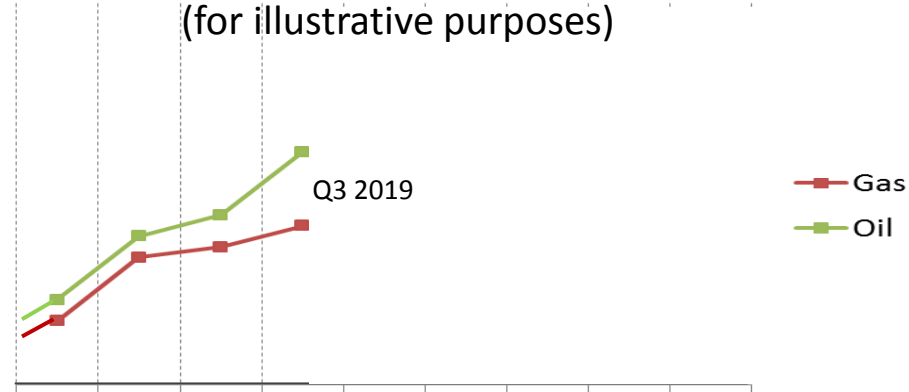
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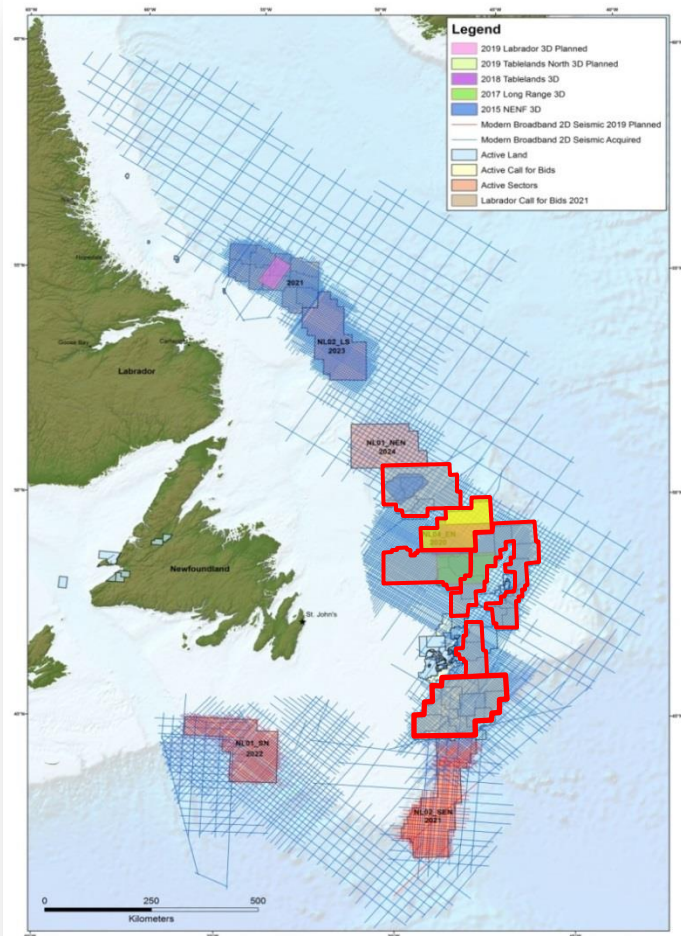
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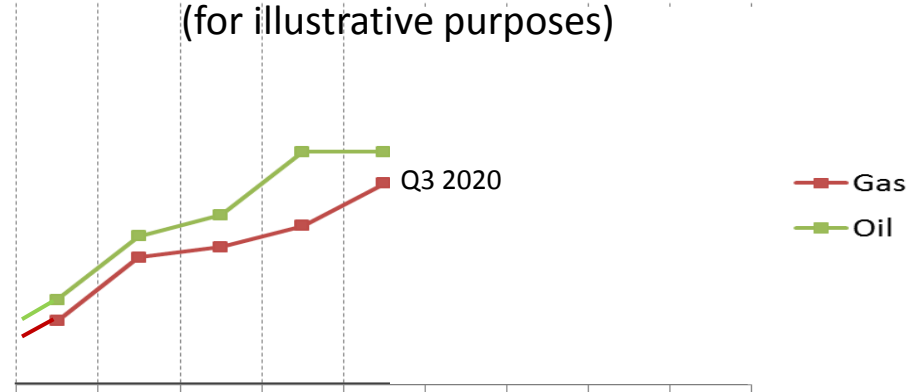
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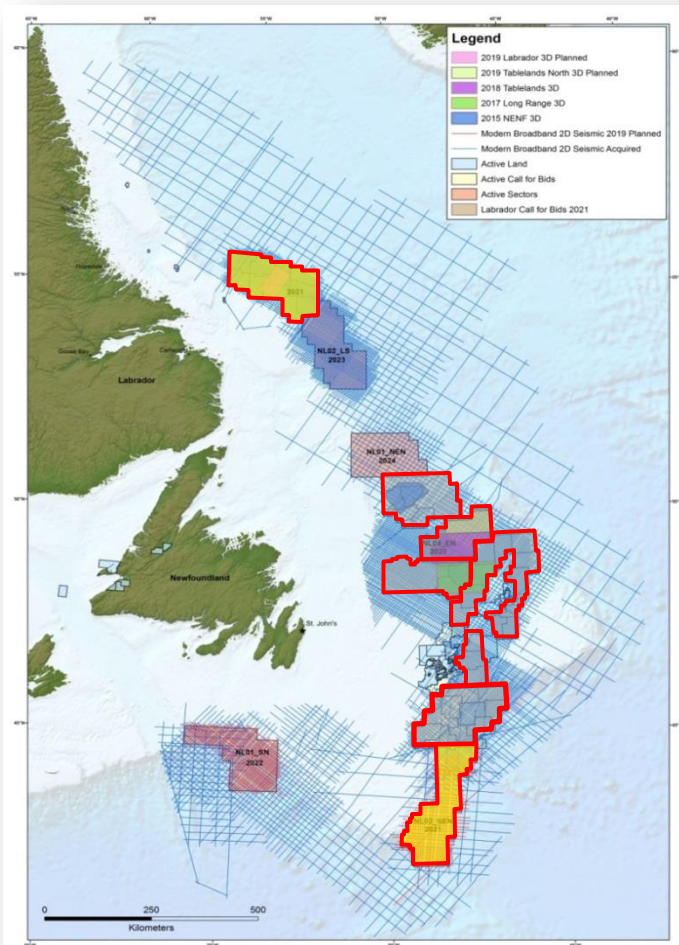
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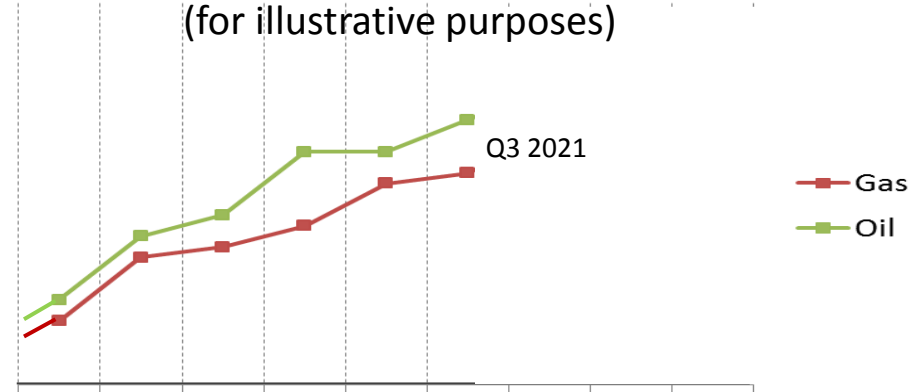
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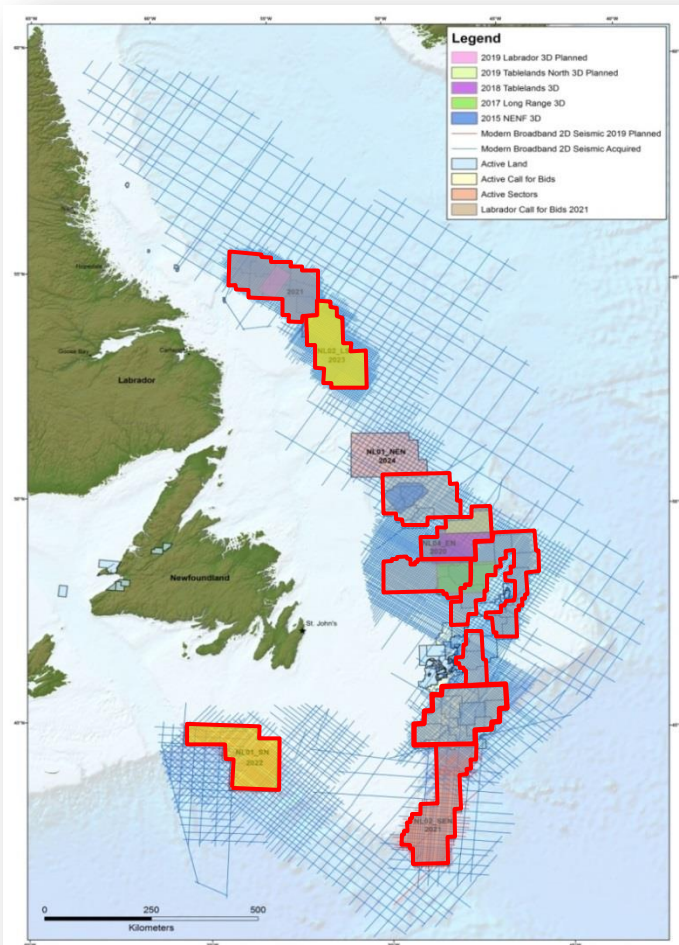
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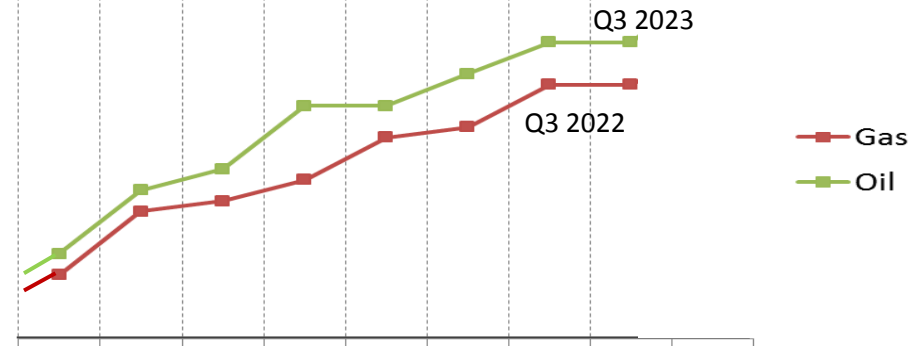
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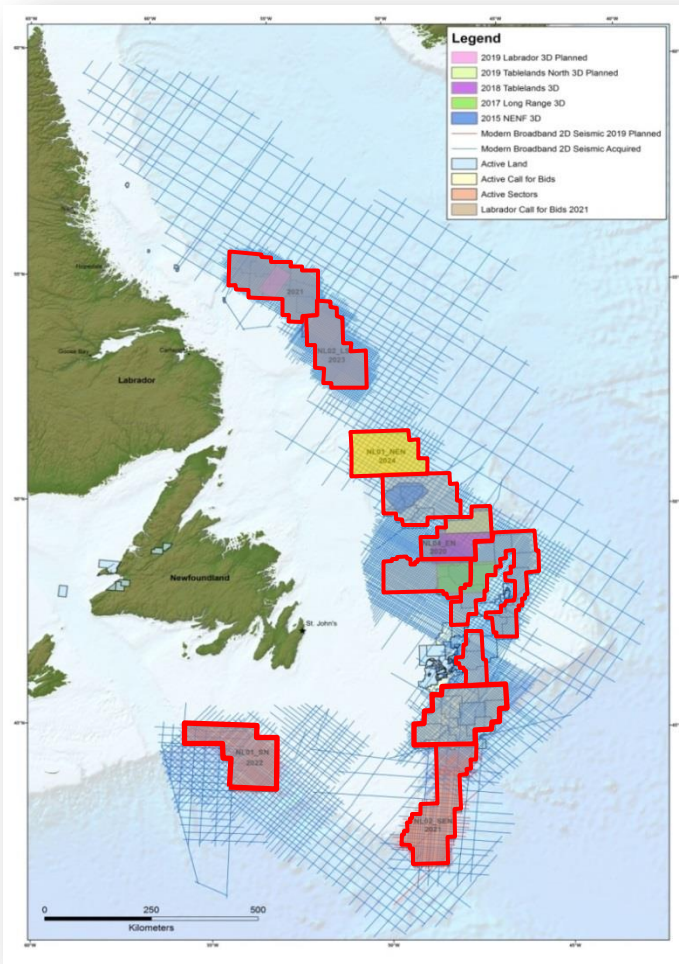
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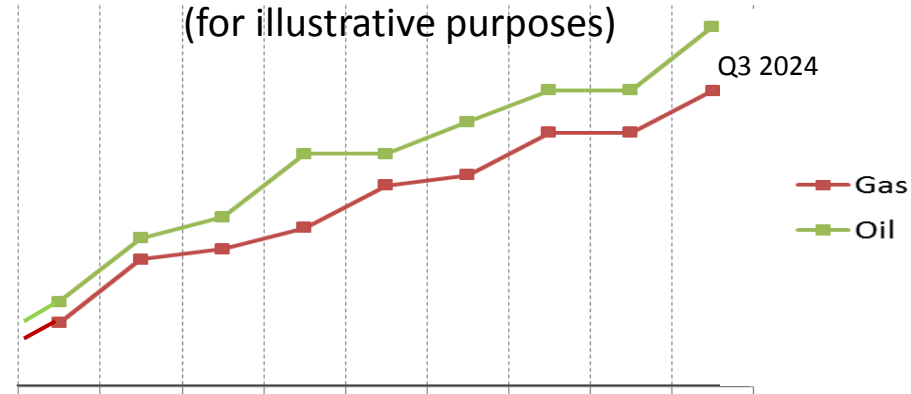
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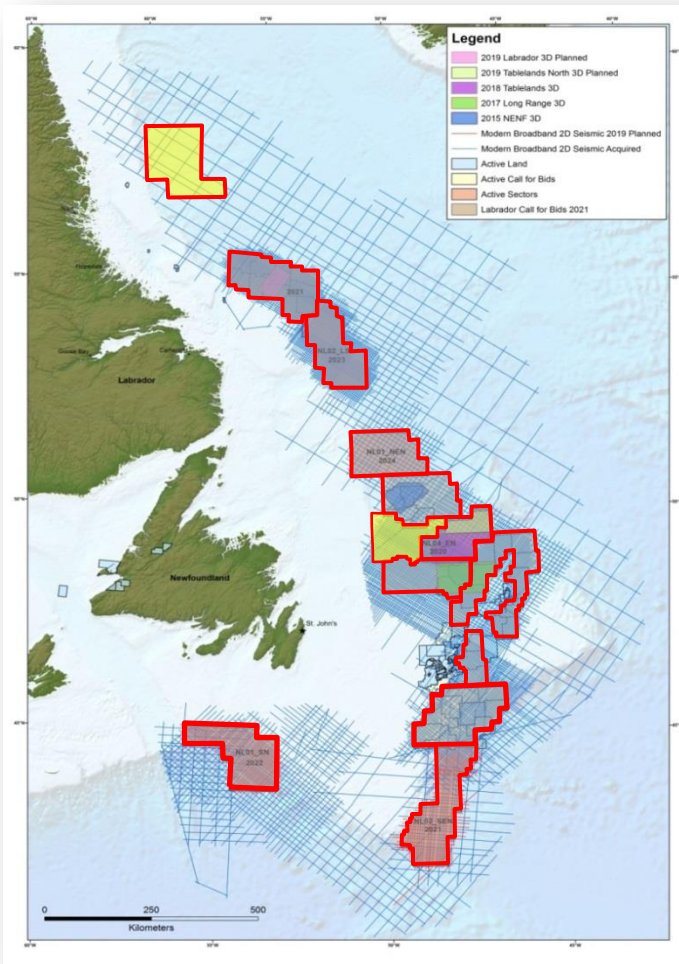
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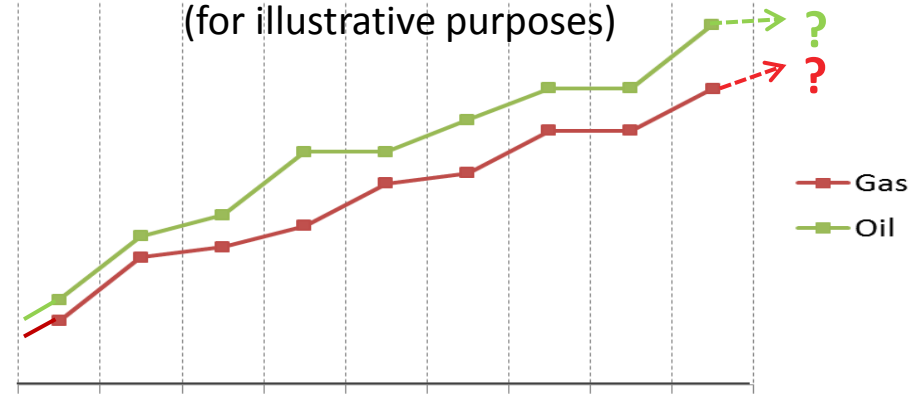
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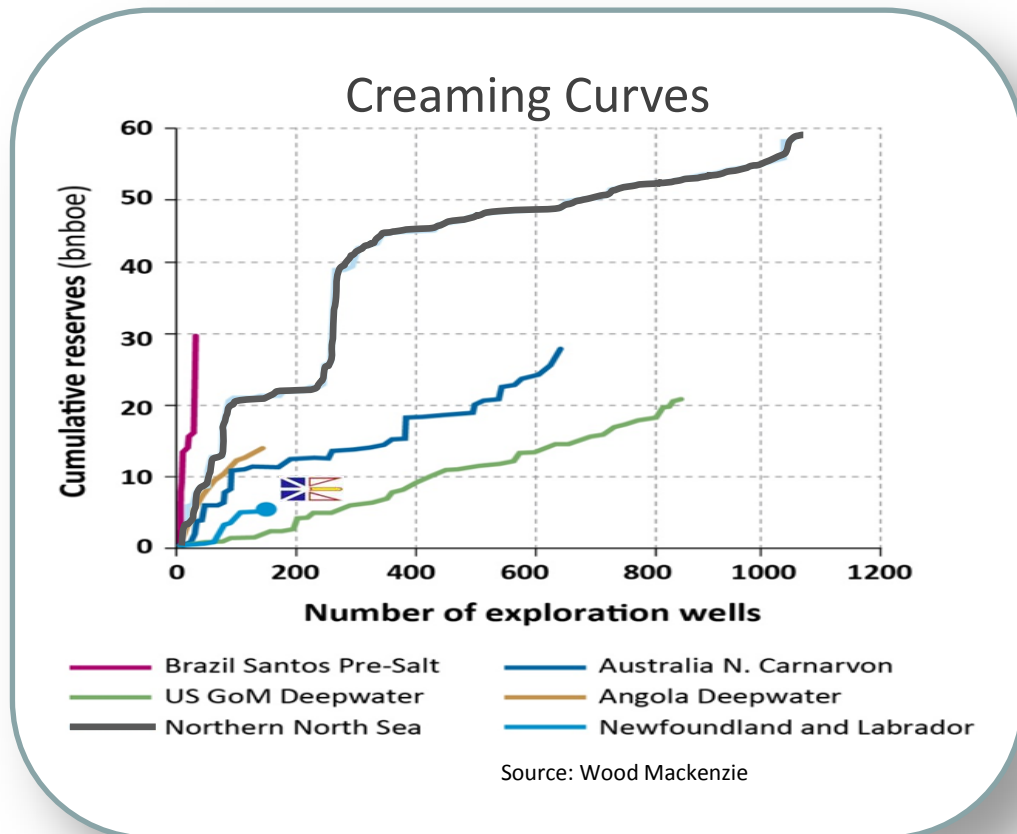
Cumulative NL Frontier Resource Assessment (for illustrative purposes)



Scheduled License Round/
Call for Bids Areas

Summary

- NL has large underexplored frontier basins – early days.
- 650+ leads/prospects imaged to date.
- Systematic Resource Assessment underway.
- New data yielding new insights into frontiers and accelerating exploration timelines.



Thank You



nalcenergy.com/exploration

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