Monetizing Natural Gas Liquids in the United States
Status Report

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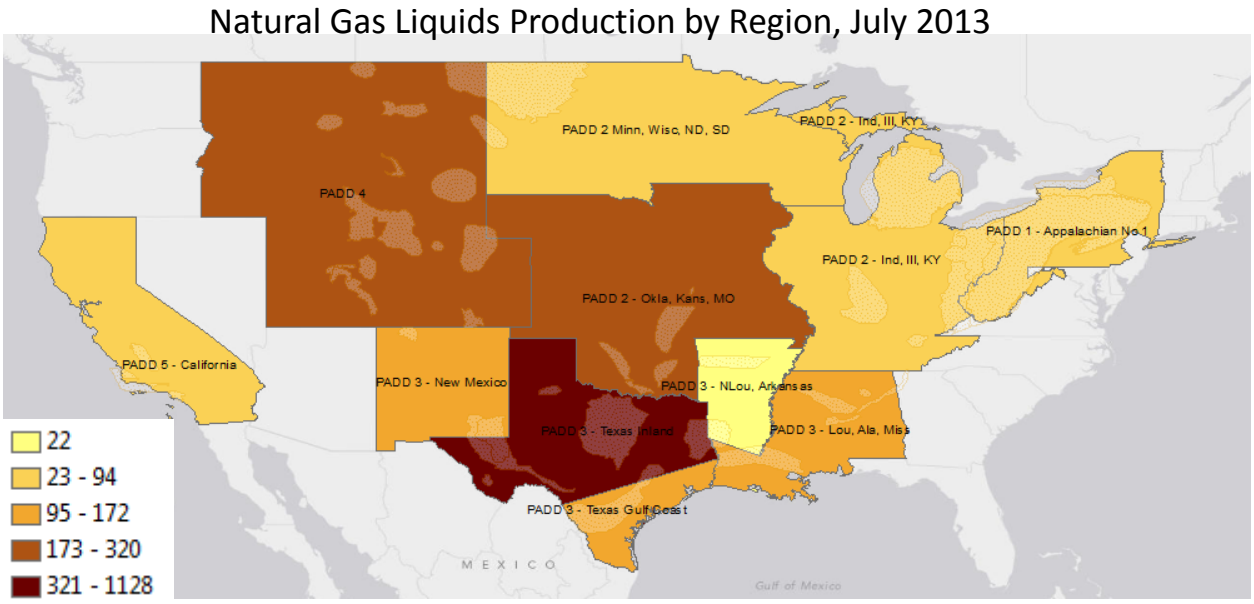
Data

Natural gas liquids (NGL) production is reported by region, not by play. To visualize this, I have mapped the production by PADD (sub-PADD where available). The data, from EIA, gives the daily rate of production of ethane, propane, n-butane, isobutene, and pentanes plus, grouped by 12 regions throughout the U.S.



Production (thousand barrels per day) U.S. Shale plays are over-layed for reference
Source: EIA http://www.eia.gov/dnav/pet/pet_pnp_gp_a_EPL0_FPF_mbbl_m.htm

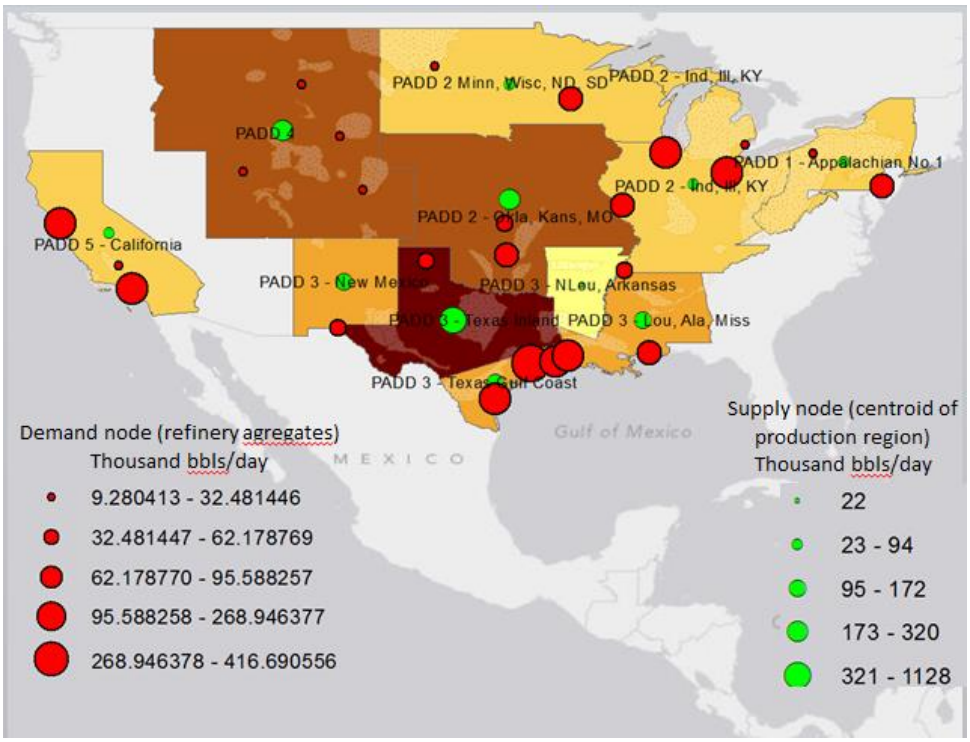
Supply
These regions show supply across the U.S. and are represented as a single node for each region. I will continue to look for better data so supply nodes will represent actual plays. But these will be resource estimates, not current production values.

Demand
I had intended for the demand data to be chemical plant locations and capacity (a subscription service from IHS Global), but this data will not be available in time so I will use aggregate refinery nodes as determined by the Canadian Association of Petroleum Producers[1] as proxies for demand location (with level of NGL demand at 18% of crude oil refinery capacity).

The model with supply and demand nodes is shown below. The size of the node reflects the magnitude of supply or demand.

[1] http://www.capp.ca/canadaIndustry/oil/Pages/PipelineMap.aspx

Natural Gas Liquids Supply and Demand Nodes



Source: Demand from CAPP http://www.capp.ca/canadaIndustry/oil/Pages/PipelineMap.aspx
Supply from EIA http://www.eia.gov/dnav/pet/pet_pnp_gp_a_EPL0_FPF_mbbl_m.htm

Analysis

Now that nodes have been established, fractionation center locations will be positioned using location-allocation analysis. Then, optimal pipeline connections and routes will be determined to complete the edges of the network between the nodes and the fractionation centers.

The analysis will include a sensitivity study of how the location-allocation results and pipeline routes will change with shifting supply and/or demand. There are two options for exploring supply changes: 1) use EIA Annual Energy Outlook[2] projections to model how the supply will shift over the next 30 years, or 2) represent supply nodes for each play and have the production amount be a fraction of the USGS estimate of tight and shale gas for each basin[3].

The results will give an indication of where fractionation centers should be constructed and what additional pipeline routes can be implemented to foster monetization of NGL supplies.

[2] http://www.eia.gov/forecasts/aeo/index.cfm
[3] http://energy.usgs.gov/OilGas/AssessmentsData/NationalOilGasAssessment.aspx#.Um8evvmshcY