

Technical Conference on Environmental Regulations and Electric Reliability, Wholesale Electricity Markets, and Energy Infrastructure

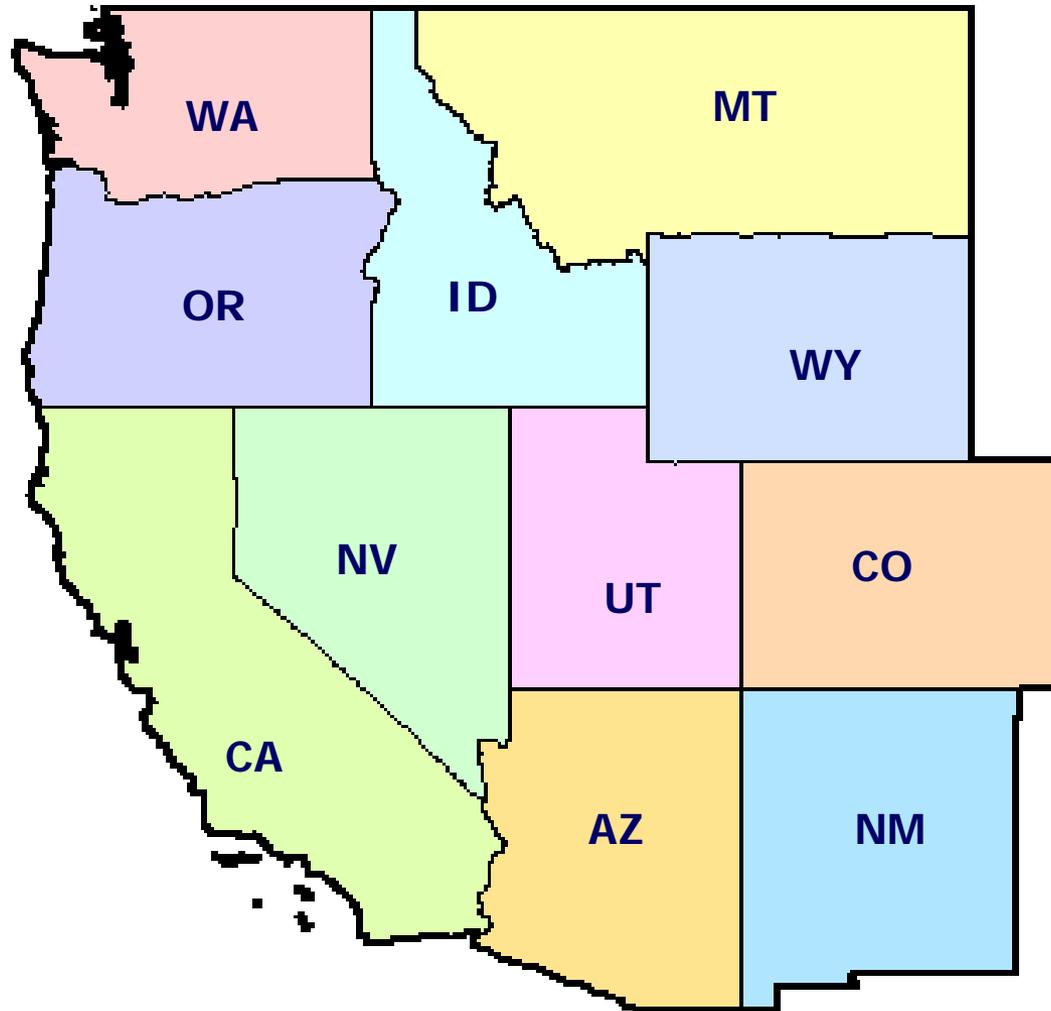
Western Region



February 25, 2015

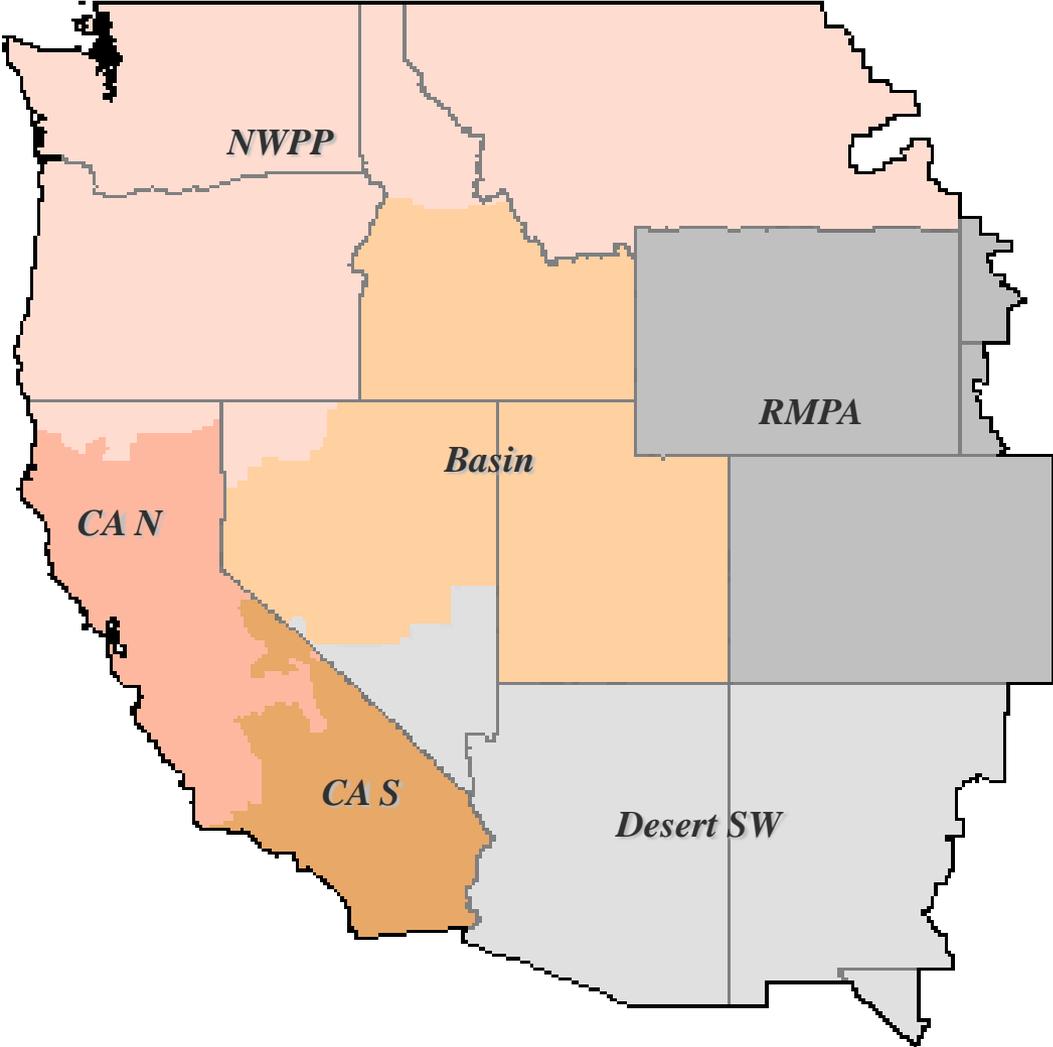
Denver, CO

Western Region States

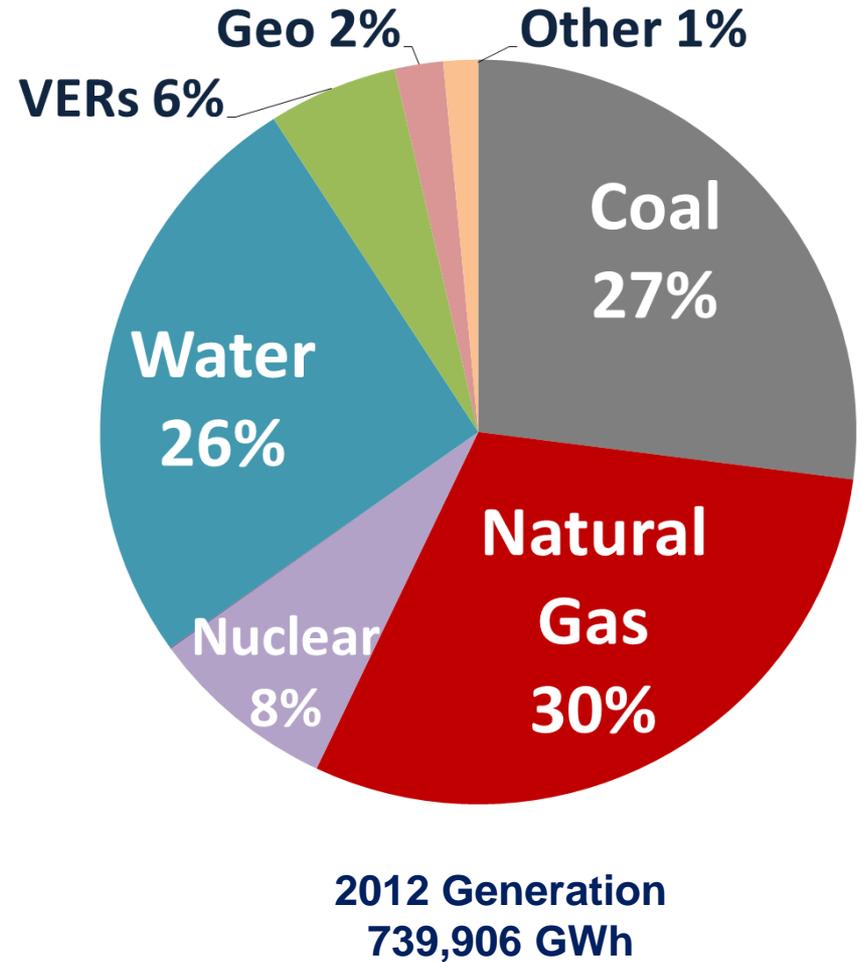
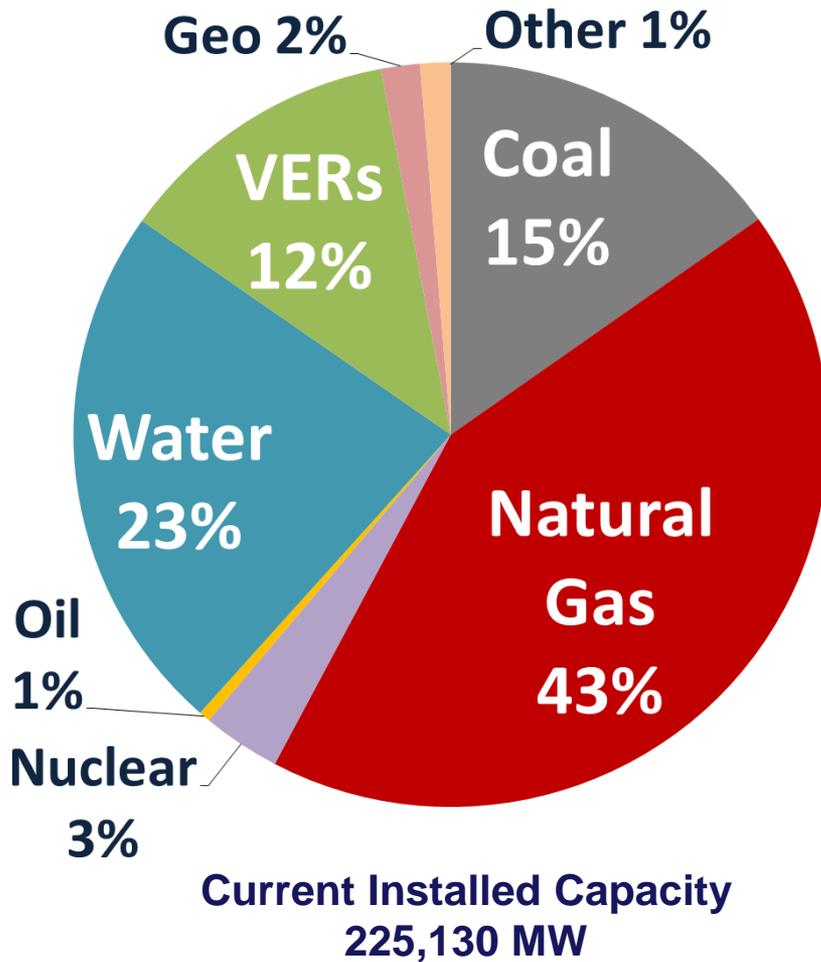


ELECTRIC INFRASTRUCTURE

WECC Sub-Regions

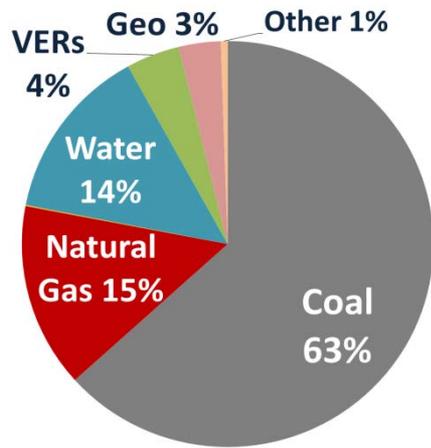


Installed Capacity and Generation

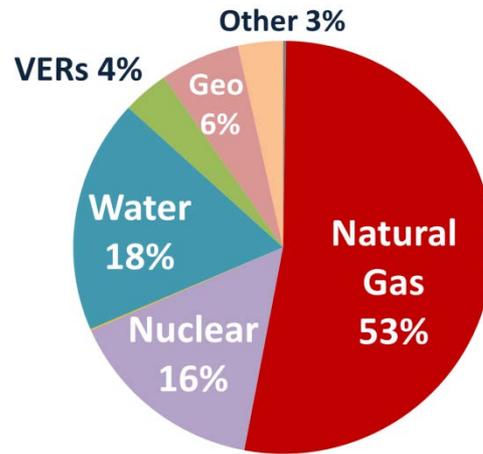


Source: Based on data derived from Ventyx, Velocity Suite, January 2015.

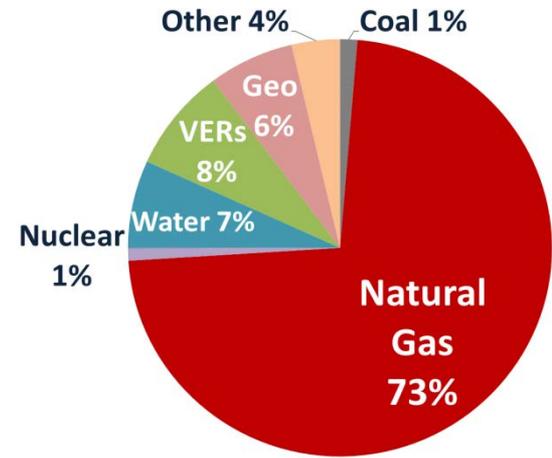
Electricity Generation by Sub Regions



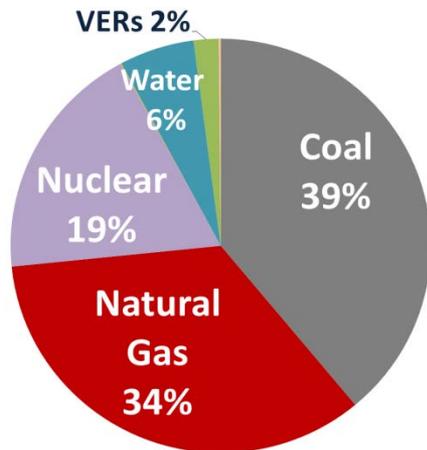
Basin 83,212 GWh



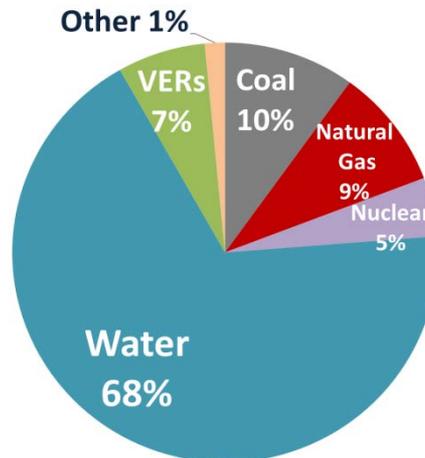
CA N 114,573 GWh



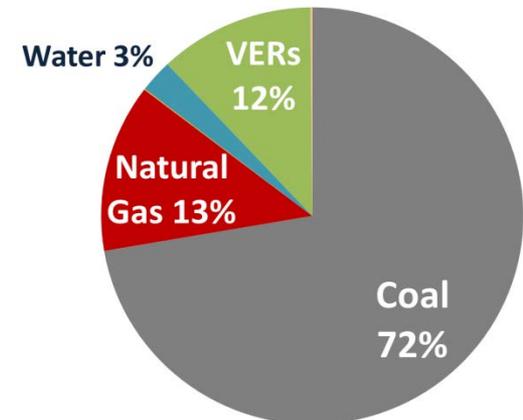
CA S 83,605 GWh



Desert SW 170,669 GWh



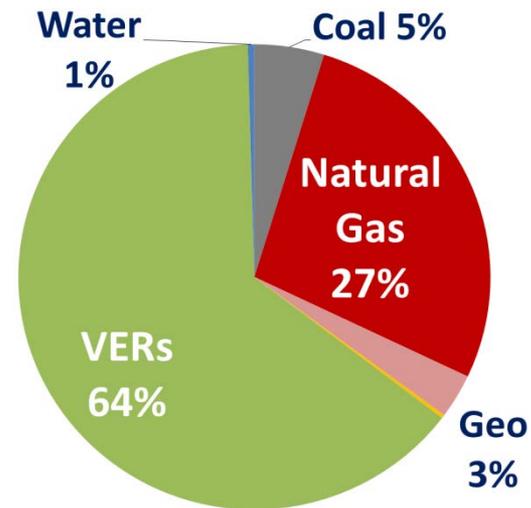
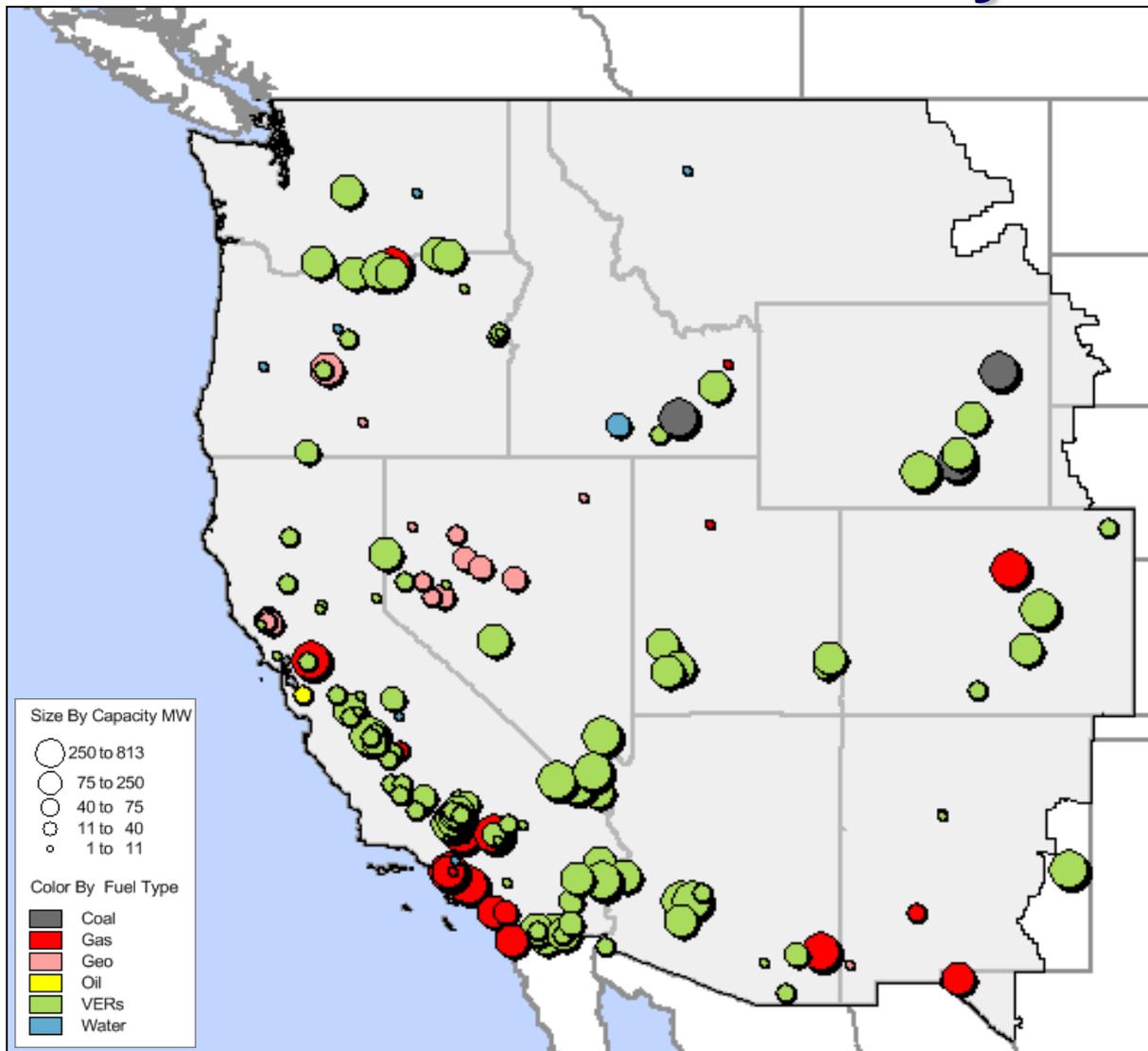
NWPP 206,324 GWh



RMPA 81,517 GWh

Source: Data derived from Ventyx, Velocity Suite, January, 2015.

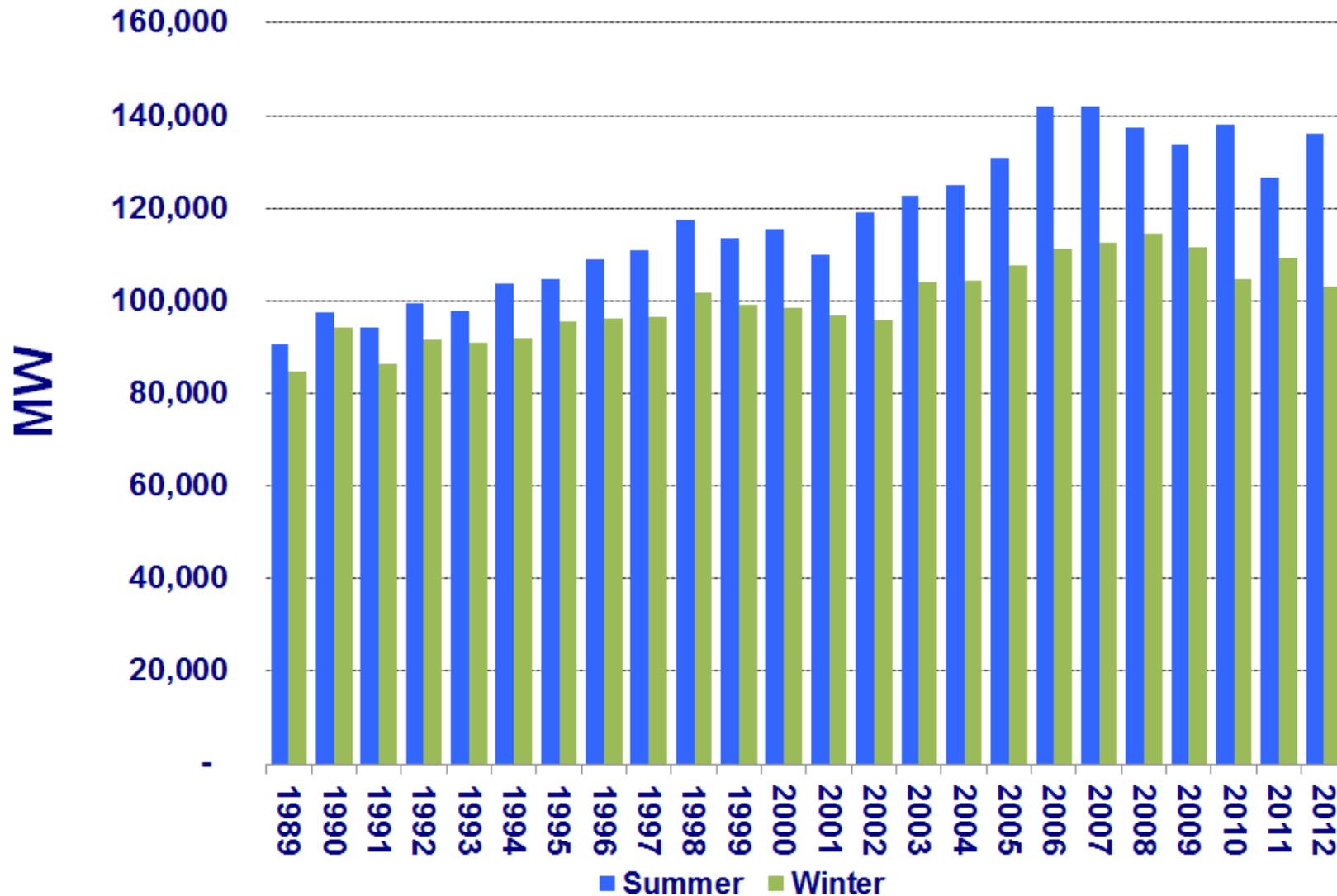
Projected 24,940 MW Capacity Additions by 2025



- Another 109,099 MW are in early development stage.

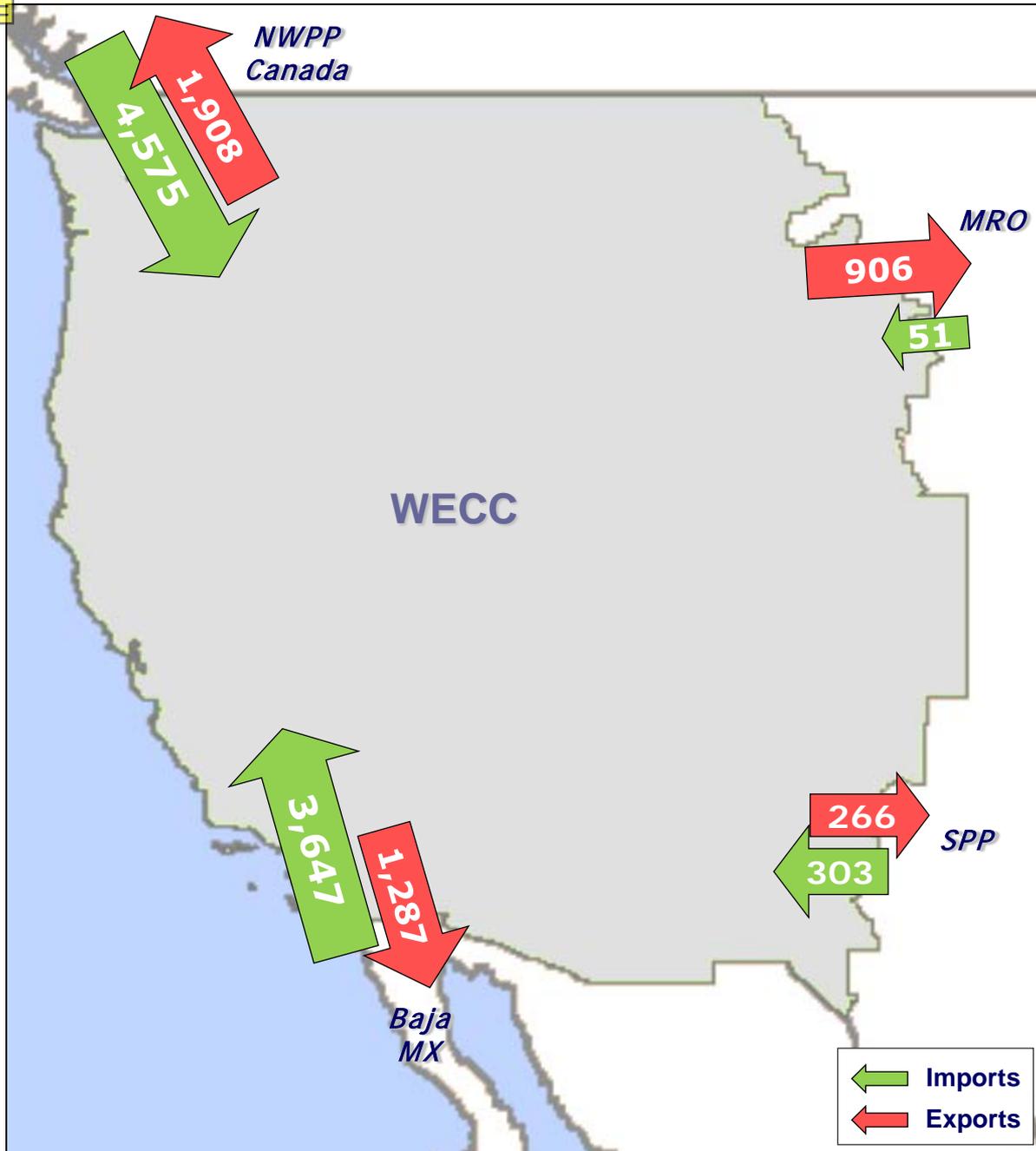
Source: Data derived from Ventyx, Velocity Suite, January, 2015.

Peak Demand



Source: The North American Electric Reliability Corporation's (NERC's) 2014 Electric Supply and Demand Database.

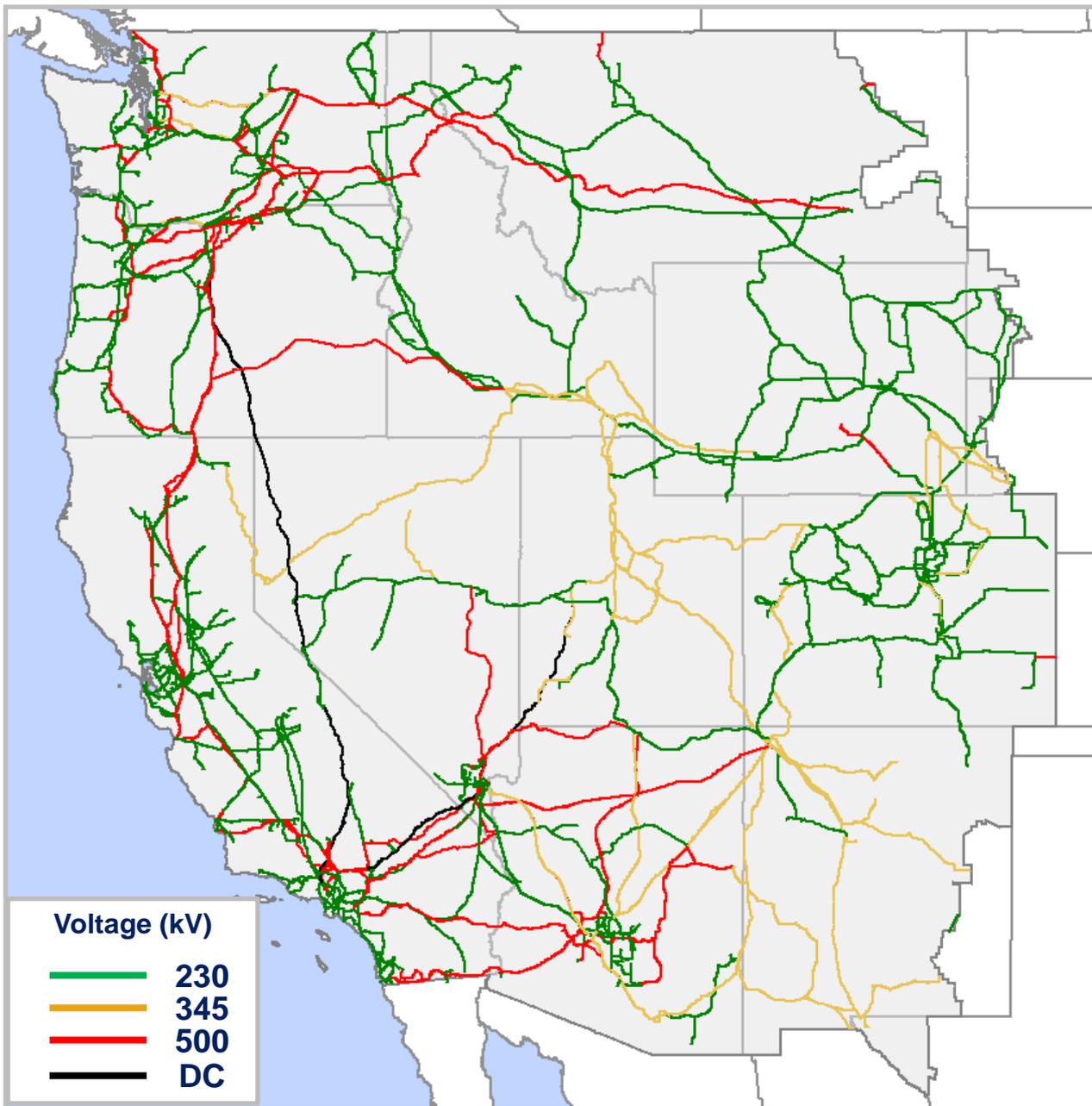
Net inter-regional deliverability 2012 (in GWh)



Imports	8,576 GWh
Exports	4,367 GWh
Net Imports	4,209 GWh

Source: Data derived from Ventyx, Velocity Suite, January, 2015.

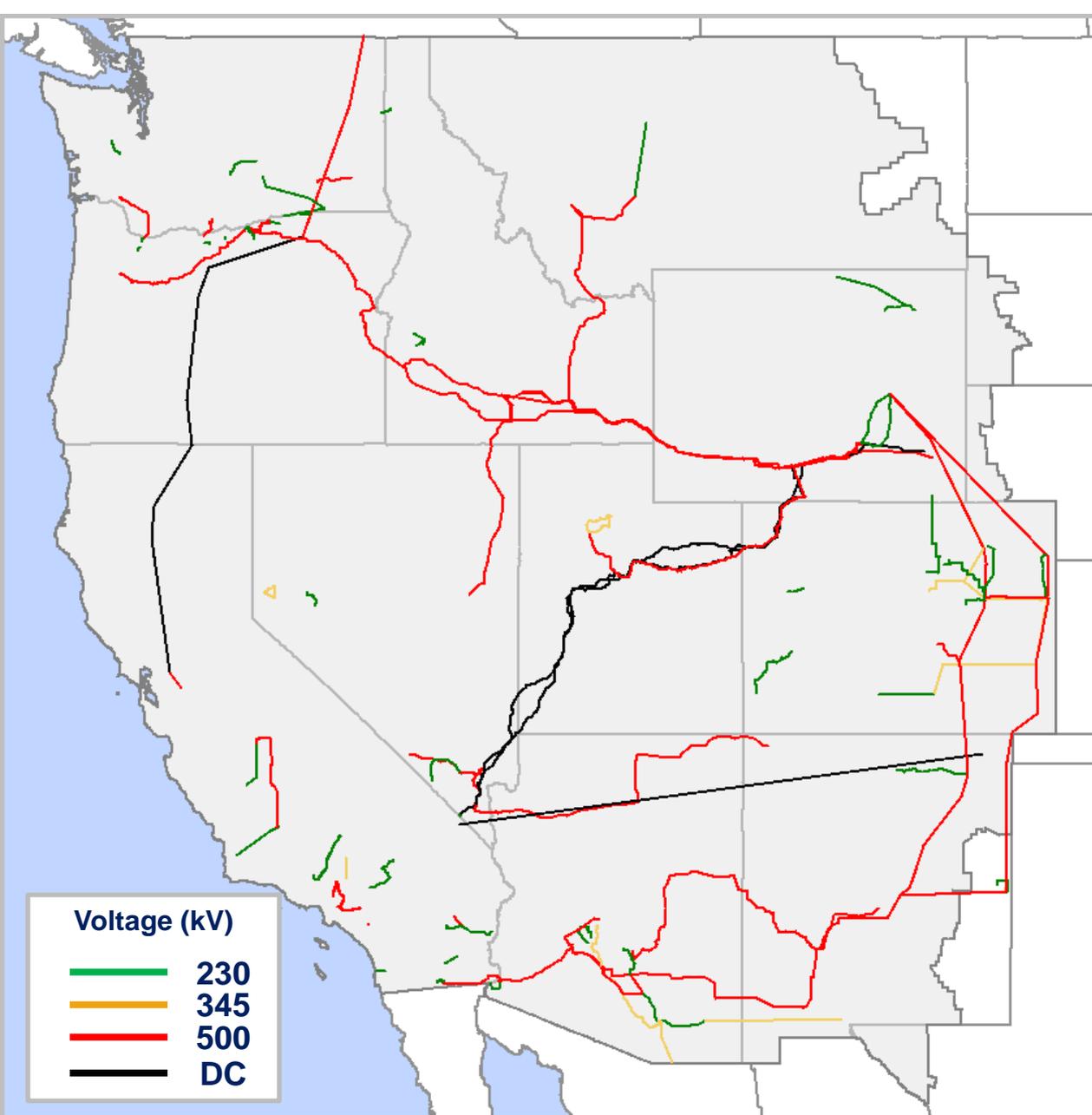
Existing Transmission



Voltage (kV)	Line Length (Miles)
230	35,334
345	11,516
500	17,184
DC	1,651
Total	65,685

Source: Data Derived from 2014 NERC Electric Supply and Demand Database; Ventyx, Velocity Suite, February 2015 and Staff Database.

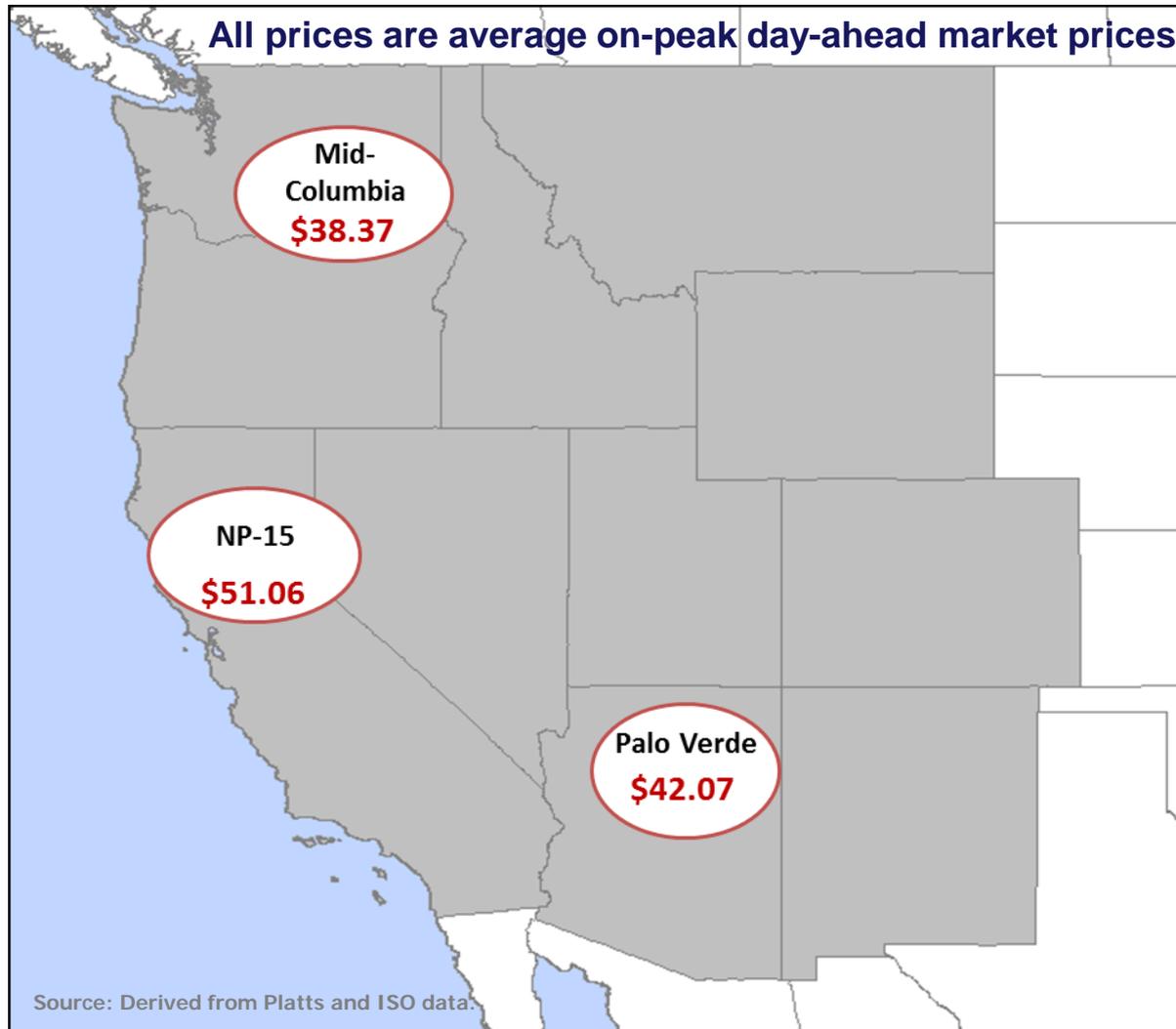
Projected Transmission through 2030



Voltage (kV)	Line Length (Miles)	Investment Cost (Millions \$)
230	3,271	8,550
345	1,416	2,905
500	4,990	17,260
DC	3,335	15,229
Total	13,012	43,944

Source: Data Derived from 2014 NERC Electric Supply and Demand Database; Ventyx, Velocity Suite, February 2015 and Staff Database.

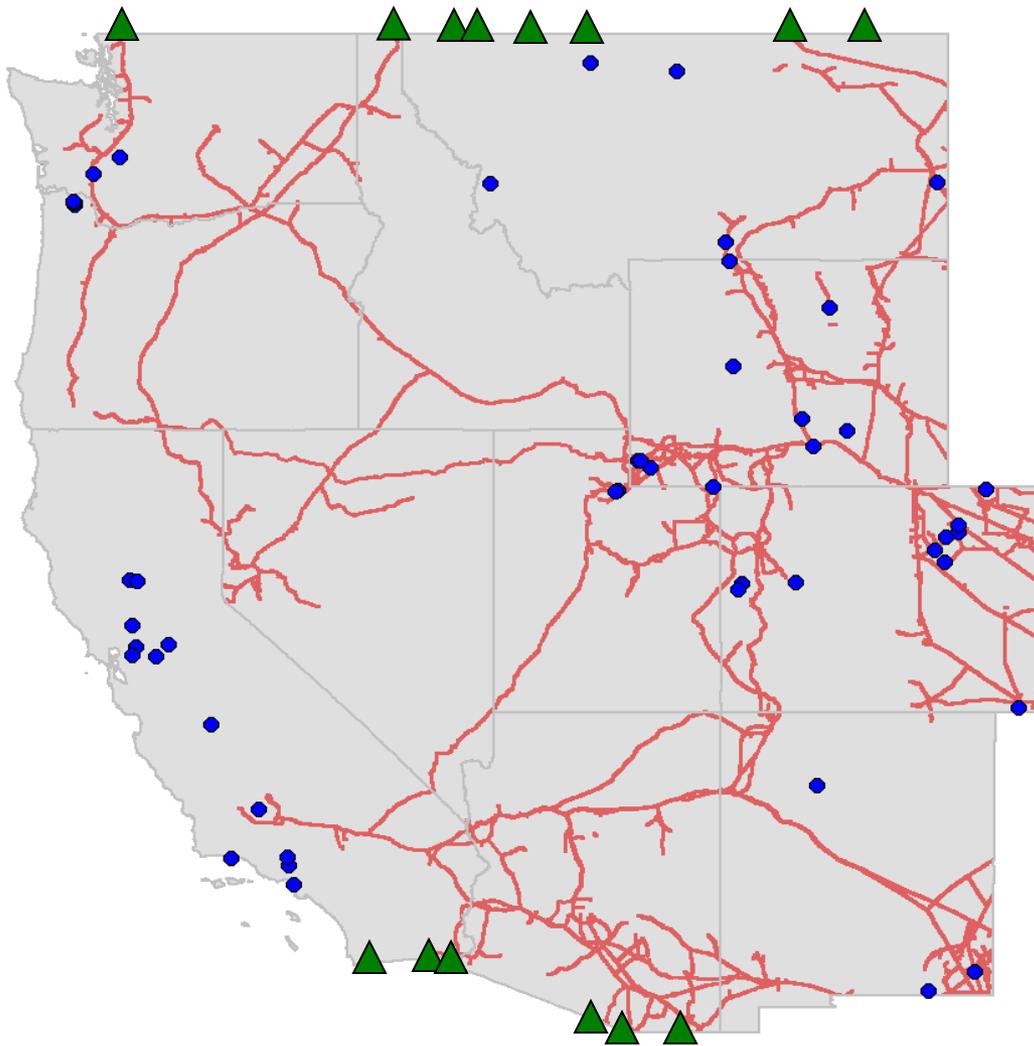
Electricity Prices 2014 (\$/MWh)



GAS INFRASTRUCTURE



Natural Gas Infrastructure

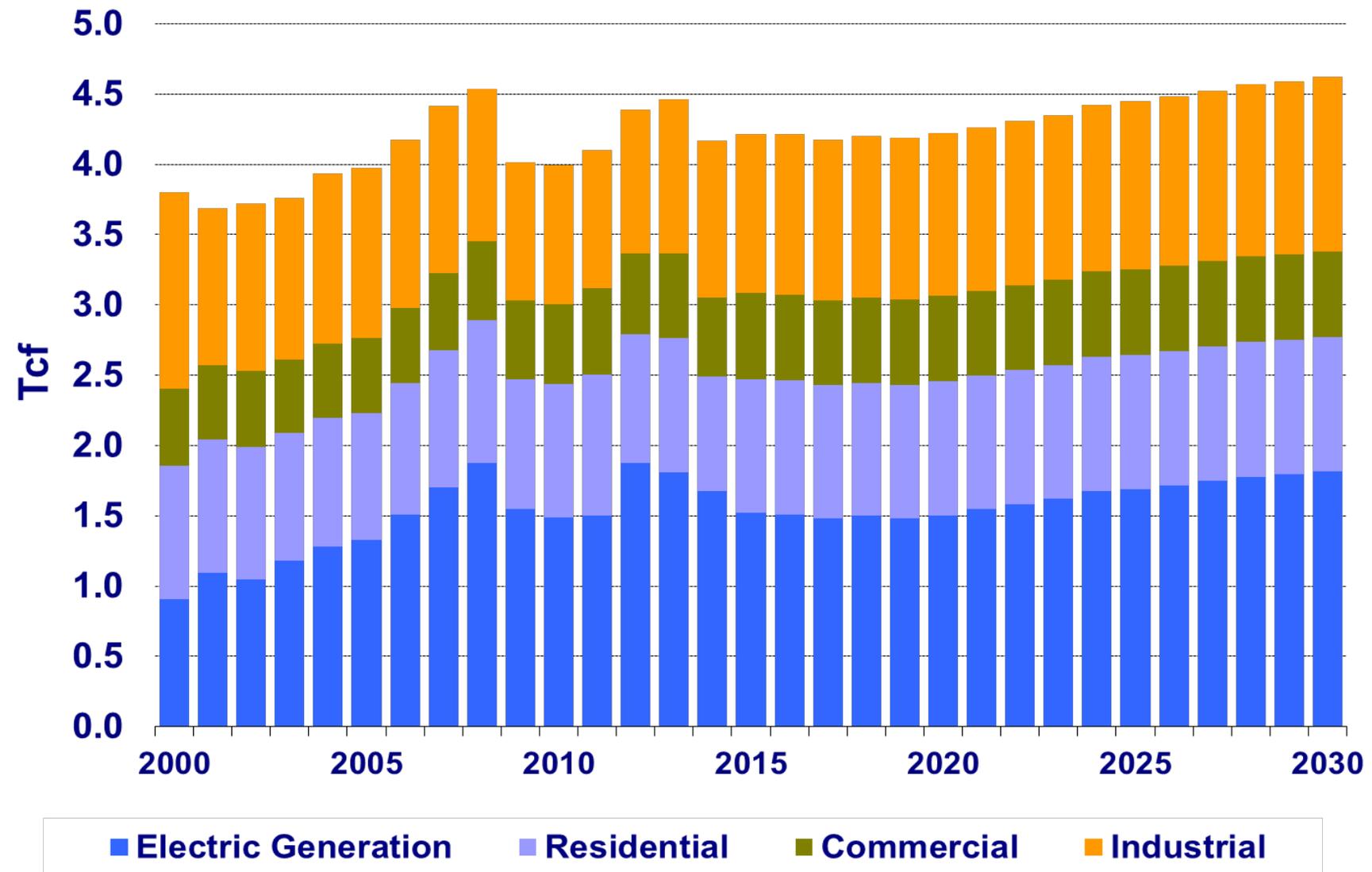


-  Interstate Natural Gas Pipelines
-  Natural Gas Storage Facilities
-  Natural Gas Import/Export Points With Canada and Mexico

Source: Data derived from Ventyx, Velocity Suite January 2015; ICF International January 2015 Data Base; and FERC's Jurisdictional Storage Fields in the US.

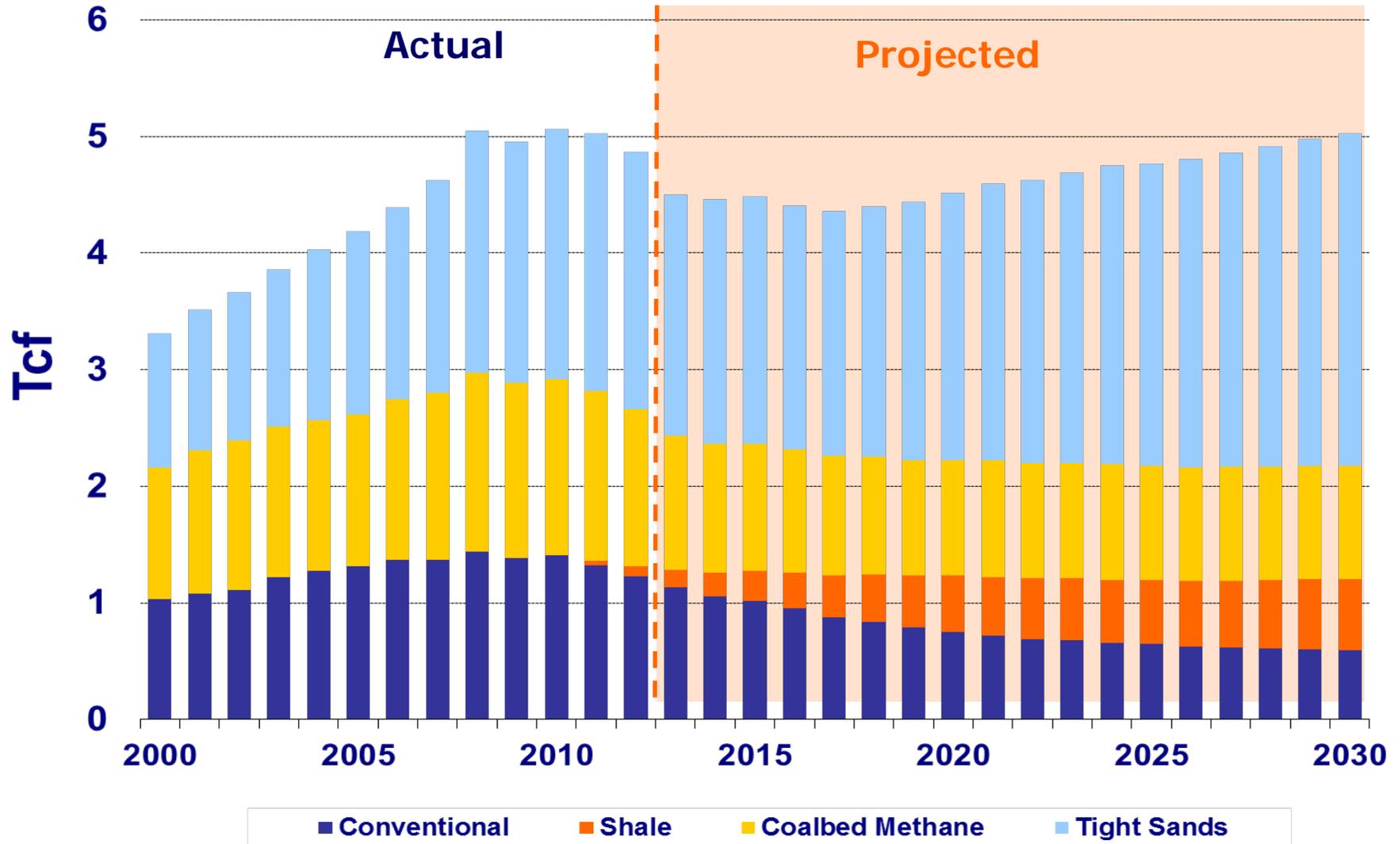


Western Region Natural Gas Consumption



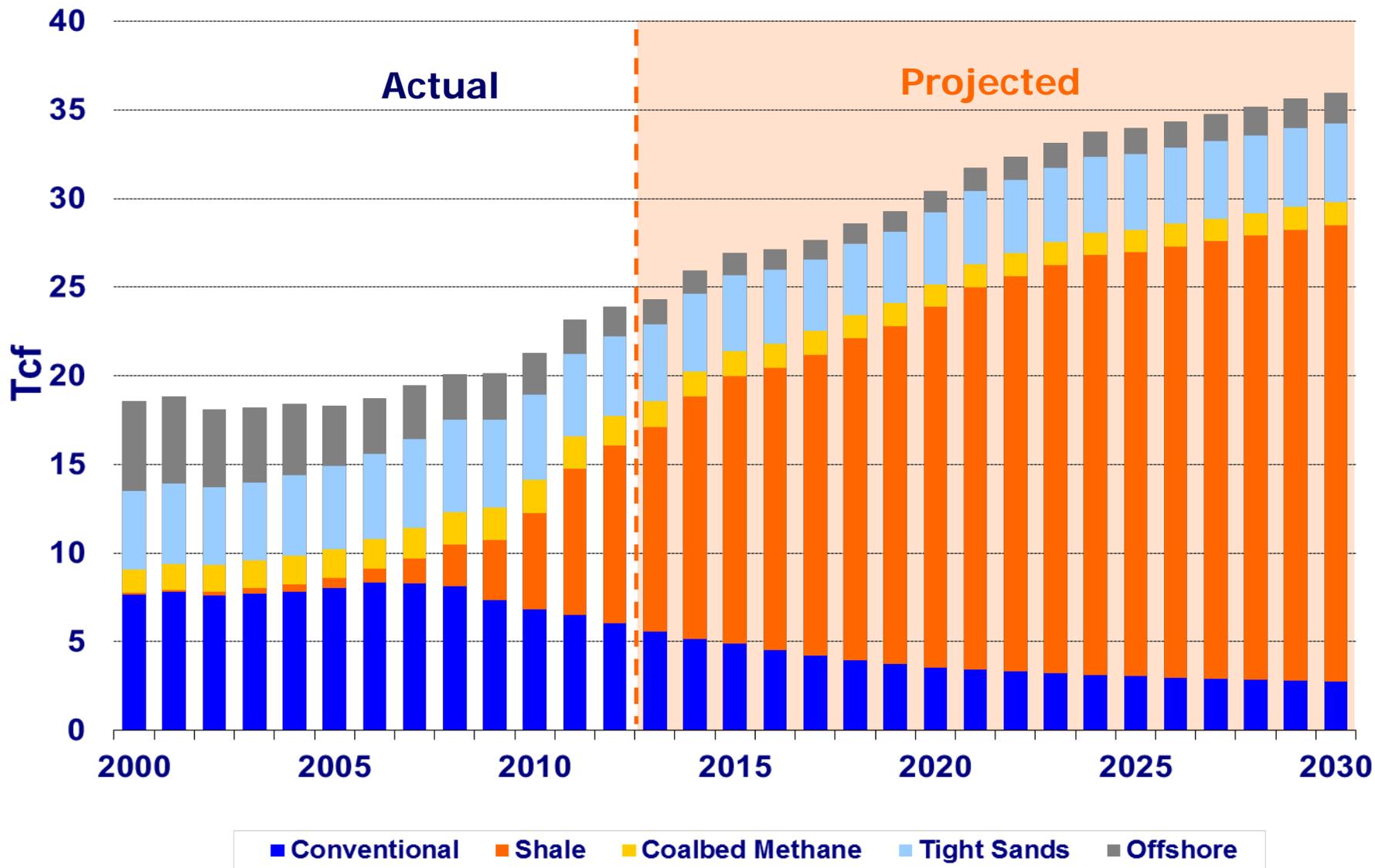
Source: ICF International January 2015 Data Base and Compass Report

Western Region Natural Gas Production by Type



Source: ICF International January 2015 Data Base and Compass Report

U.S Natural Gas Production by Type



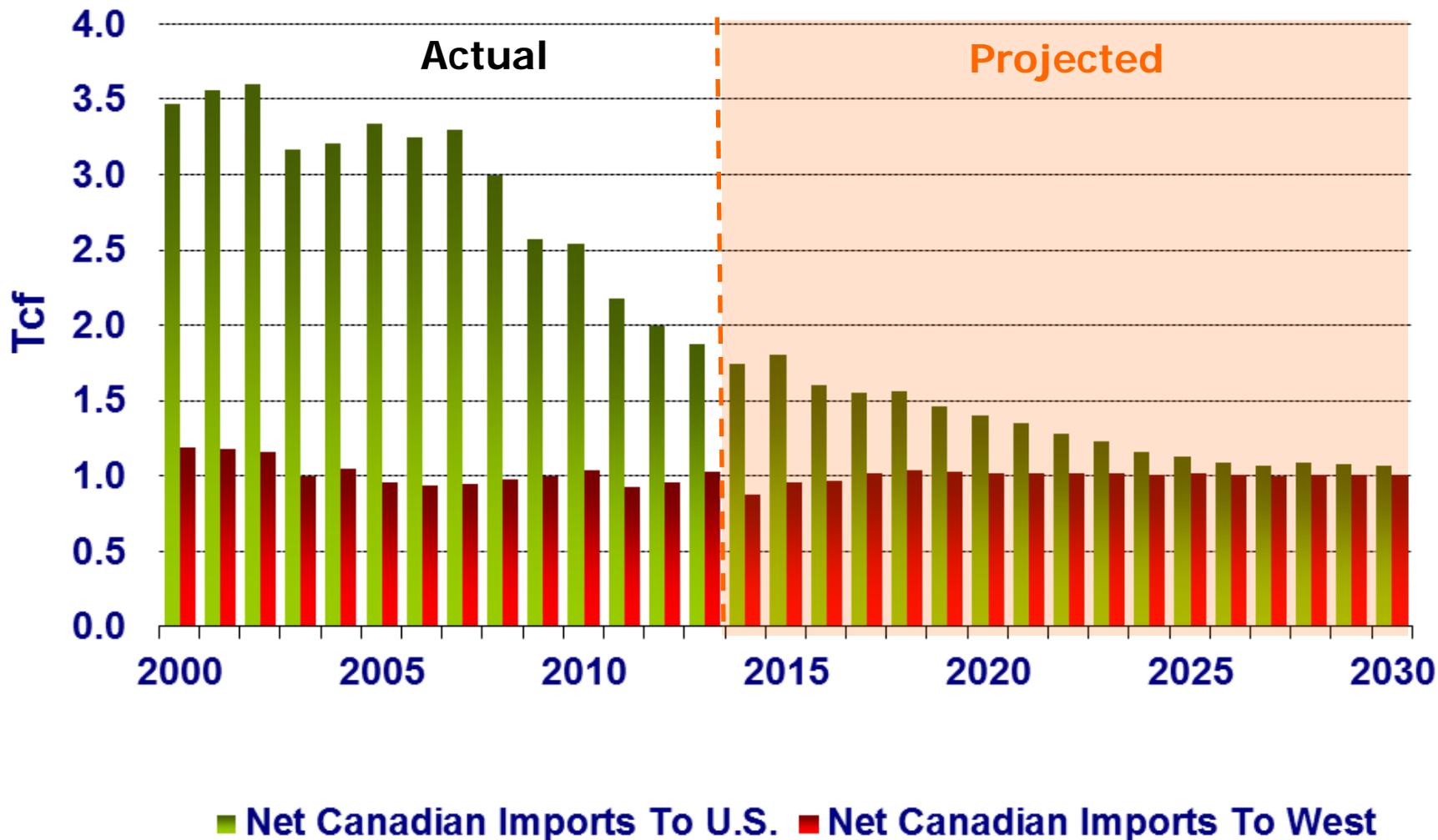
Source: ICF International January 2015 Data Base and Compass Report

Gas Facts (In Tcf)

	2013		2020		2030	
	United States	West	United States	West	United States	West
Total Gas Consumption	26.4	4.9	27.6	4.7	31.3	5.1
Total Gas Production	24.3	4.5	30.4	4.5	36.0	5.0
Total Working Storage Capacity	4.4	0.6	4.7	0.7	4.8	0.7
Total LNG Imports	0.1	0.0	0.19	0.0	2.0	0.00
Total LNG Exports	0.0	0.0	2.38	0.0	2.41	0.0
Total Net Imports from Canada	1.9	1.0	1.4	1.0	1.1	1.0
Total Net Exports to Mexico	0.7	0.2	1.9	0.3	2.5	0.4

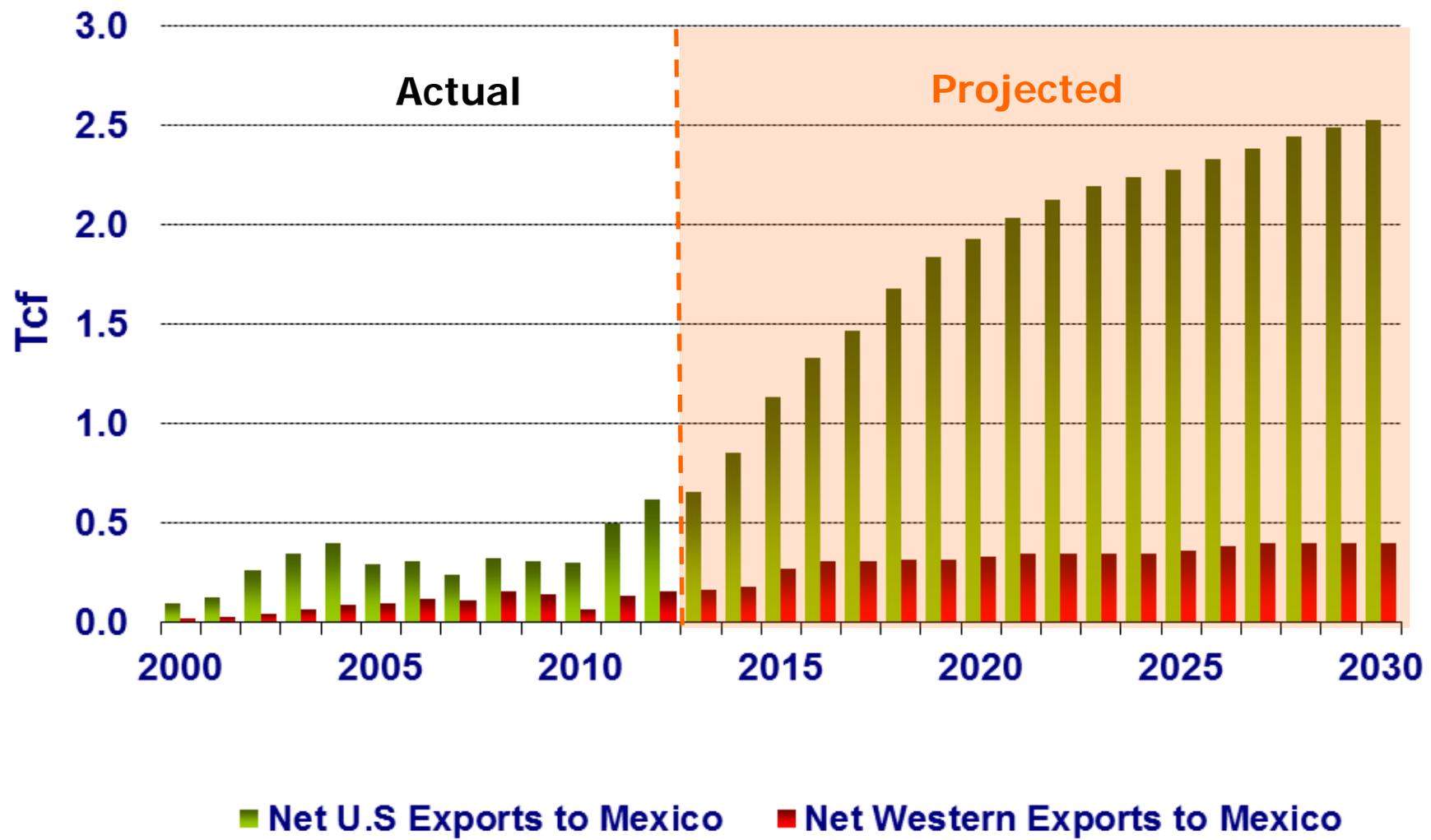
Source: ICF International Q4 2013 and Q1 2015 Data Bases and Compass Reports, and EIA Spreadsheets for 2013 data on LNG imports, and Canadian & Mexican import/exports

Actual and Projected Net Canadian Imports to U.S.



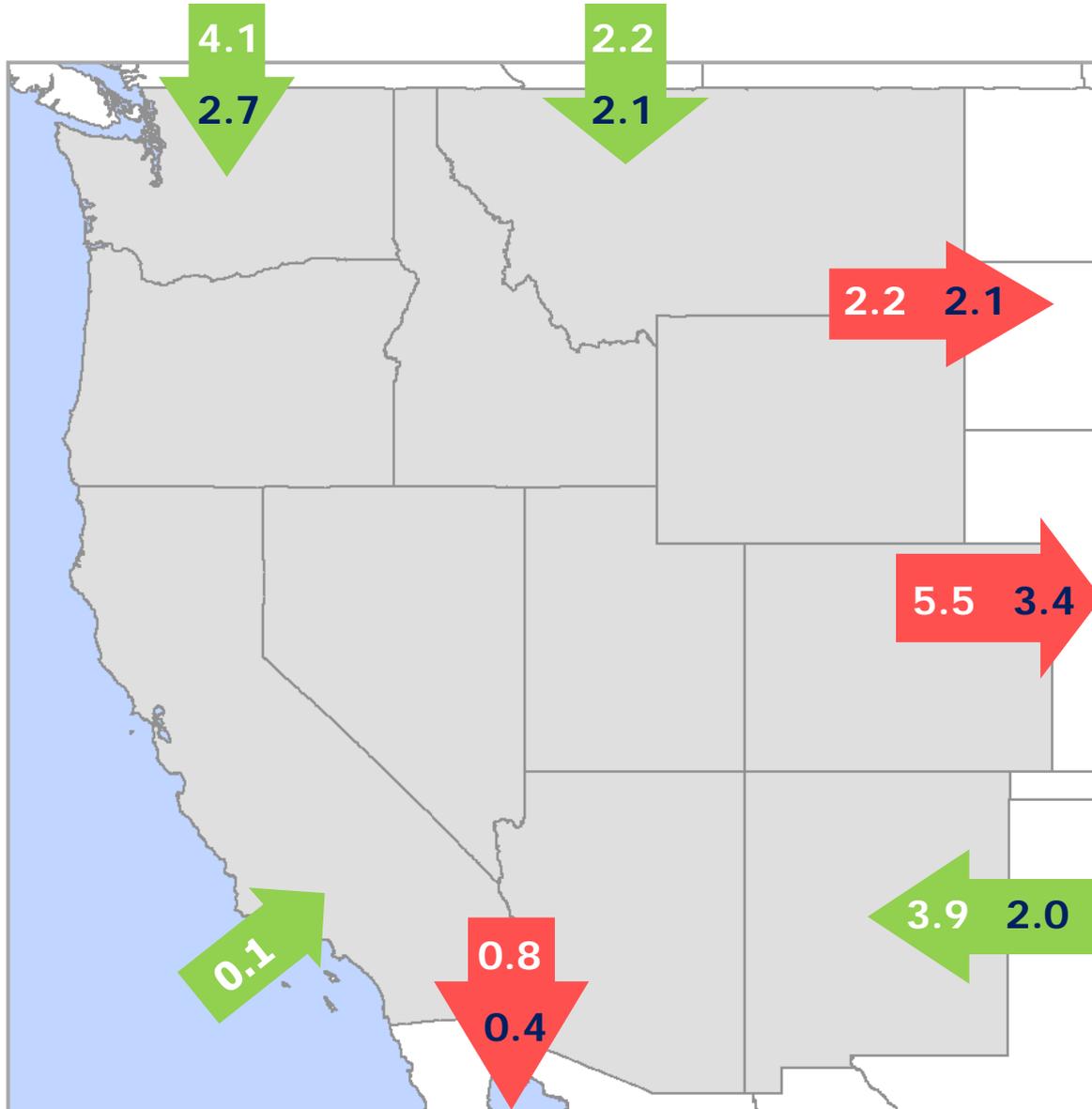
Source: ICF International January 2015 Data Base and Compass Report; and EIA Natural Gas Annuals and Spreadsheets

Actual and Projected Net U.S Exports to Mexico



Source: ICF International January 2015 Data Base and Compass Report; and EIA Natural Gas Annuals and Spreadsheets

Net Interregional Deliverability 2013 (in Bcf/d)



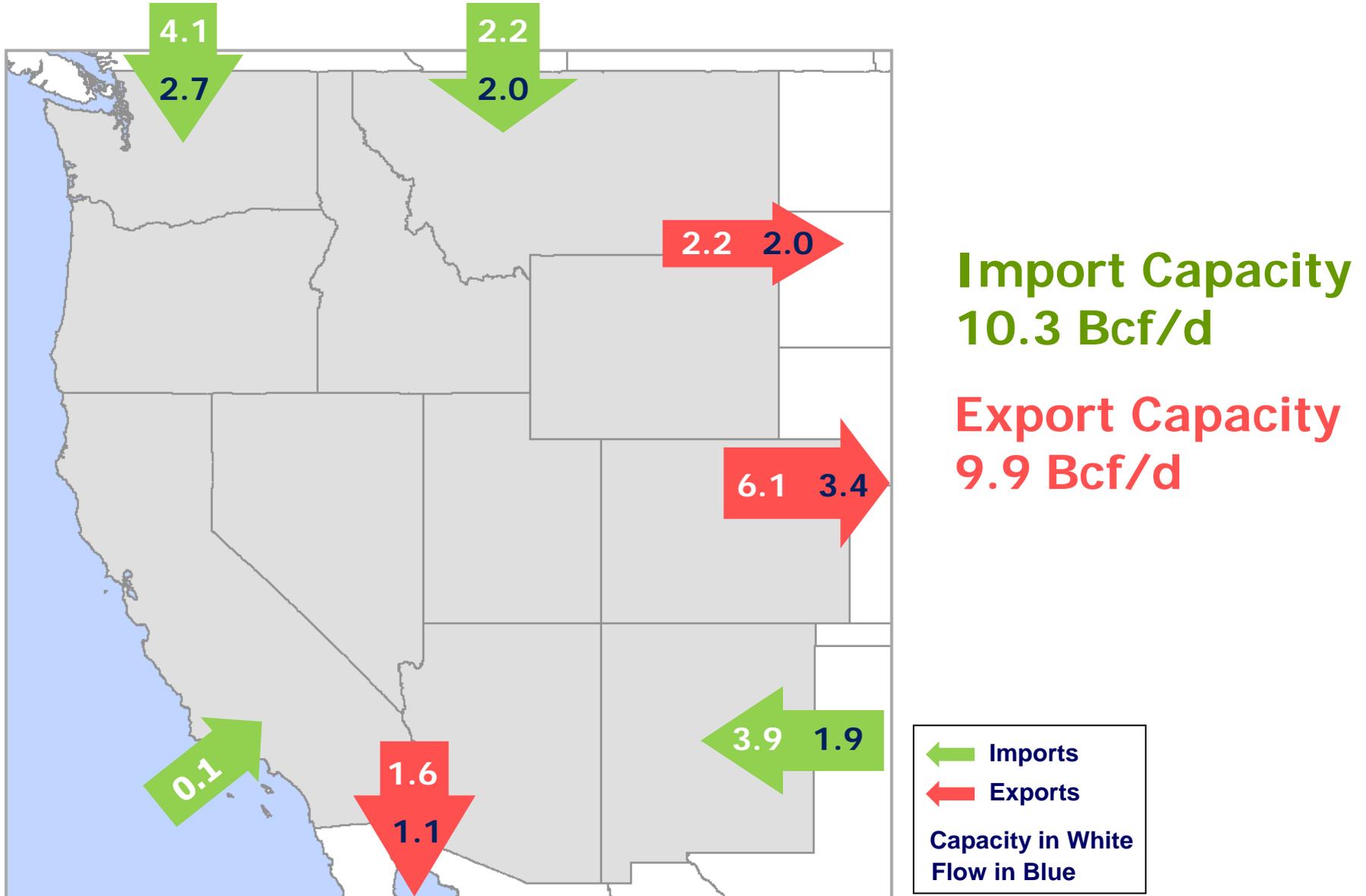
Import Capacity
10.3 Bcf/d

Export Capacity
8.5 Bcf/d

← Imports
← Exports
Capacity in White
Flow in Blue

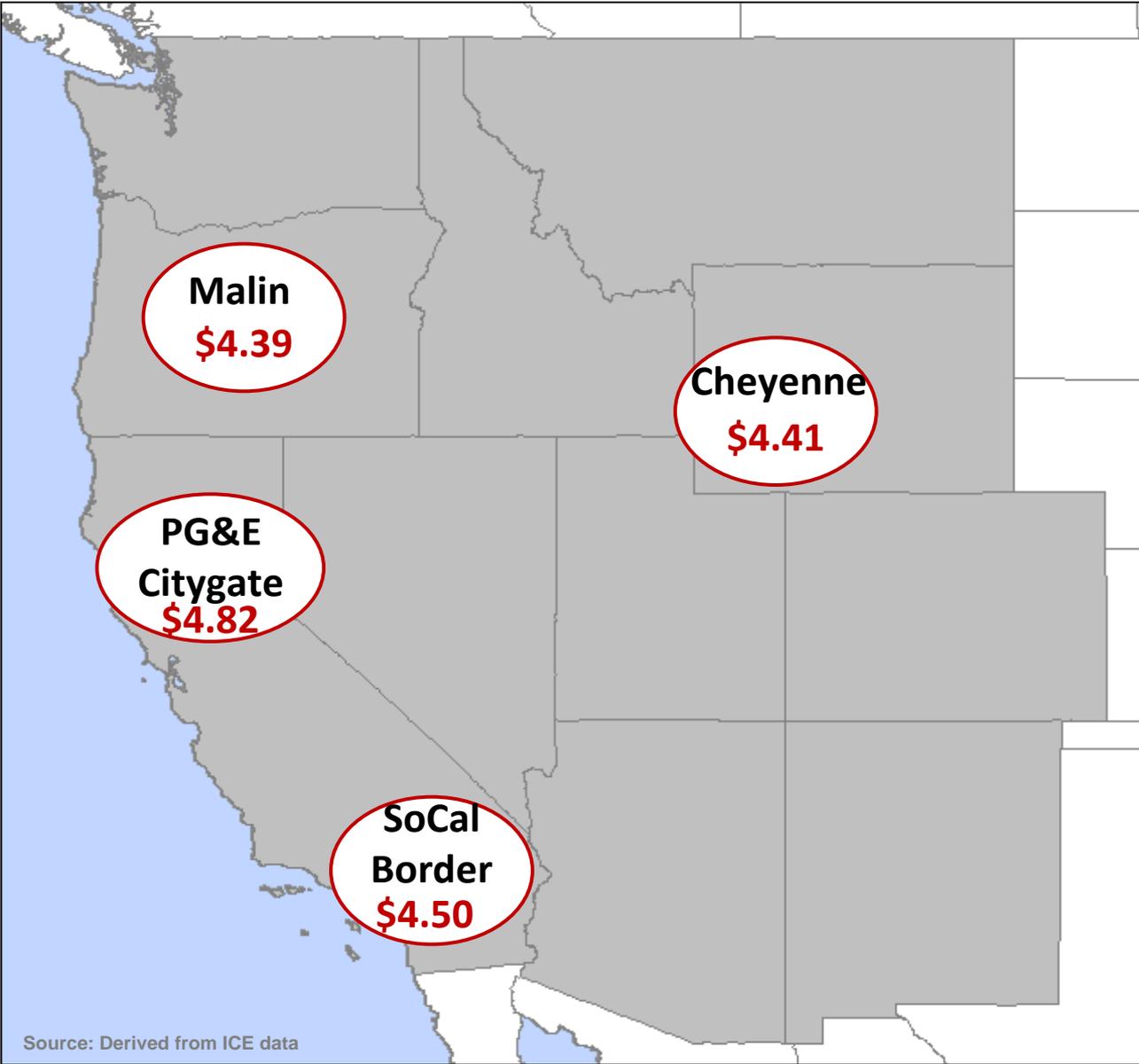
Source: ICF International January 2015 Data Base and Compass Report,

Net Interregional Deliverability 2030 (in Bcf/d)

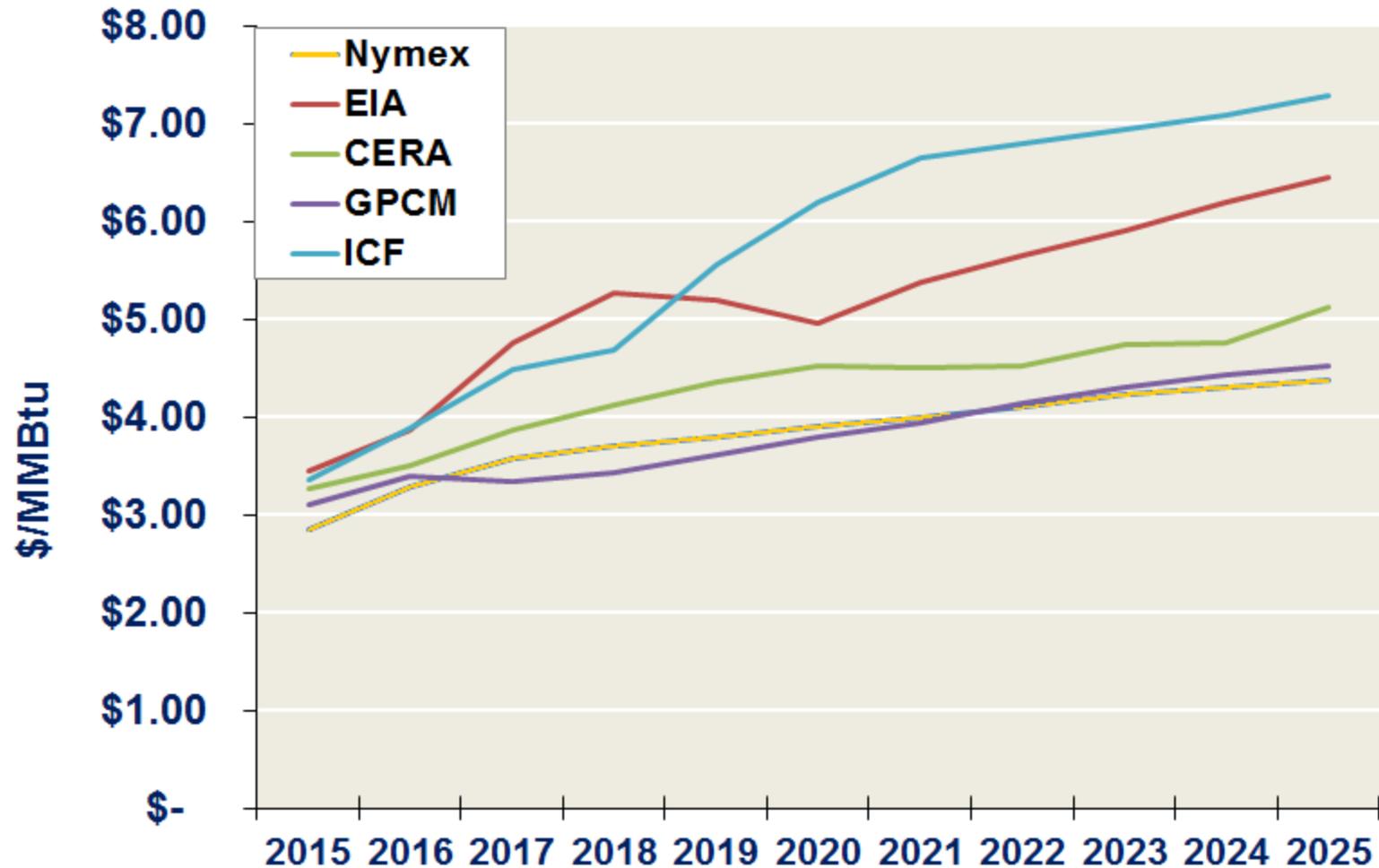


Source: ICF International January 2015 Data Base and Compass Report,

Natural Gas Prices 2014 (\$/MMBtu)



Henry Hub Price Forecasts



Source: Derived from Bloomberg, CERA, RBAC, and EIA 's STEO and AEO