



**valeura energy inc.**

EXCEPTIONAL VALUE CREATION IN TURKEY

**Growth in unconventional oil  
and gas production and the  
potential for Turkey**

**Turkey Energy Forum  
October 2-3, 2019**

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Statements related to “reserves” and “prospective resources” are deemed forward-looking statements as they involve the implied assessment, based on certain estimates and assumptions, that the prospective resources can be profitably produced in the future. Specifically, forward-looking information contained herein regarding “prospective resources” may include estimated volumes of prospective resources and the ability to finance future development.

Forward-looking information is based on management’s current expectations and assumptions regarding, among other things: political stability of the areas in which the Corporation is operating and completing transactions; continued safety of operations and ability to proceed in a timely manner; continued operations of and approvals forthcoming from the Turkish government in a manner consistent with past conduct; future seismic and drilling activity on the expected timelines; the prospectivity of the deep BCGA and shallow gas plays on the TBNG joint venture lands and Banarli licences; the continued favourable pricing and operating netbacks in Turkey; future production rates and associated operating netbacks and cash flow; future sources of funding; future economic conditions; future currency exchange rates; the ability to meet drilling deadlines and other requirements under licences and leases; and the Corporation’s continued ability to obtain and retain qualified staff and equipment in a timely and cost efficient manner. In addition, the Corporation’s work programmes and budgets are in part based upon expected agreement among joint venture partners and associated exploration, development and marketing plans and anticipated costs and sales prices, which are subject to change based on, among other things, the actual results of drilling and related activity, availability of drilling, reservoir stimulation and other specialised oilfield equipment and service providers, changes in partners’ plans and unexpected delays and changes in market conditions. Although the Corporation believes the expectations and assumptions reflected in such forward-looking information are reasonable, they may prove to be incorrect.

Forward-looking information involves significant known and unknown risks and uncertainties. A number of factors could cause actual results to differ materially from those anticipated by the Corporation including, but not limited to: the risks of currency fluctuations; changes in gas prices and netbacks in Turkey; uncertainty regarding the contemplated timelines for the timelines and costs for the deep evaluation in 2018 and 2019; the risks of disruption to operations and access to worksites, threats to security and safety of personnel and potential property damage related to political issues, terrorist attacks, insurgencies or civil unrest in Turkey; political stability in Turkey, including potential changes in Turkey’s constitution, political leaders or parties or a resurgence of a coup or other political turmoil; the uncertainty regarding government and other approvals; counterparty risk; potential changes in laws and regulations; risks associated with weather delays and natural disasters; the risk associated with international activity; and, the uncertainty regarding the ability to fulfil the drilling commitment on the West Thrace lands. The forward-looking information included in this presentation is expressly qualified in its entirety by this cautionary statement. The forward-looking information included herein is made as of the date hereof and Valeura assumes no obligation to update or revise any forward-looking information to reflect new events or circumstances, except as required by law. See the 2017 AIF for a detailed discussion of the risk factors.

**RESERVES LIFE:** Reserves life is a measure of the volume of the Corporation’s reserves divided by the annual average production.

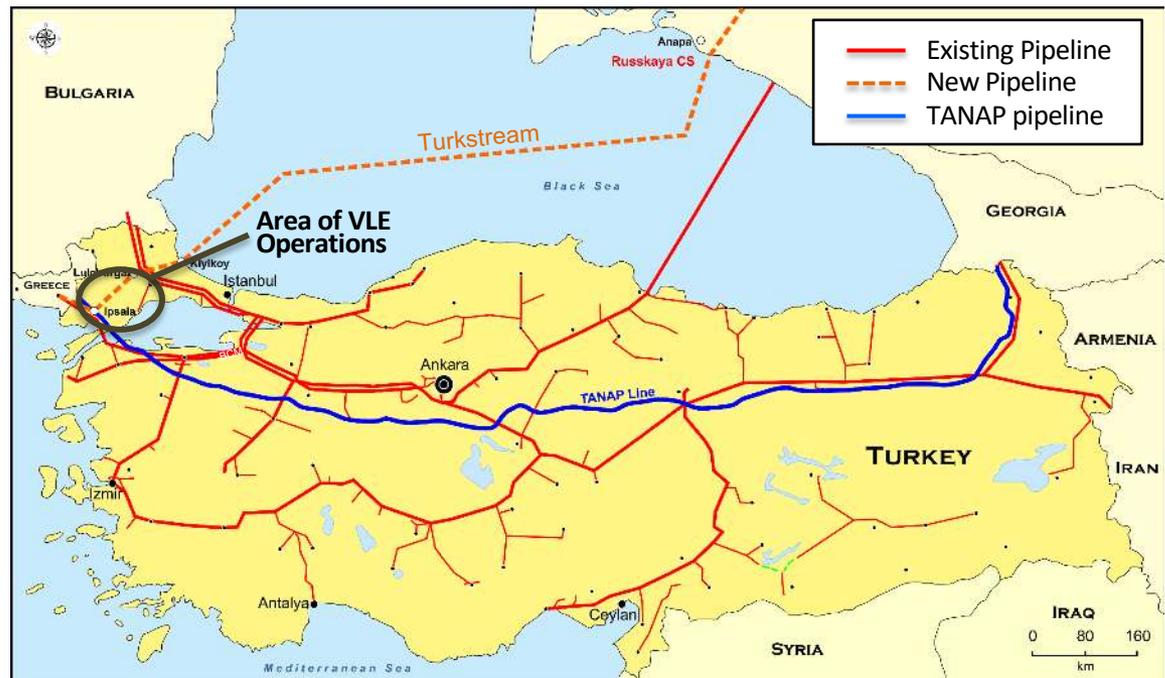
**NOTE REGARDING INDUSTRY METRICS:** Boes, recycle ratios and reserve life are industry metrics which do not have standardised meanings or standard methods of calculation and therefore such measures may not be comparable to similar measures used by other companies and should not be used to make comparisons. Such metrics have been included herein to provide readers with additional information to evaluate the Corporation’s performance; however, such measures are not reliable indicators of the future performance of the Corporation and future performance may not compare to the performance in previous periods and therefore such metrics should not be relied upon.

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# Valeura Snapshot

- Canadian Company that is listed on the Toronto (VLE) and London (VLU) stock exchanges
- Solely focused on energy in Turkey since 2011
- Currently produces and sells gas in the Thrace Basin via Thrace Basin Natural Gas (TBNG)
- Directly employs ~ 75 staff in Tekirdag and Ankara
- Discovered a potential major unconventional gas resource in 2017 with partner Equinor (Norwegian State Company)

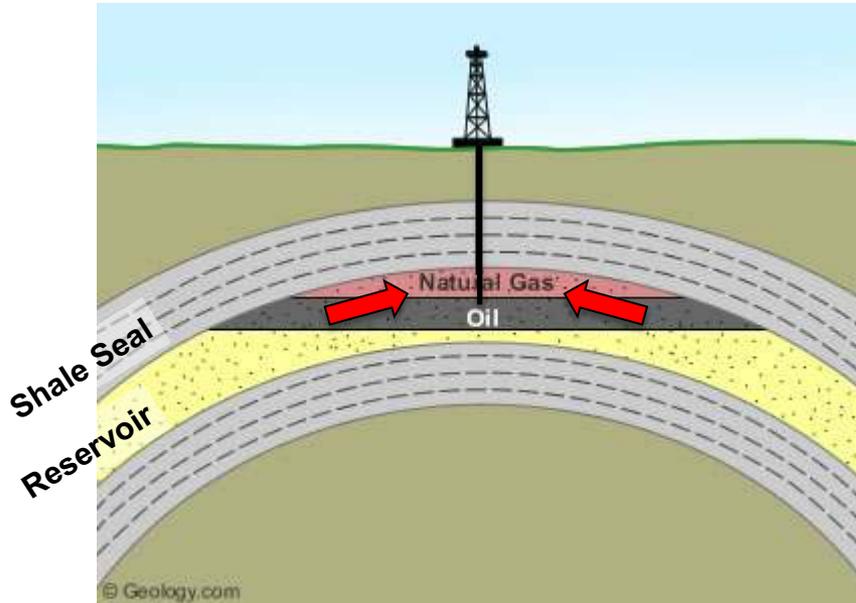
<b>Resource<sup>1,2</sup></b>	10.1 Tcfe	(287 BCM)
<b>2P Reserves<sup>2</sup></b>	7.4 MM boe	(1.2 BCM)
<b>Production<sup>3</sup></b>	700 boe/d	(~50 MCM/a)
<b>Land (net)</b>	373,588 acres	
<b>Infrastructure</b>	Valeura owns and operates all gas gathering facilities and sales contracts for its assets.	



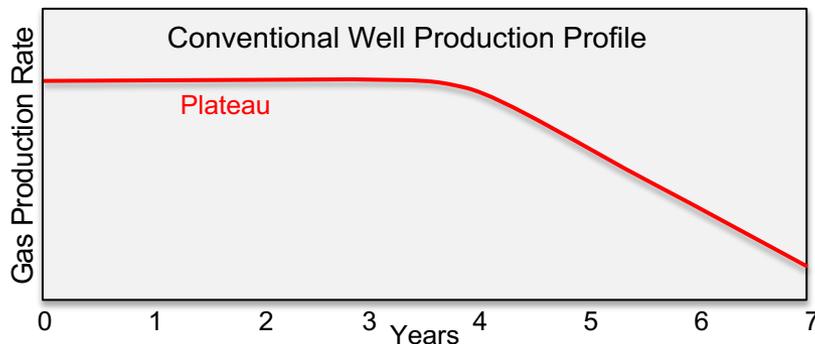
# Growth in unconventional oil and gas production and the potential for Turkey

<b>Item</b>	<b>Subject</b>
<b>1</b>	<b>What is unconventional oil and gas production</b>
<b>2</b>	<b>Growth of unconventional oil and gas production in the USA</b>
<b>3</b>	<b>Effect of unconvensionals on the USA economy</b>
<b>4</b>	<b>Can unconvensionals work outside of the USA – Turkey?</b>
<b>5</b>	<b>Valeura’s Unconventional gas play – Basin-centered gas accumulation (BCGA)</b>
<b>6</b>	<b>Status and potential for Turkey</b>

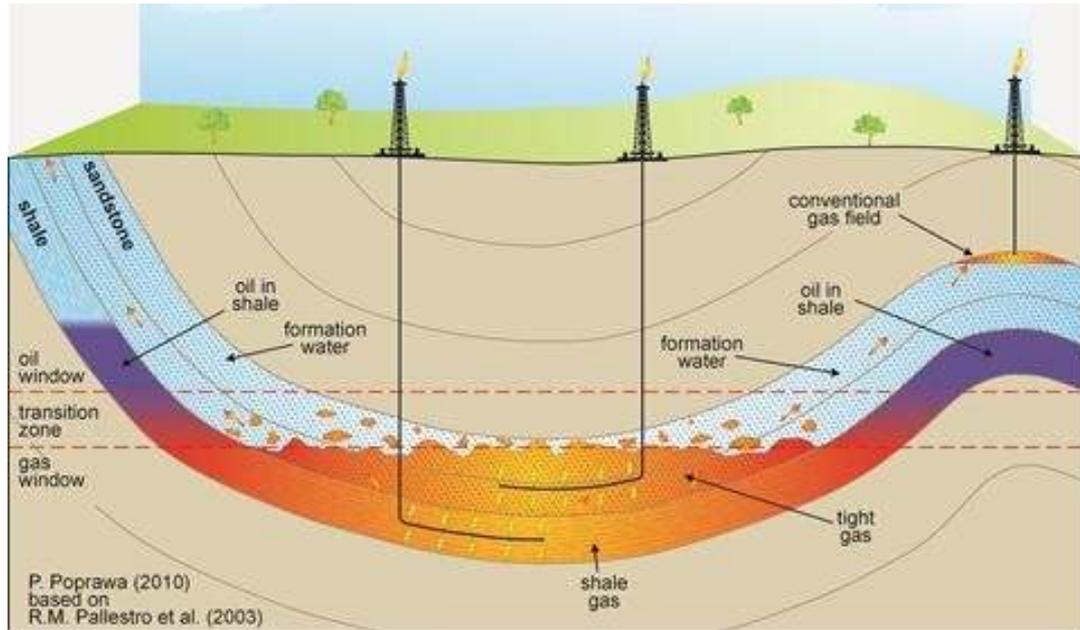
# Conventional Oil and Gas Production



- Oil and/or Gas trapped below a tight, impermeable layer (Shale?) as it rises to surface in a structure
- Field is defined by limited area of the trap
- Flow to surface due to natural pressure or may require pumping
- Small number of wells required to develop the field as oil and gas will flow through the reservoir
- Vertical wells are normal to produce oil and gas
- Typically, well production declines are low per year



# Unconventional Oil and Gas Production



## Unconventional Play Types

1. Tight oil and gas
2. Shale oil and gas
3. Coal Bed Methane (CBM) gas
4. Oil Sands (*Mining required*)

- Oil/gas will **not** flow naturally to the well – host rock is very tight and does not permit flow
- Recovery of oil/gas requires some form of stimulation of the reservoir
- Wells need to contact as much stimulated reservoir as possible to recover the oil/gas
- **Potential volumes can be massive**, as oil/gas not limited by trap size and can be pervasive over 100's of metres vertically and 1000's km<sup>2</sup> laterally

# Horizontal Drilling and Stimulation

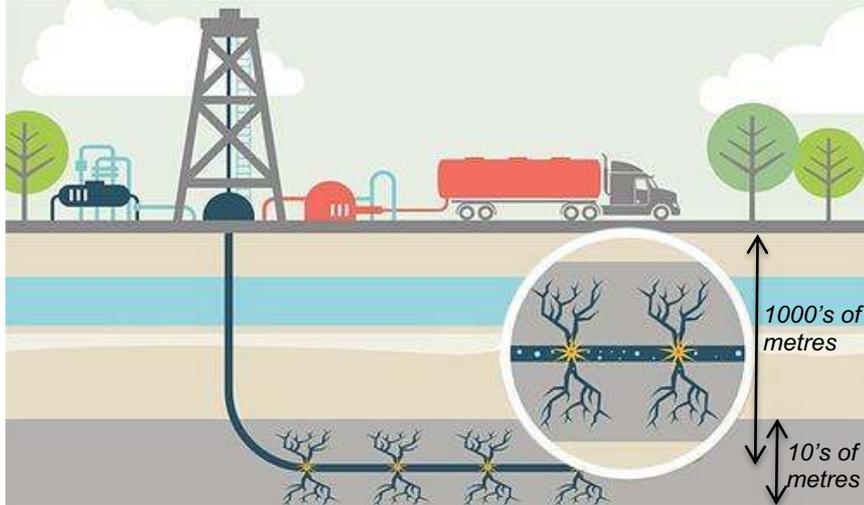
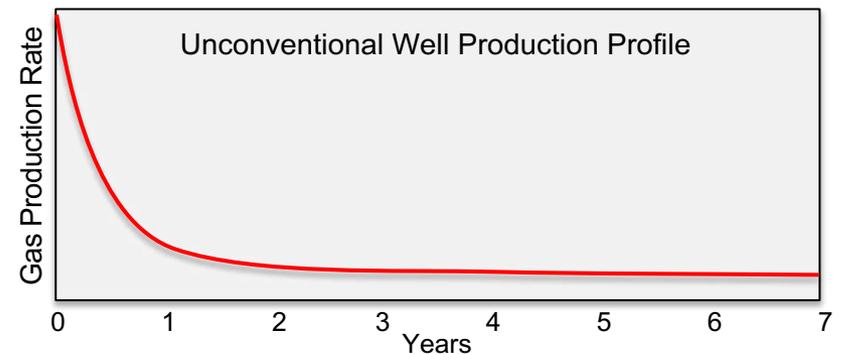


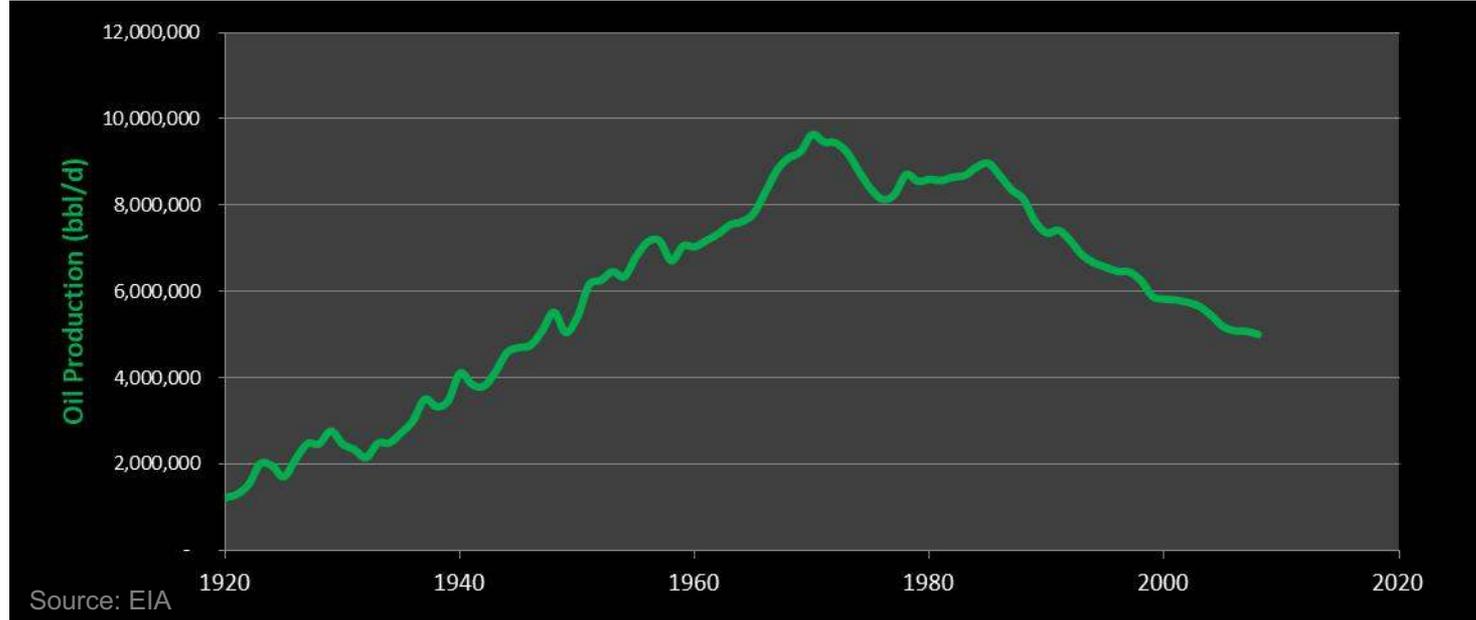
Image not to scale  
Source: Croft Production Systems



- Wells drilled vertically down to target reservoir, then laterally 1000-2000 metres in reservoir
- 5000 metre well can now be drilled in days or few weeks – Valeura’s first 5000 metre wells took 2-3 months!
- High-pressure stimulation creates small fractures in reservoir out from well – pathways for oil/gas to flow to the well
- Production declines very high in first year (70-90%) , then produce for a long time

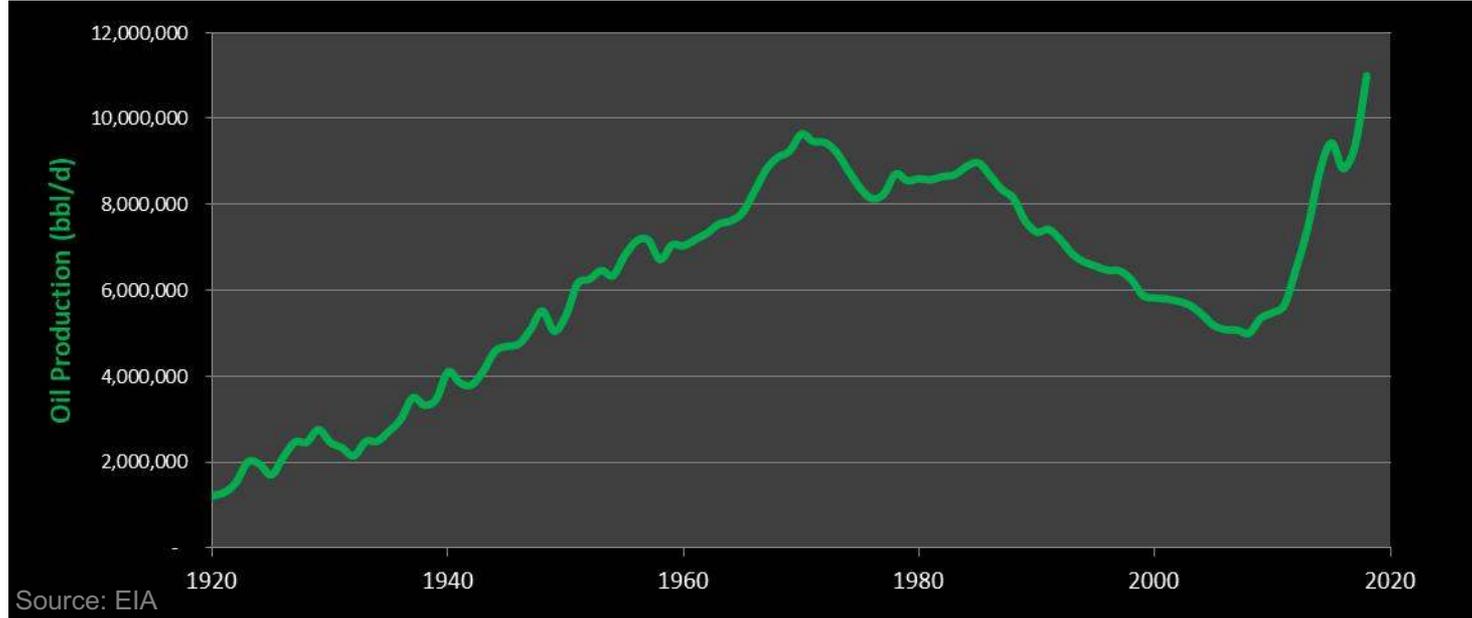


# The USA Unconventional Story: Historic Oil Production



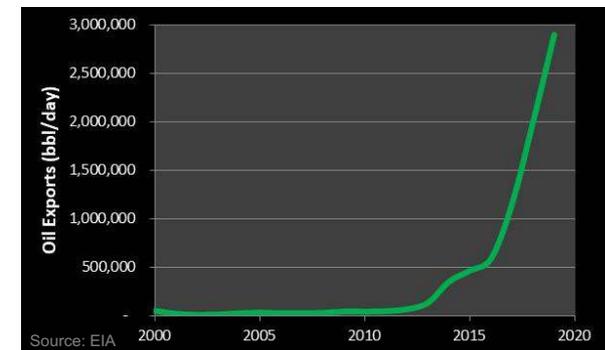
- Peak oil production in early 1970s
- Advancements in Deepwater Gulf of Mexico only kept production flat
- Continual production decline since late 1980s
- Peak imports by US reached ~ 14 MMbbl/day in 2006

# The USA Unconventional Story: Unconventional Oil Production

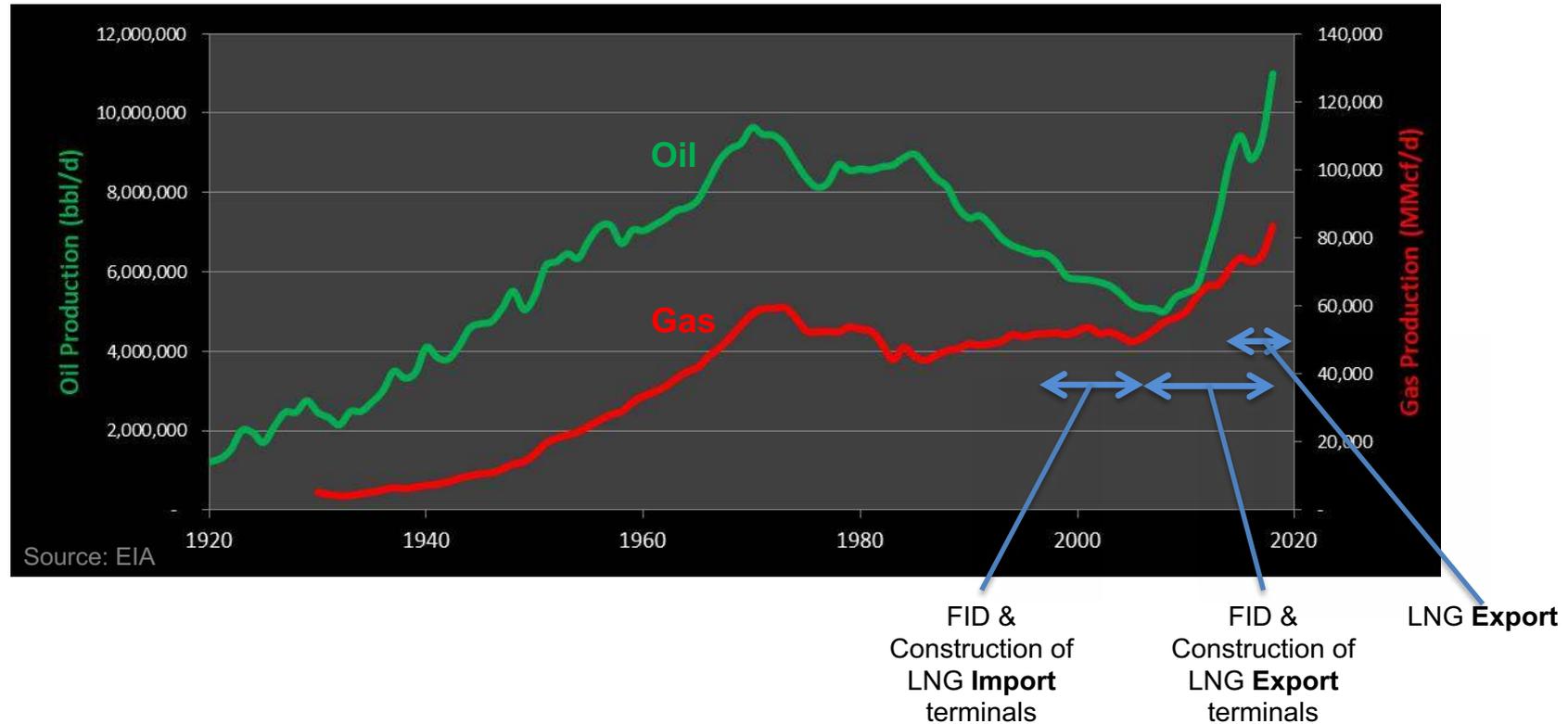


- Unconventional oil production operations rapidly increases after 2005
- US has surpassed its previous peak production in past decade – *8% growth per year since 2007*
- US is the largest oil producer in the world
- US now exports almost 4 MMbbl/day

## Oil Exports from USA



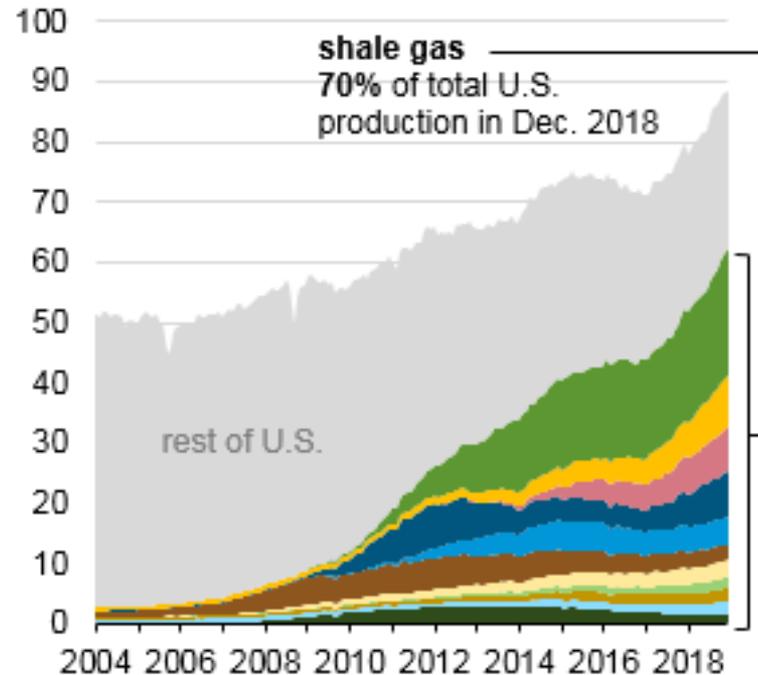
# The USA Unconventional Story: Same Story for Gas.....



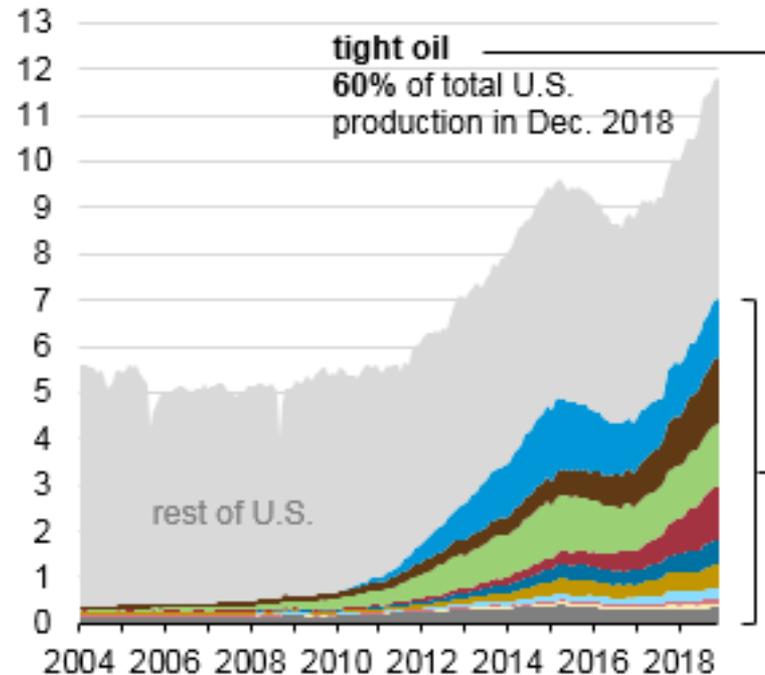
- Initial unconventional gas production growth slow as no offtake capacity
- US now the largest gas producer in the world
- US LNG exporting country since 2015 – *third largest in the world in 2018*
- US a net exporter of gas since 2017

# Majority of US production is Unconventional

**U.S. dry natural gas production (2004-2018)**  
billion cubic feet per day



**U.S. crude oil production (2004-2018)**  
million barrels per day



## Caveats

- Huge capital investment required
- Production requires continual drilling – if drilling stopped now production could drop almost 2 MMbbl/d in one year

# US unconventional growth drives economy

- Unconventionals have provided US with energy security
- Exports of oil and gas improve trade imbalance
- Energy Prices have lowered in the US (and world) generating secondary growth in the economy
- GDP associated with unconventionals in just 1 year (2014) was ~US\$300 Billion

## 2012 Forbes Article on US Unconventional (Shale) Industry

- Even with 2014 crash in oil price the estimated investment to 2020 is understated
  - Drilling Spend alone ~ \$600 Billion in 12 years
- Job Creation is >2% of total US workforce

Category	Investment (Billions)	Jobs Created (thousands)
Exploration and Production	\$60 - \$70	440 - 480
Pipelines	\$50 - \$65	800 - 920
NG Processing Plants	\$35 - \$45	450 - 550
LNG	\$20 - \$30	260 - 370
Manufacturing	\$70 - \$80	920 - 985
Rail and Other Infrastructure	\$10 - \$20	125 - 200
<b>Total</b>	<b>\$245 - \$305</b>	<b>3,000 - 3,505</b>

*Expected expenditure and job creation to 2020*

# Can Unconventionals work Globally?

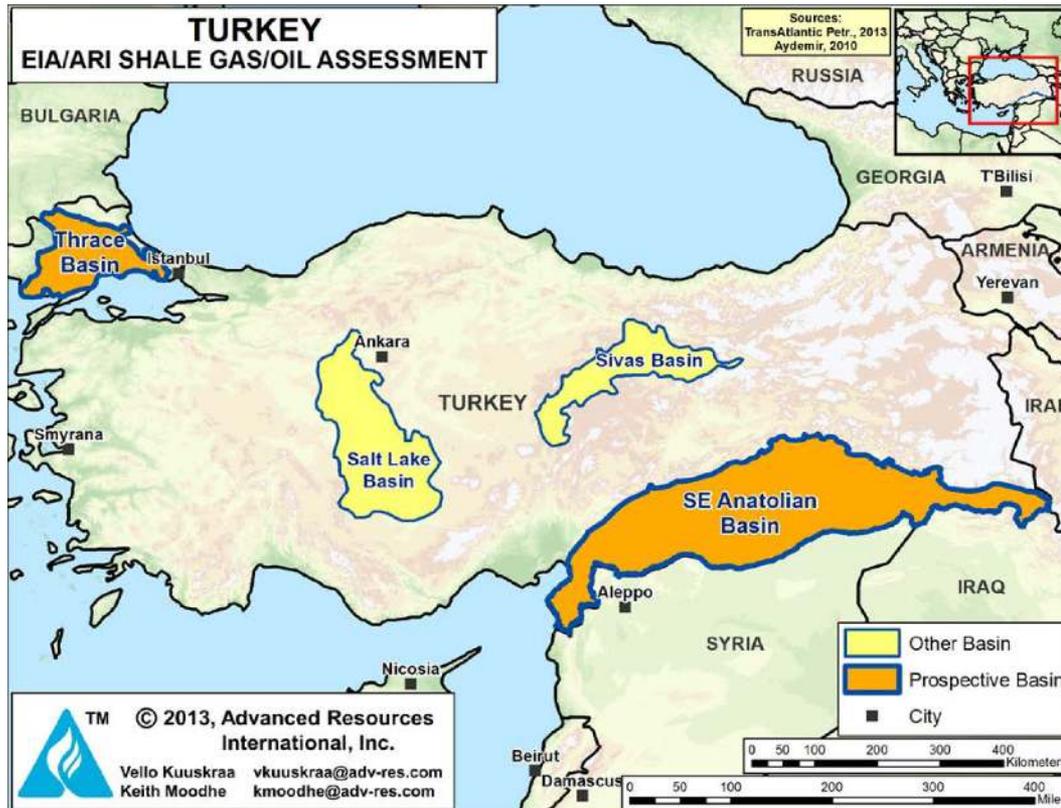


2015 Study update from EIA, *but study only focused on shale oil & gas*

- There is no technical reason for unconventional to only work in North America
- Current success in US, Canada, China, Australia & Argentina – *still very small except US*
- Many more failures globally – *Eastern Europe*

- **Lack of global uptake likely related to availability of capital**
  - 2008 financial crisis
  - 2014-2017 sharp drop in energy prices
  - US shale absorbing all of the capital
- **Growth in some regions hindered by environment movements**

# Unconventional (Shale) Potential in Turkey



2015 Study update from EIA, but study only focused on shale oil & gas

## SE Anatolian

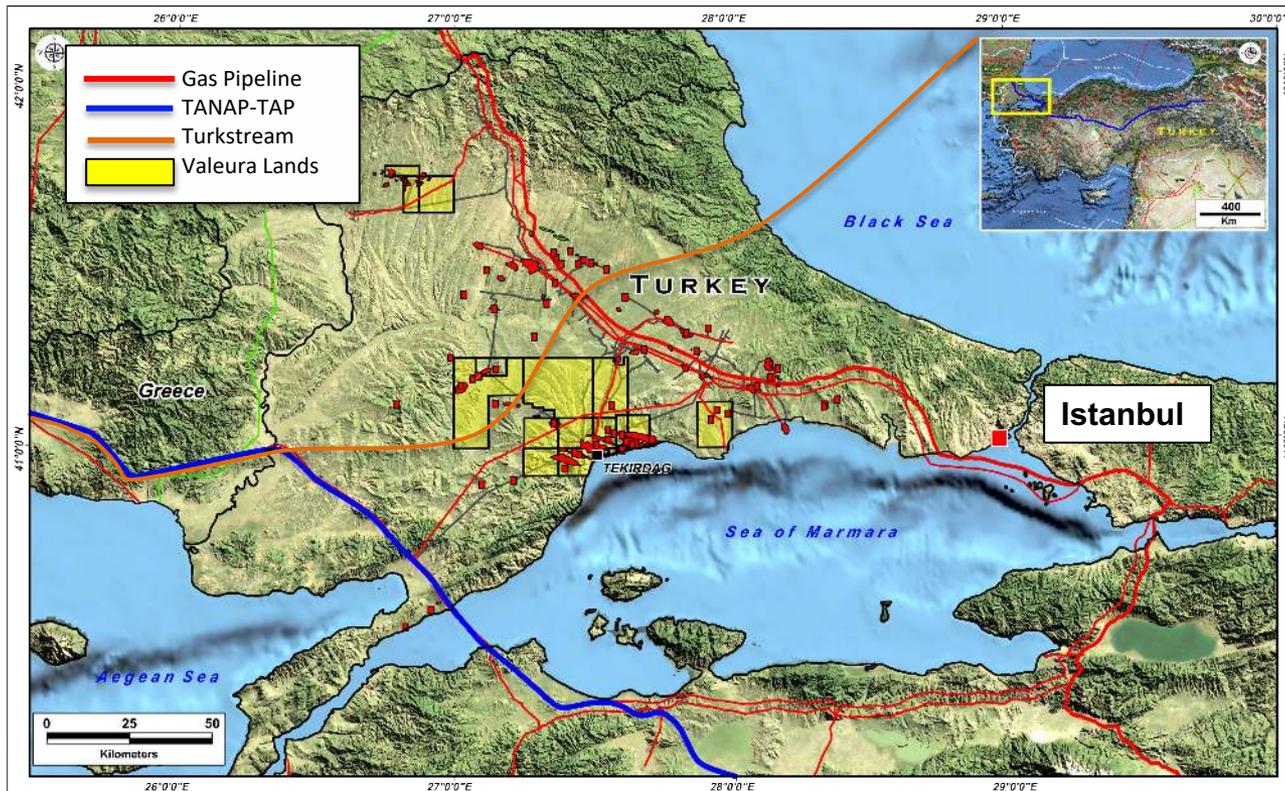
- Dadas Shale
- 60% chance of success
- 17 Tcf (~500 BCM) risked recoverable gas
- 4.5 Bbbl (~600 million Tonnes) risked recoverable oil
- TPAO currently active in testing play

## Thrace Basin

- Hamitabat Shale
- 36% chance of success
- 6 Tcf (~150 BCM) risked recoverable gas
- Minimal risked recoverable oil
- **No evaluation of tight-gas potential**

- Positive move by government to revise Petroleum Law in 2014 to support the exploration and development of unconventional resources

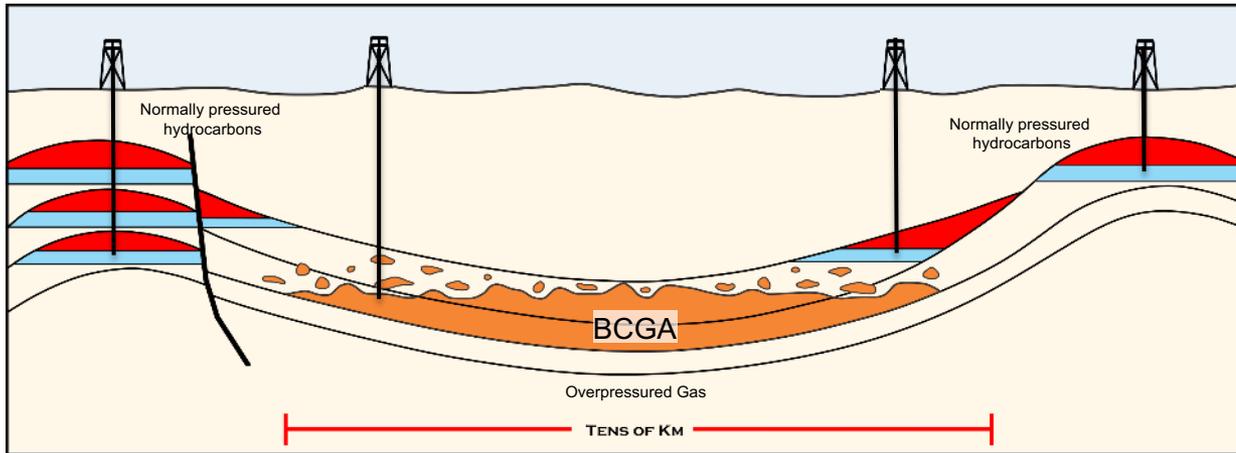
# Valeura tight gas position in Thrace Basin



- Thrace basin decades of gas production
- Predominantly gas with ~ 30 BCM produced
- Fields generally small – largest <2 BCM

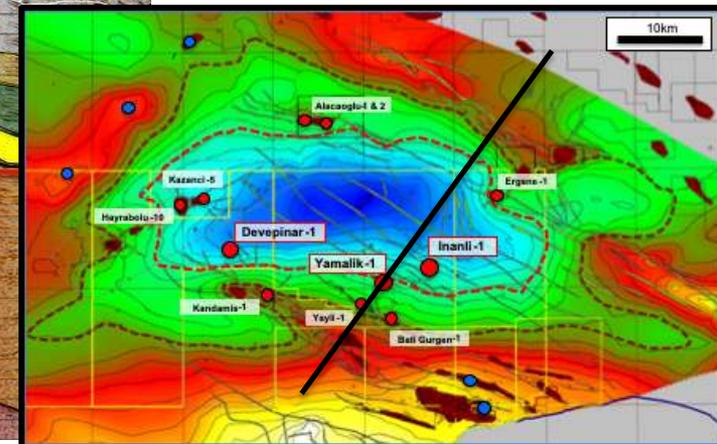
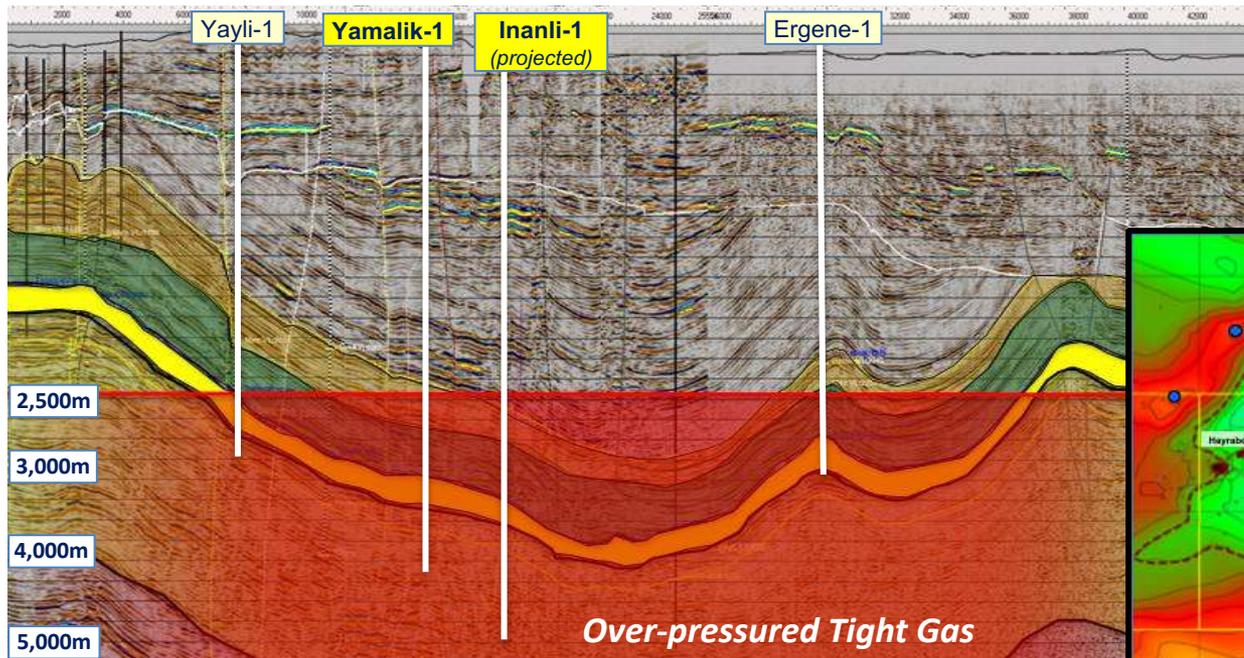
- Valeura operates the local network of gas processing facilities and sales lines
- Drilling horizontal wells and fracking to improve conventional production since 2012
- Identified potential for an unconventional through combination of strong local knowledge and North American geological experience

# Unconventional Basin Centered Gas Accumulation

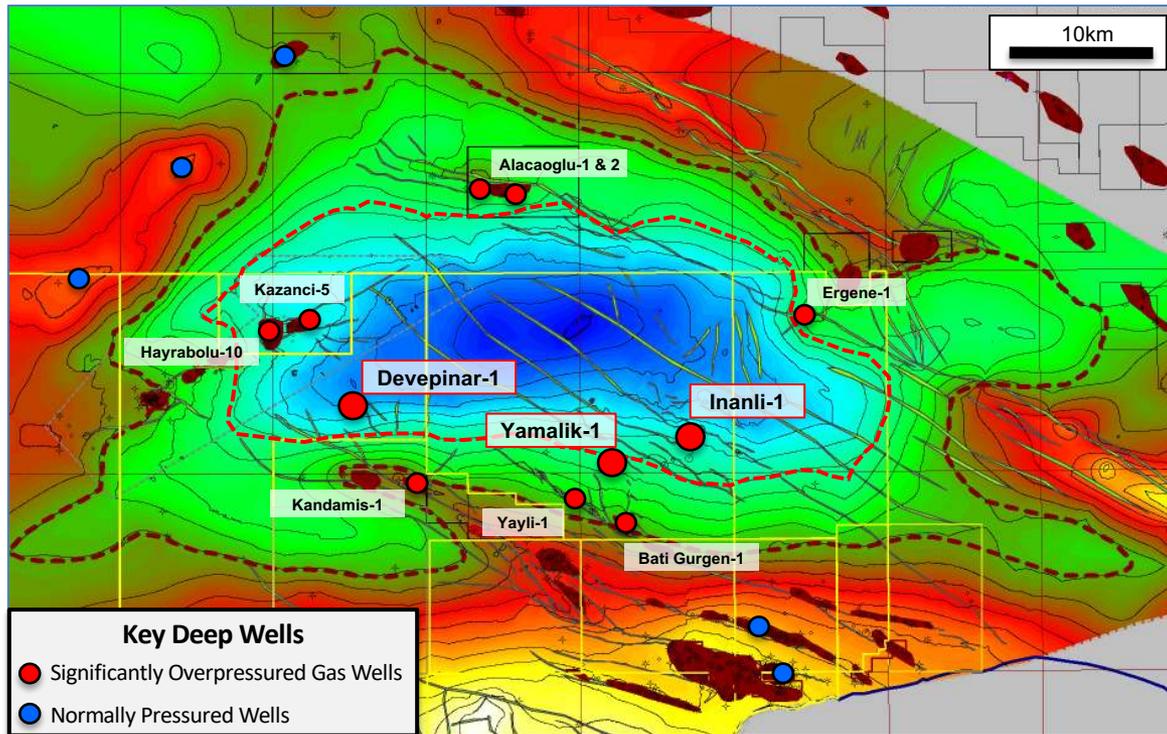


## What is a BCGA?

- Pervasive, basin-centered gas accumulations trapped in low permeability rock
- "Potentially, one of the more economically important unconventional gas systems in the world"<sup>1</sup>
- Up to 15% of total US gas production



# BCGA Play and Volume Summary



- **Normally pressured gas fields around basin**
  - Numerous gas fields producing from normally pressured reservoirs in the same formations
- **Reservoirs significantly over-pressured and high temperature**
- **BCGA typically has significant thickness of low permeability reservoir**

## External 2018 BCGA Prospective Resource Report

Unrisked Recoverable Gas (Valeura Net Share )				
	Low Estimate	Best Estimate	High Estimate	Mean Estimate
Bcf	3,229	7,652	20,077	10,137
BCM	91	217	569	287

Chance of Commerciality: **51%**

Valeura Net Mean Risked Est: **146 BCM**

Gross Mean Risked Est.: **~350 BCM**

# BCGA Conceptual Development Scenario

## Production Profile

- Production profile to recover 350 BCM
- Plateau production : 15 BCM / year
- 40 year project life with a 20+ year production plateau

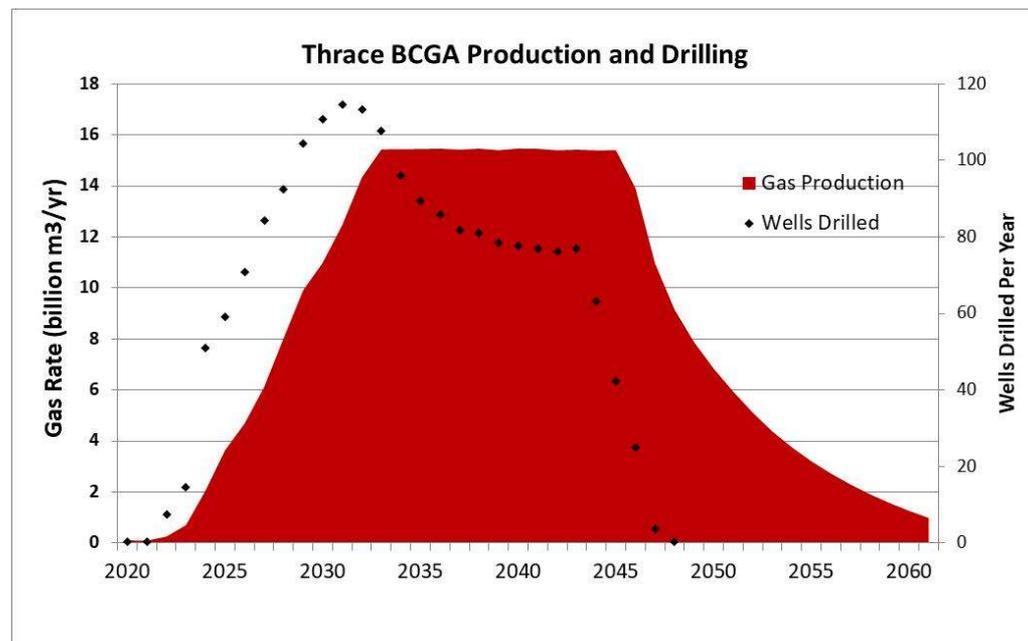
## Capital and Operating Costs<sup>1</sup>

- 1900 production wells
  - 75 wells per year drilling for 25 years
  - Generation of industry

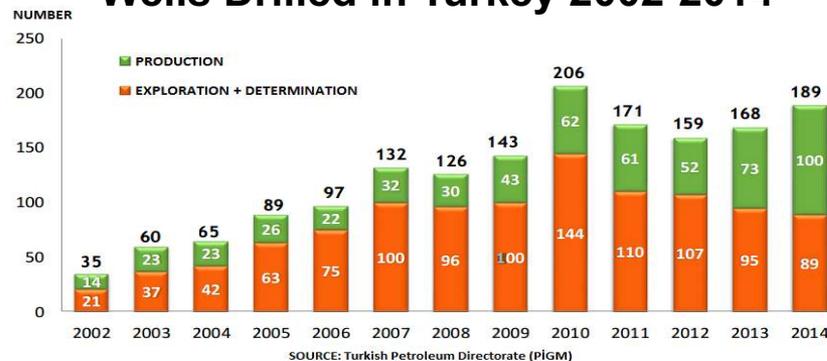
- US\$ 27 Billion in Capital Investment
- US\$300 Million per year in annual operating costs

## Country Benefits<sup>1</sup>

- >US\$ 50 Billion Direct Government Take (Royalty and Taxes)
- Secondary benefits in O&G contracting industry



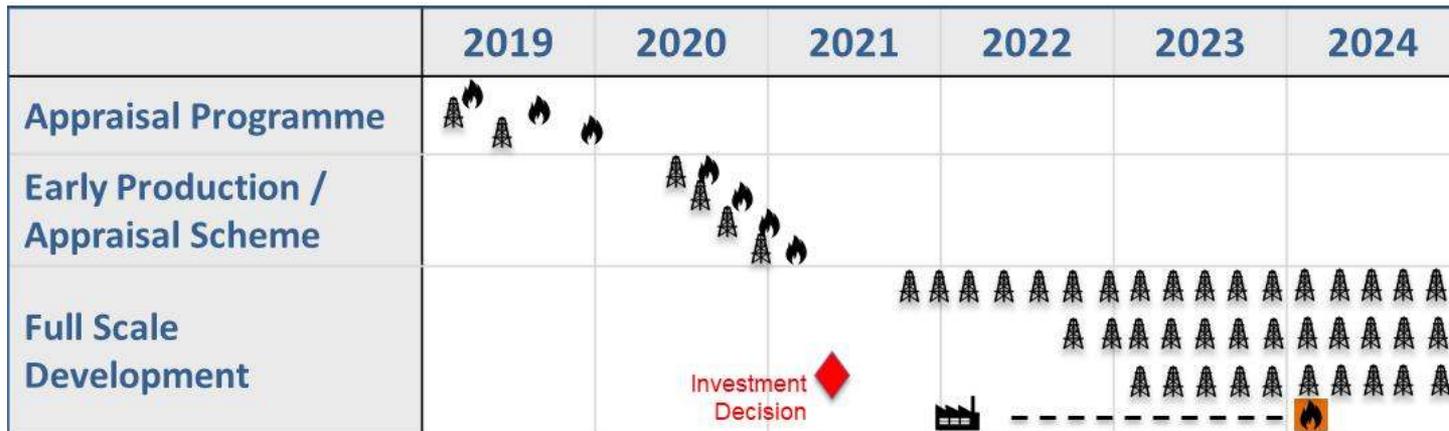
## Wells Drilled in Turkey 2002-2014



# Project is still in appraisal phase

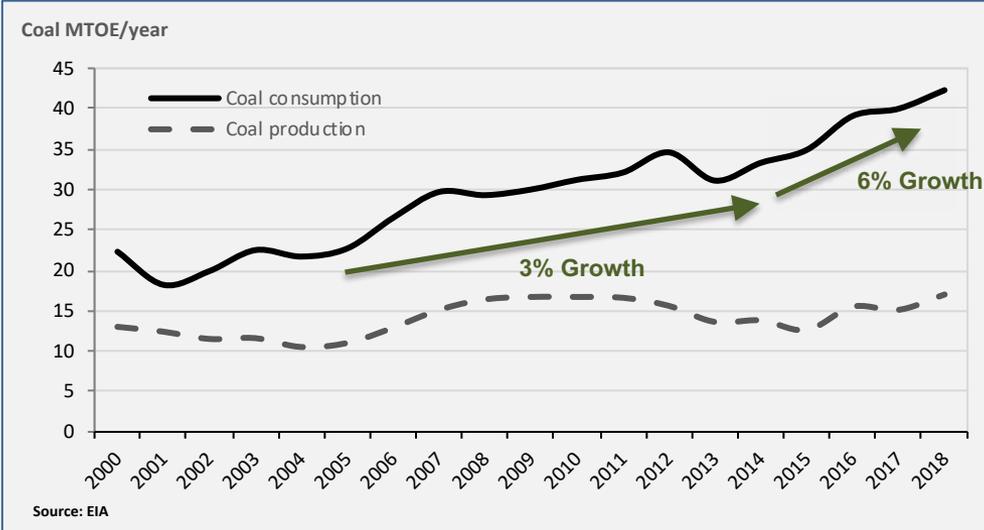
## Current program to test commercial gas flow potential

- Continued stimulation and flow testing of discrete levels within BCGA interval and within different hydrocarbon maturity windows
- Long-term flow testing by putting any successful well on production
- Test areas interpreted to have increased natural fracturing
- Demonstrate the condensate potential both vertically in the section and laterally across the basin



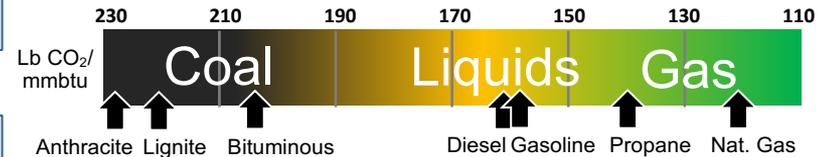
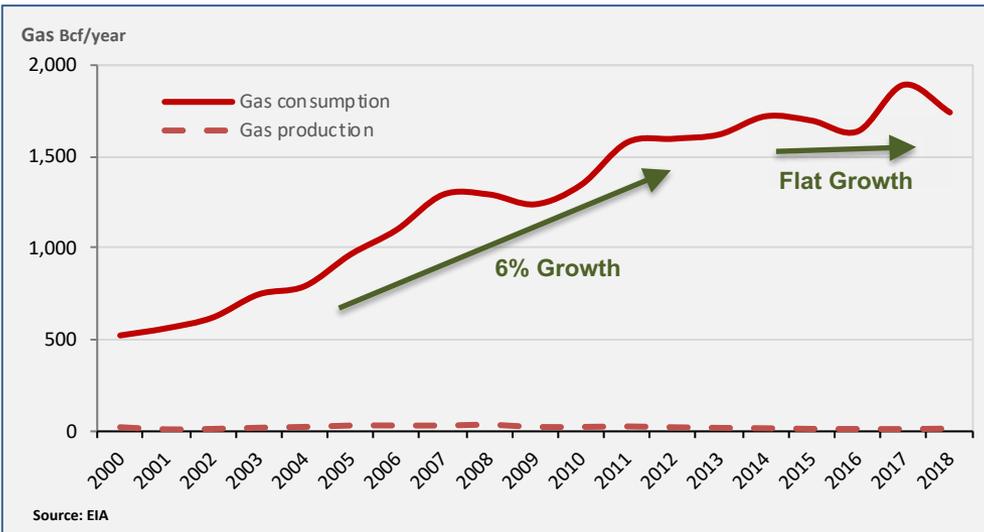
**Approximately US\$ 100 million spent to date on testing this play!**

# Domestic Gas can reduce Turkey's CO<sub>2</sub> emissions



## Coal consumption is growing

- Turkey wants to become more energy self-sufficient
- Substantial domestic supply of coal (>95% of it is high CO<sub>2</sub> lignite)
- 40% of coal consumption is produced domestically
- Coal consumption is growing 6%/year



## Domestic gas offers longer-term benefits

- Only 2% of gas consumption is produced domestically
- Developing a major gas resource play in Turkey reduces reliance on imports
- More gas in Turkey's energy mix reduces CO<sub>2</sub> emissions



# valeura energy inc.

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