LNG Exports

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Introduction

- The shale gas revolution has changed the U.S. natural gas supply landscape
- The U.S. natural gas market is currently demand constrained – there is room for increased demand, including LNG exports, while maintaining stable, affordable natural gas prices.
- Global energy markets and capital markets will naturally limit volumes of LNG exports.
- Fears of price volatility and diversion of investment are unfounded – expeditious permit approval will allow U.S. companies to compete for a share of the global market and lead to job creation at home.

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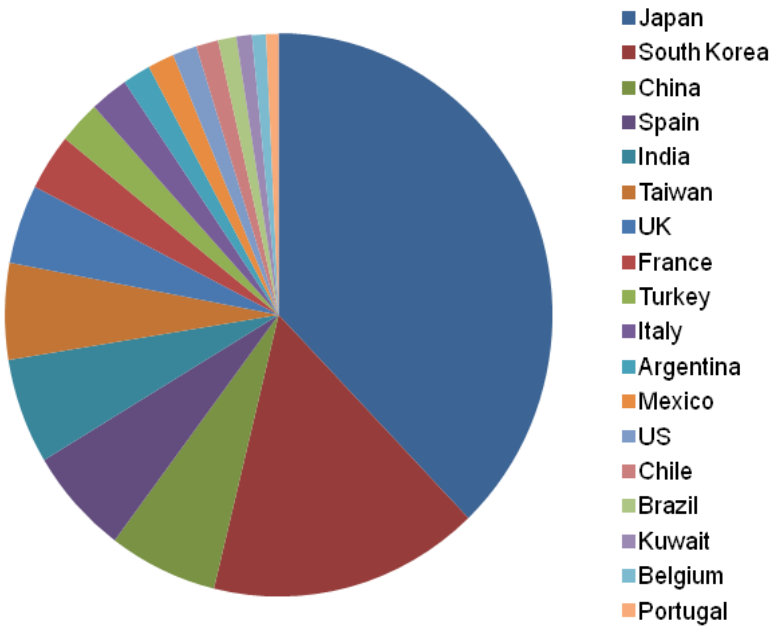
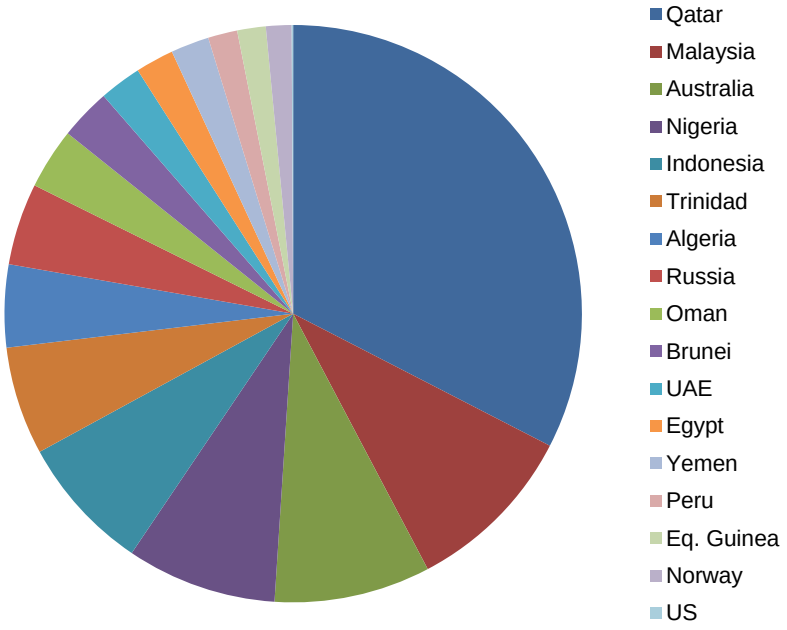
LNG Imports/Exports Worldwide

LNG Imports



LNG Exports



Source: Waterborne LNG Reports, US DOE, PFC Energy Global LNG Service

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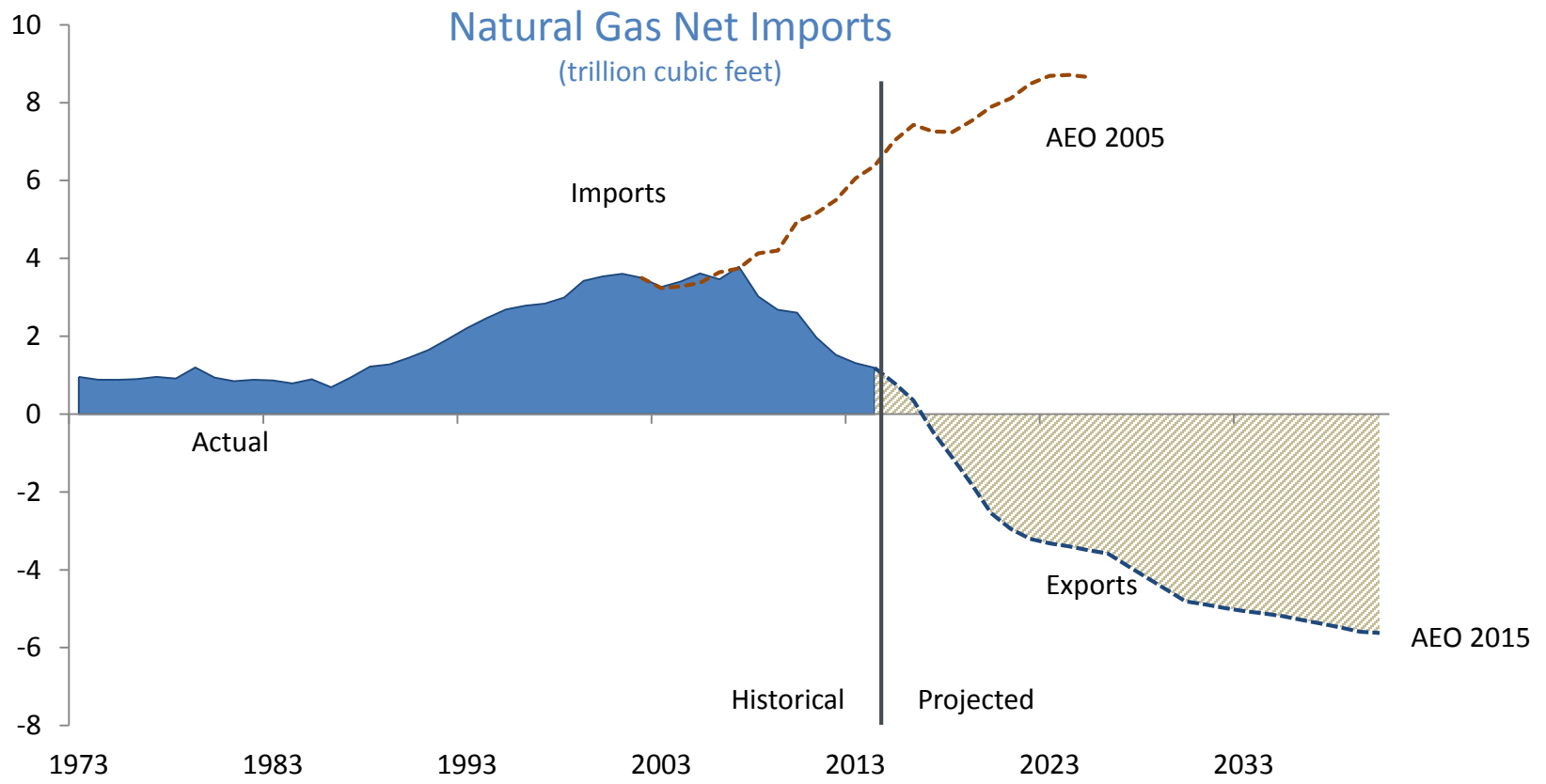
Fundamental Shift in Outlook



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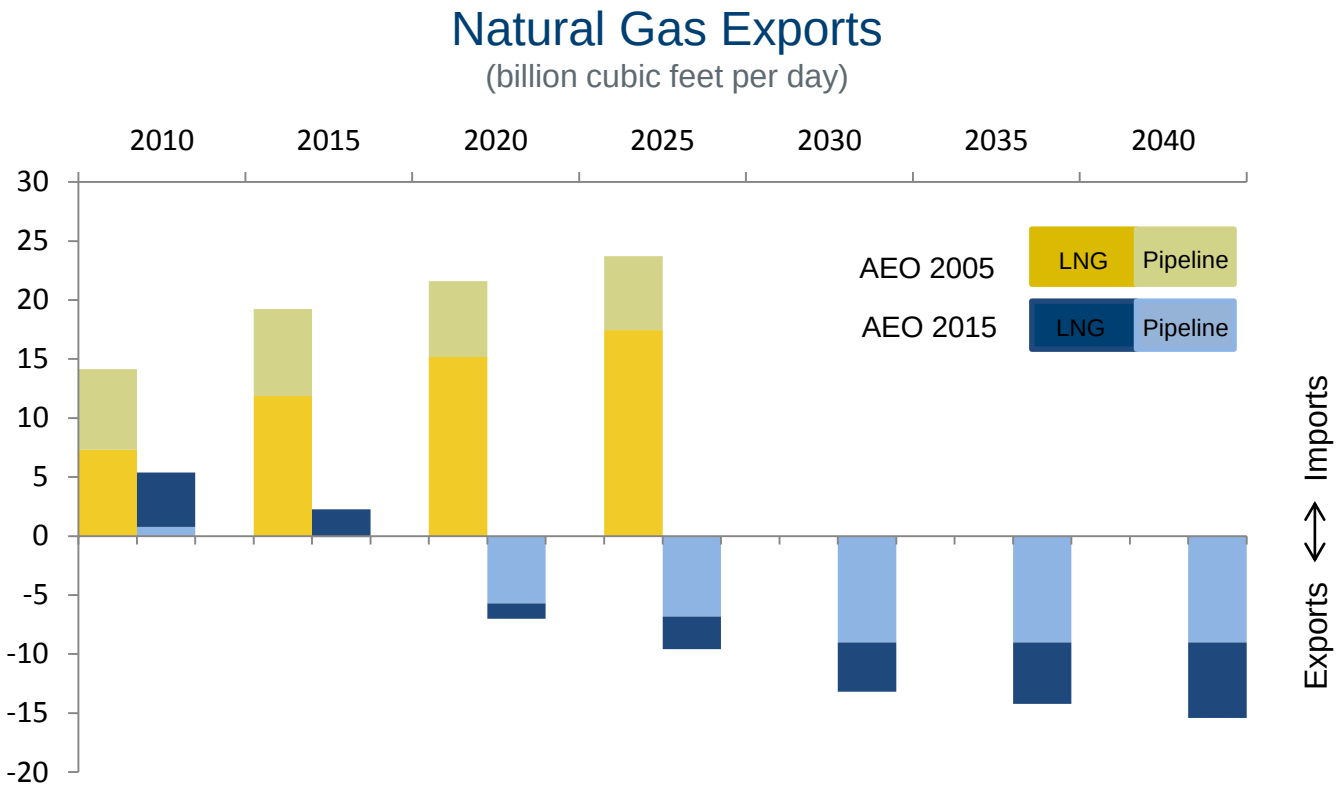
LNG and Pipeline Exports



Source: EIA Annual Energy Outlook 2005 & 2015

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LNG Export Study Comparison

Modeler	Release Date	U.S. Natural Gas Supply Assumption	LNG Exports Volume Range (Bcf/d)	Price Change from Baseline Case
EIA	October, 2014	Reference	12.0 - 20.0	$0.10 - $0.80
ICF	May, 2013	High	4.0 - 16.0	$0.32 - $1.02
CRA	February, 2013	Low	20.0 - 35.0	$1.60 - $3.10
NERA	December, 2012	Reference	0.0 - 15.8	$0.00 - $1.09
Navigant	January, 2012	Reference	0.9 - 6.6	$0.04 - $0.41
Deloitte	2011	Reference	6	$0.22

* Relative to EIA supply assumptions

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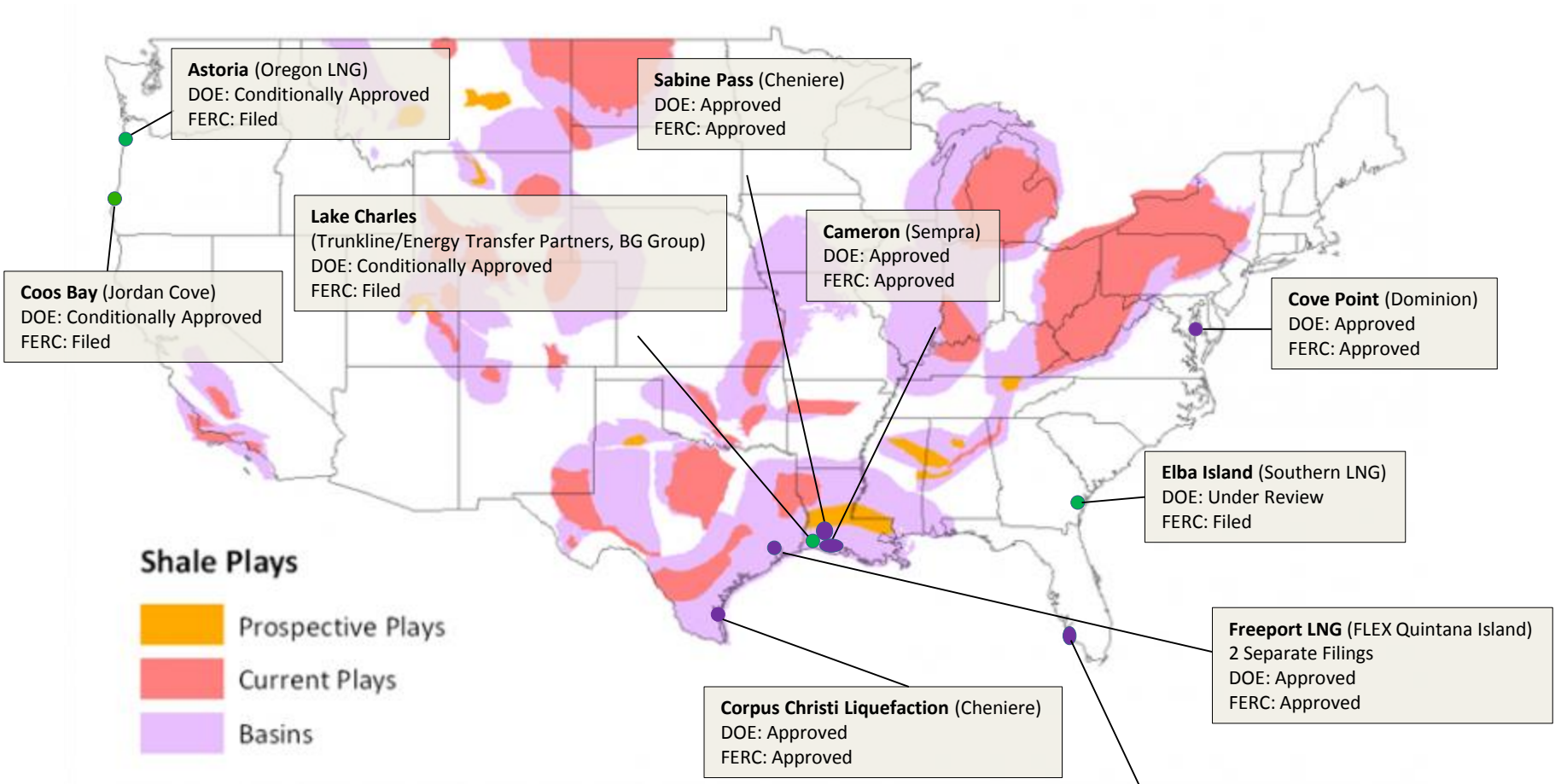
LNG Exports



- Waiting all Final Approvals
- Approved by FERC and waiting DOE Approval
- Received Final Approval

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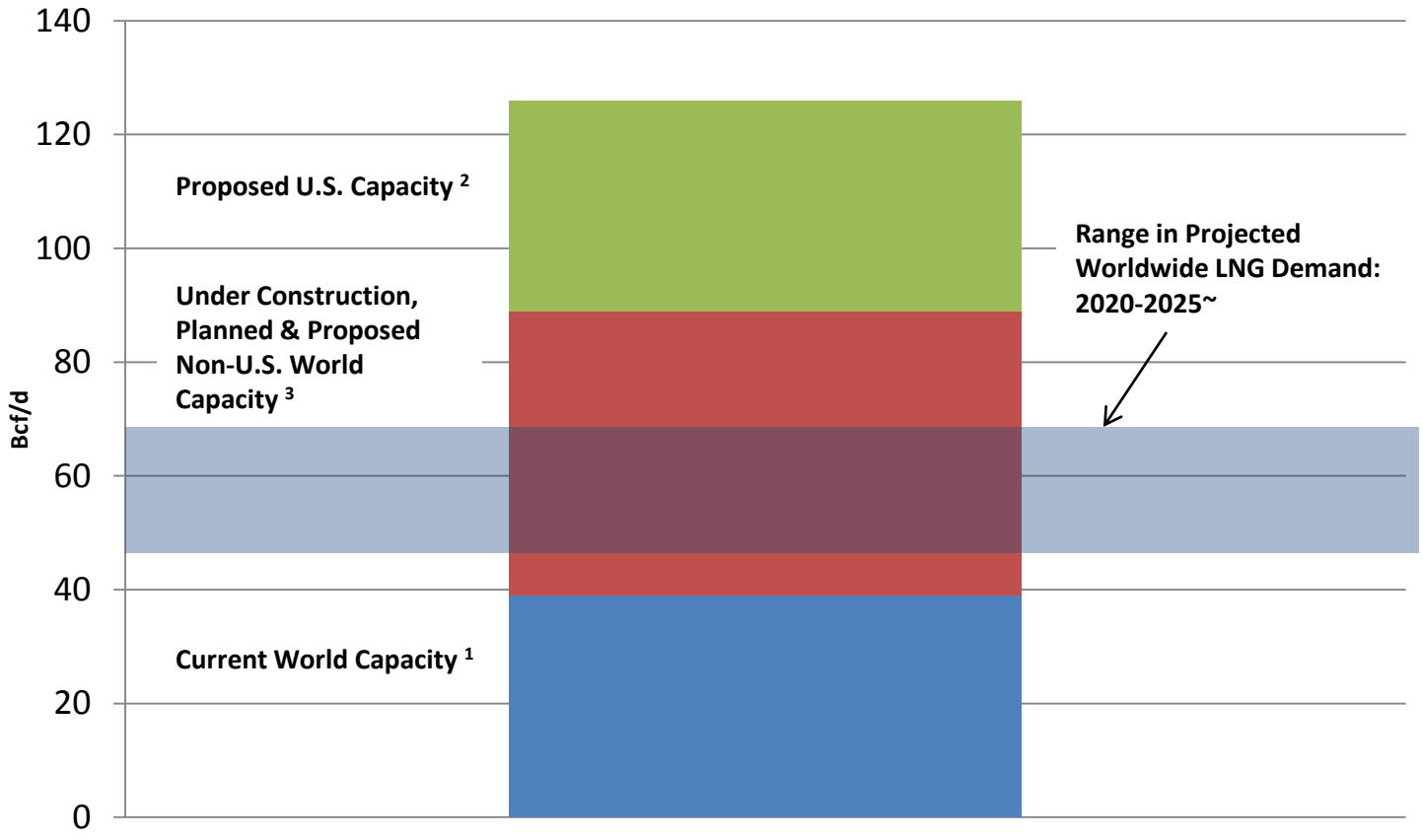
Meeting Global Demand



1. ICF estimate for year end 2011.
2. FTA & non-FTA Applications to DOE as of Mar 31, 2014
3. Dec 2012 ICF estimate based on current worldwide project list.

~Poten, BG Group, Credit Suisse, Facts Global

Source: API, ANGA

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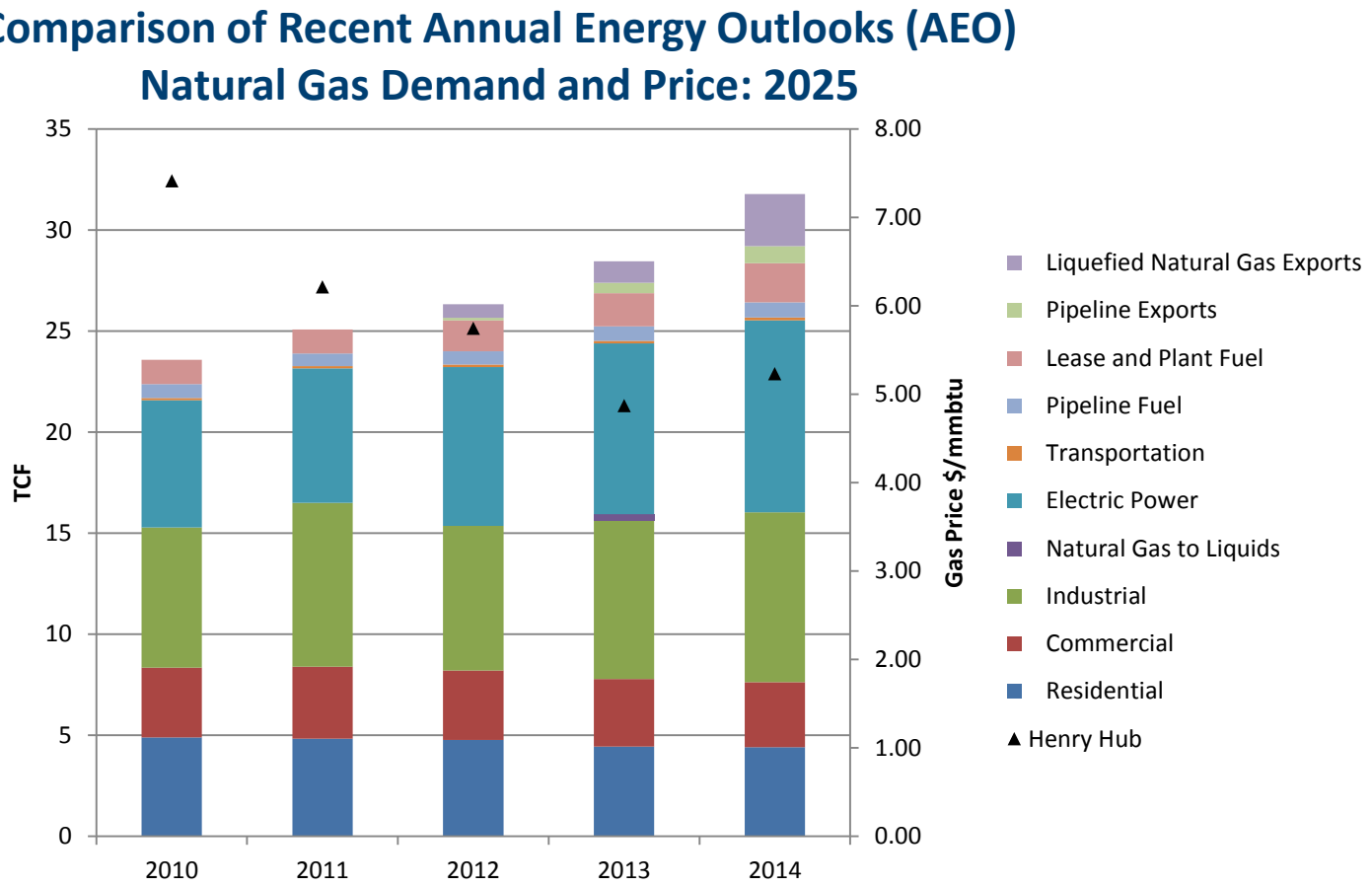
Demand and Price Expectations



EIA has increased expected demand for year 2025 by 35% since the 2010 AEO release while expected 2025 prices have fallen 29%. This further supports the growing, abundant supply claim.

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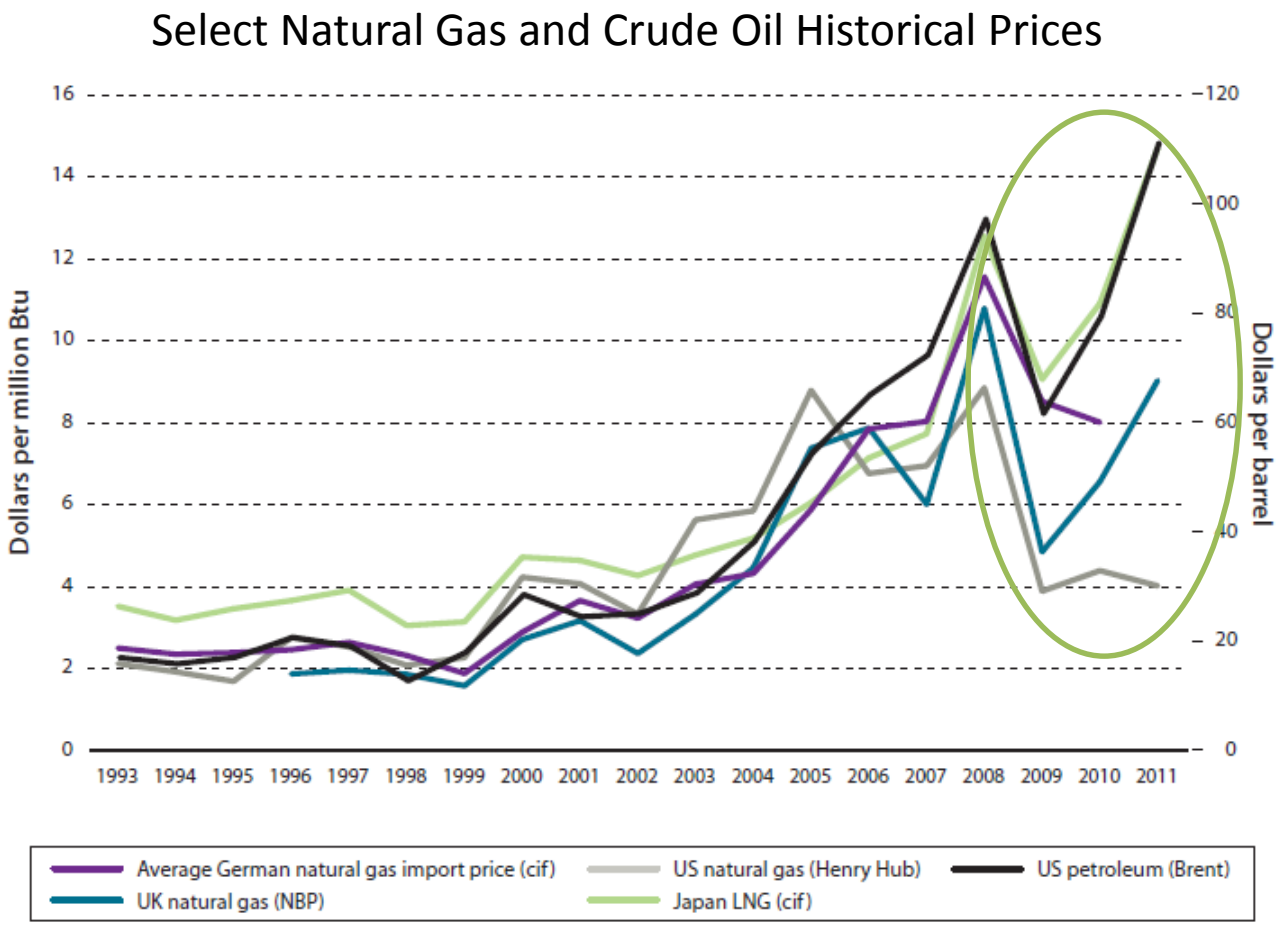
International Interest in U.S. LNG Exports



Historical price correlations have broken down since 2009, start of U.S. shale gas revolution.

Divergence between US, European and Asian natural gas hubs drives strong international interest in U.S. exports.

Source: Brookings Institute, "A Strategy for U.S. Natural Gas Exports", June 2012

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LNG Export Concerns

- Fear:
  - All proposed LNG export projects will be built and all built capacity will be fully utilized
  - Leading to high domestic gas prices and volatility
  - Resulting in diversion of investment and job losses
- Truth:
  - Abundant supplies and continued development will mitigate price and volatility impacts
  - Global energy markets and capital markets will limit LNG export volumes
  - Government intervention is counterproductive

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International Markets

- Short-term market risks:
  - International LNG competition exists to capture LNG demand.
  - Several Middle East LNG suppliers have marginal production costs close to zero; but they limit demand by insisting on oil-linked contracts.
  - Once the U.S. enters the LNG export market, ME suppliers will need to compete with the next marginal supplier, which will be the U.S.
  - To maintain/increase export volumes, they must compete with next marginal supplier by lowering price
  - International LNG prices expected to lower toward U.S. cost of production (less transportation and liquefaction costs).
  - This reduces incentive for U.S. LNG exports.

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International Markets

- Mid to long-term market risks
  - New pipeline capacity between Russia, Central Asia, South Asia and China frees up more existing LNG cargos to go elsewhere.
  - Global shale gas development commences.
    - Only Australia has announced drilling. But significant untapped reserves exist internationally.

Country	Production (TCF)	Consumption (TCF)	Proved Reserves (TCF)	Recoverable Shale Gas Resources (TCF)
China	2.9	3.1	107	1,275
United States	20.6	22.8	273	862
Argentina	1.5	1.5	13	774
Mexico	1.8	2.2	12	681
Australia	1.7	1.1	110	396
Canada	5.6	3.0	62	388
Libya	0.6	0.2	55	290
Algeria	2.9	1.0	159	231
Brazil	0.4	0.7	13	226
Poland	0.2	0.6	6	187

Source: EIA, 2011

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Capital Markets

- LNG export facilities are capital intensive: $5-$10 billion per project
- Each LNG export project will compete for financing
- Off-take contracts are required for financing
  - 3.5 contracts typically needed to justify one LNG train[1]
  - Challenge: Majority of projects sponsored by companies without international LNG marketing experience.
- Context:
  - 25 proposed LNG export facilities exist, if all were built at $5 billion/project the cumulative capital investment would be $125 billion.
  - Capital investment in natural gas transportation and distribution in 2011 totaled $21 billion.[2]

2. US Census, "Capital Expenditures Survey", Feb 2013

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Capital Markets

- Historical Example
  - In the early 2000's, it was expected that the U.S. would require significant LNG import facilities.
  - 47 facilities were proposed.
  - 8 projects were built.
  - Rise of U.S. shale gas and resulting lower prices rendered these projects obsolete.
- Lesson: Market forces, not governmental intervention, imposed limits on investment.

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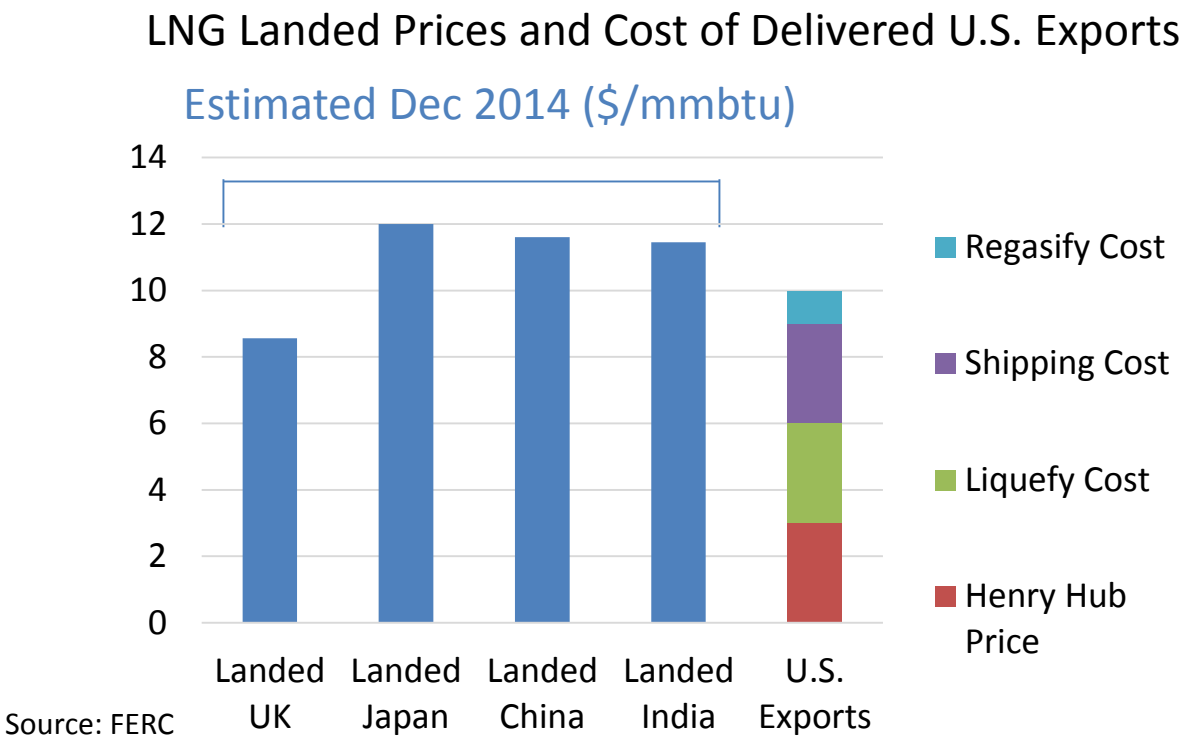
U.S. LNG Export Price Components



Source: FERC

The U.S. domestic price is only one component of the total cost to export LNG from the U.S. Additional costs include: liquefaction costs, shipping costs and regasification costs.

Depending on destination, these additional costs can be 2 to 3 times the current U.S. domestic price.

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What is the Government's Role?

DOE EXPORT AUTHORIZATION

- Applicant files an NGA § 3 application to export to FTA countries *(immediately approved)*
- Applicant files an NGA § 3 application to export to non-FTA countries (*DOE must make an affirmative "public interest" finding for each export application)*

FERC FACILITY SITING AUTHORIZATION

- Applicant requests approval to enter FERC's pre-filing process at least 6 months prior to applying for authorization to site & construct export facilities
- Pre-Filing Phase: FERC conducts scoping study with public consultation to prepare for its Nat'l Envtl. Policy Act ("NEPA") environmental review
- Applicant submits formal application
- FERC issues a draft environmental study (either a full Environmental Impact Statement ("EIS") ***or*** streamlined Environmental Assessment ("EA")) under NEPA
- FERC solicits public comment and responds to comments
- FERC issues a final EIS, if applicable
- FERC approves or denies the project

LNG Exports Promote Domestic Investment

- Jobs created from an LNG include direct (construction/operating) and indirect (production) jobs. For example, a 2 bcf/d export facility means:
  - 3,400 construction jobs (spread over 20 year plant operating period)
  - 400 operations jobs
  - 26,000 upstream and midstream natural gas jobs
- Export market for dry gas will promote continued development/production, leading to NGL supply that is promoting domestic manufacturing jobs

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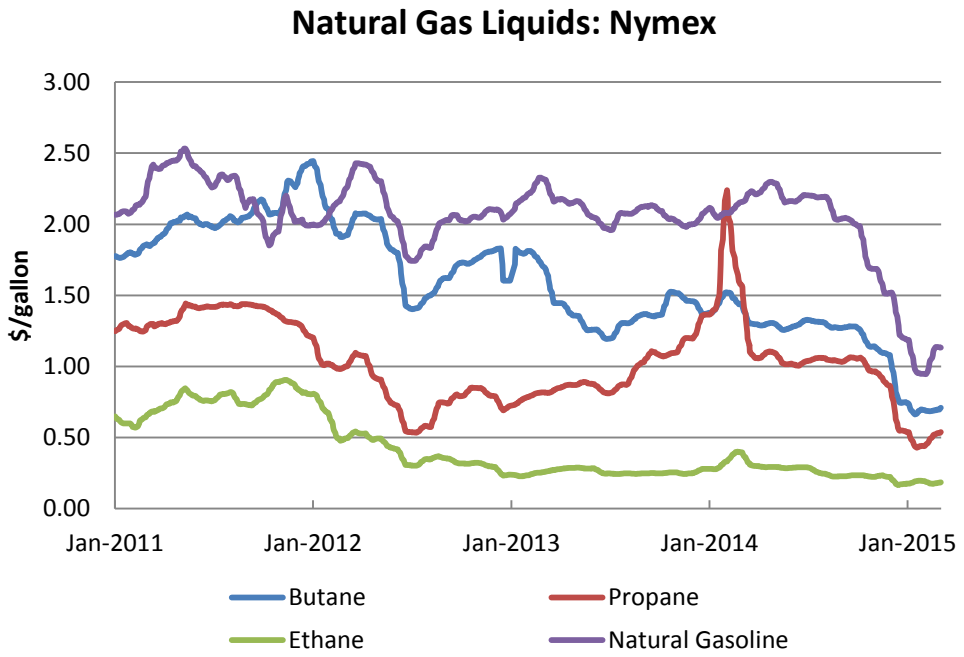
Renewed Domestic Manufacturing

- Due to shale gas abundance, natural gas liquids (NGLs) have seen increased supply and decreased prices on average.

- Permitting LNG exports will drive demand for U.S.-produced dry natural gas and continued investment in overall production.

- This helps preserve low NGL prices that benefit the domestic chemical, fertilizer and plastics industries.



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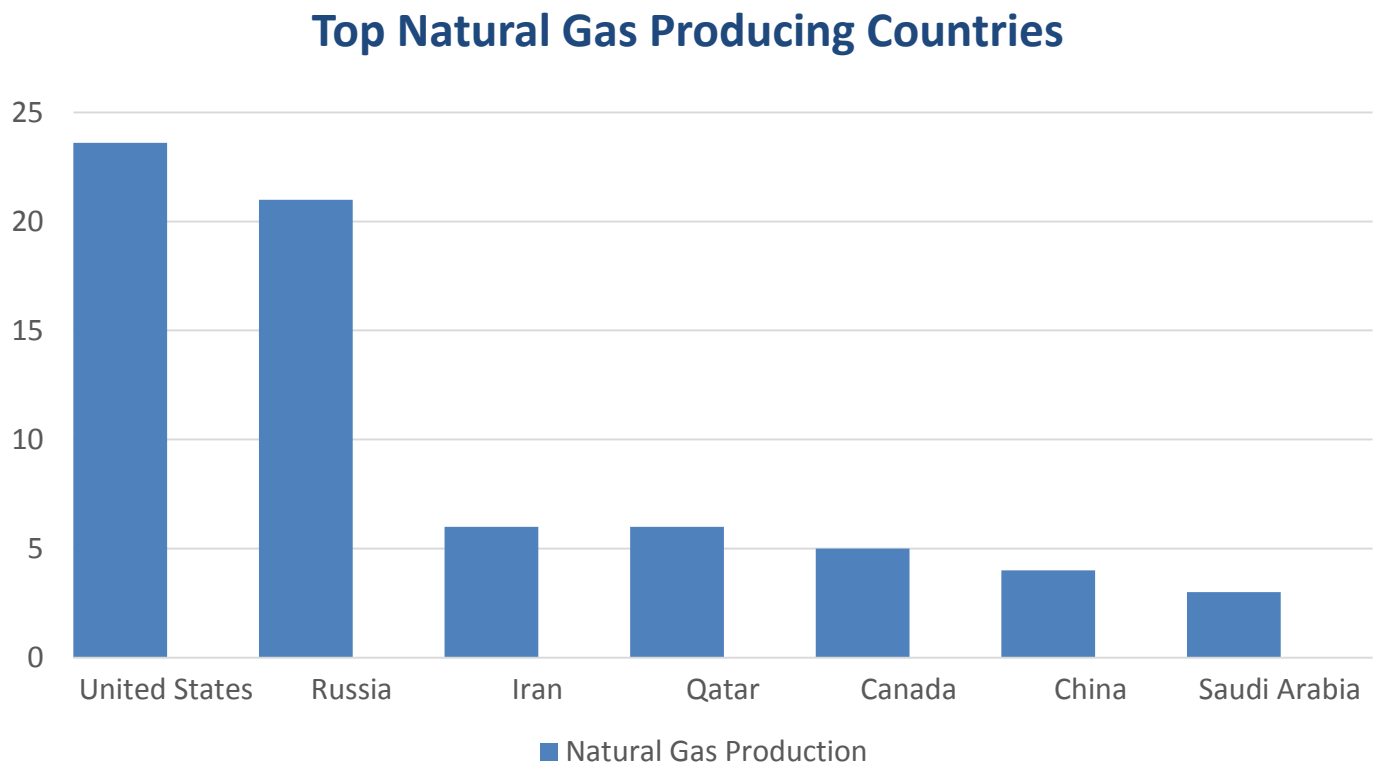
Natural Gas Production Worldwide



Source: EIA – International Energy Outlook 2013

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Conclusion

- The shale gas revolution has changed the U.S. natural gas supply landscape.
- LNG exports will have a positive impact on the economy and the environment.
- The Federal government should move expeditiously to allow U.S. companies to compete in the global LNG market so the domestic benefits from export can be realized.

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