



# Global Natural Gas Markets – Trends and Selected Uncertainties

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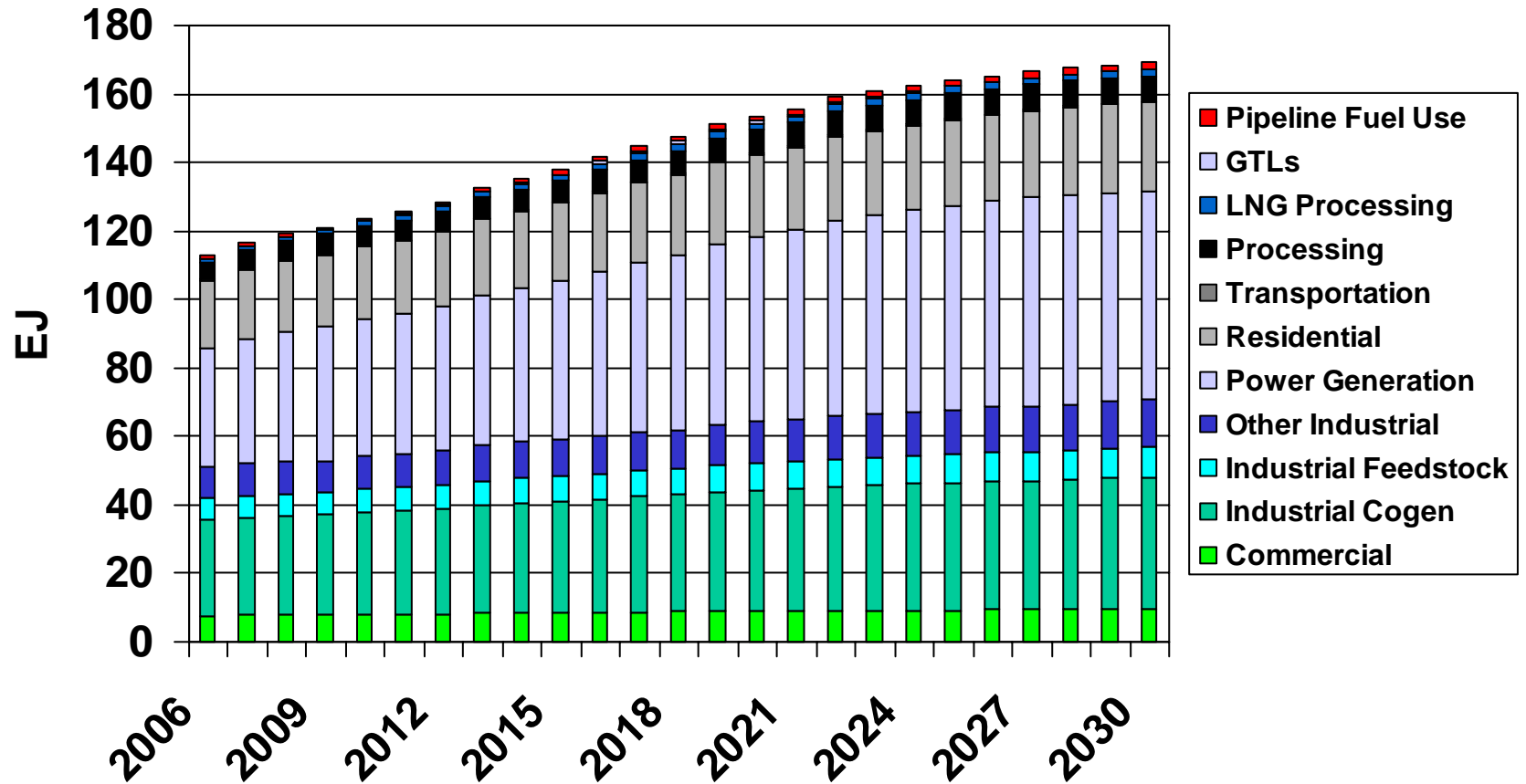
# Use of International Natural Gas Model

- Simulates production, processing, transport, transformation, and demand for natural gas globally
- Models activities for 60 nodes with 16 regions
- Demand information comes from EIA WEPS+ and NGTDM model
  - But modified for higher electricity demand in the U.S.
- Used to develop reference scenario through 2030 and sensitivities looking at oil prices and shale oil resources

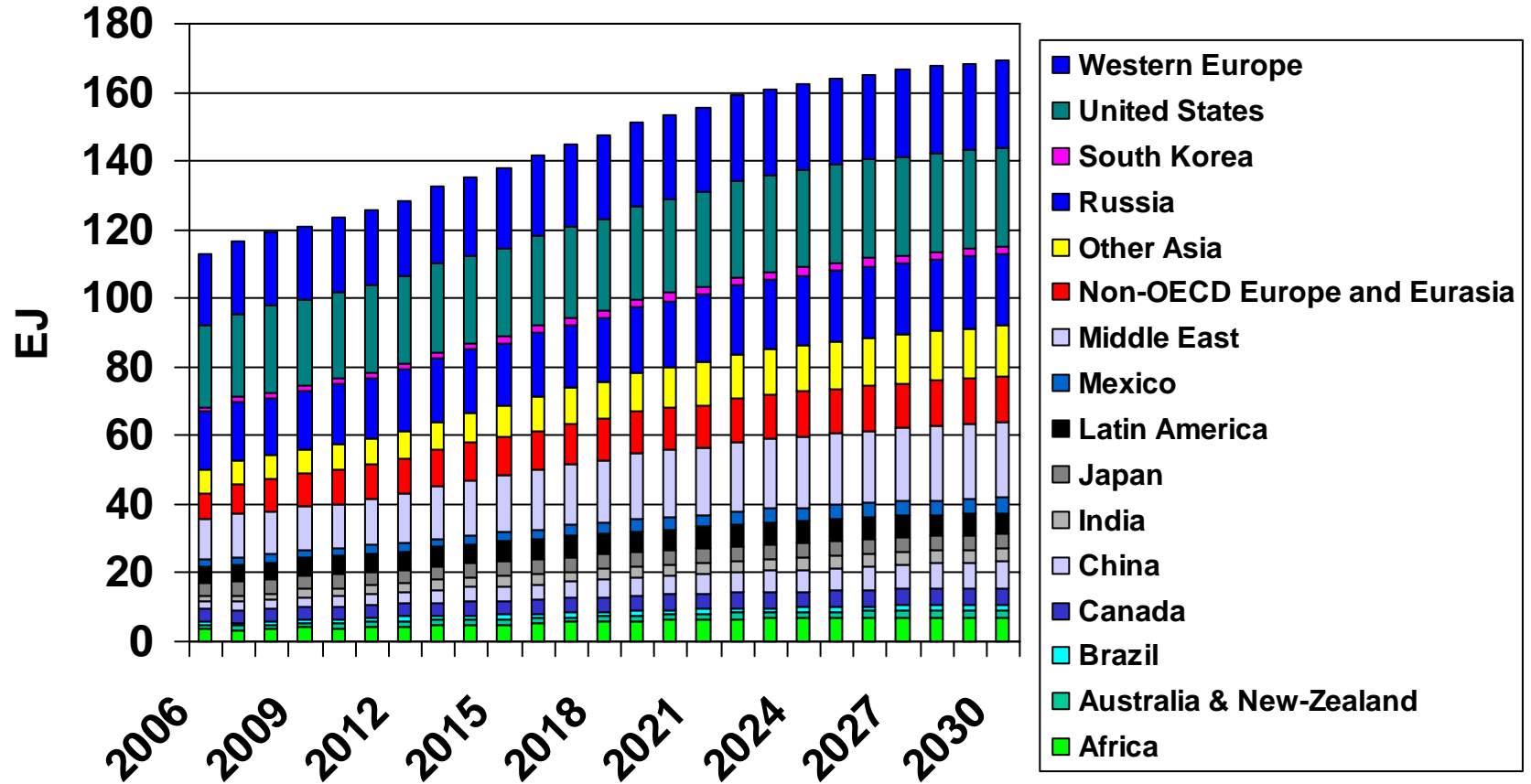
# Scenarios

- Reference Scenario
  - Oil Prices stay at \$71/bbl (\$2006)
- EIA Oil Prices
  - Oil prices grow to around \$130/bbl by 2030 (\$2006)
- High Oil Prices
  - Oil prices grow to \$200/bbl (\$2006) by 2030
- High Shale
  - Shale gas resources doubled
- All
  - GTL capacity growth is constrained

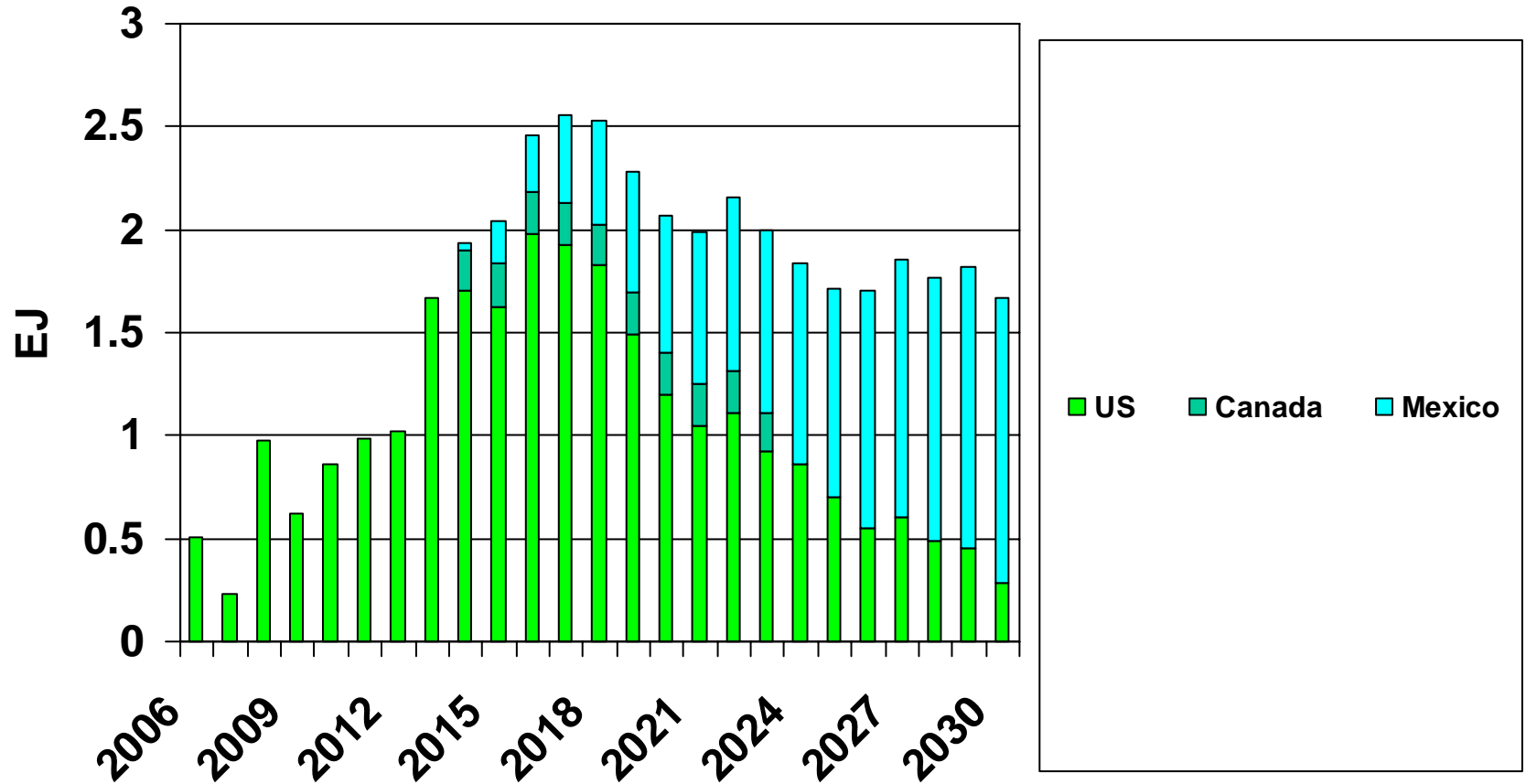
# Global Demand for Natural Gas by Sector – Reference Scenario



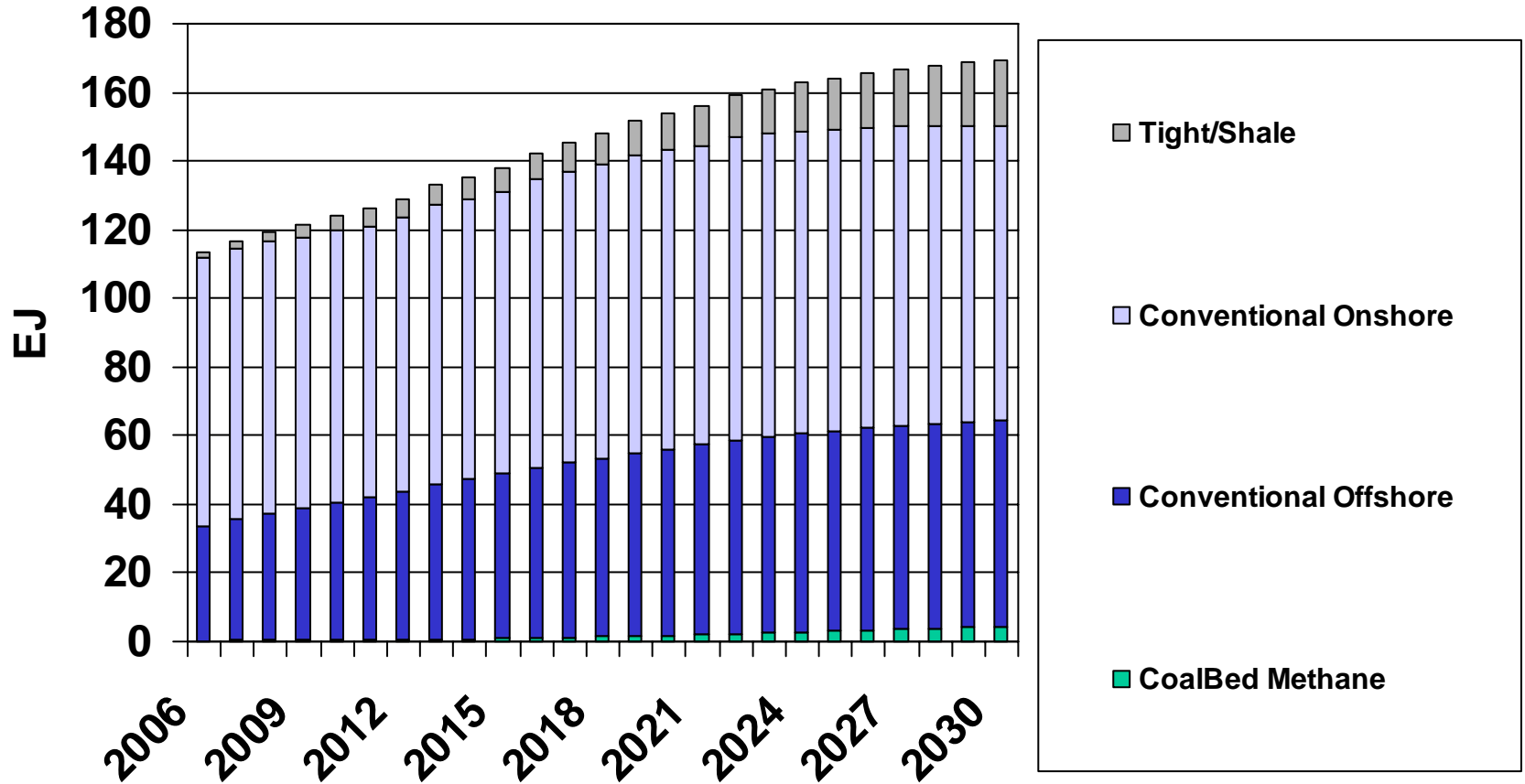
# Global Demand for Natural Gas by Region – Reference Scenario



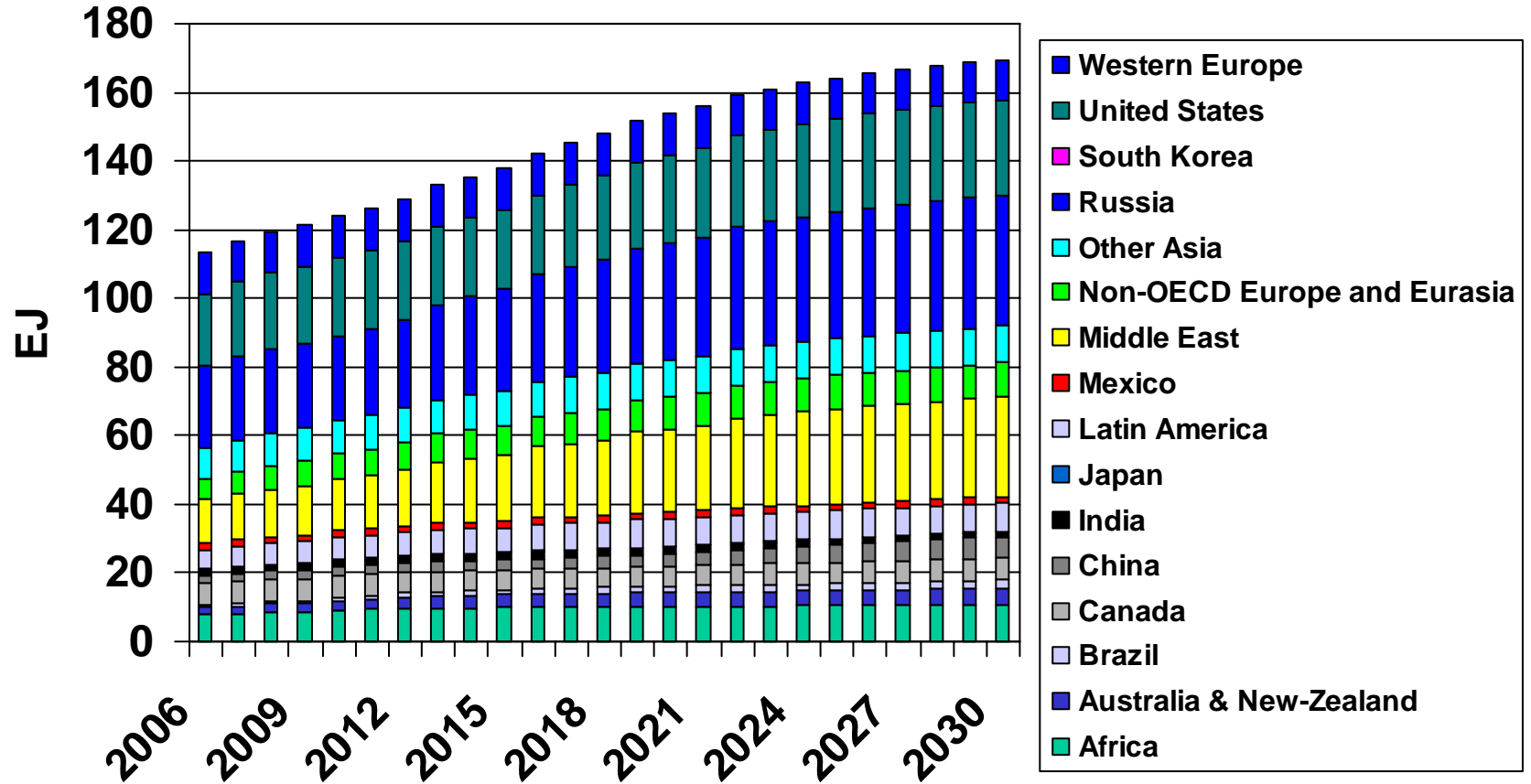
# LNG Imports to North America – Reference Scenario



# Global Production by Type – Reference Scenario



# Natural Gas Production by Region – Reference Scenario

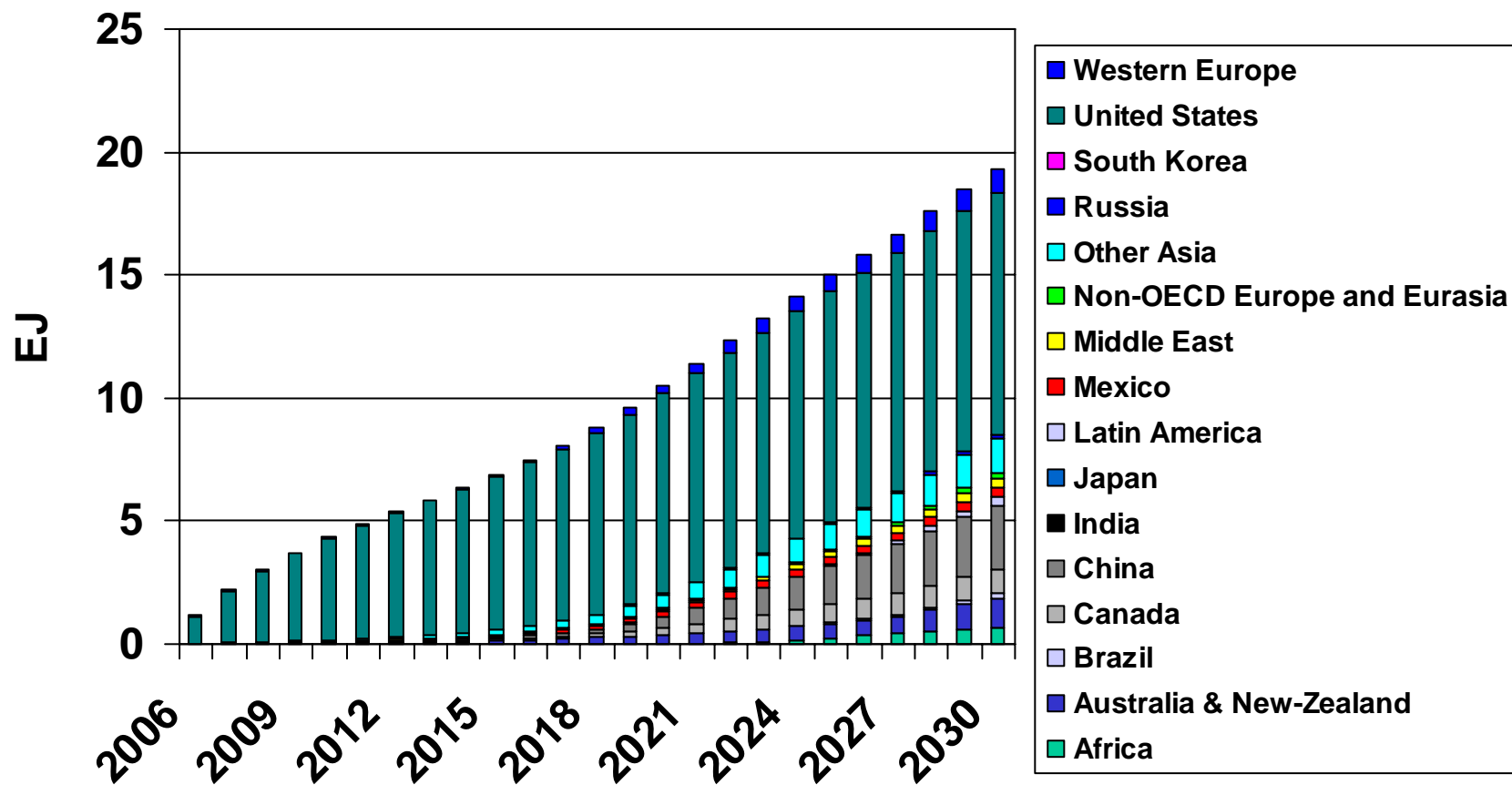


# Unconventional Gas Resources – Gas in Place

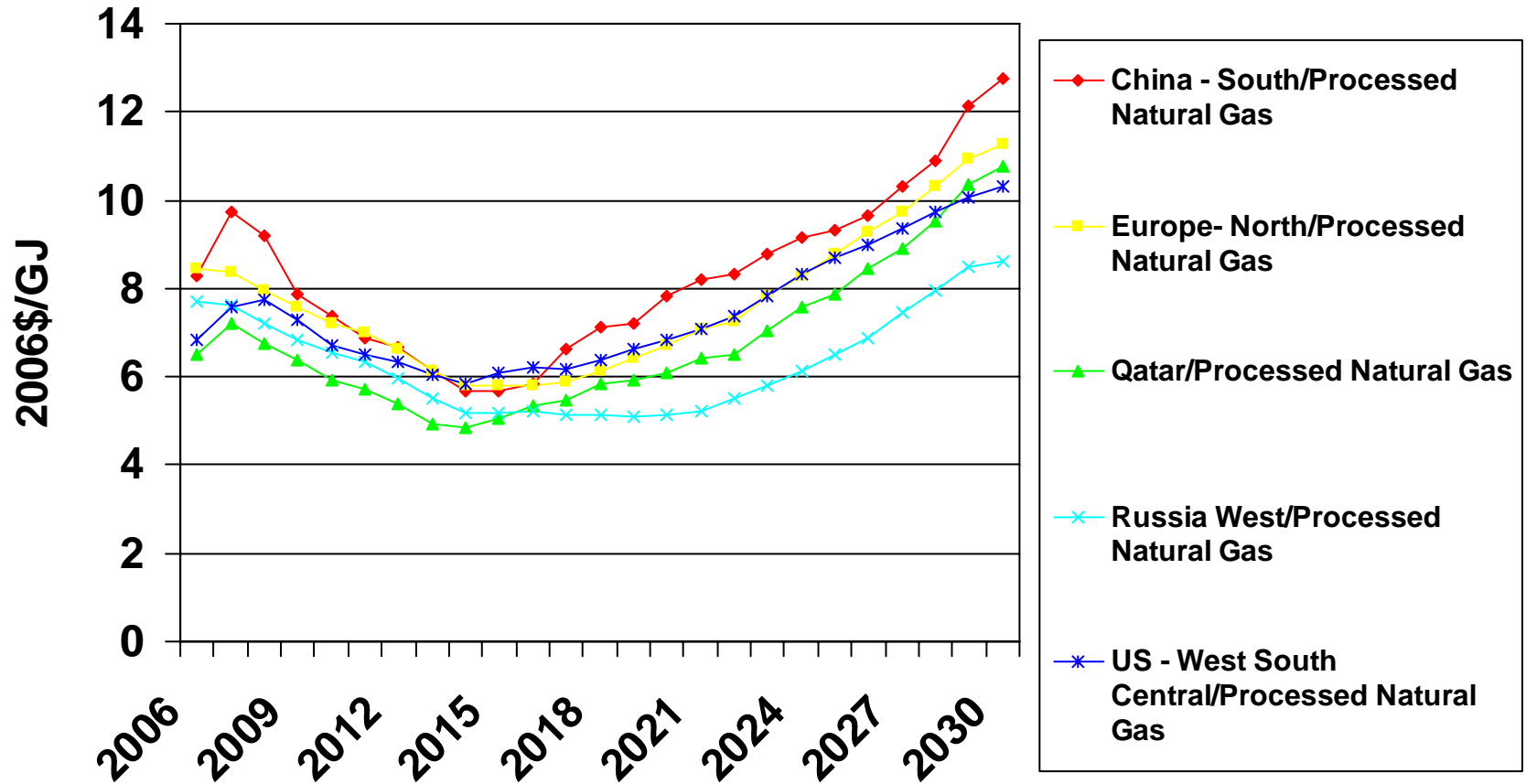
Region	Coalbed Methane (TCF)	Shale Gas (TCF)	Tight-Sand Gas (TCF)	Total (TCF)
North America	3,017	3,840	1,370	8,228
Latin America	39	2,116	1,293	3,448
Western Europe	157	509	353	1,019
Central and Eastern Europe	118	39	78	235
Former Soviet Union	3,957	627	901	5,485
Middle East and North Africa	0	2,547	823	3,370
Sub-Saharan Africa	39	274	784	1,097
Centrally planned Asia and China	1,215	3,526	353	5,094
Pacific OECD	470	2,312	705	3,487
Other Asia Pacific	0	313	549	862
South Asia	39	0	196	235
World	9,051	16,103	7,406	32,560

Source: ‘Some Predictions of Possible Unconventional Hydrocarbons Availability Until 2100’, Yuko Kawata, Kazuo Fujita, The University of Tokyo, Department of Geosystem Engineering, 2001. This summarizes work from Rogner 1996

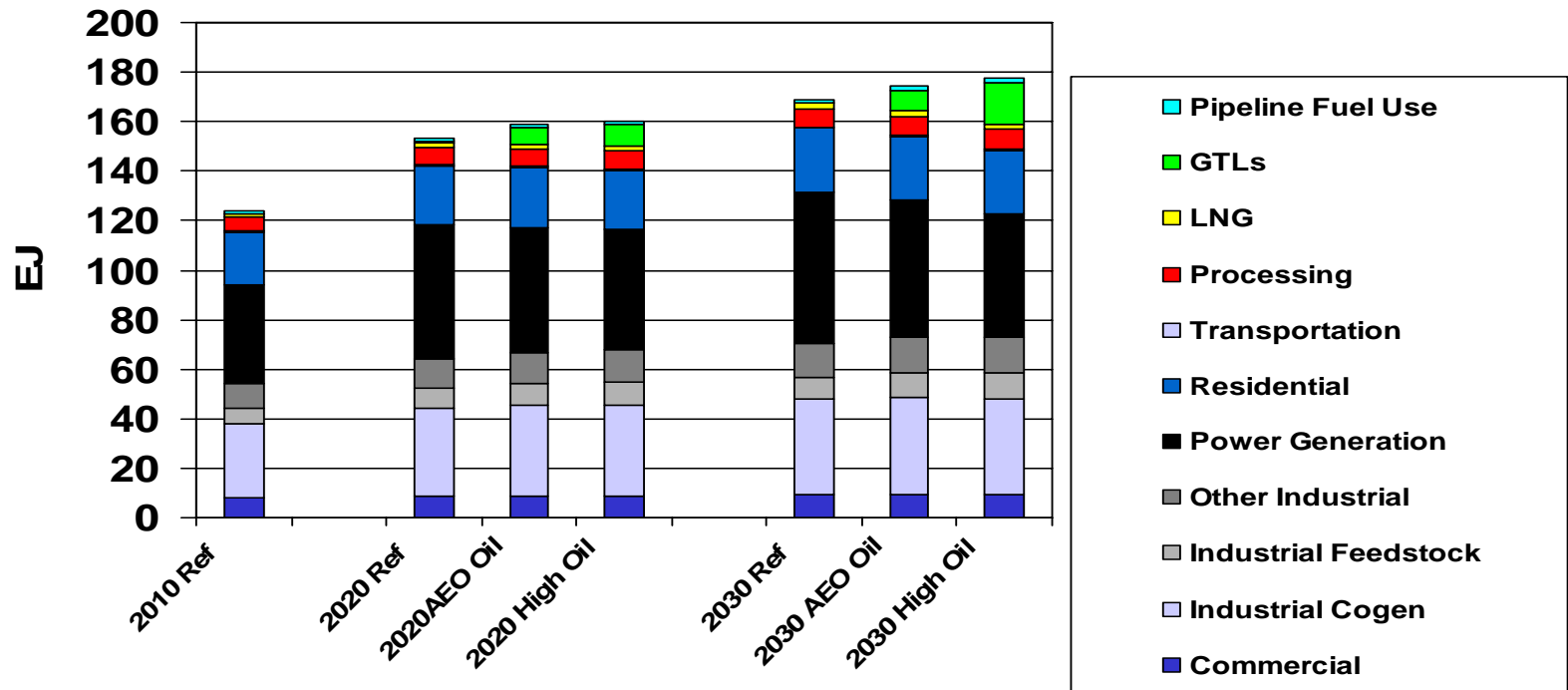
# Tight/Shale Gas Production by Region – Reference Scenario



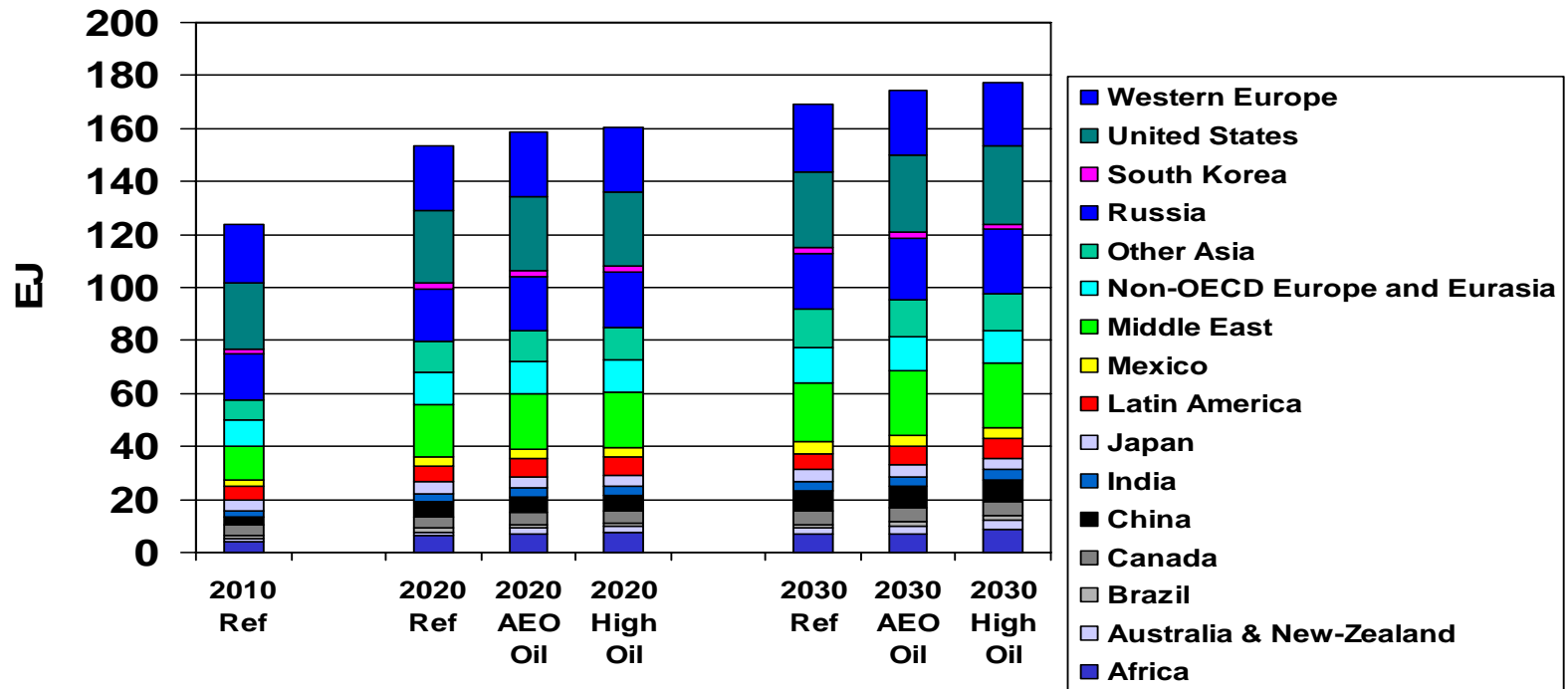
# Marginal Cost of Gas for Selected Nodes – Reference Scenario



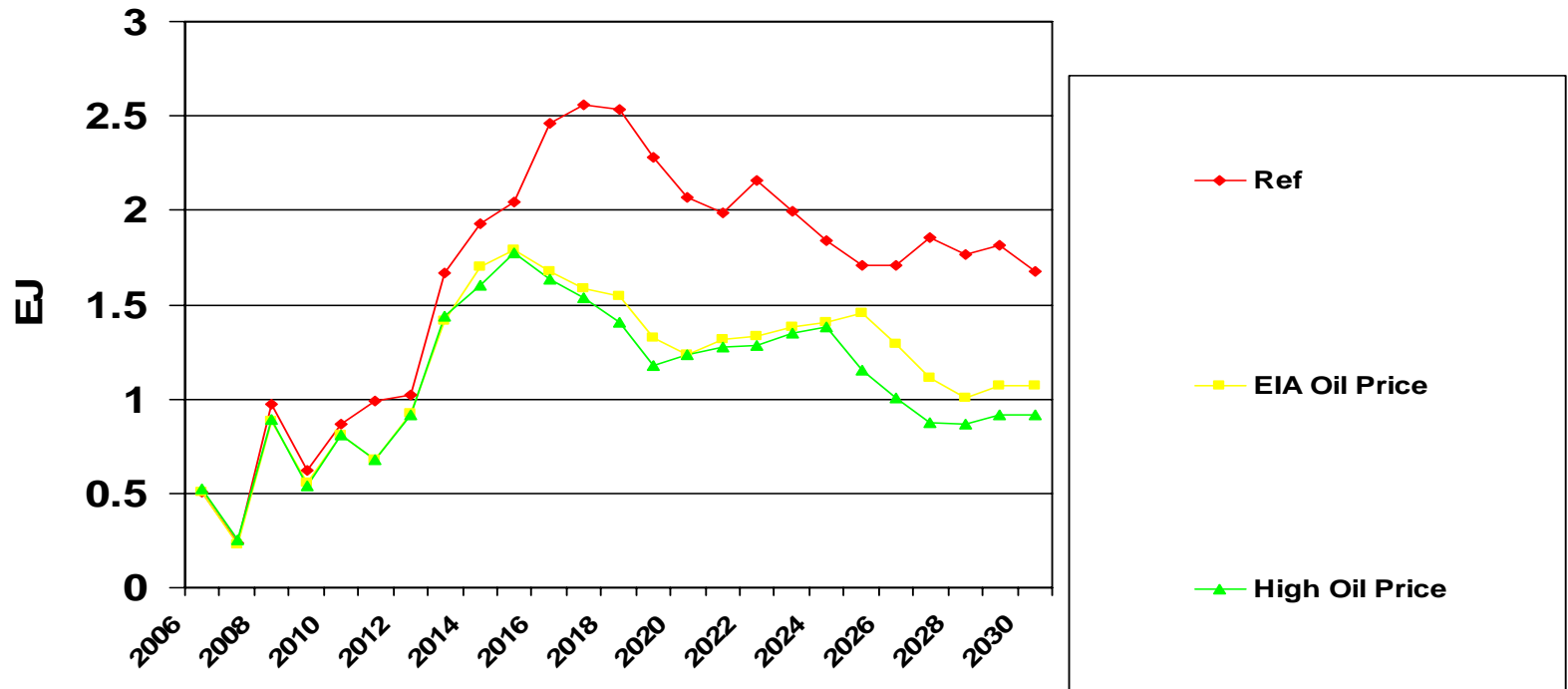
# Oil Price Impacts on Natural Gas Demand by Sector



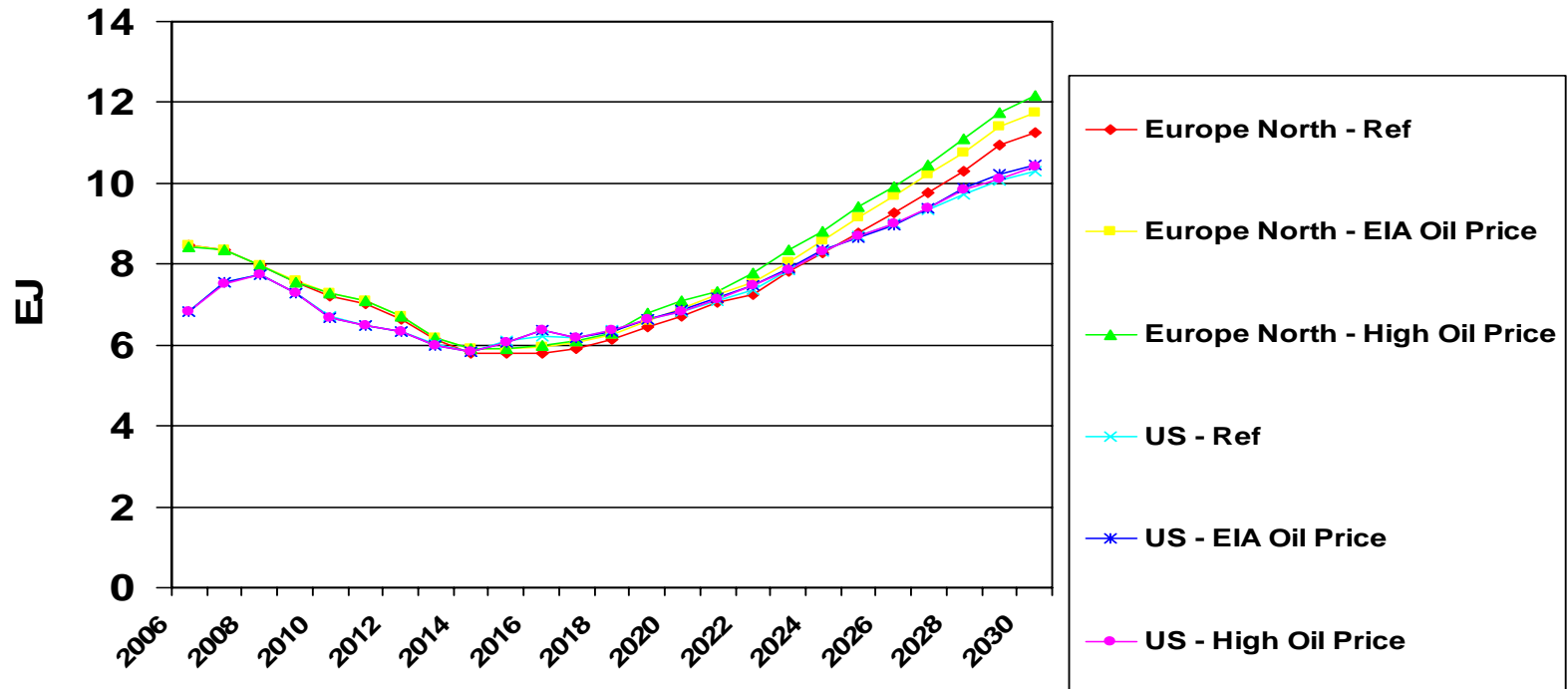
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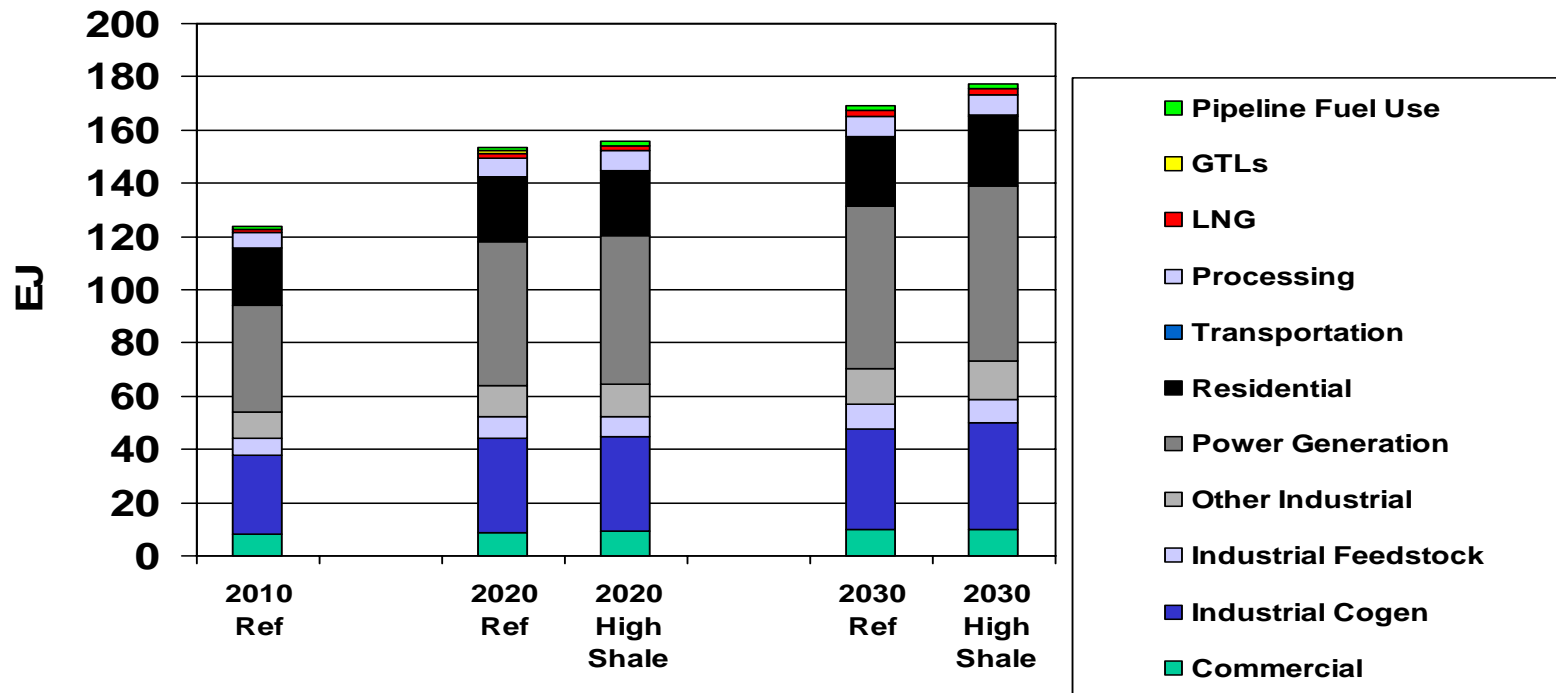
# Oil Price Impacts on North American LNG Imports



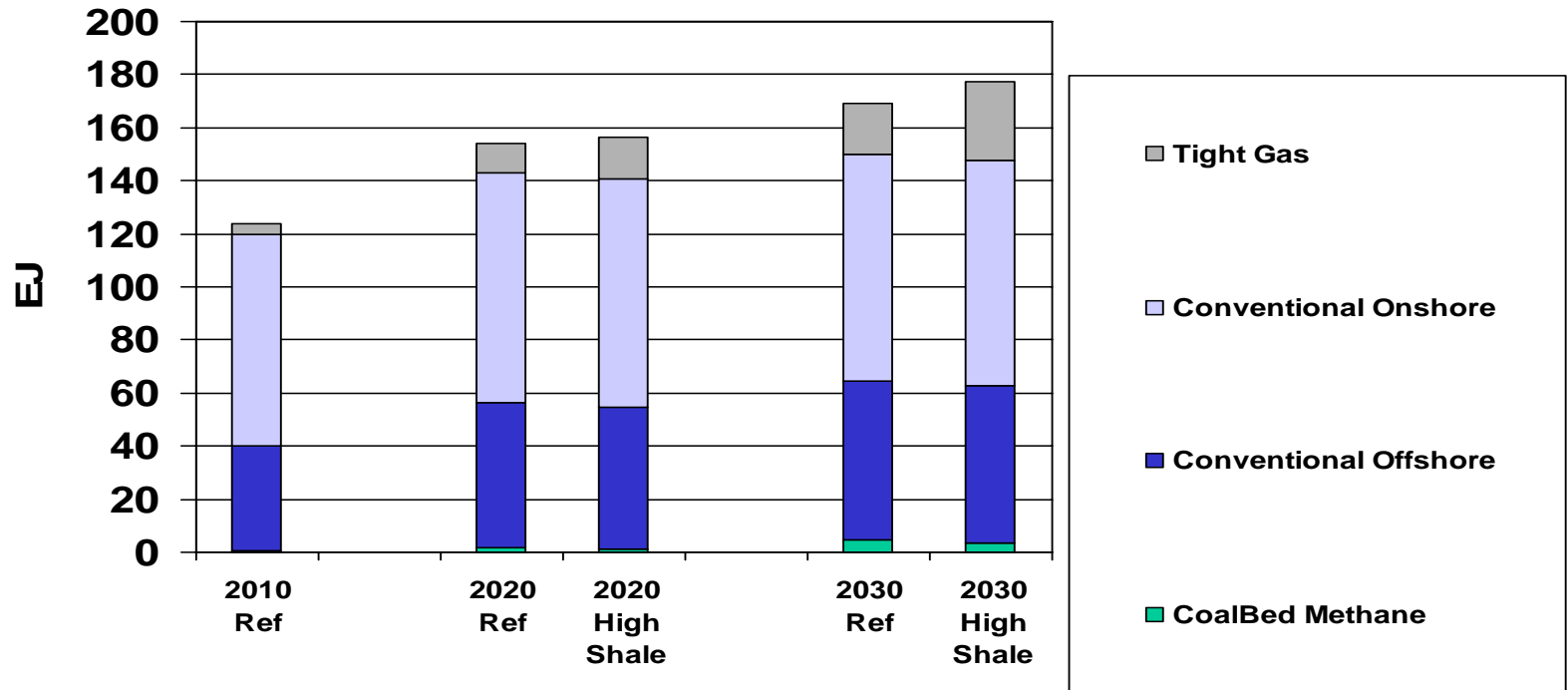
# Oil Price Impacts on Natural Gas Marginal Prices



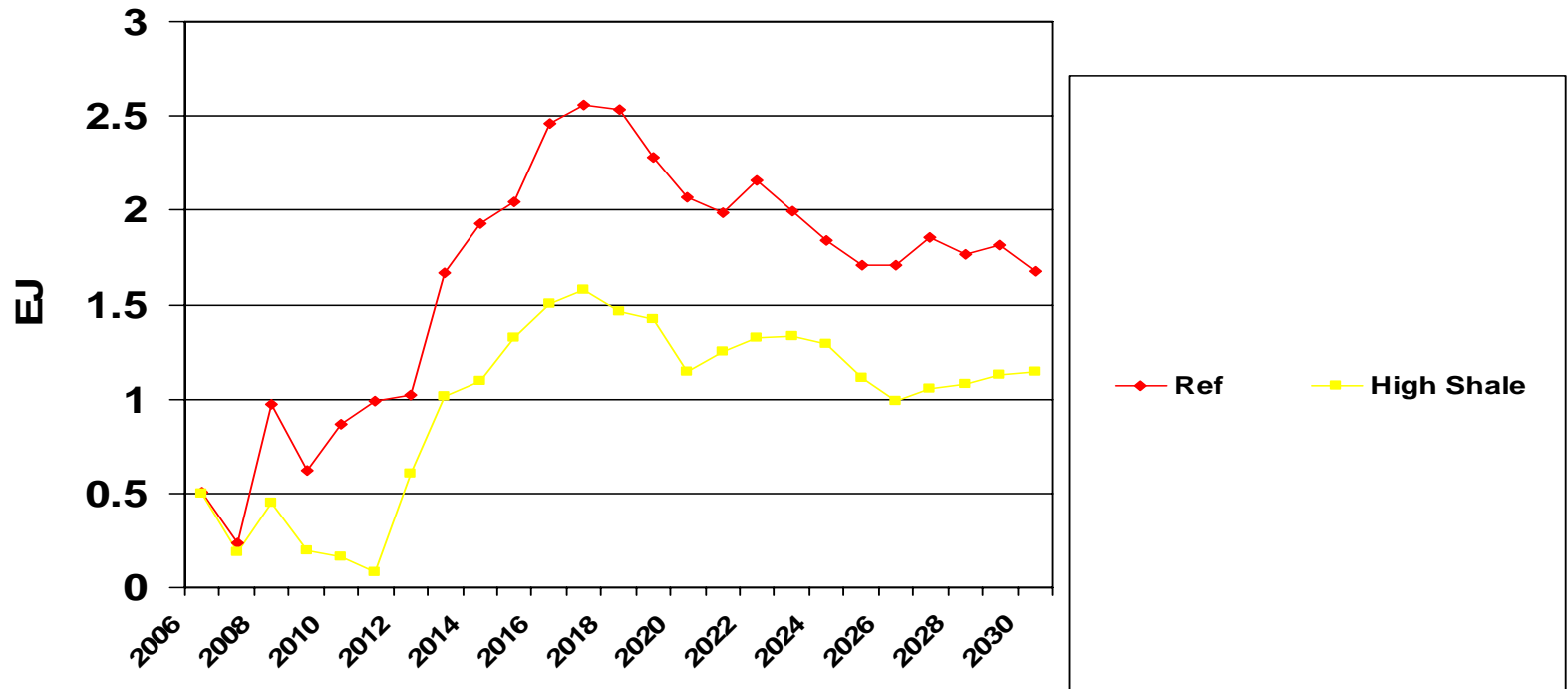
# Impacts from Alternate Shale Assumptions on Natural Gas Demand by Sector



# Impacts from Alternate Shale Assumptions on Natural Gas Production by Sector



# Impacts from Alternate Shale Assumptions on North American LNG Imports



# High Shale Resource Impacts on Natural Gas Marginal Prices

