



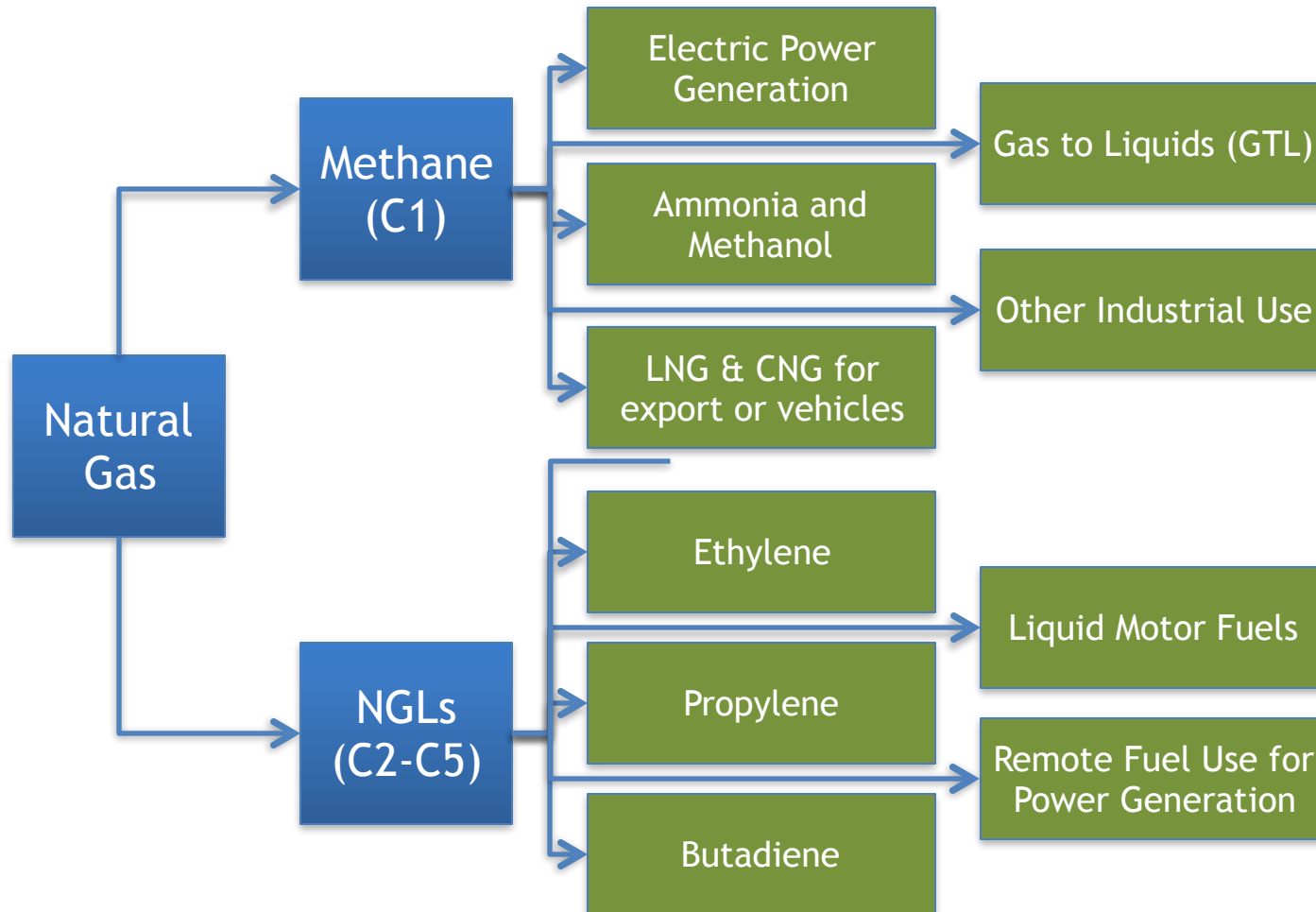
Driving Industrial Demand for Natural Gas and NGLs

Marcellus and Manufacturing
Development Conference

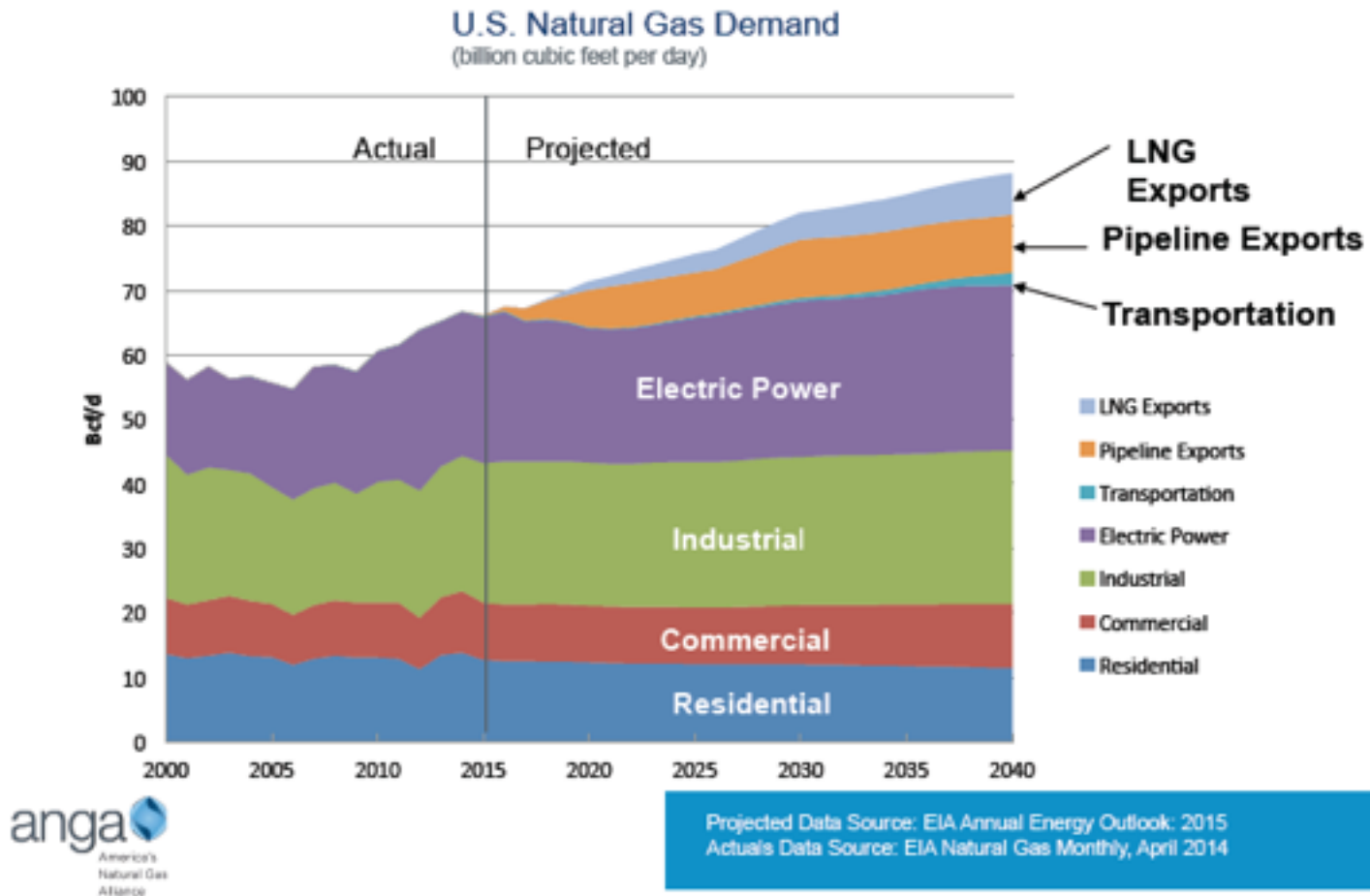
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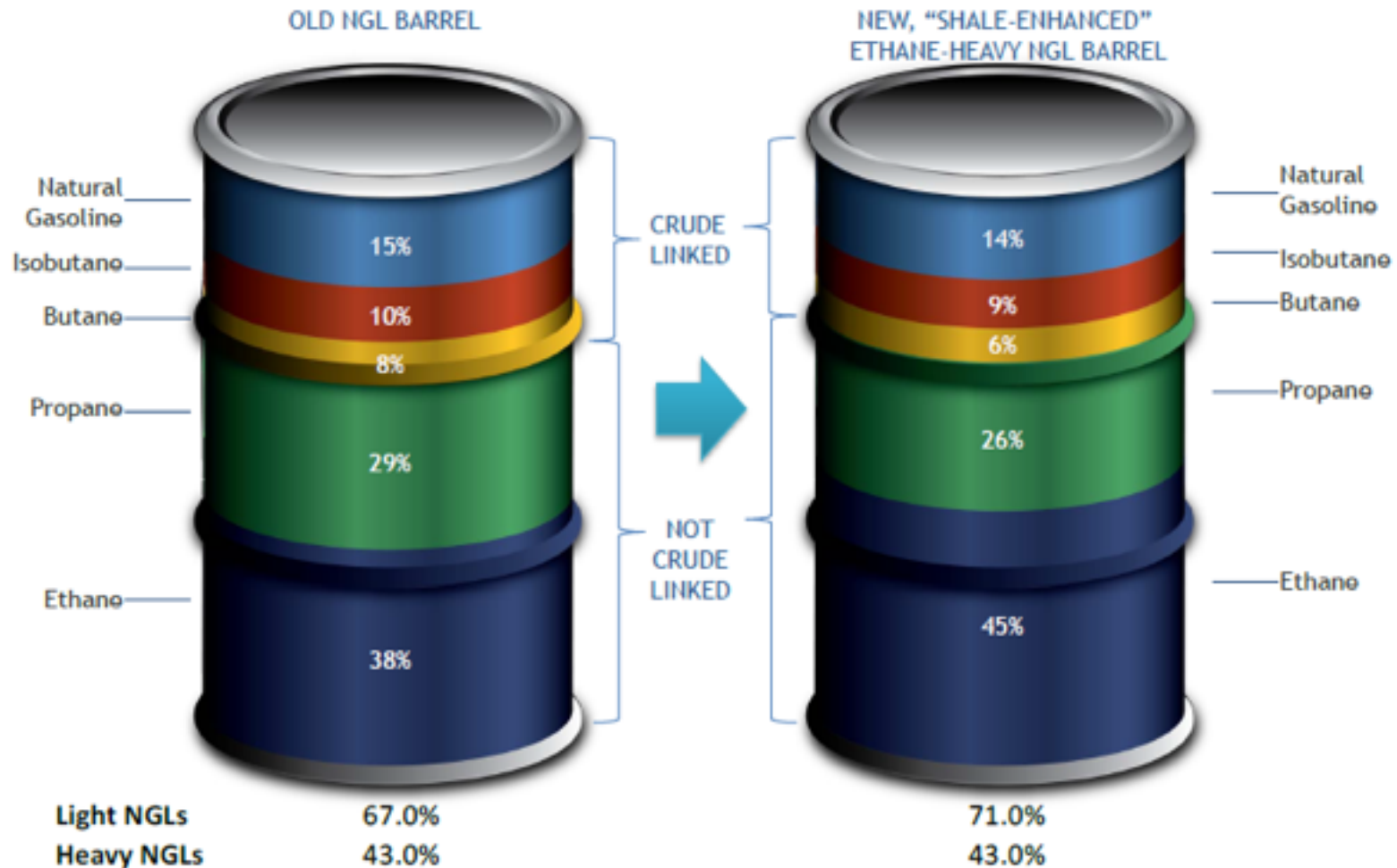
Natural gas and NGLs are the building blocks of the modern economy



Natural gas use in the U.S. centers on electric power and industrial use, with increasing growth in exports



NGL Content: At the heart of the Shale Revolution



Source: Tudor Pickering & Holt

NGLs: Feedstocks for making olefins, plastics, rubber and other chemical products

NGL Component	Chemical Products	Products we use everyday
Natural Gas ETHANE (C ₂)	Ethylene → <ul style="list-style-type: none"> • Polyethylene • Ethylene Oxide • Ethylene Glycol • PVC 	  
Propane PROPANE (C ₃)	Propylene → <ul style="list-style-type: none"> • Polypropylene • Acrylonitrile • Fibers and Resins 	  
Butane BUTANE (C ₄)	Butadiene → <ul style="list-style-type: none"> • Rubber • Latex • ABS resins • Neoprene 	 
Chemical Feedstocks NATURAL GASOLINE (C ₅)	Ethylene Propylene Butadiene Motor Fuel → <ul style="list-style-type: none"> • All of the above • Fuels 	  

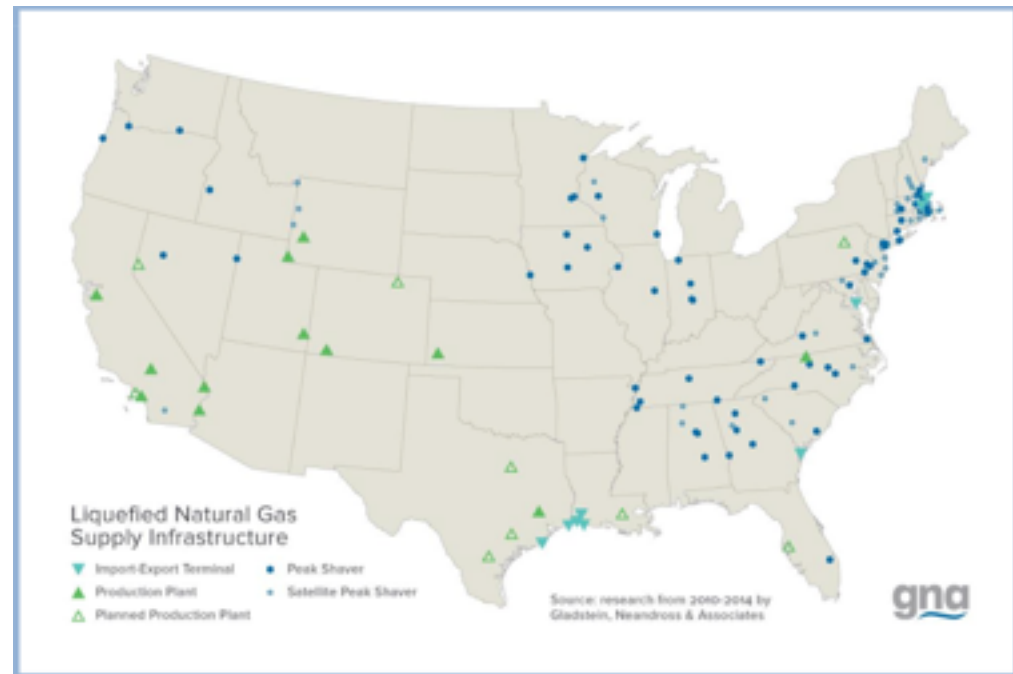
Pipeline, Rail and Truck logistics expanding as raw material and end-use products expand, enabling NGL fractionation

- NGL pipelines are connecting Appalachia to major existing industrial centers and export markets. To name a few:
 - ATEX and TEPPCO pipelines to the US Gulf Coast
 - Mariner West to Sarnia, Ontario
 - Mariner East to Marcus Hook, PA
- Class I and short line railroads see strong growth from shale industry
 - NGL transportation from Appalachia to refineries, end-users and export hubs (e.g. US Gulf Coast, Philadelphia region, Midwest, Edmonton)
 - Frac sand, heavy machinery, and engineered materials in Wisconsin, Pennsylvania, West Virginia, and Ohio
 - Expansion of plastic resin manufacturing will drive future increase in chemicals transport



Emerging market for lower-cost and cleaner transportation fuels driving supply chain for gas-powered vehicles

- Low price and low emissions of liquefied natural gas (LNG) and compressed natural gas (CNG) drives truck fleet conversions
 - UPS, FedEx, and Waste Management have large fleets of 2000+ vehicles using alt fuel
 - LNG supply infrastructure networks are emerging in core truck traffic regions
- Marine LNG is an emerging area of growth for barge and oceangoing vessels
- Opportunities will exist for the industrial sector to reduce supply chain costs by introducing standby onsite supplies



Spotlight: West Virginia Electricity and Manufacturing End-Uses

- Moundsville Power LLC plans to build a 549 Megawatt combined-cycle natural gas fired power plant in Moundsville
- Ergon Inc. continues to manufacture specialty oils and asphalt products, utilizing Appalachian regional crude oil and condensates
- Marathon expanding regional refinery operations with 2 new condensate splitter investments
- Regionally, three ethane cracker and downstream chemical plants are being considered:
 - Shell Chemical in Beaver, PA
 - Odebrecht/Braskem in Parkersburg, WV
 - PTT Global Chemical in Belmont County, OH
- Additional opportunities to attract to the region: Fertilizer manufacturing, glass manufacturing, methanol-based chemicals manufacturing, and other energy intensive industries

The marriage of low cost, abundant raw materials, and the built infrastructure of the Northeast region, positions the region well for manufacturing growth

- **Opportunities presented by new resources in the Northeast are tremendous**
 - Natural gas and liquids deposits in WV, PA and OH represent some of the largest and most cost effective in the world, driving exploration and production
 - New fuel sources driving new pipelines, terminals and demand sources
 - Tremendous built infrastructure poised to retool for new growth
 - Industrial redevelopment of areas in West Virginia, the Pittsburgh area, and Philadelphia are a few examples where value is being created from manufacturing and exports
- U.S. is now one of the lowest cost feedstock regions in the world, enabling more chemicals manufacturing and more energy-intensive industries
- Assets located in producing regions and at the intersection of pipeline, rail and port infrastructure will remain advantaged

Next Steps

For more information, to learn more and to discuss further,
please be in touch

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