The Changing Energy Landscape and Its Effect on the Economy

Evening at the Fed
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*The views expressed herein are those of the presenter only and do not necessarily reflect the views of the Federal Reserve Bank of Kansas City or the Federal Reserve System.
The “Fed” consists of three main entities:

- **Board of Governors**: 7 members appointed by U.S. President
- **Federal Reserve Banks**: 12 total; semi-independent by design
- **Federal Open Market Committee**: 19 members; 12 voting

Primary responsibility areas:

- Monetary policy
- Bank regulation
- Financial services
Overview

- The mix of fuels used for energy in the United States is changing and is expected to change further in coming decades, as renewable energy grows.

- The Tenth District economy has been and remains highly concentrated in the energy sector, especially in production of oil, natural gas, and coal.

- The District also is well positioned for the transition to renewable energy, but the regional economy faces some disruptions as the transition occurs.
U.S. energy usages has been and will continue to move toward more reliance on renewables

Source: EIA Annual Energy Outlook 2021
Fossil Fuel Energy’s Importance in the Tenth District Economy
Compared to the rest of the U.S., mining (oil, natural gas, coal) contributes 3 times as much to Tenth District GDP.

Real GDP Share by Industry, 2020

Sources: BEA, Staff
Mining’s share of GDP fell slightly in 2020 but remains especially high in NM, OK, and WY.
The Tenth District is home to some of the top producing states for traditional sources of fuel

<table>
<thead>
<tr>
<th>2018 Rank</th>
<th>Coal</th>
<th>Natural Gas</th>
<th>Crude Oil</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Wyoming</td>
<td>Texas</td>
<td>Texas</td>
</tr>
<tr>
<td>2</td>
<td>West Virginia</td>
<td>Pennsylvania</td>
<td>North Dakota</td>
</tr>
<tr>
<td>3</td>
<td>Pennsylvania</td>
<td>Oklahoma</td>
<td>New Mexico</td>
</tr>
<tr>
<td>4</td>
<td>Illinois</td>
<td>Louisiana</td>
<td>Oklahoma</td>
</tr>
<tr>
<td>5</td>
<td>Kentucky</td>
<td>Ohio</td>
<td>Colorado</td>
</tr>
<tr>
<td>6</td>
<td>Indiana</td>
<td>Colorado</td>
<td>Alaska</td>
</tr>
<tr>
<td>7</td>
<td>Montana</td>
<td>West Virginia</td>
<td>California</td>
</tr>
<tr>
<td>8</td>
<td>North Dakota</td>
<td>Wyoming</td>
<td>Wyoming</td>
</tr>
</tbody>
</table>

Note: Tenth District states in red.

Source: EIA
Tenth District Oil and Gas in Recent Years
After a boom in natural gas prices from 2003-08 and oil from 2009-15, prices have since stayed lower.
Rig activity in the District reflects this, with a lower overall level of drilling, especially since COVID-19

Source: Baker Hughes/Haver Analytics
Recent and expected growth in oil production has mostly been in the Permian basin of TX/NM, not in the District.
For natural gas, the biggest growth has been in the eastern U.S., especially the Marcellus basin of PA.
In addition to regional movements, in recent years it takes considerably fewer workers to produce more oil and gas.

U.S. Rig Count, Employment, and Production

Index May-90=100

- Rig Count
- Employment
- Production (BOE/day)

Note: Employment is for NAICS 211, 213111, and 213112. Production is shown as a 3mma.

Sources: Baker Hughes, EIA/Haver Analytics
Indeed, from 2012-2017, productivity (output per hour) in oil and gas doubled, and rose 60% in the broader sector.

Sources: Bureau of Labor Statistics/Haver Analytics, Author's calculations

Industry labor productivity five year cumulative change

NAICS 211: Oil & gas extraction
NAICS 21: Mining
Total U.S. nonfarm business


% chg

140
120
100
80
60
40
20
0
-20
-40
140
120
100
80
60
40
20
0
-20
-40

Sources: Bureau of Labor Statistics/Haver Analytics, Author's calculations
Only a select few industries have experienced productivity growth like that, and most grew further but reduced jobs

Change in output, investment, and employment
10 years after productivity surge

- Electronic & appliance stores (1996-2001)
- Air transport (2001-2006)

Sources: U.S. Census Bureau, Bureau Economic Analysis, Bureau of Labor Statistics/Haver Analytics, Author's calculations
Since 2017, mining employment has dropped across the U.S., region, and most District states, but production’s up.
More recently, COVID hurt oil and gas activity in the region, but firms have become more optimistic about 2021.
Renewable Energy in the Tenth District
Some Tenth District states already rank among the top producers of renewable energy

<table>
<thead>
<tr>
<th>2018 Rank</th>
<th>Biofuels</th>
<th>Solar/Wind/Water</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Iowa</td>
<td>California</td>
</tr>
<tr>
<td>2</td>
<td>Nebraska</td>
<td>Washington</td>
</tr>
<tr>
<td>3</td>
<td>Illinois</td>
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<td>Indiana</td>
<td>New York</td>
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<td>South Dakota</td>
<td>Oklahoma</td>
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<tr>
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<td>Wisconsin</td>
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</tr>
</tbody>
</table>

Note: Tenth District states in red.

Source: EIA
The Tenth District has about the best overall potential for solar and wind of any Fed District

Renewable Resources in FRS Districts

Source: NREL
So it could pay off for us to be so hot and windy!

Utility-scale Solar PV
Levelized cost of energy by county

Wind Potential
Levelized cost of energy by county

Source: Brookings, UT Austin Energy Institute
But growth in the renewable sector may not be as fast as the decline in fossil fuels, especially in terms of jobs.

Source: EIA Annual Energy Outlook 2021
Summary

• U.S. energy consumption has grown in recent years. Fossil fuel production and specifically oil and gas has been a large industry and key employer across the Tenth District

• However, COVID-19 and fluctuating commodity prices have changed the outlook for the industry and accelerated trends for greater renewable energy production

• While the energy landscape has continued to evolve in recent years, it remains an important part of the Tenth District economy
Additional Resources:

- Annual [Energy Conference](#) of Dallas and KC Feds
- Kansas City Fed [Energy & Economy](#) Webpage
- Quarterly Energy [Survey](#)
- Quarterly Energy [Databook](#)
- Quarterly [Oklahoma Economist](#)