



COAL POWER  
Smart Policies in Support of  
**CLEANER**  
**STRONGER**  
**ENERGY**



International Pittsburgh  
Coal Conference

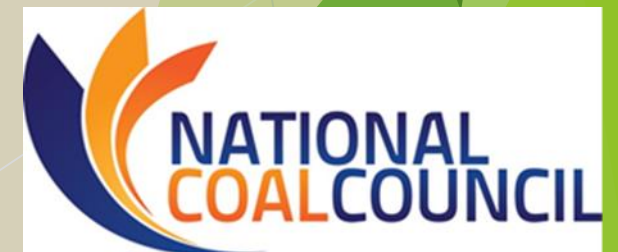
**COAL POWER Report**  
**Findings & Recommendations**

Janet Gellici  
Chief Executive Officer  
National Coal Council

September 8<sup>th</sup>, 2020 ~ Via Webcast

# Advisors to the U.S. Secretary of Energy

- ▶ Federal Advisory Committee
  - Organized under the Federal Advisory Committee Act (FACA)
  - Established in 1984
- ▶ Provides advice and recommendations to the U.S. Secretary of Energy
  - On coal policy, technology and markets
- ▶ Members
  - ▶ Appointed to serve by the Secretary of Energy
- ▶ Over 40 reports prepared to date





The Secretary of Energy  
Washington, DC 20585

July 3, 2019

Mr. Danny Gray  
Chairman  
National Coal Council, Inc.  
1101 Pennsylvania Avenue, NW, Suite 300  
Washington, DC 20004

Dear Chairman Gray:

I am writing today to request the National Coal Council (NCC) develop a white paper assessing smart policies in support of advanced coal-fired power-generation technologies.

The white paper should focus on an industry perspective on the future of advanced coal technologies in the power sector, including carbon capture, utilization, and storage (CCUS); advanced energy systems to enhance energy efficiency and flexibility; high efficiency-low emissions technologies; small modular coal power plant technologies; and transformational technologies, such as supercritical CO<sub>2</sub> cycles and pressurized oxy-combustion.

The report would address how various regulatory and legislative policies could be employed to enhance and accelerate the deployment of these technologies. The prospective policies would include, but are not limited to:

- For CCUS: 45Q Federal Tax Incentive, USE IT Act, Master Limited Partnerships, Private Activity Bonds
- EPA's New Source Review Regulation
- Public Utility Regulatory Policies Act
- EPA Regulations on Coal Combustion Residuals and Effluent Limitation Guidelines
- Wholesale Electricity Markets
- State Initiatives and State Public Utility Commission Regulatory Oversight
- The newly-authorized U.S. International Development Finance Corporation
- Energy Infrastructure

Key questions to be addressed include:

- What regulatory and legislative initiatives could be advanced to help accelerate the deployment of coal-fired power-generation technologies?
- What coal-fired power-generation technologies would benefit from regulatory and legislative reforms?
- What energy infrastructure initiatives would support the deployment of advanced coal-fired power-generation technologies?

- ▶ Energy Secretary Rick Perry
- ▶ Assess smart **policies** in support of advanced coal generation technologies
- ▶ Power Sector Technologies  
**Existing & New Coal Generation**
  - ▶ CCUS
  - ▶ Energy Efficiency/Flexibility
  - ▶ HELE
  - ▶ Small modular
  - ▶ Transformational
- ▶ Regulations & Legislation
  - ▶ 45Q
  - ▶ NSR
  - ▶ PURPA
  - ▶ CCR/ELG
  - ▶ Wholesale Markets
  - ▶ Int'l Development Finance Corp.
  - ▶ **State and Public Utility Commission**
- ▶ Energy Infrastructure



# Report Leadership

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- ▶ Jeff Bloczynski, America's Power
- ▶ Kipp Coddington, Univ. of Wyoming
- ▶ Janet Gellici, NCC
- ▶ Neeraj Gupta, Battelle
- ▶ Jared Hawkins, Battelle
- ▶ Josh Stanislawski, EERC/Univ. ND

## ▶ Executive Editor

- ▶ Janet Gellici, NCC

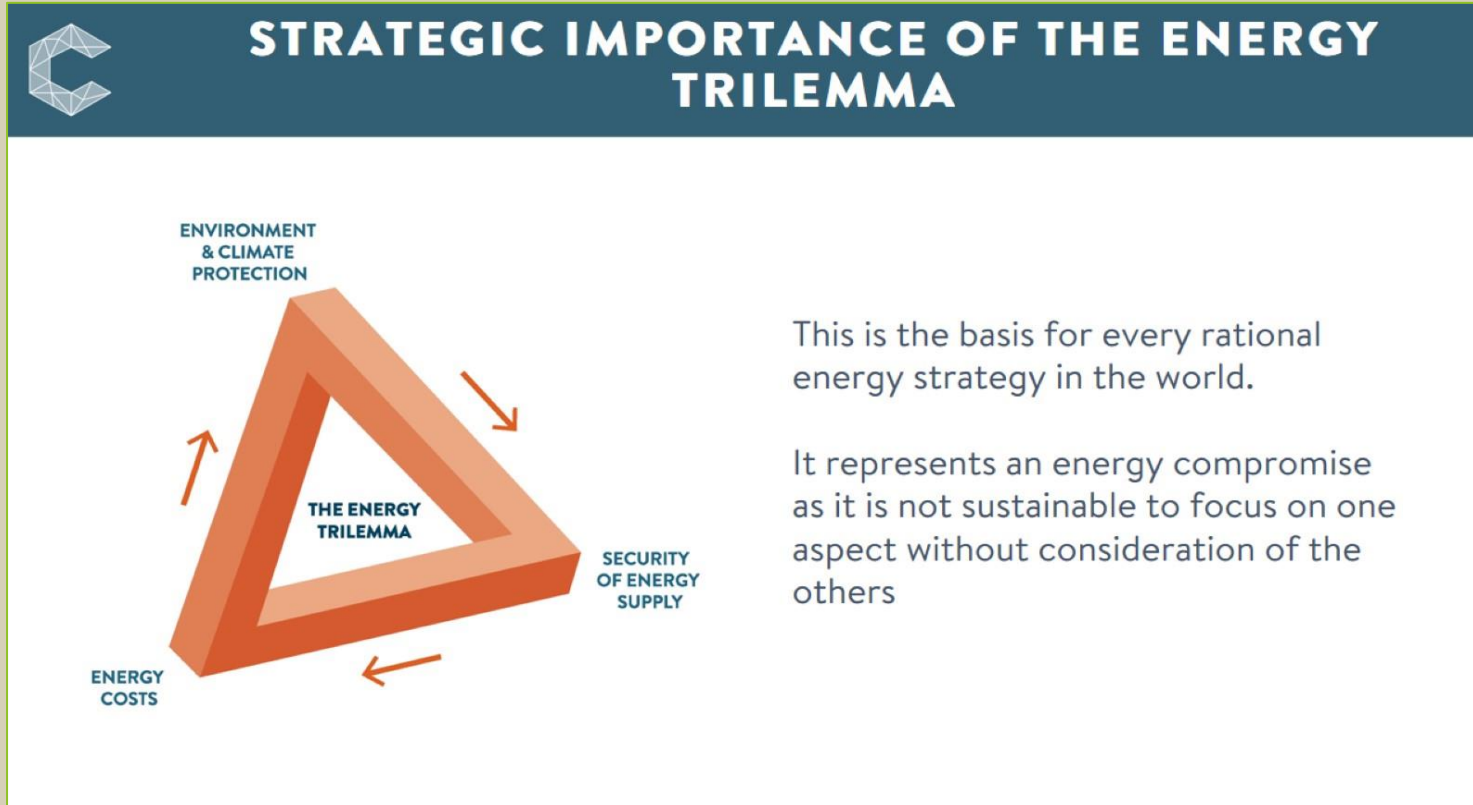
## ▶ Contributors & Reviewers

- ▶ Over 50 NCC Members & Associates

# Report Overview

- ▶ Executive Summary
- ▶ Chapter 1. Background
- ▶ Chapter 2. Coal Generation Technologies
- ▶ Chapter 3. Federal Regulations & Legislation
- ▶ Chapter 4. State, Regional, Tribal Initiatives
- ▶ Chapter 5. Energy Infrastructure
- ▶ Chapter 6. Recommendations

# The Energy Trilemma

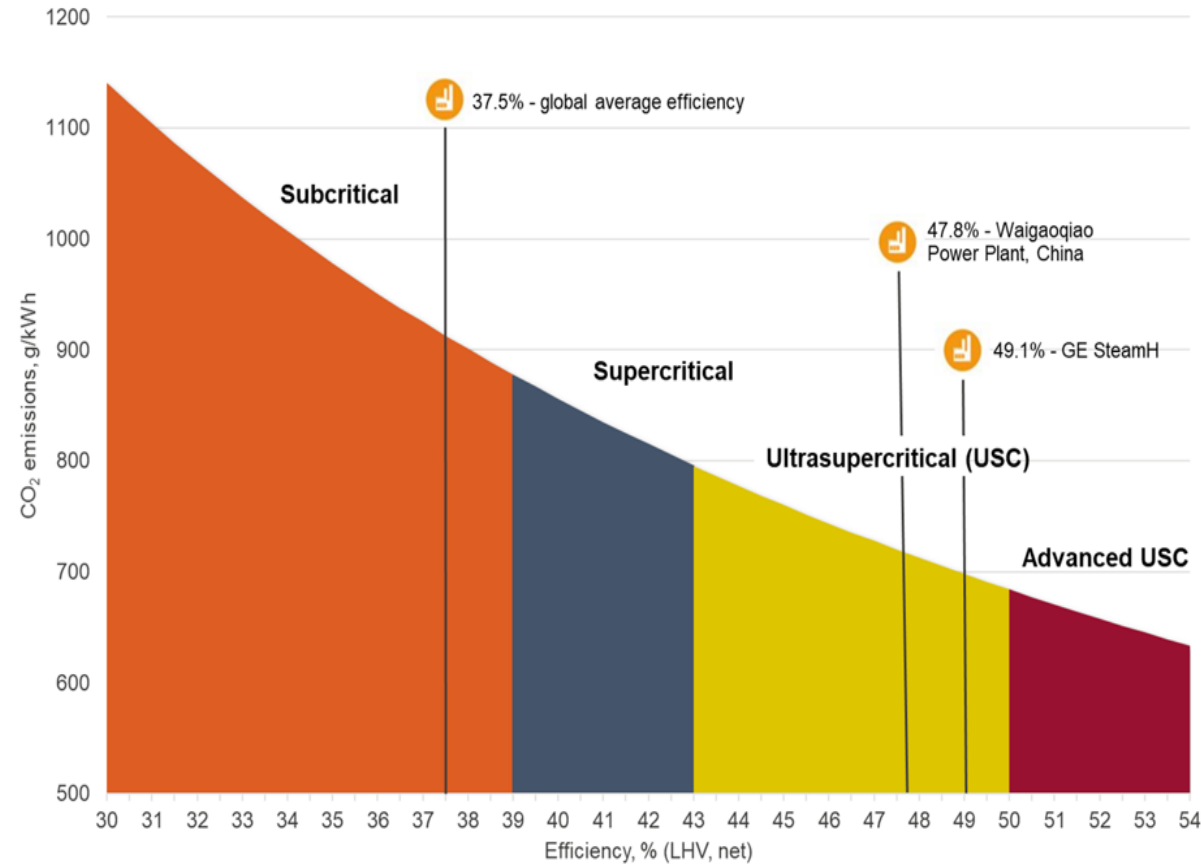


Source: International Energy Agency

# The Value of Efficiency Improvements for Reduction of CO<sub>2</sub> Emissions

Potential for ~2 Gt of CO<sub>2</sub> savings if global average brought to state of the art

USC not strictly defined – broadly refers to use of material advances since the 1990s



Source: International Energy Agency

# Advanced Coal Generation Technologies: Deployed and Under Development

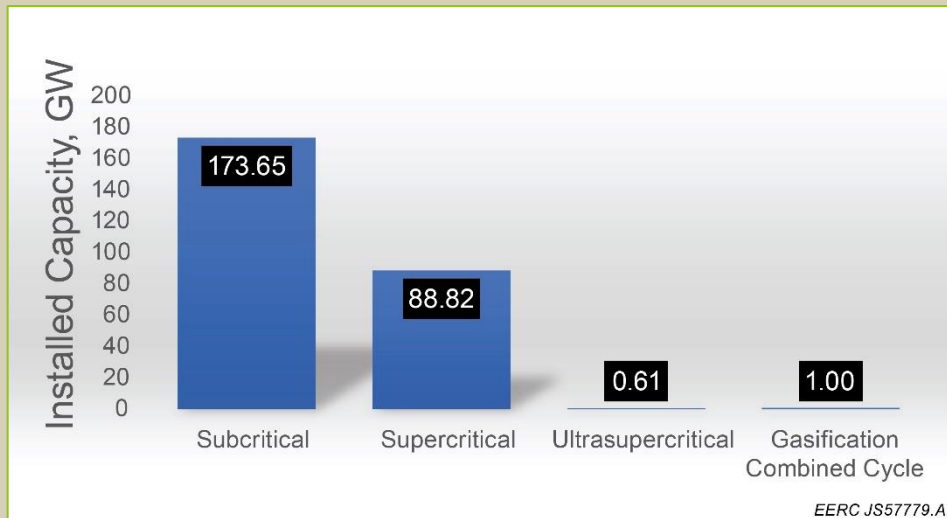
Technology	Retrofit	New Plants	Flexible	Innovative	Resilient	Small	Transformational
<b>Currently Deployed Technology</b>							
USC	X	X	X	X	X	X	X
IGCC	X	X	X	X	X	X	X
Post-combustion CCUS	X	X	X	X	X	X	X
<b>Technologies Under Development</b>							
AUSC	X	X	X	X	X	X	X
sCO <sub>2</sub>	X	X	X	X	X	X	X
Post-combustion CCUS	X	X	X	X	X	X	X
Oxy-Combustion	X	X	X	X	X	X	X
Pressurized Oxy-Combustion	X	X	X	X	X	X	X
PFBC	X	X	X	X	X	X	X
Chemical Looping	X	X	X	X	X	X	X

Matrix of Technologies Related to Coal FIRST Energy Objectives



# International & U.S. Deployment of Advanced Coal Generation Technologies

## U.S. Installed Generation Capacity 2018



Source: U.S. Energy Information Administration

## Worldwide Ultra-Supercritical Coal Capacity

REGION	IN OPERATION
	2018
Asia	224203
Europe	19208
Middle East	0
Eurasia	300
North America	665

Source: International Energy Agency

# Federal Support Opportunities

- Initiatives to Advance R&D
- Initiatives to Minimize Cost & Risk
- Initiatives to Bolster Emissions Abatement
- Initiatives to Address Regulatory Risk & Burdens
- Initiatives to Reform Energy Markets
- Initiatives to Support Energy Infrastructure

Technology	CCUS	HELE	USC/AJUSC	Allam Cycle	Oxy-Combustion	Other Transformational	Small Modular	Energy Infrastructure	Other	Coal Conversion & Utilization	Exports Coal & Coal Technology
<b>Policy</b>											
<b>Initiatives to Advance R&amp;D</b>											
Coal FIRST	x	x	x	x	x	x	x				x
EFFECT Act	x	x	x	x	x	x	x			x	x
Fossil Energy R&D	x		x	x	x	x	x				
Technology Transitions Act	x	x	x	x	x	x	x				
<b>Initiatives to Minimize Cost &amp; Risk</b>											
45Q	x										
Master Limited Partnerships	x								x		
Private Activity Bonds	x										
BEAT Tax Relief	x										
48A	x	x	x								
Technology Neutral Tax Credit	x	x	x	x	x	x	x				
USDA RUS Leg.	x									x	
Contracts for Differences	x	x	x	x	x	x					
LPO Reforms	x	x	x	x	x	x					
Development Finance Corp	x	x	x	x	x	x	x	x	x		x
<b>Initiatives to Bolster Emissions Abatement</b>											
Clean Energy Standard	x	x	x	x	x	x	x				
Affordable Clean Energy	x				x						
<b>Initiatives to Address Regulatory Risk &amp; Burden</b>											
USE IT Act	x							x			
NSR/Gain Act	x	x									
Coal Combustion Residuals								x	x	x	x
Effluent Limitation Guidelines									x		
<b>Initiatives to Reform Energy Markets</b>											
PURPA	x	x	x	x	x	x					
Capacity Market Reforms	x	x	x	x	x	x					
<b>Initiatives in Support of Energy Infrastructure</b>											
LIFT America Act								x			
INVEST CO, Act								x			
FAST Act								x			



# State Support for Coal Technologies

## Legislative & Regulatory Initiatives

- Regulatory Certainty
- Clean Energy Standards
- R&D Support
- Expediting Coal Project Permitting
- Tax Incentives
- Measured Approach to Coal Plant Retirements

	GA	IN	IA	KY	MT	ND	OH	OK	VA	WV	WY
Financial Support	x			x	x						
Reliability & Resilience		x		x	x		x			x	x
R&D Support						x	x				
Regulatory Certainty			x			x					
Permitting & Environment	x		x						x		x
Tax Incentives				x	x	x		x		x	x

# Recommendations - It's URGENT!

- **By 2030 -**
  - Retrofit a critical mass of existing coal power plants with carbon capture and efficiency enhancing technologies.
  - More fully demonstrate the viability and maturity of these technologies and their availability through competitive bids from multiple vendors.
- **By 2035 -**
  - Establish a growing network of CO<sub>2</sub> storage sites and pipelines approximately five times larger than what exists today.
  - The network will need to expand over time to meet 2050 needs of the power and industrial sectors.
- **By 2040 -**
  - A variety of new coal plant technologies will need to be commercially available, cost competitive and have a near-zero emissions profile.

# By 2030 - Retrofit Existing Coal Fleet

- **Enhance Utilization of 45Q Tax Credits -**
  - Extend “under construction” deadline to 2030 (at least)
  - Extend credit period from 12 to 20 years
  - Expedite Class VI permits issued by EPA to states
  - Extend 48A tax credits to existing power plants
  - Complement 45Q with MLP and PAB
  - Secure 100% relief from BEAT for CCUS technology
- **Government Engagement in Risk-Sharing & Incentivizing -**
  - Reforms to DOE Loan Guarantee Program
  - Independent National Development Corporation or Investment Authority
- **New Source Review**
  - GAIN Act

# By 2035 - Establish CO<sub>2</sub> Storage & Pipeline Network

- **Include CCUS infrastructure in post-pandemic economic revitalization**
- **Support R&D and characterization of geologic storage**
- **Support USE IT Act**
- **Support INVEST CO<sub>2</sub> Act**

# By 2040 - Commercial Deployment of New Technologies

- **Federal FEED funding**
- **Federal funding for demonstration and commercial-scale projects**
- **Support U.S.-owned companies**
- **Projects managed by those experienced in large-scale project management**

# What Will Be Accomplished?

- **By 2030 - Retrofit Existing Coal Fleet**
  - Lower the cost of CCUS and advanced coal generation technologies through learning by doing at large-scale demonstration and commercial projects.
- **By 2035 - Establish CO<sub>2</sub> Pipeline & Storage Network**
  - Eliminate deployment bottlenecks created by lack of enabling infrastructure
- **By 2040 - New Coal Plant Technologies**
  - Enable commercial deployment of a variety of next generation coal plants that are competitive on cost and environmental performance.

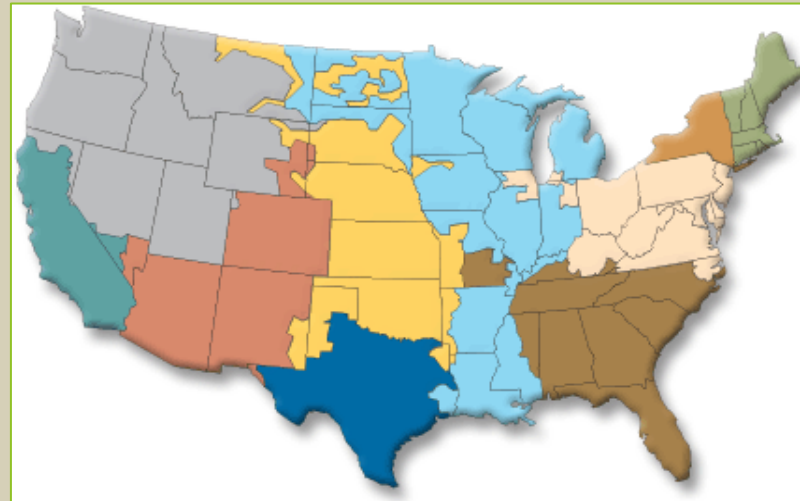


# Additional Priorities

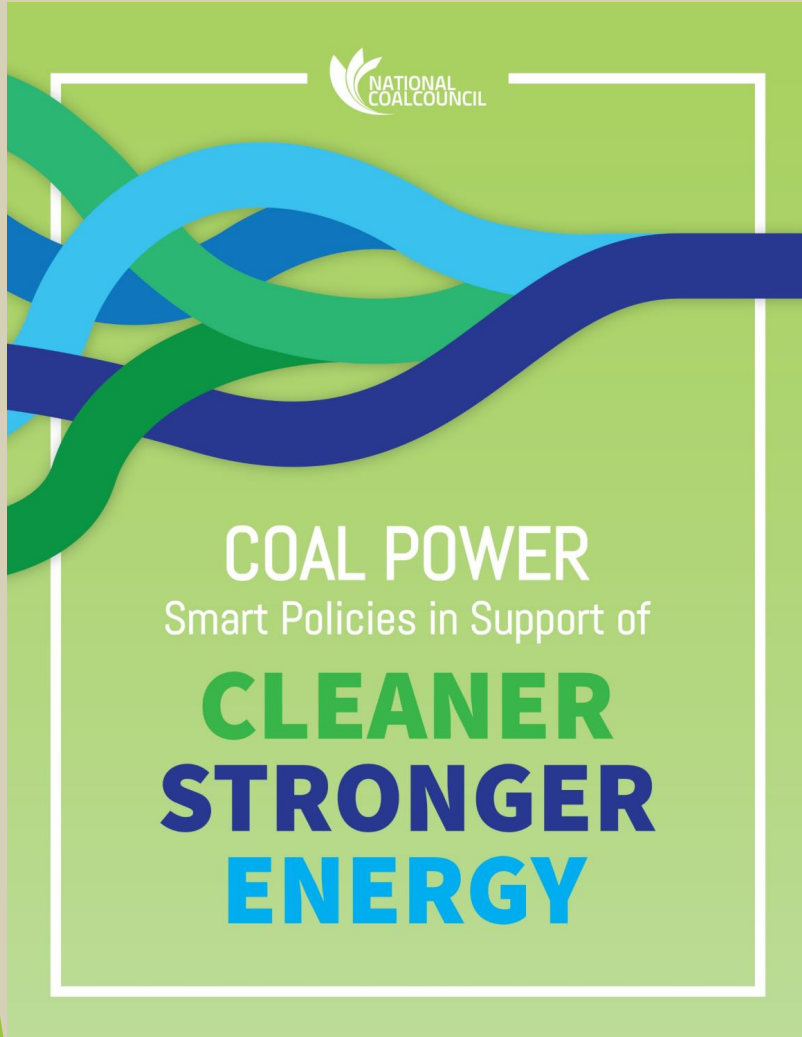
Coal FIRST  
Small Modular Coal Power Plants



Market Reforms



# Conclusion



*"... we can't get rid of coal.  
It is essential to this nation."  
Dan Brouillette, U.S. Secretary of Energy  
June 25, 2020 - Penn Live/Patriot News*

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