Arctic Alaska Conventional Oil & Gas Exploration Potential

- Prospective area onshore & offshore shelves ~ 150,000 mi^2 (~400,000 km^2)
- Fewer than 500 exploration wells (red dots)
- Entire state of Wyoming ~100,000 mi^2 (~250,000 km^2)
- Petroleum-prospective area ~75,000 mi^2 (~250,000 km^2)
- ~19,371 exploration wells
Global Conventional Oil Resources

Note: Does not include results from USGS Circum-Arctic Oil and Gas Resource Appraisal study.
Arctic Alaska Province ~ 30BB

UNDISCOVERED OIL (billion barrels)

- Green: >10
- Light Green: 1-10
- Yellow: <1
- Gray: Area not quantitatively assessed
- White: Area of low petroleum potential

USGS Circum Arctic Resource Appraisal, 2008
CARA Gas Provinces

UNDISCOVERED GAS (trillion cubic feet)
- Red: >100
- Orange: 6-100
- Light orange: <6
- Grey: Area not quantitatively assessed
- White: Area of low petroleum potential

USGS Circum Arctic Resource Appraisal, 2008
Simplified and Generalized Regional Cross-section

Modified from Bird and Bader (1987)

USGS
Geologic Mapping
Topical Petroleum-related Studies

- Killik Bend non-marine to deltaic succession, highstand aggradational system tract

Porosity (%) vs. Permeability (mD) North Slope Foothills, 2001

- Tuluvak ss
- Schrader Bluff
- Nanushuk
- Gilead ss
- Fortress Mtn
- Cobblestone ss
- Okpikruak
- Otuk Fm
- Siksikpuk
- Lisburne Limestone

Quartz (monocrystalline)-Feldspar-Lithics (total)

- Medial to Proximal Delta Front Ss
- Coal
- Bioturbated ss
- Coal
- Bioturbated ss

Kilik Bend non-marine to deltaic succession, highstand aggradational system tract
Revising and Codifying Stratigraphic Nomenclature

[Diagram showing stratigraphic columns with ages, stages, and formations labeled, including Quaternary, Pliocene, Miocene, Oligocene, Eocene, Paleocene, and Cretaceous periods.]

Chronostratigraphic columns for the Colville basin, northern Alaska, modified from Mull and others (2003, USGS Professional Paper 1673) and Creny and others (2005, USGS Open-File Report 2005-1182). Curved arrow indicates direction of major transgressive floodback and retrogradation. Other symbols and abbreviations as follows: < >, uncertain relationship; cr, Cribroblastic sandstone of Fortress Mountain Formation; (informal) m, manganojenic shale unit (informal); Fm, Formation; Mtr, Mountain; LCU, Lower Cretaceous unconformity.
Merging Surface and Subsurface Data

Brookian Sequence Stratigraphic Correlation Section, Umiat Field to Milne Point Field, West-central North Slope, Alaska

Simplified from Decker (2007)
Foothills Structural Plays
Seismic Interpretation

Composite seismic transect west of Canning River, North Slope, Alaska


PLDecker, Alaska Division of Oil & Gas

Kavik structure
State Lands: ~1 undiscovered oil accumulation > 250 MMBO recoverable. ~2 undiscovered gas accumulations > 1.5 TCF recoverable.

NPRA: ~11 undiscovered oil accumulations > 250 MMBO recoverable. ~7 undiscovered gas accumulations > 1.5 TCF recoverable.

ANWR 1002: ~9 undiscovered oil accumulations > 250 MMBO recoverable (~65% of estimated total recoverable oil volume); gas resource not shown.
USGS Potential for Undiscovered Petroleum in Arctic Alaska

**Chukchi Shelf OCS**
- **Oil**: 15.4 (2.3 - 40.1) BBO
- **Gas**: 76.8 (10.3 - 209.5) TCF

**Beaufort Shelf OCS**
- **Oil**: 8.2 (0.4 - 23.2) BBO
- **Gas**: 27.6 (0.6 - 72.2) TCF

**ANWR 1002 Area**
(Federal + Native, + State Resources)
- **Oil**: 10.4 (5.7 - 16.0) BBO
- **Gas**: 3.8 (0 - 10.9) TCF

**NPRA**
(Federal + Native, + State Resources)
- **Oil**: 19.6 (6.7 - 15.0) BBO
- **Gas**: 61.4 (40.4 - 85.3) TCF

**Central North Slope**
(State + Native + Federal Resources)
- **Oil**: 4.0 (2.6 - 5.9) BBO
- **Gas**: 33.3 (23.9 - 44.9) TCF

---

* Oil includes crude oil + natural gas liquids
* Gas includes nonassociated + associated gas
* Oil includes crude oil only
* Gas includes nonassociated gas only
“Unconventional” Gas Resources (continuous resources)

Coalbed Gas

Overpressured, Basin-centered Gas

Gas Hydrates

Evaluation in Progress