Geopolitical Change and the Continued Significance of Our Nation's Inland Waterways

November 2021
The Mississippi Valley yields to no region in the world in interest, in romance, and in promise for the future. Here, if anywhere, is the real America — the field, the theatre, and the basis of the future civilization of the Western World. The history of the Mississippi Valley is the history of the United States; its future is the future of one of the most powerful of modern nations.

Albert Bushnell Hart
The Future of the Mississippi Valley (1900)
Greater Mississippi River Basin

Irrigated and rainfed cropland along with small fractions of crops

Data: MEaSUREs GFSAD1KCD, NOHRSC
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U.S. Expansion in North America and Hawaii

1. Original Thirteen Colonies
2. Territory of the Original Thirteen States (Ceded by Great Britain) 1783
3. Louisiana Purchase 1803 (from France)
4. Ceded to United Kingdom 1818
5. British Cession 1818
6. Texas Annexation 1845 (former Republic of Texas)
7. Mexican Cession 1848
8. Gadsden Purchase (from Mexico) 1854
9. Oregon Territory 1846 (Treaty with United Kingdom)
10. Alaska Purchase (from Russia) 1867
11. Hawaii Annexation 1898

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GEOGRAPHIC CHALLENGES TO CHINA'S INTERIOR DEVELOPMENT
Strategic Position of Taiwan in Chinese Security

Data: NASA SEDAC, CIESIN GPWv4
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China’s Belt and Road Initiative
Water Stress Forecast, 2040

Patterns of climate change, conservation and usage are stressing water availability across the globe. Where water stress, population growth and underlying social tensions meet, the impact may move beyond food supplies and limits on urbanization to conflict both within countries and among them.
Outlook for Global Energy Demand

Dozens of different oil companies, intergovernmental agencies and other bodies have put together their own forecasts of energy demand over the next two decades. The five selected represent a diverse set of scenarios where the international community works together on climate change — Shell’s Sky 1.5 and the IEA’s Sustainable Development Scenario (SDS) — and others where other priorities limit international collaboration — mirroring key differences in the scenarios that we have developed.

Oil

MILLION BARRELS PER DAY

2019*  2030  2040

Shell: Waves
IEA: STEPS
BP: BAU
Shell: Sky 1.5
IEA: SDS

Natural Gas

BCM PER YEAR

2019*  2030  2040

IEA: STEPS
BP: BAU
Shell: Waves
Shell: Sky 1.5
IEA: SDS

*Data for 2020 is from 2019 because each of these reports was drafted before full year 2020 data was available.

Sources: IEA, BP, Shell
Freight Transported on U.S. Inland Waterways by Sector in 2020

Total: 596 million short tons

- **Petroleum**: 22%
- **Coal and Coke**: 20%
- **Farm and Food Products**: 14%
- **Chemicals**: 8%
- **Other**: 36%

Source: U.S. Army Corps of Engineers
Greenhouse Gas Emissions Intensity of Mode of Freight Transportation

<table>
<thead>
<tr>
<th>Mode of transportation</th>
<th>Water</th>
<th>Pipeline</th>
<th>Rail</th>
<th>Truck</th>
<th>Air</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relative GHG emissions intensity*</td>
<td>0.3</td>
<td>0.4</td>
<td>0.9</td>
<td>1.2</td>
<td>320.0</td>
</tr>
<tr>
<td>Share of total tonnage transported</td>
<td>3.4%</td>
<td>19.1%</td>
<td>9.2%</td>
<td>66.1%</td>
<td>0.01%</td>
</tr>
<tr>
<td>Share of GHG emissions</td>
<td>0.9%</td>
<td>7.4%</td>
<td>8.0%</td>
<td>80.5%</td>
<td>3.2%</td>
</tr>
</tbody>
</table>

NOTE: Freight transport emissions make up about 30% of total transport emissions.

*Relative GHG Intensity = Share of greenhouse gas emissions divided by share of tonnage transported

Sources: CATO Organization; U.S. Bureau of Transportation Statistics

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Evolving Global Framework

**Bipolar Cold War**
- U.S. and allies
- Soviet Union and allies

**Unipolar Moment**
- U.S.
- Globalization

**Three Pillars**
- U.S. (security)
- China (economic)
- Europe (regulatory)

**Fragmented Globalization**
- Multiple poles of power
- 2+2+ (two major powers: China and the U.S., two secondary powers: Russia and Europe)
Change in EU Household Debt (2018–2021)

As household debt grew over the COVID-19 pandemic, the EU and the bloc’s national governments both took extensive measures to ensure European banks had the liquidity and guarantees needed to keep lending.

Change in Household Debt from 2018 Q1 to 2021 Q1

- 30% to 40%
- 20% to 30%
- 10% to 20%
- 0% to 10%
- -10% to 0%

Source: European Central Bank

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Russia’s Projected Population, by Age Bracket

Returning echoes of lower fertility rates, originally initiated by World War II and the financial crisis in the late 1990s, will gradually raise the demographic pressure on Russia beyond 2036.

Source: Rosstat
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China’s Local Debt Risk by Province, 2019

Most provincial and regional governments have been grappling with high debt and growing expenditures, meaning the tax cut could add to their stress. Some provinces in the southwest and center are facing greater challenges this year due to their relatively weak financial footing.

Local debt risk*

Provinces
1. Anhui
2. Beijing
3. Chongqing
4. Fujian
5. Gansu
6. Guangdong
7. Guangxi
8. Guizhou
9. Hainan
10. Hebei
11. Heilongjiang
12. Henan
13. Hubei
14. Hunan
15. Inner Mongolia
16. Jiangsu
17. Jiangxi
18. Jilin
19. Liaoning
20. Ningxia
21. Qinghai
22. Shaanxi
23. Shandong
24. Shanghai
25. Shanxi
26. Sichuan
27. Tianjin
28. Tibet
29. Xinjiang
30. Yunnan
31. Zhejiang

* Local Debt Risk = (Local Debt plus Local Government Financing Vehicle) / (Fiscal Revenue minus Fixed Expenditure)

Sources: Government budget report; Wind; Guosheng Securities; Ministry of Commerce, National Bureau of Statistics

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China’s Local vs. Central Fiscal Structure

Since the 1994 tax reform, when the central government reasserted fiscal authority, the share of fiscal revenue to local governments significantly declined. Those governments are also bearing the cost of growing spending -- everything from public services to education and infrastructure projects. The fiscal imbalance was particularly magnified by the 2008 financial crisis.

Expenditure

Revenue

Sources: WIND, Ministry of Commerce, China Merchant Securities

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The Broken Link Between U.S. Productivity and Pay

U.S. productivity and labor income growth have diverged widely since 1973. Between then and 2017, productivity grew by more than 77 percent, while hourly pay increased by 12 percent.

U.S. Worker Productivity and Pay Index, 1948-2017; 1948 = 100

Source: Economic Policy Institute

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Global Shipping, Trade and GDP

Global trade and increasingly long and complex supply chains have been the defining features of the post Cold War world. But with demographic shifts, technological developments and rising economic nationalism, a new model may emerge.

![World Shipping Chart]

![World GDP Chart]

![World Trade Volume Chart]

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Sources: World Bank, IMF, ICS

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Ports able to accommodate ships of over 500 feet long
Freight Transport Volume by Mode of Movement

For year 2010

Mode
- Interstate highways
- Non-interstate highways
- Railroad
- Inland waterway

Volume Scale
(Tons/Year)

250 million
100 million
50 million

Copyright Stratfor 2021  Source: U.S. Bureau of Transportation
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