



Coal in a New Carbon Age

*Powering a Wave of Innovation in
Advanced Products & Manufacturing*

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Report Chair & National Coal Council Vice Chair
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May 15th, 2019 – NCC Webcast



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The Secretary of Energy
Washington, DC 20585

August 31, 2018

Mr. Deck Slone
Chairman, The National Coal Council
1000 Independence Avenue SW, Room 4G-036
Washington, DC 20585

Dear Chairman Slone:

I am writing today to request the National Coal Council (NCC) develop a white paper assessing opportunities to enhance the use of U.S. coal beyond power markets.

The white paper should focus on new markets for "coal to products" including coal conversion (coal to liquids, coal to gas, coal to chemicals); carbon engineered products (value-added non-Btu products); rare earth elements; coal combustion products, methanol; biotechnology approaches (agriculture, liquid fuels); and beneficiated coal for non-power uses, among others.

The key questions to be addressed include:

- What significant market-scale opportunities exist for new markets for coal?
- What are the economic, energy security, trade, and other issues the U.S. faces now that can be addressed with new markets for coal?
- Considering the current uses for coal overseas (syngas, chemicals, synthetic oil, transportation fuels, etc.), where and how are these markets operating today and what is the outlook for these markets going forward?
- What has been the domestic history of coal utilization and what can be learned from past successes/failures in coal utilization?
- How can domestic markets for utilization (other than for CO₂) be developed similar to those underway in other countries?

The white paper should be managed under the auspices of the Executive Advisory Board within the NCC. I ask that the white paper be completed no later than April 12, 2019.

Upon receiving this request and establishing your internal working groups, please advise me of your schedule for completing the white paper. The Department looks forward to working with you in this effort.

Sincerely,

A handwritten signature in black ink that reads "Rick Perry".

Rick Perry





Report Leadership

Report Chair: Randall Atkins, Ramaco Carbon

NCC New Markets for Coal Subcommittee Chair: Fred Palmer, Heartland Institute

Principal Editors

- Charles Atkins, Ramaco Coal, LLC
- Don Collins, Western Research Institute
- Janet Gellici, National Coal Council
- Matt Targett, SpruceWorks, LLC



Chapter Leads

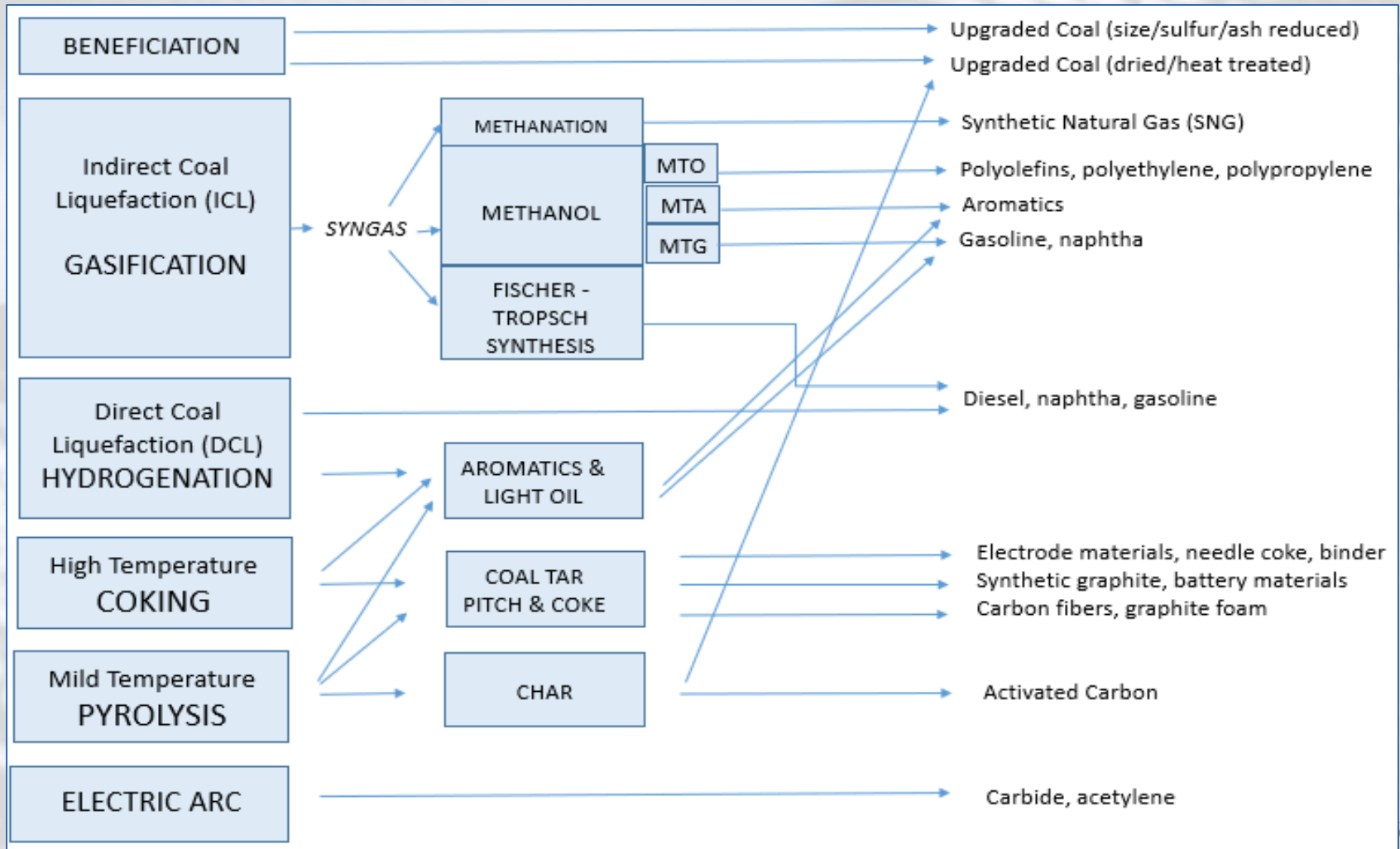
- Charles Atkins, Ramaco Coal LLC
- Marcos Nogueira Cesar, Nexant
- David Denton, Denton Consulting
- Don Collins, Western Research Institute
- Sheila Glesmann, Emissions Strategies
- Judd Swift, Synfuels Americas
- Matt Targett, SpruceWorks LLC



Coal in a New Carbon Age

- The Value of Advancing New Markets for Coal
- International Activity
- U.S. Historical Efforts
- Trends & Outlook for Coal-Derived Products in the U.S.
- Recommendations
- + Technology
- Compendium Appendix





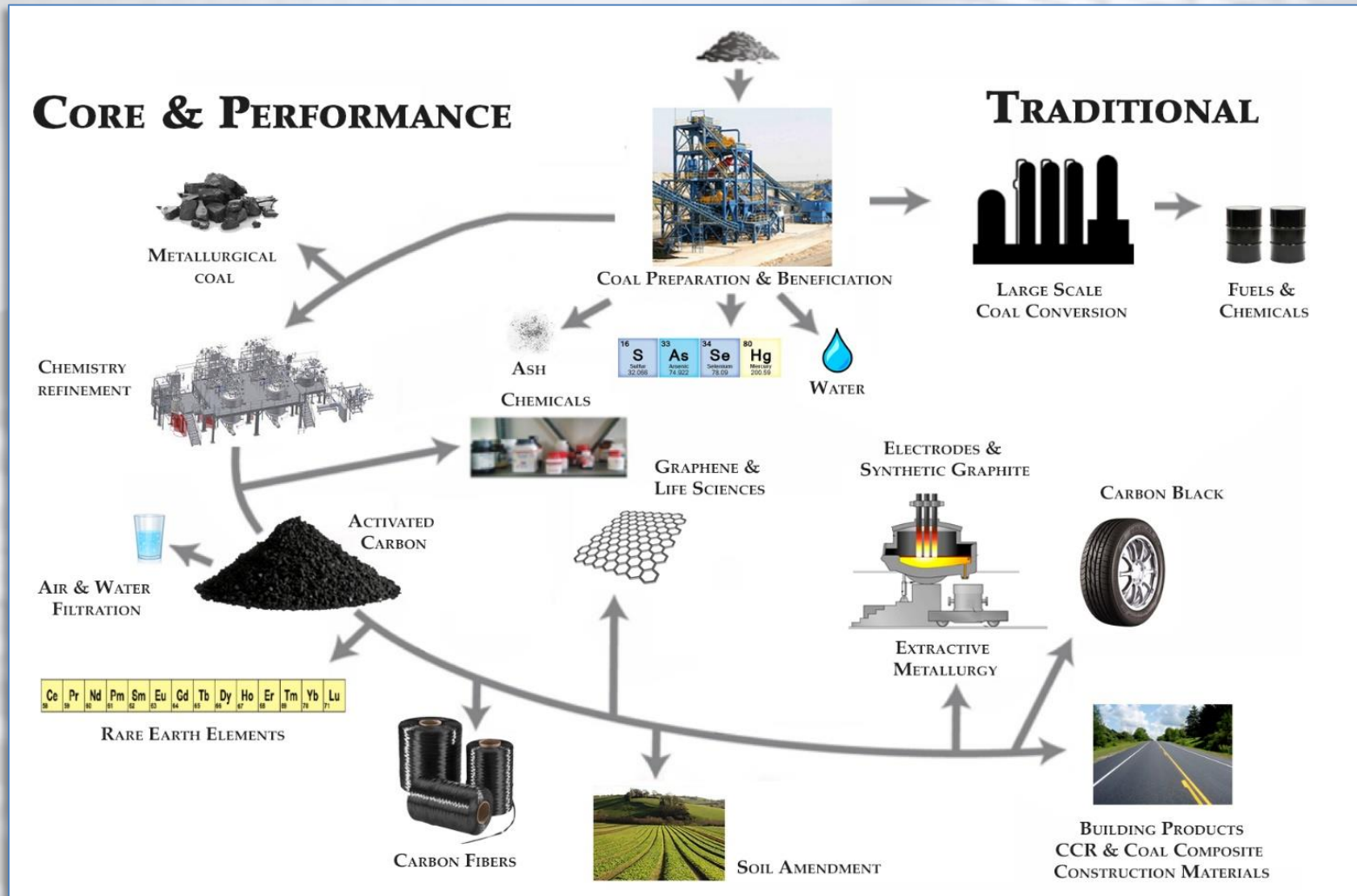


Value of Coal-to-Products

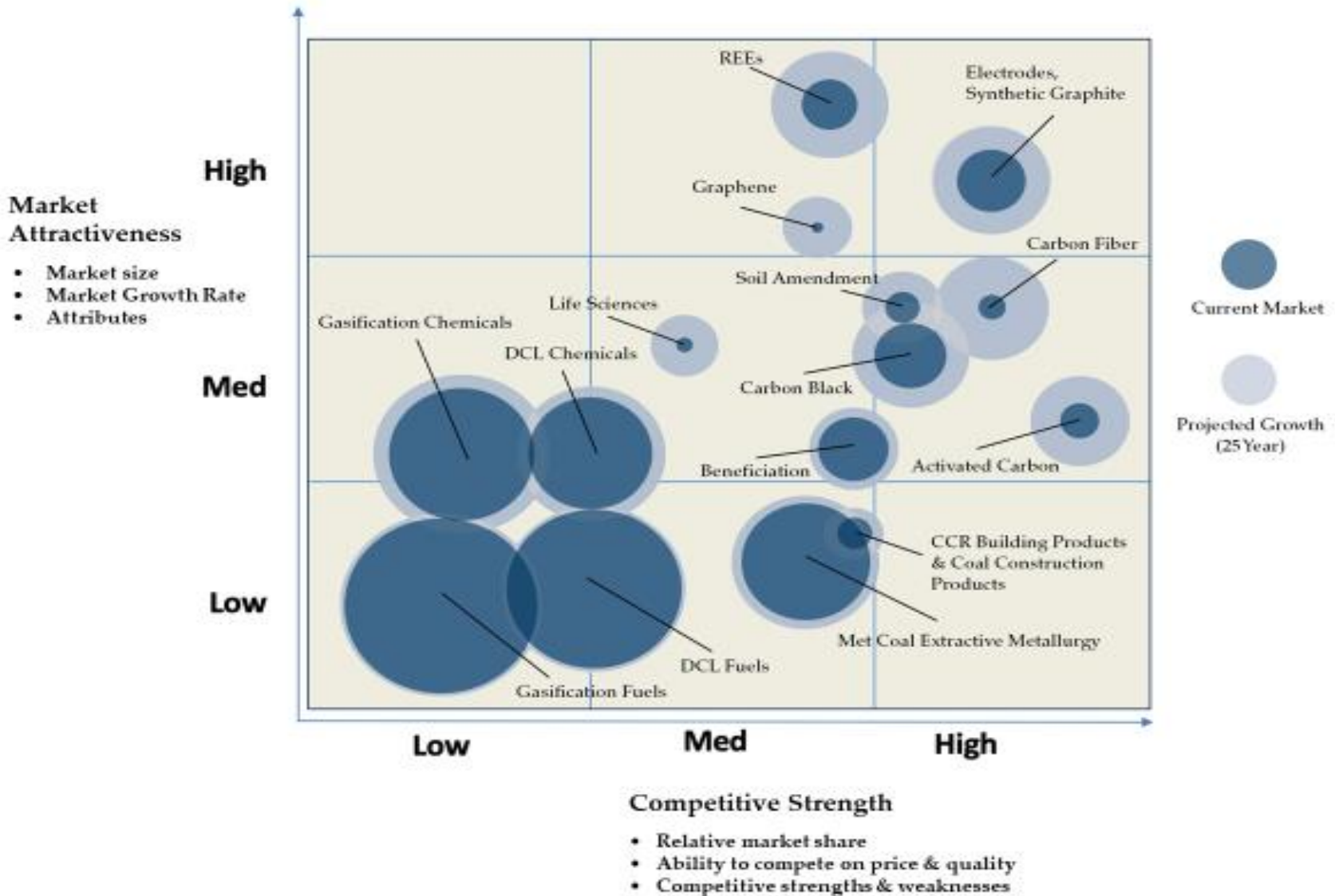


Market Potential





Nine Block Analysis





Strategic Recommendations

- Establish a focused R&D program on coal-to-products.
- Accelerate research-to-commercial deployment in coal-to-products market sectors.
- Incentivize private sector investment in coal-to-products production and manufacturing sectors.



Tactics: Focused R&D Program

- Establish a national R&D program for advanced carbon products and manufacturing within the U.S. Department of Energy.
- Sustain a multi-decade base level of Federal commitment and support.
- Implement a broad-based interagency coordinated program to accelerate coal to fuels and products development.
- Elevate the priority of and increase R&D funding for coal-to-products technologies.



Tactics: Accelerate Deployment

- Establish an Office of Carbon Products tasked with building one or more Carbon Advanced Material, Manufacturing and Production (CAMP) centers at coal mining sites in key coal states to accelerate the pace of research-to-commercial deployment of coal-to-products and to develop repeatable modular plant designs.
- Support multiple first-of-a-kind projects throughout the U.S.
- Expand DOE Loan Guarantee Program.
- Dramatically reduce DOE Loan Guarantee Program costs, red tape and processing time.
- Apply U.S. Department of Defense Manufacturing Readiness Levels to DOE programs.
- Target defense applications and national critical materials to avoid “Valley of Death” stall-out.
- Target dual-use applications to quickly grow markets and demand for coal.
- Ensure U.S. developed technologies are deployed in the U.S.
- Address U.S. Export Administration Regulations (EAR) and International Traffic in Arms Regulations (ITAR).



Tactics: Incentivize Investment

- Establish public-private partnerships.
- Provide tax and other investment incentives and subsidies to facilitate the rapid development and commercialization of coal-to-carbon products.
- Validate revenue and business models and management strategies in addition to technology performance and cost.
- Expedite environmental and permit approvals.
- Analyze the condition and suitability of existing infrastructure assets.
- Use shuttered and producing mines, coal power plants and coal communities as economic revitalization zones for new coal to fuels and products production and manufacturing centers.
- Update regulations, legislation and permitting.
- Provide DOE financial support for pre-FEED and FEED projects.

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