

# GETTING AHEAD OF THE ENERGY TRANSITION

**The Economic Impact of Proactive Energy  
Policy**

# Getting Ahead of the Energy Transition



- The Energy Transition is Happening
  - ▣ A Changing Energy Environment
  - ▣ Wyoming Exposure
- Energy Policy in a Changing Economy
  - ▣ Changing Technologies
  - ▣ Economic Development Impacts of Energy
- Economic Diversification and Development: ENDOW
  - ▣ Building Blocks
  - ▣ Next Generation Engines
- Promoting Next Generation Engines: Fiscal Decoupling

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# The Energy Transition is Happening

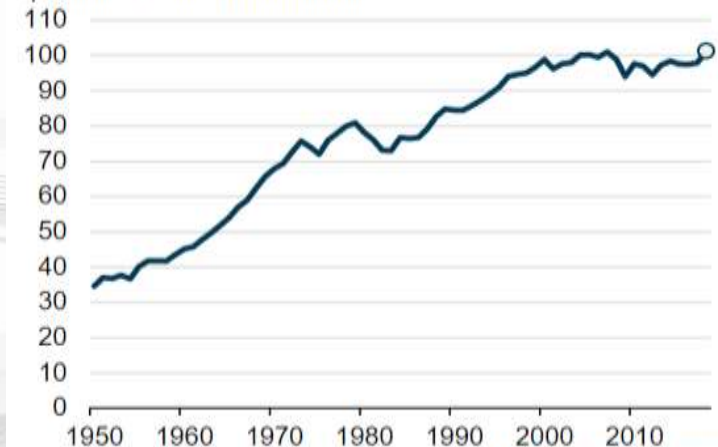


## A Changing Energy Environment

- Energy consumption slowing
  - ▣ 2018: energy consumption up 0.3% from 2007 record
- Energy Mix Changing
  - ▣ 29 states now have RPS's
  - ▣ New-build costs changing

U.S. total energy consumption (1950-2018)

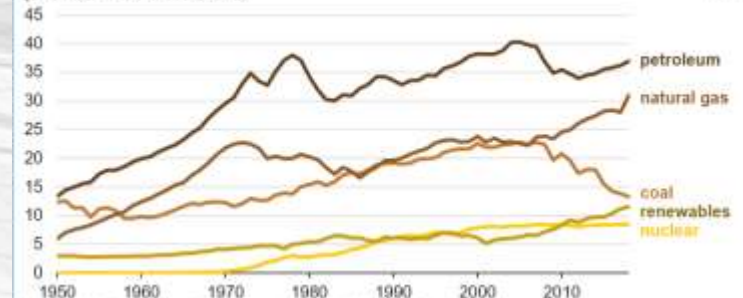
quadrillion British thermal units



Source: U.S. Energy Information Administration, *Monthly Energy Review*

U.S. total energy consumption (1950-2018)

quadrillion British thermal units



Source: U.S. Energy Information Administration, *Monthly Energy Review*

# The Energy Transition is Happening



## Wyoming Exposure

- 2017 Production
  - WY produced 40% of all coal mined in the United States, 1/3 of nat'l reserves
  - Top 10 nat. gas, top 5 reserves
- 2017 REMI Natural Resources Industry in WY
  - 9.6% of total private non-farm employment
  - 11.5% of total compensation

*"We must evolve beyond the boom-bust cycle of our economy, wherein 70% of state revenue comes from the energy and mineral industry"*

*-Gov. Matt Mead's 2018 State of the State Address, ENDOW*



# Energy Policy in a Changing Economy



- Changing Technologies
  - ▣ Energy Efficiency Programs
  - ▣ Hybrid and Electric Vehicles
- Economic Development Impacts of Energy
  - ▣ Xcel Energy's Preferred Colorado Energy Plan
  - ▣ Early Retirement of Colstrip Units 1 and 2

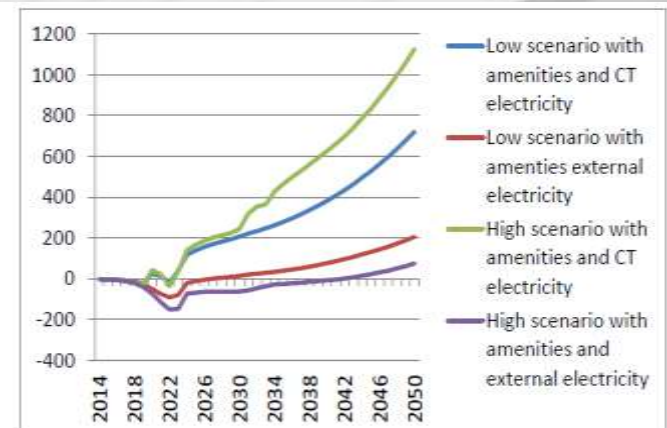
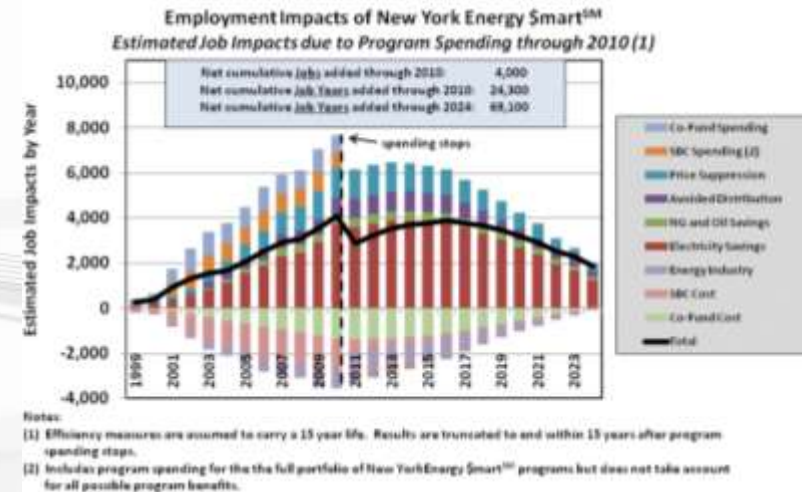


Figure 6. Personal Disposable Income Impacts Utilizing External or Connecticut Generated Electricity (\$M)

# Economic Development Impacts of Energy



## Preferred Colorado Energy Plan

- 2018 Xcel Energy IRP included early retirement of coal-fired generation in favor of wind, solar, gas, battery storage
    - Approved August 2018
  - UC Boulder given operation, investment changes by industry, change in revenue requirements by consumer class
- The image shows the cover page of a report. At the top, it says "PUBLIC SERVICE COMPANY OF COLORADO" and "Economic Impacts of the Preferred Colorado Energy Plan". Below that, it states "A consulting research study conducted for Xcel Energy by the:" followed by "Business Research Division", "Leeds School of Business", and "University of Colorado Boulder". At the bottom right, the date "June 20, 2018" is printed.
- Results positive for Pueblo county, where coal-fired generation takes place, along with rest of state
    - *Why: siting of replacement assets maintains quality of life for affected community; lower cost, locally supplied assets supports eco dev and business competitiveness; reduced revenue requirements*

what does **REMI** say? <sup>sm</sup>

# Economic Development Impacts of Energy



## Early Colstrip Retirement Study

- University of Montana studied impact of closure if coal-fired Colstrip Units 3&4 closed due to political concerns, bankruptcy

- Colstrip's markets moving towards renewables, Units 1 and 2 closing early due to environmental regulations



## THE ECONOMIC IMPACT OF THE EARLY RETIREMENT OF COLSTRIP UNITS 3 AND 4 FINAL REPORT

June 2018

- Average statewide results per year: 3,300 less jobs, \$4.6bn less disposable personal income, \$1.2bn less state revenues per year
  - *Why: little replacement assets means higher prices, no alternative economic development strategy*

*what does **REMI** say? <sup>sm</sup>*



# Economic Diversification and Development: ENDOW



- Jan. 2 2017: Gov. Matt Mead established ENDOW to develop 20-yr comprehensive diversification strategy
  - Comprehensive multi-stakeholder engagement process driven by Executive Council
  - Target “next generation” industries identified along with strategies state can take to support private sector expansion in these industries



*“it is businesses and their actions in the marketplace that will define success...We want to remove the perception that government will be responsible for achieving the plans' objectives”*

*what does REMI say? <sup>sm</sup>*

*-ENDOW 20 Year Diversification Strategy 2018 Report*

# Building Blocks: Workforce and Education



- Critical consideration: disruptive industries want to see workforce prepared for their needs
  - ▣ Amazon site selection priority: local SAT scores, access to talent pipeline

## □ Recent Wins

- ▣ SF29 – Computer Science courses in state education
- ▣ SF119 – workforce training funds for priority sectors
- ▣ SF111 – bachelor of applied sciences bill in community colleges

### The National-Level Economic Impact of the Manufacturing Extension Partnership (MEP): Estimates for Fiscal Year 2017

W.E. Upjohn Institute for Employment Research  
300 South Westnedge Avenue  
Kalamazoo, MI 49007

[www.Upjohn.org](http://www.Upjohn.org)



April 23, 2018



Forecast	Jobs	GDP	Output	Personal Income	Returns to Treasury	ROI
Unconstrained Model Using Industry Statistics	711,908	\$83.64'	\$162.70'	\$45.63'	\$6.16'	48.2:1
Constrained Model Using Firm Statistics	219,148	\$22.01'	\$40.34'	\$13.76'	\$1.86'	14.5:1
60% of Reported Impact	15,115	\$1.52'	\$2.78'	\$0.949'	\$0.128'	1:1

what does REMI say? <sup>sm</sup>

*"One of the biggest barriers highlighted by businesses in Wyoming was a lack of skilled workers"*

*-ENDOW 20 Year Diversification Strategy 2018*

*Report*

# Building Blocks: Health and Quality of Life



- Aspiration: WY residents should have access to affordable healthcare, within 75 miles of home
  - ▣ Solution for rural communities, eco dev opportunity: telehealth technologies
- Aspiration: “to build and maintain the working climates and community life climates that a modern workforce requires”
  - ▣ REMI partnership w ArtsMarket



Louise Stevens  
President, ArtsMarket  
[lstevens@artsmarket.com](mailto:lstevens@artsmarket.com)

# Building Blocks: Infrastructure



- Similar challenge: providing quality critical infrastructure across decentralized communities
  - ▣ Transportation
  - ▣ Water/waste
  - ▣ Telecom
  
- Recent Wins
  - ▣ WYDOT: FHWA ATCMTD grant awarded for rural integrated corridor management system
  - ▣ Nov. 2018: American Airlines daily svc between Cheyenne, Dallas-Ft. Worth



# Building Blocks: Entrepreneurial Ecosystem



- Financial side: greater access to venture capital will reduce the barriers to entry for would-be entrepreneurs
  - ▣ Discussion for after presentation: how can state, business community support this?
- Technical side: make use of shared spaces, incubators, P3's, accelerators to foster entrepreneurship
  - ▣ SF118 Kickstart: Wyoming – provides resources for mentoring, marketing, legal, biz services for start-ups

# Building Blocks: State Capabilities



- ENDOW role of government
  - ▣ Proper regulatory regimes
  - ▣ Provide smart incentive and support programs
  - ▣ Ensure access to quality infrastructure
  
- Pure gravy: improve government efficiency by aligning state agency strategies, roles, objectives
  - ▣ Planning and programming
  - ▣ Budget
  - ▣ Economic and Workforce Development Grants
  - ▣ Data and Analysis
  - ▣ Performance Monitoring
  - ▣ Permitting

# Next Generation Engines

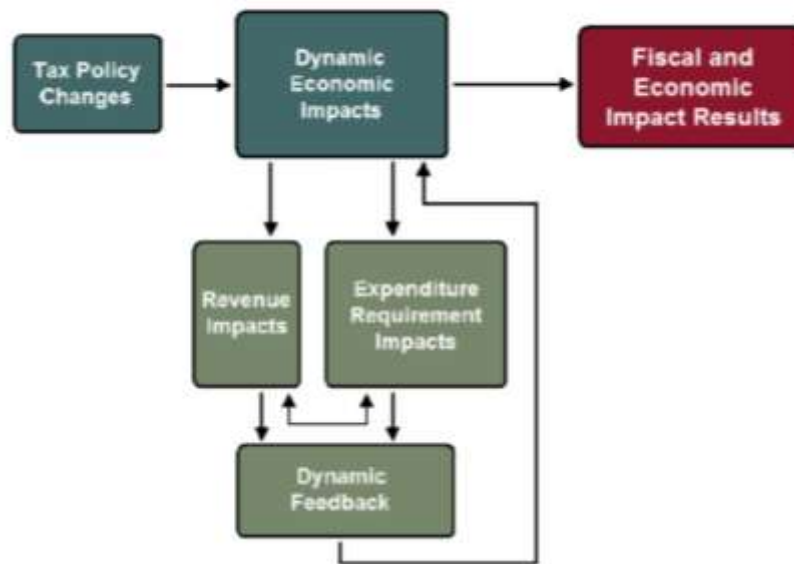


- Natural Resources
  - ▣ Strategy: target value add sectors, untapped wind, solar, water, rare elements
- Tourism and Recreation
  - ▣ Quality of Life: accommodations, outdoor rec, outdoor equipment manufacturing
- Sustainable Harvest
- Advanced Manufacturing
  - ▣ Industrial equipment
  - ▣ Energy/storage
  - ▣ Aerospace
  - ▣ Medical devices
  - ▣ pharmaceutical
- Knowledge and Creative
  - ▣ Financial/professional services
  - ▣ Healthcare
  - ▣ Digital and technology
  - ▣ Arts/culture

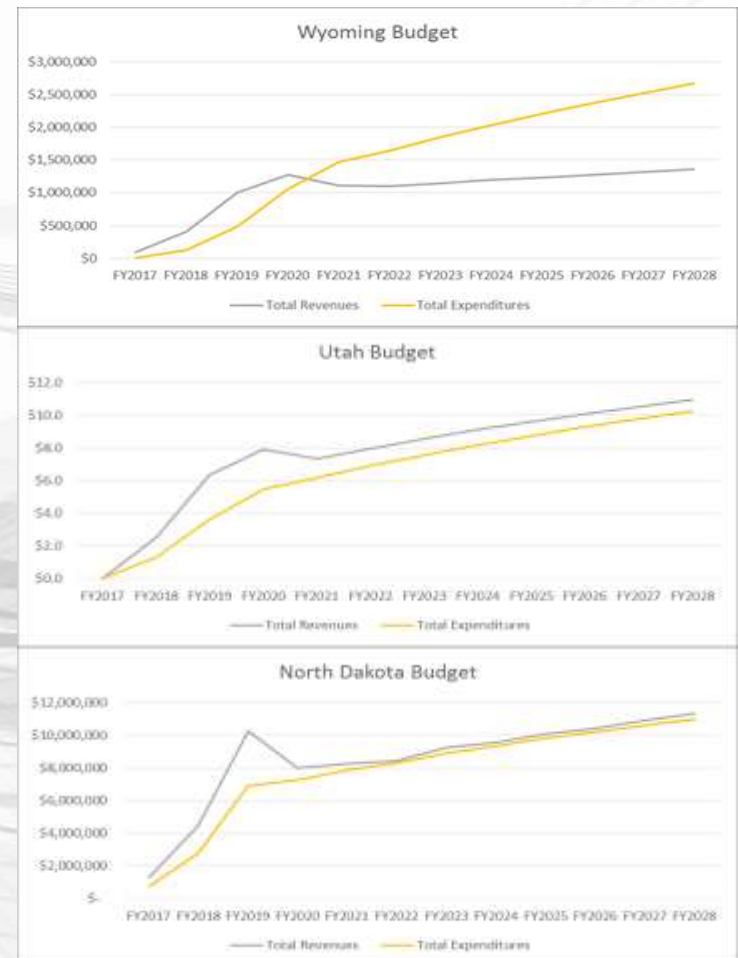
# Promoting Next Generation Engines: Fiscal Decoupling



## Tax-PI Model Structure Overview



- Lesson learned: overreliance on extraction industries, necessary minimum expenditures hinder economic diversification



what does **REMI** say? <sup>sm</sup>



# Promoting Next Generation Engines: Fiscal Decoupling



- Model: 70 sector WY state Tax-PI model w modified budget
- Scenario 1: 500 new mining (except oil & gas) jobs
  - ▣ 160 sector sub-industries: coal mining, metal ore mining, nonmetallic mineral mining
  - ▣ 10-year fiscal impact: \$240m net revenue gain
- Scenario 2: 500 new misc. manufacturing jobs
  - ▣ 160 sector sub-industry: medical equipment manufacturing
  - ▣ 10-year fiscal impact: \$10m net lost revenue