

What is Hydraulic Fracturing?



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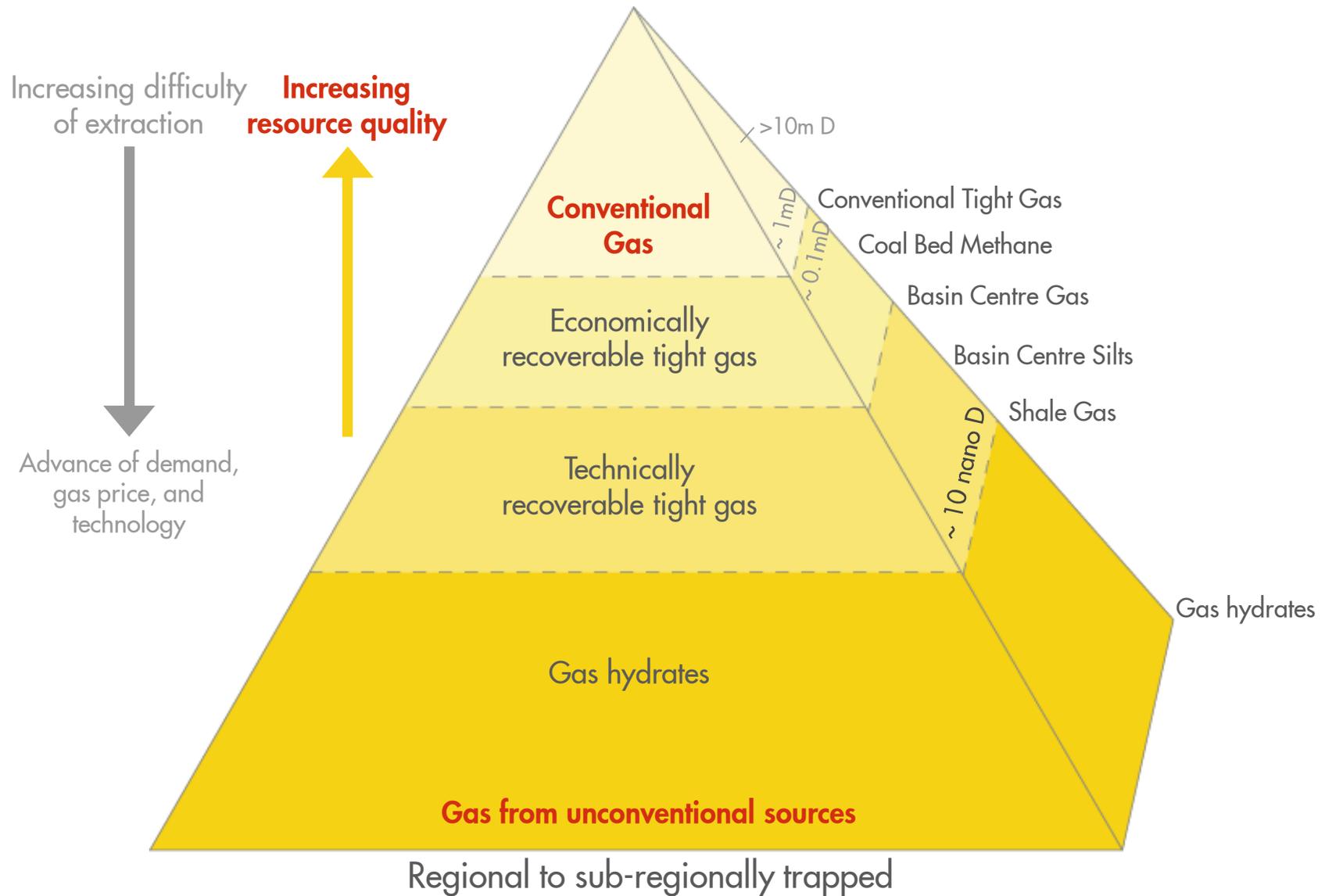
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TIGHT GAS RESOURCES



TECHNOLOGY & INTEGRATION

TECHNOLOGY ENABLERS

Decrease Well Costs

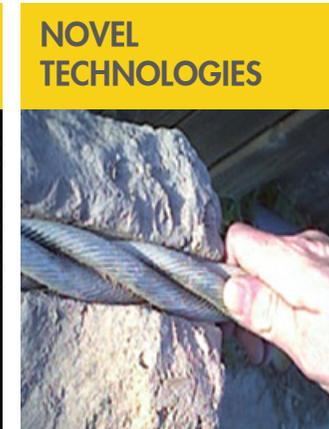
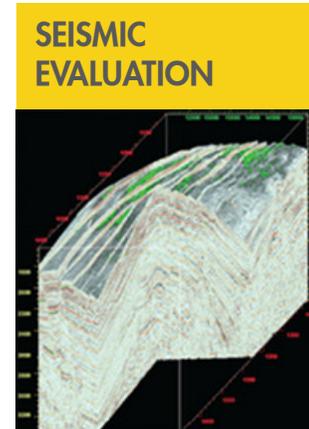
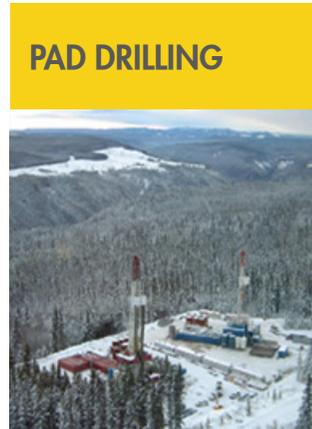
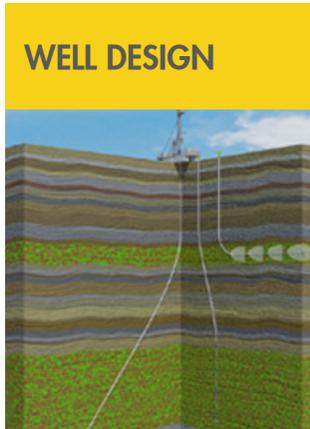
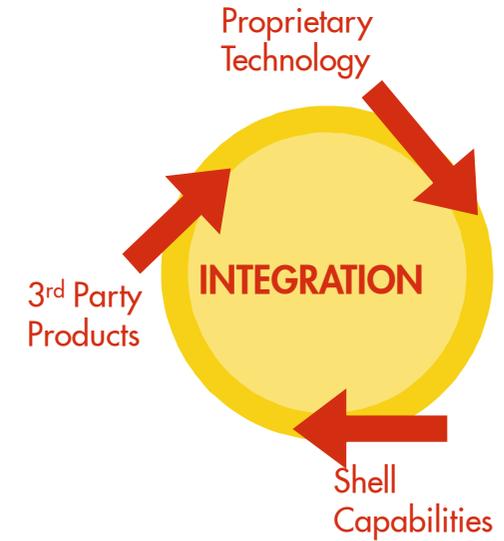
- Best in class drilling technologies
- Drilling Automation & Well Manufacturing
- Rigs on skids
- Mud composition
- Fracturing techniques
- Multi-stage completions
- Micro seismic

Increase Production

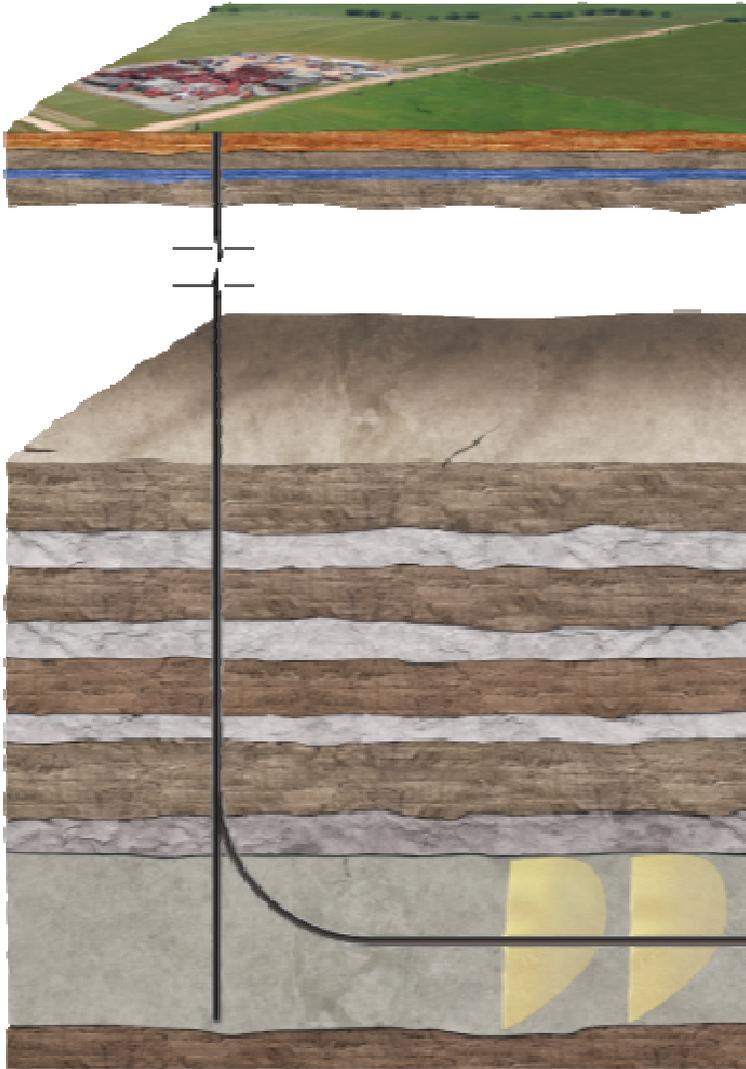
- Integration of techniques
- Selecting the best areas
- Fracture prediction
- Rock property analysis
- Seismic evaluation
- Geomechanical analysis
- Geochemical analysis

Reduce Footprint

- Green Completions
- Multi well pads
- Light, noise inhibitors
- Green frac fluids
- Fluids recycle as reasonably practicable
- Pipeline water as reasonably practicable
- Novel stimulation technologies



HYDRAULIC FRACTURING



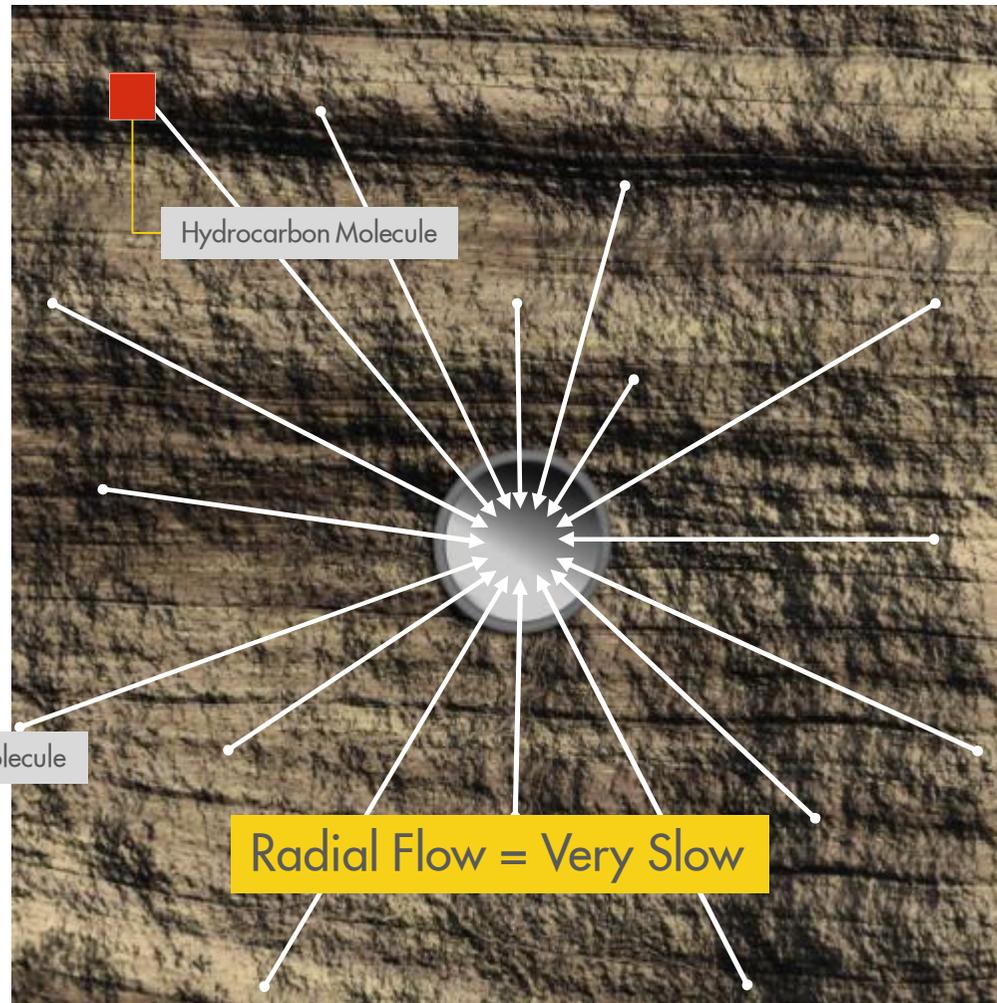
■ What is it?

- Fracture typically 500 to 1,500 ft
- Use fluids to create a pathway or 'crack' in the rock to connect to the wellbore
- Use typically 99% water and sand and around 1% chemical additives
- Place small granular solids into the pathway to ensure that it remains open after the hydraulic pressure is removed

■ Why do we use it?

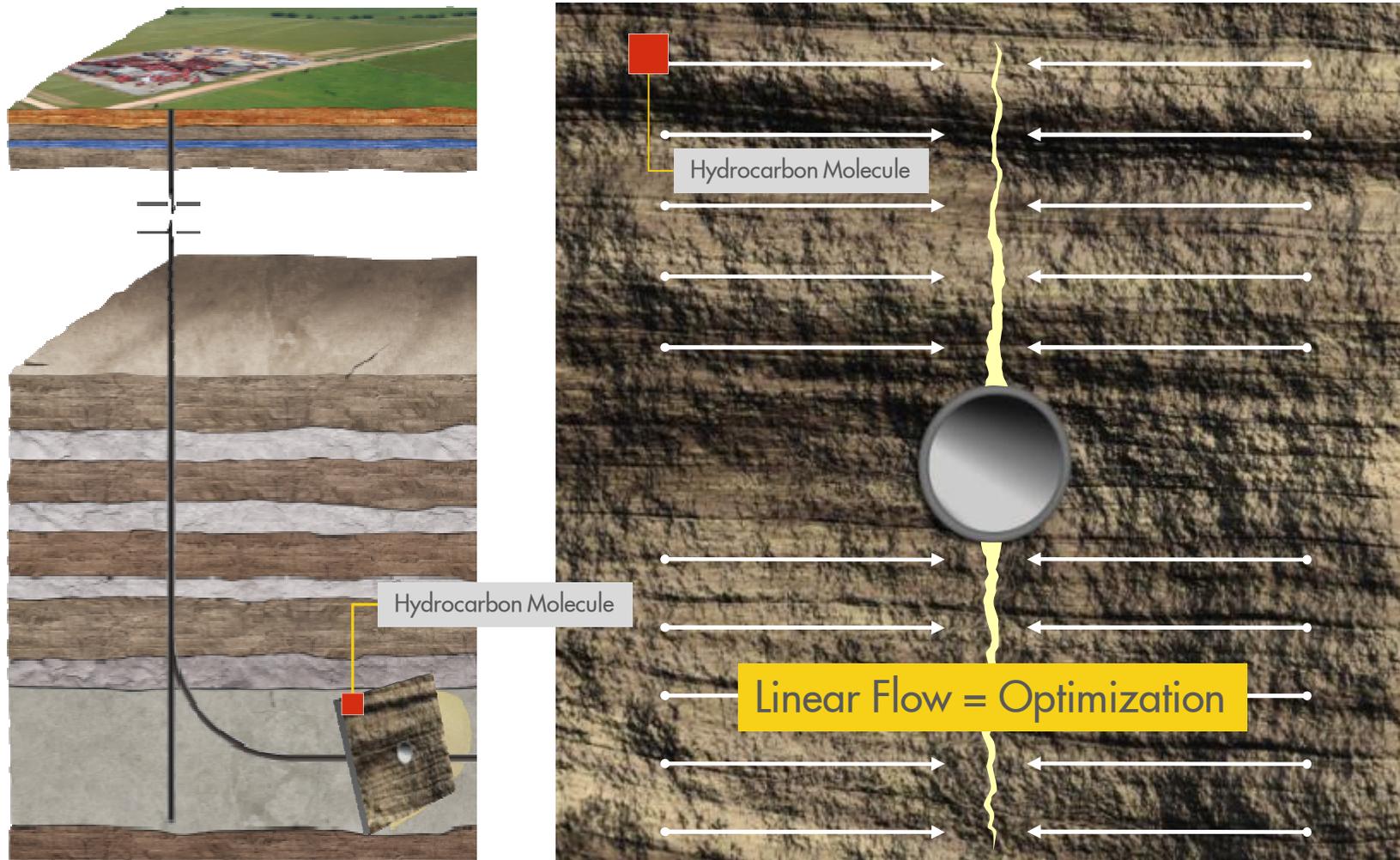
- Increase the rate at which the well is capable of producing oil or gas
- Increase the economically recoverable reserves for a well

WHY WE FRAC: NO FRACTURE SCENARIO



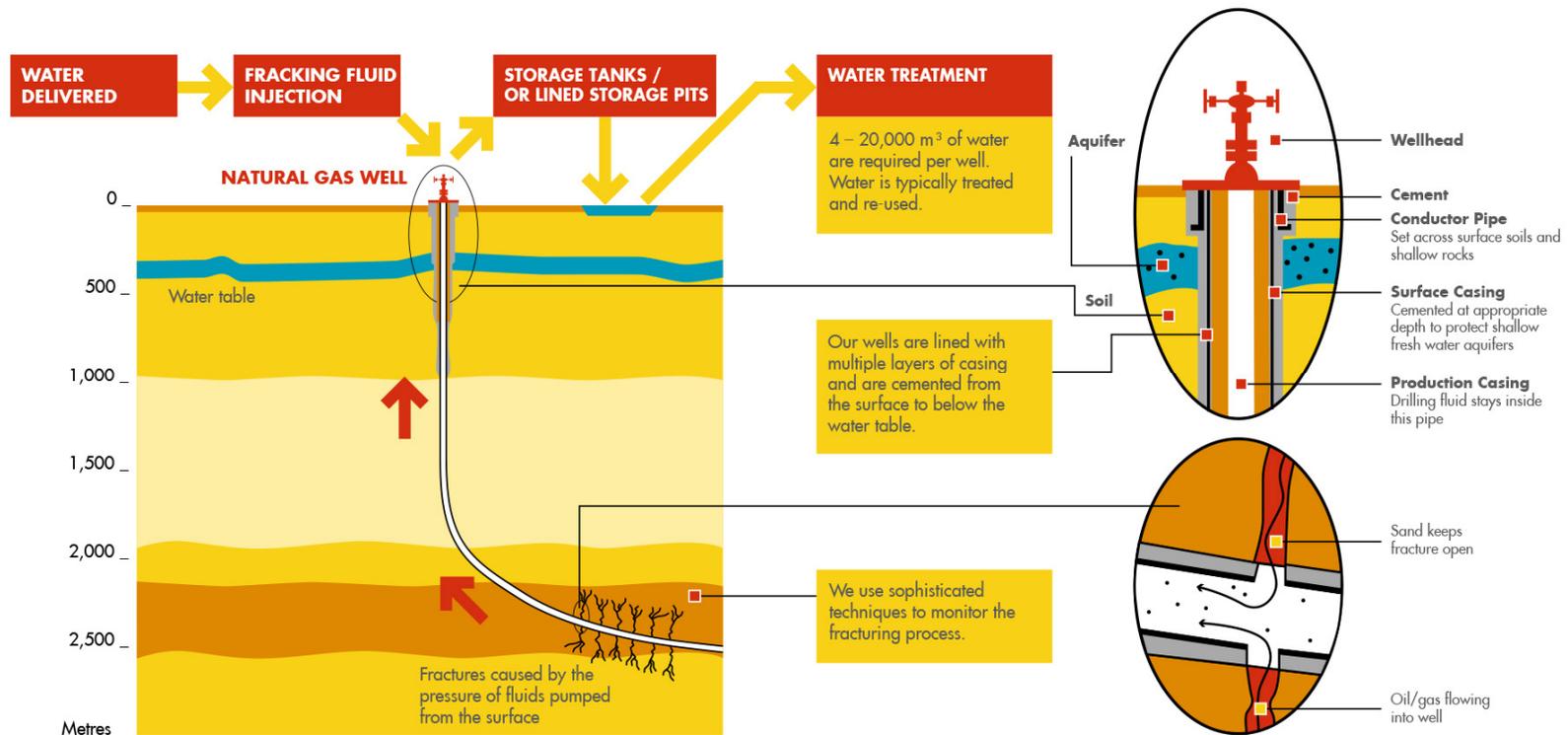
WHY WE FRAC: LINEAR FLOW

SHALE PLAYS ARE NOT PRODUCIBLE OR ECONOMIC WITHOUT FRACTURING



HYDRAULIC FRACTURING: HEALTH, SAFETY & ENVIRONMENTAL PROTECTION

- Cement steel casing utilized to protect groundwater
- Requires 1 to 5 million gallons of water per well
- “Flowback” water typically treated & re-used



SHELL TIGHT GAS OPERATING PRINCIPLES



Safety & Well Integrity

Shell designs, constructs and operates wells and facilities in a safe and responsible way.



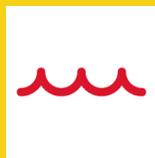
Air

Shell conducts its operations in a manner that protects air quality and controls fugitive emissions as reasonably practicable.



Footprint

Shell works to reduce its operational footprint.



Water

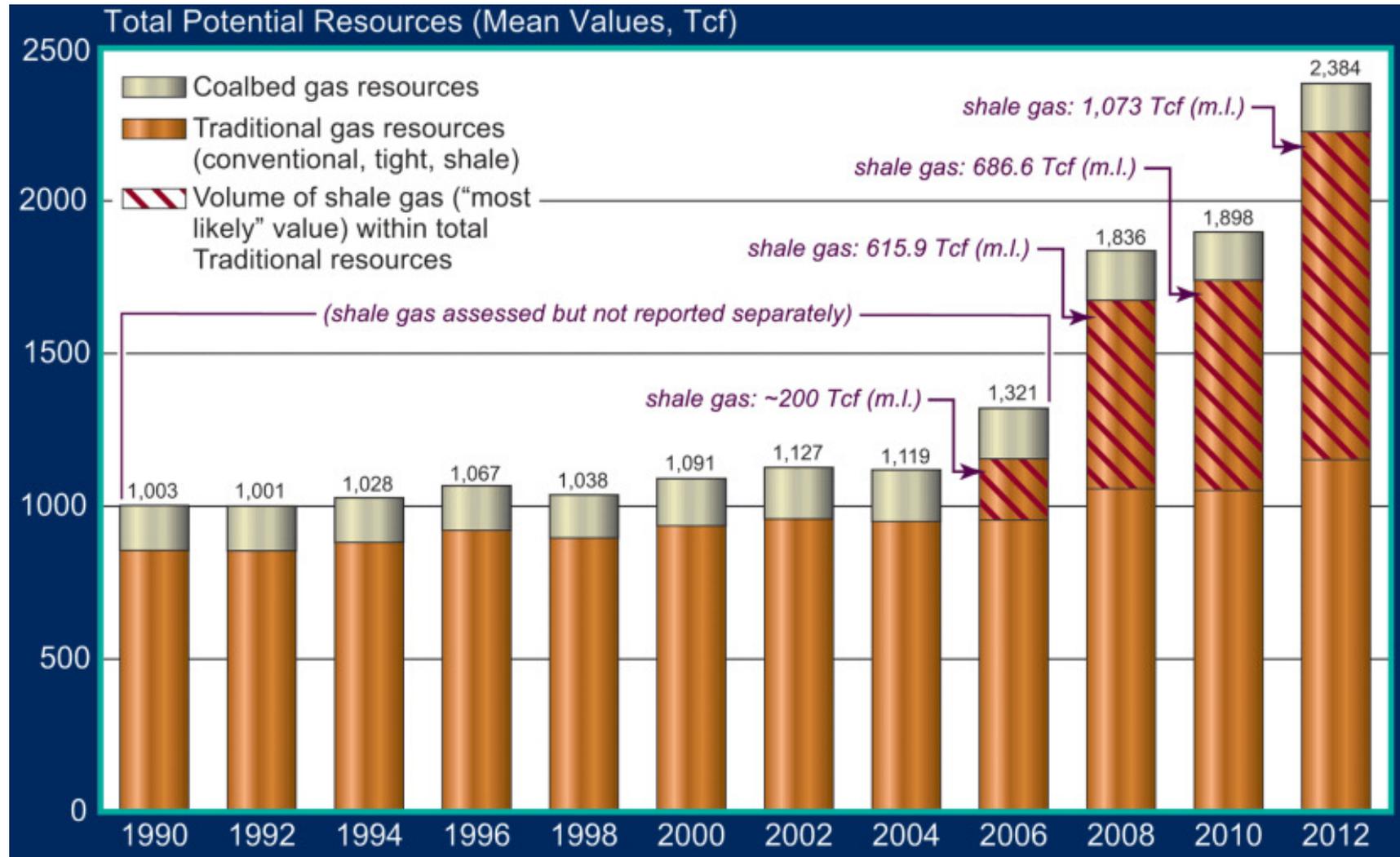
Shell conducts its operations in a manner that protects groundwater and reduces potable water use as reasonably practicable.



Community

Shell engages with local communities regarding socio-economic impacts that may arise from its operations.

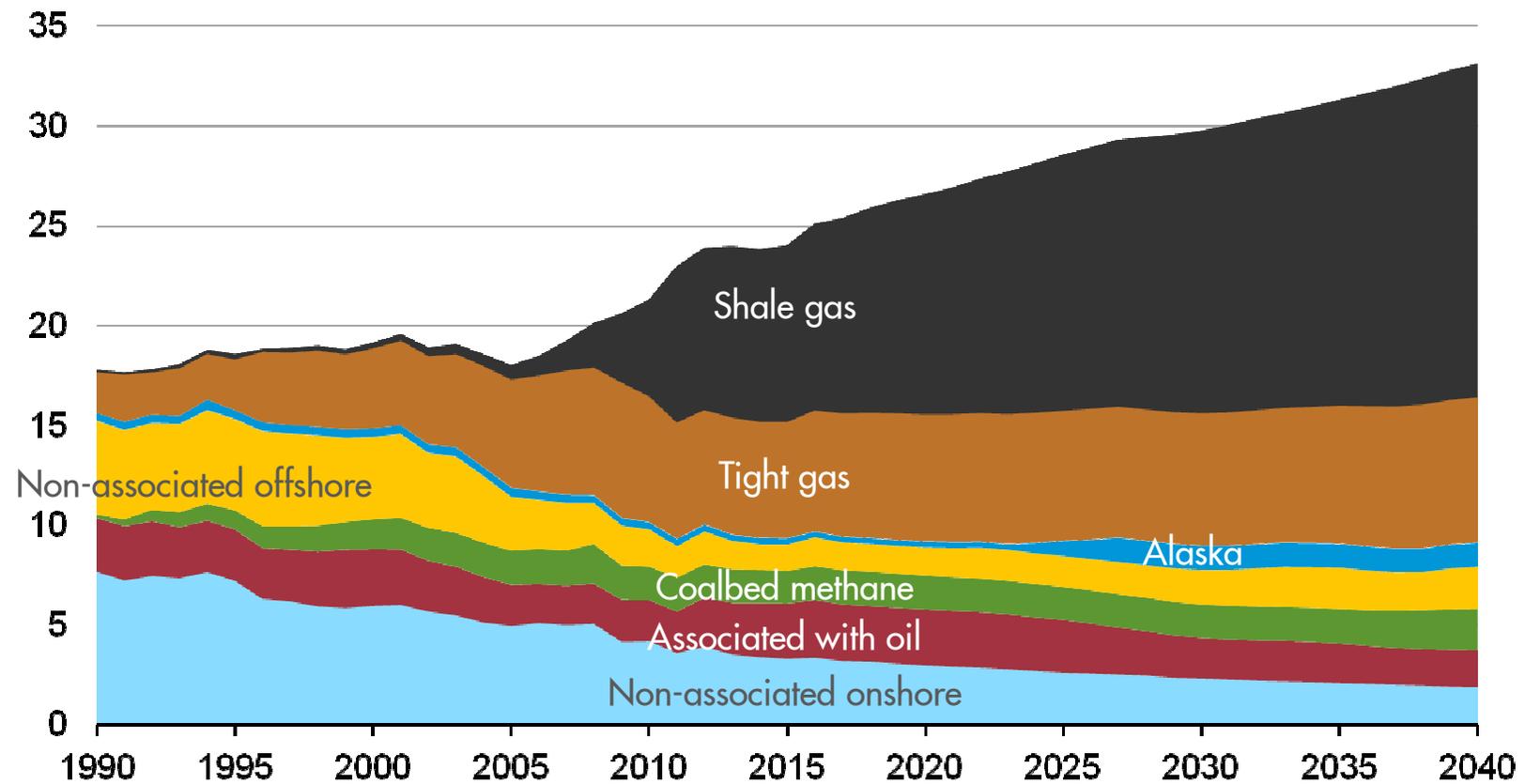
GAS RESOURCES HAVE INCREASED SIGNIFICANTLY



Source: Potential Gas Committee:
<http://potentialgas.org/download/pgc-press-release-april-2013-slides.pdf>

SHALE GAS WILL SUPPORT GROWTH PRODUCTION

U.S. dry natural gas production
trillion cubic feet



Source: EIA, Annual Energy Outlook 2013 Early Release

CONCLUSION

- Unconventional resources are abundant but more complex
- Hydraulic fracturing proved to work to open up these resources
- Technically recoverable resource could support consumption for 100+ years