BOISE STATE UNIVERSITY

Idaho National Laboratory

Compete.
Council on Competitiveness

Competitiveness Conversations Across America

A Competitiveness Conversation in the Mountain West:

Powering and Securing Innovation—Semiconductors, Clean Energy, Advanced Nuclear, and Cybersecurity

Boise State University
Boise, Idaho
August 6-8, 2024

THE COUNCIL ON COMPETITIVENESS is a nonprofit, 501 (c) (3) organization as recognized by the U.S. Internal Revenue Service. The Council's activities are funded by contributions from its members, foundations, and project contributions. To learn more about the Council on Competitiveness, visit Compete.org.

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Why “Competitiveness Conversations Across America”? And Lessons Learned in the Mountain West

Dear Council Community,

For nearly 40 years, the Council on Competitiveness has served as a prominent, nonpartisan advocate for enhancing our nation's innovation capacity and capabilities. Our members—comprising CEOs, university presidents, labor leaders, and national laboratory directors—offer valuable real-world insights to policymakers in Washington and around the country.

Five years ago, leaders within the Council identified the emergence of several disruptive technological revolutions set to present both unprecedented challenges and opportunities for the nation's long-term security and productivity potential. Rapidly emerging and converging technologies were poised to address national and global challenges, heralding a new era of societal transformation.

However, the Council also recognized that the prosperity of the United States depends on our ability to take advantage of these opportunities by adapting our society to an increasingly innovation-driven future. Because, if the United States does not develop the next major technologies and solutions, a competitor will. To ensure the United States is positioned to lead on innovation, the Council established the **National Commission on Innovation and Competitiveness Frontiers** (Commission), the Council's flagship, multi-year initiative that unites over 60 National Commissioners from diverse geographies and sectors. National Commissioners are dedicated to enhancing innovation capacity and capability to promote long-term productivity and inclusive prosperity across the United States.

During Phase 1 of the Commission (2020 to 2023), the focus was on how the widespread adoption of new tools, like generative AI, along with novel business and workforce models, are empowering individuals and institutions nationwide to innovate, create, develop, and scale new products and services like never before. However, despite the vast potential offered by these advancements, a significant portion of America's talent remained untapped.

In response, the Commission highlighted the necessity to broaden the definition of “place” beyond traditional innovation hubs on the coasts, ensuring that every community in the United States can engage with and benefit from the innovation economy.

To support this national imperative, the Council launched the **Competitiveness Conversations Across America**, a series of high-level, multi-stakeholder gatherings at local, state, and regional levels. These discussions are designed to explore emerging and best practices in innovation from regions across the country while high-

lighting the nation's cutting-edge efforts. In this way, the Competitiveness Conversations aim to deepen engagement and broaden participation in the innovation economy, ensuring a larger segment of the nation is involved in shaping its future.

A Competitiveness Conversation in the Mountain West: Powering and Securing Innovation—Semiconductors, Clean Energy, Advanced Nuclear, and Cybersecurity, was the second edition of the Competitiveness Conversations series. It took place on the campus of Boise State University on August 6-8, 2024. The event brought together leaders from across the Mountain West, the United States, and the world to discover the innovation drivers of Idaho and the broader region.

Over the three-day Conversation, we learned from thirteen informative sessions, with panelists from universities, industry, federal and local government, utilities, national laboratories, and economic development leaders. Collectively, the speakers provided a 360 view of the distinctive characteristics of the region's economy, the challenges and opportunities faced by the region, and the approaches being deployed in the Mountain West to build the region into a world-class innovation hub. Let me share five insights from the region that stood out to me:

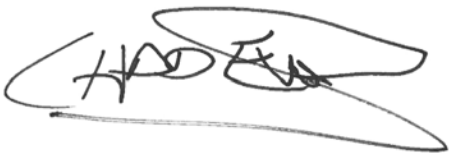
1. **Triad of transformation.** The Mountain West is redefining its economic landscape through three pivotal industries: semiconductors, cybersecurity, and advanced nuclear. These sectors not only promise to revolutionize everyday life but also ensure our national security. This triad is essential for boosting America's global competitiveness, providing groundbreaking solutions that address both local needs and international challenges.
2. **Innovation drives growth.** Innovation is the lifeblood of the Mountain West, a region steeped in exploration and discovery that has seen remarkable economic success. In 2023, Idaho's economy surged with the fastest growth in the U.S., achieving a 5 percent increase in gross state product (GSP). As it embraces new opportunities, Idaho is becoming a global hub for research in industries that are reshaping the modern economy, embodying the American spirit of adaptability and progress.
3. **A growing ecosystem in an attractive location.** As life in more "traditional" coastal tech hubs becomes more expensive and crowded, innovators are looking for new places to work. The Mountain West has positioned itself as a place of opportunity, both for migrants and for longstanding residents, as it has invested in the infrastructure and companies necessary to create an attractive job market.
4. **Collaborative powerhouses.** Strategic collaborations are essential to fueling growth in the semiconductor industry and beyond. Idaho stands out as a leader in this space, thanks to partnerships like that of Boise State University and Idaho National Laboratory, which are pushing the boundaries of innovation across nuclear, semiconductors, materials science, cybersecurity, and many other sectors. The synergy between academia, government support, and private investment fosters an unparalleled environment for innovation and regional growth.

5. **Investment in long-term economic sustainability.** As the region sees economic growth and population expansion, it is taking a long-term view on how to prepare for its future. From energy sustainability to creating economic engines to reforming education, the region is not just riding a wave of growth; it is investing to ensure that it can continue to grow sustainably for decades to come.

Alongside the valuable insights from our Conversation speakers, the three-day event was an opportunity for participants to meet, connect, exchange ideas, and begin thinking of new ways to collaborate. I have heard about partnerships seeded during the Conversation and look forward to hearing what grows from them. These connections, in combination with fantastic speakers and breathtaking venues made the overall experience of the Mountain West Competitiveness Conversation such a success. I thank wholeheartedly the leadership at Boise State University and Idaho National Laboratory—in particular Dr. Marlene Tromp, Dr. John Wagner, Dr. Nancy Glenn, and Dr. Todd Combs—along with their incredible teams. Their collective strategic insights, conscientious planning, and diligence made this event truly special and productive.

As I reflect on the Council's time in the Mountain West, it's clear that the opportunities are enormous for the region and the country, especially across the growing industry of semiconductors and microelectronics, energy and advanced nuclear, and cybersecurity. The lessons learned in Boise will be taken by the Council and shared nationwide. I look forward to working with our partners in the Mountain West again in the future and hope to hear much more in the years to come about how the region is leading the nation towards a more prosperous and innovative future.

Sincerely,



Chad Evans
Executive Vice President and
Chief Operating Officer
Council on Competitiveness

Agenda

August 6 @ the Boise Train Depot

EVENING

5:00 Networking Reception and Registration

6:00 Competitiveness Conversation Dinner

Welcome Remarks from:

Mr. Matthew Ewing
CEO
Boise State University Foundation

Dr. Jeremiah Shinn
Vice President of Student Affairs
and Enrollment Management
Boise State University
The Hon. Lauren McLean, Mayor, City of Boise

8:00 Dinner Concludes

August 7 @ the Stueckle Sky Center

MORNING

7:30 Breakfast, Registration, and Networking

Grab your name badge and be sure to sign up for an afternoon tour and no-host dinner, with several options curated by Boise State University. These are first-come first-served, so be sure to reserve your spot for Wednesday night's activities and the opportunity to explore Boise and its rich culture.

8:30 Putting Competitiveness in Context: Challenges and Opportunities for 2024

Leaders launch the Mountain West edition of the "Competitiveness Conversations Across America" series—taking place under the auspices of the National Commission on Innovation and Competitiveness Frontiers—framing the grand challenges and opportunities facing Idaho, the Mountain West region, and the United States.

Dr. Todd Combs
Deputy Laboratory Director for Science & Technology & Chief Research Officer
Idaho National Laboratory

Mr. Chad Evans
Executive Vice President and
Chief Operating Officer,
Council on Competitiveness

Dr. Nancy Glenn
Vice President of Research & Economic
Develoent
Boise State University

9:00 Developing the Pillars of the Mountain West's Innovation Ecosystem

Leaders on this panel will explore the key drivers of the region's innovation ecosystem. They will highlight major challenges and opportunities in Idaho and the Mountain West, as well as suggest best practices to scale nationally to increase dramatically the innovation capacity of the United States.

Dr. Tommy Ahlquist
CEO
Ball Ventures Ahlquist

The Hon. Dave Lent
Idaho State Senator

Mr. Rick Murdock
CEO & Co-Founder
Autovol and Waypaver Intl.;
& Co-Founder, Prefab Logic

Ms. Wendi Secrist
Executive Director
State of Idaho Workforce Development Council

Moderator

Ms. Bobbi-Jo Meuleman
President & CEO,
Boise Metro Chamber of Commerce

9:50 Networking Break

10:10 Microchips in the Mountain West: Becoming America's Hub for Microelectronics and Advanced Semiconductors

The Mountain West has emerged as a powerhouse in microelectronics and semiconductor innovation. This panel features visionary leaders who are spearheading efforts to establish Idaho as a national hub for semiconductor research, design, and manufacturing. The conversation will explore the region's role in meeting the imperatives and overcoming challenges of the ambitious CHIPS & Science Act, which will pave the way for America's resurgence in microelectronics, crucial for shaping the future competitiveness and national security of the United States.

Mr. Jeff Binford
Senior Director of U.S. Expansion Planning
Micron Technology

Mr. Doug Hackler
President & CEO
American Semiconductor

Dr. Dan Lamborn
Executive Director of the Institute for
Microelectronics Education & Research
Boise State University

Ms. Amanda Mays
Senior Advisor for Policy
CHIPS Program Office,
U.S. Department of Commerce

Moderator

Mr. Roger Brown
Director of Economic Development
Boise State University

11:00 Tech Talk: Advanced Materials and Semiconductors

Dr. David Estrada
Professor & Associate Director
Center for Advanced Energy Studies
Boise State University

11:15 Cyber Frontier: Establishing Idaho as an Epicenter of Cybersecurity

As cyber threats escalate, the need for robust cybersecurity infrastructure to protect sensitive data and our national security from increasingly sophisticated attacks has never been more critical. This session will explore the strategic initiatives necessary to attract leading cybersecurity businesses, foster innovation, and build a skilled cyber workforce in Idaho.

Mr. Matthew Bott
Foreign Affairs/Legislative Affairs Officer
Bureau of Cyberspace & Digital Policy
U.S. Department of State

Chief Jerred Edgar
Director of Cyber Training / CISO
Idaho Army National Guard

Dr. Sin Ming Loo
Professor of Electrical & Computer Engineering & Director of the Cyber Operations & Resilience Program
Boise State University

Moderator

Mr. Zach Tudor
Associate Laboratory Director for National & Homeland Security
Idaho National Laboratory

12:00 Lunch

AFTERNOON

1:00 A Perspective on Innovation and Leadership: A Keynote from Senator James Risch

The Hon. James Risch
United States Senator

1:15 Innovation to Achieve Energy Targets: Advanced Nuclear and Beyond for Idaho, America, and the World

The Mountain West, the United States, and countries globally are working to address rapidly growing energy demands, necessitating significant policy and economic reforms to achieve a sustainable, clean, and reliable energy future. This panel assembles leaders who are addressing these challenges and driving the energy transition forward. They will explore opportunities for cleaner energy production and distribution, exciting research into advanced nuclear technologies, the complexities of transitioning to cleaner power, and pathways for growing the U.S. competitive advantage in energy.

Dr. Kathleen Araújo
Professor, Sustainable Energy Systems, Innovation & Policy
Director, CAES Energy Policy Institute
Boise State University

Dr. Shannon Bragg-Sitton
Director of Integrated Energy & Storage Systems
Idaho National Laboratory

Ms. Lisa Grow
President & CEO
IDACORP & Idaho Power

Dr. Scott Holcombe
Vice President of Engineering
Lightbridge Corporation

Mr. Rinaldo Hunt
Executive Director for Business Development & Strategic Partnerships
Purdue Applied Research Institute

Moderator

Mr. John Revier
Director of External Engagement and Communication
Idaho National Laboratory

2:00 Group Photo on "The Blue"

Conversation participants will have their photo taken on Boise State University's iconic blue football field to commemorate the Competitiveness Conversation. For safety, heels smaller than two inches by two inches are not allowed on the turf.

2:45 A Perspective on Innovation and Leadership: A Keynote from the Idaho Secretary of State

The Hon. Phil McGrane
Idaho Secretary of State

3:15 Innovation Tours on Boise State University Campus

5:00 Competitiveness Conversation Day 1 Concludes

Whether or not you plan to join one of the Boise State University curated no-host dinners, be sure to check out the Boise Area Guide for great ideas of what to do around the region.

August 8 @ the Stueckle Sky Center

MORNING

7:30 Breakfast, Registration, and Networking

8:30 Day 2 Kickoff

Dr. Todd Combs
Deputy Laboratory Director for Science & Technology & Chief Research Officer
Idaho National Laboratory

8:45 Harnessing Technology, Energy, and Natural Resources to Transform Industries

Mines, farms, forests, and the supply chains that connect them are critical to powering the innovation economy and fueling America's national laboratories, universities, factories, and utilities. This panel brings together leaders from across domains to unpack how technology is transforming and optimizing industry and the workforce in the Mountain West.

Ms. Catherine Cantley
Center Director
studio\Blu

Dr. Walter Copan
Vice President for Research & Technology Transfer
Colorado School of Mines

Mr. Benjamin Davenport
Executive Vice President
Idaho Mining Association

Mr. Ken Dey
Director of Government & Public Affairs, J.R. Simplot Company

Moderator

Mr. Rich Stover
Administrator
Idaho Office of Energy & Mineral Resources

9:30 Networking Break

9:45 Tech Talk: From Imagination to Insight—Leveraging Computation and Storytelling to Affect Change

Dr. Eric Jankowski
Associate Professor & Director
Micron School of Materials Science & Engineering
Boise State University

10:00 Unleashing State, Regional, and National Competitiveness with Radical Collaboration

The future of innovation will rely increasingly on multidisciplinary and multidomain partnerships that connect the research, development, and deployment of new technologies at scale. This panel will look at how the Mountain West region is working collectively across sectors, institutions, and state lines to bring together the talent, technology, infrastructure, and investment needed to maximize its regional competitiveness.

Dr. Elizabeth Cantwell
President
Utah State University

Ms. Dana Kirkham
Senior Director of Regulatory & Strategic Affairs
Idaho Environmental Coalition

Dr. Glen Murrell
Community & Regional Engagement Director
Idaho National Laboratory

Dr. Robert Wagner
President
Idaho State University

Moderator

Mr. Peter Risse
Government Relations
Boise State University

10:45 Mapping the Enabling Conditions for the Mountain West's Competitiveness Strategy for the Next 25 Years

Pulling from insights gathered throughout the Mountain West Competitiveness Conversation, the cohosts will examine the enabling conditions essential for the region's competitiveness strategy over the next 25 years, including the intersection of policy, infrastructure, education, innovation, and workforce development.

Dr. Todd Combs
Deputy Laboratory Director for Science & Technology & Chief Research Officer
Idaho National Laboratory

Dr. Nancy Glenn
Vice President of Research & Economic Development
Boise State University

Moderator

Mr. Chad Evans
Executive Vice President and Chief Operating Officer
Council on Competitiveness

11:15 Mountain West Competitiveness Conversation Concludes

First Look—The Mountain West

One of the Competitiveness Conversations series's goals is to equip local, state, and regional leaders with tools to assess their communities and foster vibrant innovation ecosystems, while also aiding national policymakers in understanding the complexity of interconnected systems. This "First Look" serves as an introduction to the region's competitiveness fundamentals, providing a foundation for the Conversation. It specifically focuses on:

- A Growing Regional Economy
- Industries of the Future
- Investment in an Innovation Economy
- Building Tomorrow's Workforce
- Infrastructure for an Innovation Ecosystem

1. A Growing Regional Economy

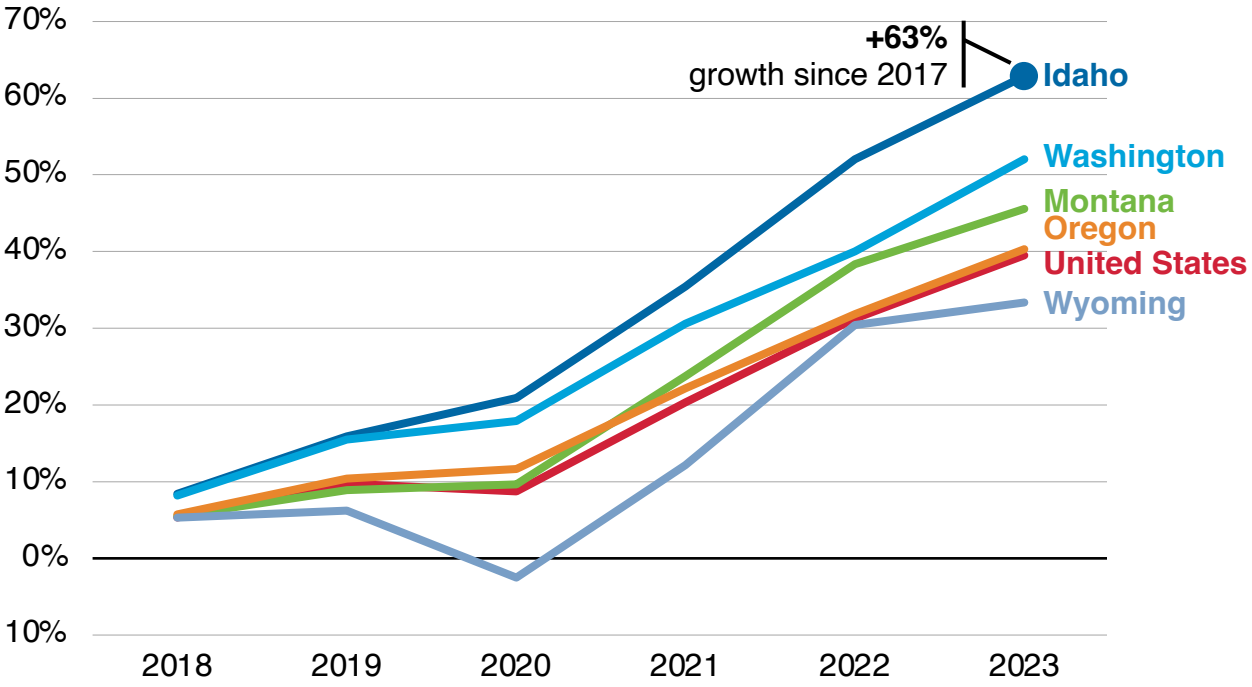
Idaho leads the nation in terms of state GDP growth.

Gross Domestic Product by State (US Bureau of Economic Analysis)

- Idaho's economy has grown rapidly since the COVID-19 pandemic. In 2023, the state's GDP reached over $118 billion, 63 percent higher than 2017 levels—marking Idaho as the fastest growing state in the nation over that period.
- As a region, the Mountain West states (e.g., Idaho, Washington, Montana, Oregon, and Wyoming) have generally outpaced the rest of the nation in state GDP growth since 2017.

Rate of Change in GDP, Chained to 2017

Source: U.S. Bureau of Economic Analysis



Manufacturing is a leading value-add industry.

Total *Value-Add by Industry (US Bureau of Economic Analysis); Idaho Departmen*t of Commerce

- Manufacturing added ~$10 billion to Idaho's economy in 2023.
- Idaho has developed a robust advanced manufacturing sector, creating products across industries such as semiconductors, robotics, and aerospace machinery.
- Advanced manufacturing offers high wages, with an average wage of $78,103/yr. Wages are even higher for semiconductor manufacturing, at an average of $135,000/yr.

Despite leading the state in value-add, manufacturing lags in employment.

Industry by Occupation (US Census Bureau)

- Manufacturing accounts for 10 percent of employment in Idaho.
- The largest employment industry in Idaho (22 percent) is educational services, health care, and social assistance.

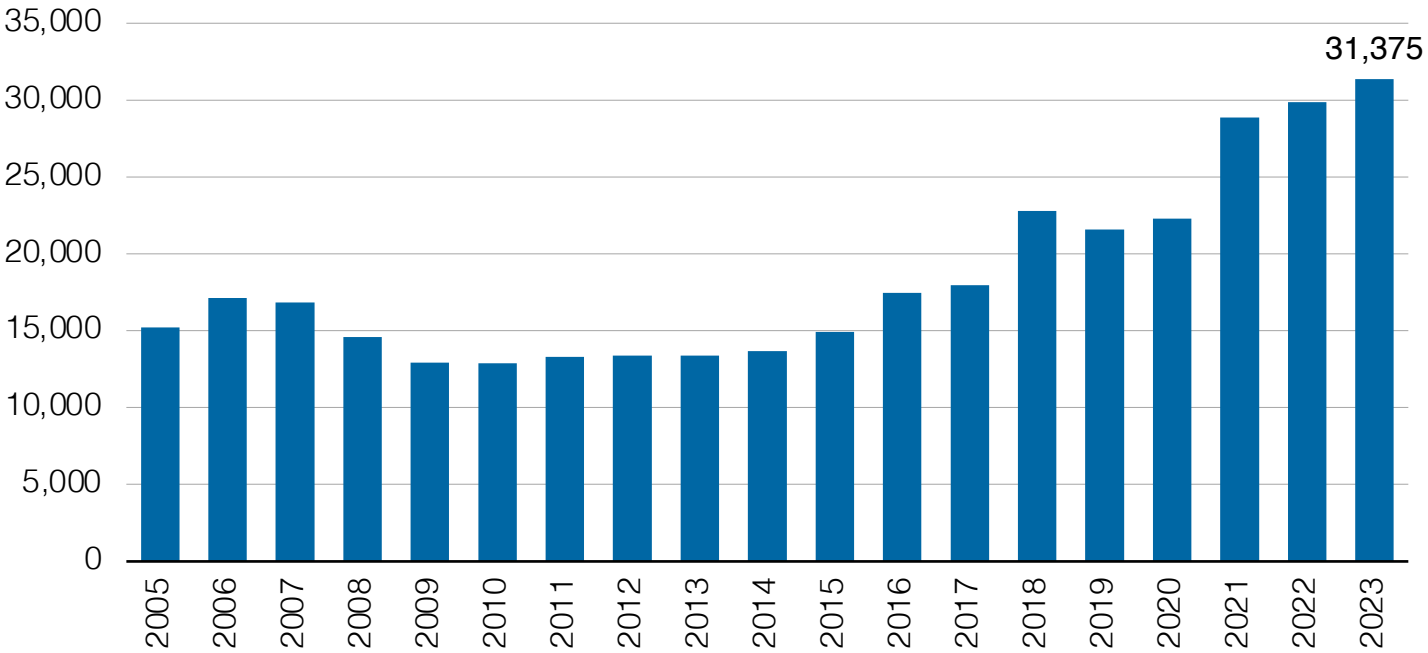
Idaho has become a hotspot for entrepreneurship and new business activity.

Quarterly Business Filings by State (US Census Bureau); Kauffman Indicators of Entrepreneurship

- Business filings in Idaho hit a record high in 2023, with over 30,000 new businesses created. Like many other states, each post-pandemic year has brought a new record high, continuing the decade-long trend growth in business creation.
- Idaho ranks 7th in the nation for early-stage entrepreneurship, according to the Kauffman Early-Stage Entrepreneurship Index.

Annual Business Filings, 2005-2023

Source: U.S. Census Bureau



Ada County is Idaho's population, commercial, and innovation hub.

The State of US Science and Engineering 2024 (National Science Foundation); Boise State

- Ada County holds over 25 percent of Idaho's population.
- Ada County produced 983 patents in 2022, the 17th highest concentration of patents per capita in the nation.
- Innovation in Ada County has been assisted by the CHIPS and Science Act of 2022, which supports a multi-million-dollar partnership between Boise State and Idaho National Laboratory to design neuromorphic technology to advance development of U.S.-manufactured computer chips.

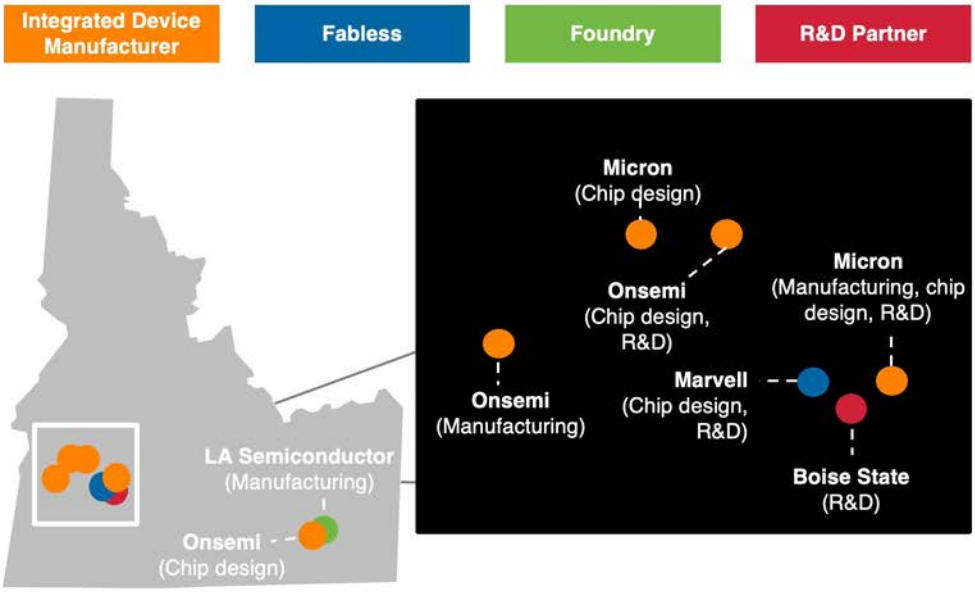
2. Industries of the Future

Idaho is home to one of the most robust semiconductor ecosystems in the nation.
U.S. Semiconductor Ecosystem Map (Semiconductor Industry Association); Boise State

- Idaho has the 2nd highest concentration of semiconductor manufacturing jobs as a share of total manufacturing jobs in the nation.
- Micron has announced a $25 billion investment into their chip fab in Boise, which is estimated to create 2,000 jobs in the area.
- Boise State's Institute for Microelectronics Education and Research, supported by a $5 million Idaho Workforce Development Council Grant, is positioned to spearhead research and workforce development in semiconductors.

Idaho Semiconductor Ecosystem Map

Existing facilities that are a part of the SIA as of March 2024
Source: Semiconductor Industry Association



Note: Graphic is illustrative, not comprehensive.

Idaho is a national leader in renewable energy generation.

State Profile and Energy Estimates (US Energy Information Administration); Department of Energy; Idaho Power

- Idaho ranks 5th in the nation for levels of renewable energy generation, driven by high hydropower production.
- With no state-mandated renewable energy goal, Idaho's private sector has taken on a unique role in driving the demand for renewable energy.
- In 2024, the Department of Energy partnered with two solar energy developers for carbon-free electricity generation projects hosted within the Idaho National Laboratory site.
- In 2023, Micron and Meta both committed to selling solar facilities back to Idaho Power to help offset the development of their data centers and chip fab.

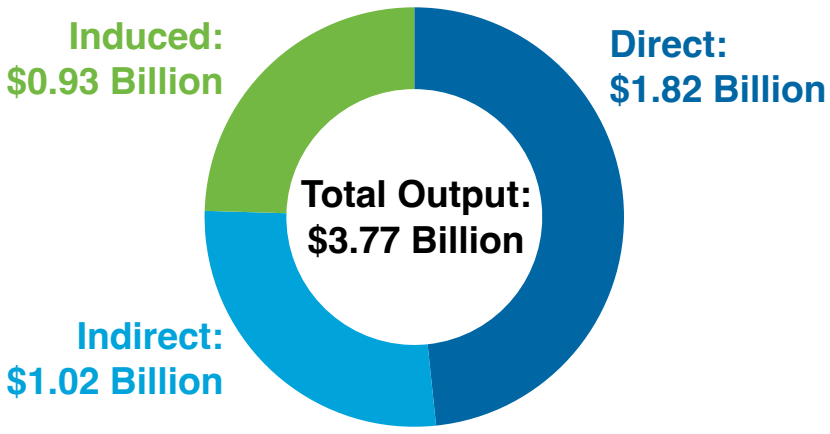
The advanced nuclear energy industry is rapidly growing in Idaho, largely due to public-private partnerships.

Intermountain-West Nuclear Energy Corridor (Idaho Advanced Energy Consortium); Department of Energy

- Idaho is home to the Intermountain-West Nuclear Energy Corridor Tech Hub (INEC), a 2023 USDEA Tech Hub Designee, in large part due to research excellence at Idaho National Laboratory. A focus of the INEC is to support industry partners in advanced technology implementation and testing to accelerate the development of advanced reactor designs.
- Recently, Curio Solutions received a GAIN voucher from the Department of Energy to pursue nuclear research at the Idaho National Laboratory. Their project hopes to close the nuclear fuel cycle with a process that avoids proliferation concerns.
- Idaho National Laboratory houses the Advanced Test Reactor, the world's premier nuclear test reactor, providing unmatched testing capabilities for military, federal, university, and industry partners and customers.

Idaho National Lab Annual Economic Impact
Estimated Total Economic Impact, FY2023

Idaho National Laboratory Economic Impact Summary FY2023



Idaho is a hub for cybersecurity research and development.

Idaho Commerce; Boise State University; Idaho National Laboratory

- Idaho National Laboratory houses the Cybercore Integration Center that leads cyber research and connecting partners across the nation.
- Boise State is home to the Institute for Pervasive Cybersecurity. This institute houses the "Cyberdome," a collaborative hub that aims to reduce cybersecurity risk for rural communities while producing a ready-to-work cybersecurity workforce.
- Boise State has been designated a National Center of Academic Excellence in Cyber Defense by the NSA since February 2022.
- Governor Brad Little created a Cybersecurity Task Force to help broaden Idaho's reach in the cybersecurity space.

3. Investment in an Innovation Economy

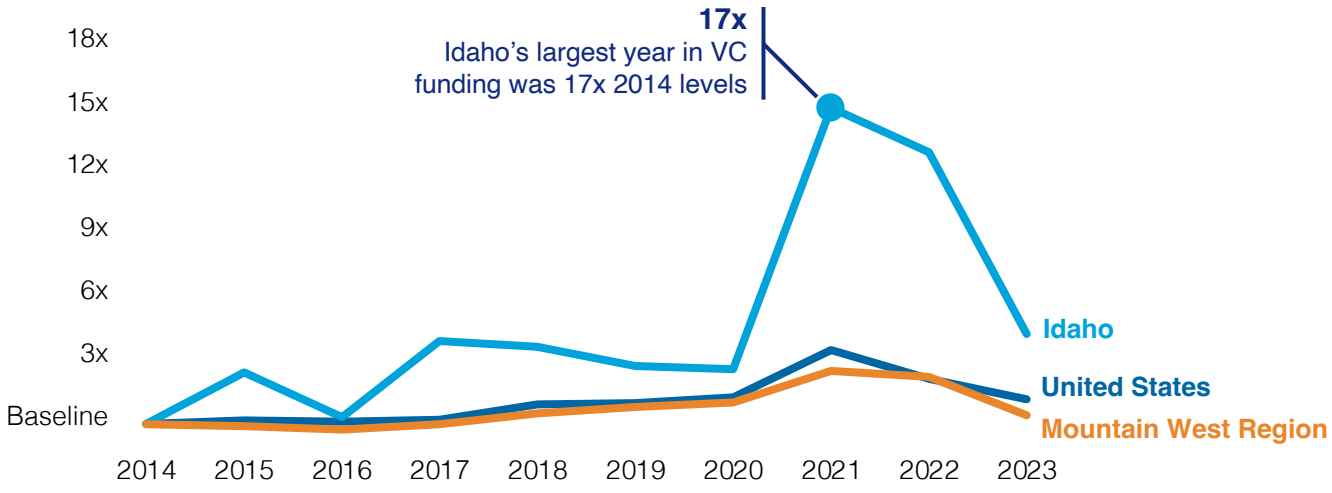
Venture capital funding in Idaho is growing faster than the national rate but has been sporadic.

National Center for Science and Engineering Studies; National Venture Capital Association

- Idaho has developed a substantial VC ecosystem and was the state with the second fastest VC growth rate during 2014-2023.
- State VC funding was 17x times higher in 2021 compared to 2014. Low interest rates and increased interest in VC from non-traditional investors in 2021 caused a national surge in VC funding. Idaho surged beyond this trend, with the increase driven by large investments in emerging industries including semiconductors and software.
- But rising inflation and climbing interest rates have slowed VC funding in recent years, impacting Idaho more than most other states. Despite this dip, Idaho has remained a regional leader in VC funding.

Annual Growth in Venture Capital Total Deal Value, Indexed to 2014

Source: National Venture Capital Association



R&D in Idaho is driven by the business sector.

National Center for Science and Engineering Statistics

- In 2021, R&D conducted in Idaho totaled an estimated $3.1 billion, propelling Idaho to 13th in the nation in R&D intensity (R&D/GDP).
- The business sector drove most of R&D in the state, performing 74 percent and funding over 72 percent of R&D in 2021.
- Idaho provides tax credits to local businesses for investing in R&D, encouraging the business sector to drive overall R&D performance.
- Idaho National Lab contributes significantly to overall R&D performance, totaling 17 percent of R&D performance in 2021. Specific areas of R&D interest at INL include advanced nuclear energy, renewable energy, and national security.

4. Building Tomorrow's Workforce

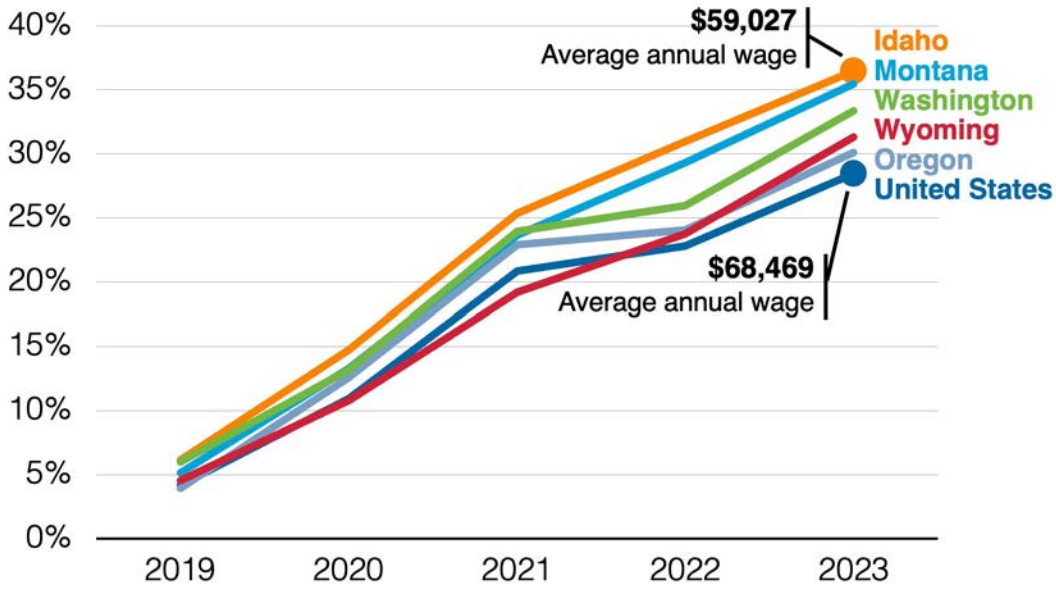
Idaho's labor market and income levels are strong and growing.

Idaho Department of Labor; Income per Capita by State (US Bureau of Economic Analysis); Idaho Department of Commerce

- Idaho's year-over-year job growth rate ranks second in the nation, with employment up more than 11 percent since early 2020.
- Per capita income in Idaho is up 36 percent since 2018, outpacing the rest of the nation.
- Advanced manufacturing boasts competitive pay that is higher than the state average, with an average wage of $78,103/yr. Semiconductor manufacturing specifically offers a $135,000/year average wage.

Rate of Change in Income per Capita, Chained to 2018

Source: U.S. Bureau of Economic Analysis



Population growth is driving the expansion of Idaho's workforce.

Population Estimates (US Census Bureau)

- Population inflow accounted for 78 percent of Idaho's 2023 population growth. Eighty-two percent was immigration from other U.S. states, while 18 percent was international.

Idaho's focus has increasingly turned to expanding the workforce of key industries.

National Science Foundation; Idaho Workforce Development Council

- Micron, Global Foundries, and the U.S. National Science Foundation are partnering to increase equitable education and create a diverse semiconductor workforce.
- Idaho's Workforce Development Council offers grants to key industry sectors to engage employers in developing Idaho's workforce.

5. Infrastructure for an Innovation Ecosystem

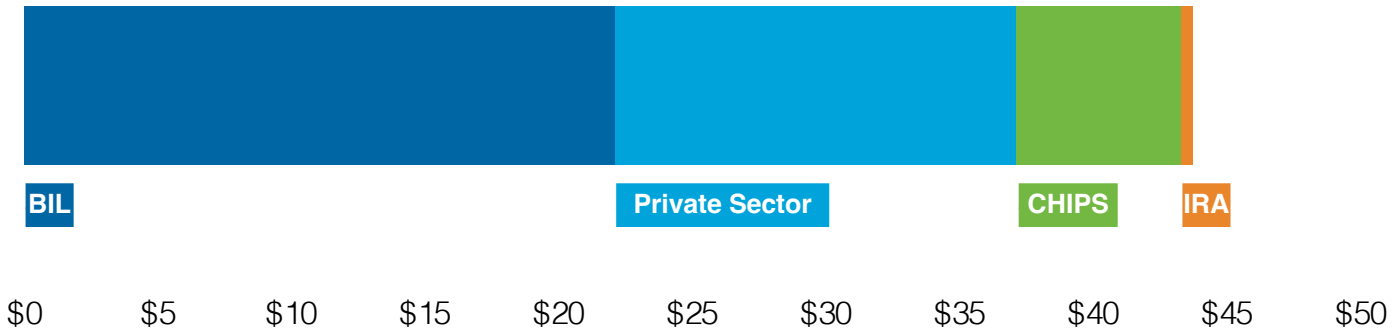
Idaho's innovation ecosystem is supported by regional and national legislation.

US Department of Commerce; Idaho Department of Commerce; US Environmental Protection Agency

- Idaho received the largest award in the nation from the CHIPS and Science Act of 2022, for semiconductor manufacturing.
- Idaho's state legislature enacted the Idaho Semiconductors for America Act, which provides qualifying Idaho semiconductor companies with a sales and use tax exemption on the purchase of qualifying construction and building materials.
- Idaho has received multiple Bipartisan Infrastructure Law grants aimed at improving physical infrastructure including broadband development, dam and reservoir repair, and water system improvement.

Investments in Idaho Spurred by National Policies, $B USD, last updated Jan 2024

Center for American Progress



Idaho's physical infrastructure has room to grow with the help of federal funding.

Economic Development Capacity Index (Argonne National Laboratory); American Society of Civil Engineers

- Three of Idaho's four most populous counties—Ada, Kootenai, and Bonneville—have high or elevated capacity to support an advanced and diverse business environment.
- Idaho's initial Infrastructure Report Card from the ASCE was a C-, but since then it has received many Bipartisan Infrastructure Law grants that will help further develop infrastructure statewide.

Housing affordability has become a significant challenge in Idaho.

Out of Reach Report (National Low Income Housing Coalition; US Department of Housing and Urban Development

- Idaho's rental housing prices are outpacing federal minimum wage and the average wage of a renter, making it difficult for workers to afford housing.
- In Idaho, a worker earning minimum wage would have to work 103 hours a week to afford a 1-bedroom rental home in Idaho.
- According to HUD's Comprehensive Housing Affordability Strategy, only half of Idaho's state rental units are affordable to Idaho residents.
- There are more than 41,000 cost-burdened renter households in Idaho, with a large concentration falling under the lowest income bracket (0-30 percent). Similarly, there are nearly 52,000 cost-burdened homeowner households.

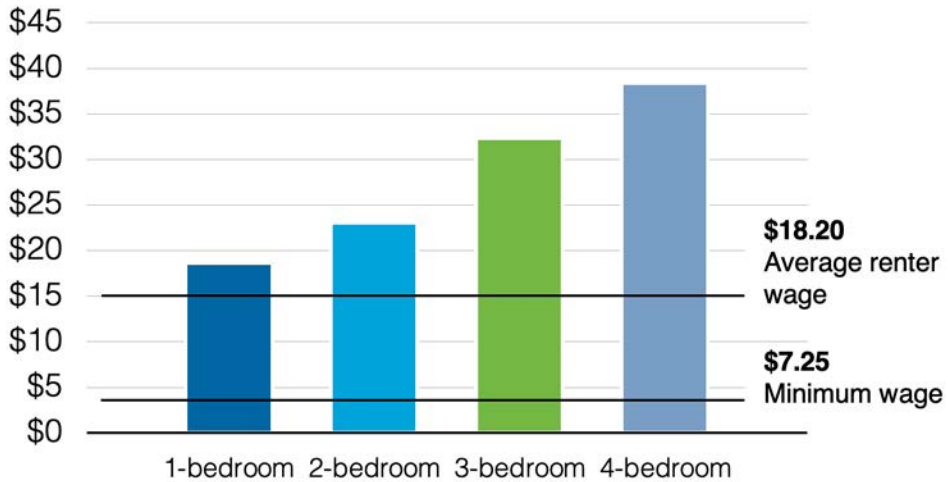
Urban-rural disparities in Idaho are illustrated by the digital divide.

Digital Divide Index (Purdue Center for Regional Development); Computer and Internet Use (Census Bureau)

- Broadband infrastructure and socioeconomic levels make it difficult for rural areas of Idaho to access broadband and adopt other technologies.
- Despite the digital divide, Idaho (90 percent) is only slightly behind the national average (91 percent) in terms of households with broadband internet access. However, more can be done to reduce other aspects of the digital divide (e.g., access to technology).

Hourly Wage Necessary to Afford Rental Housing in Idaho, 2024

Source: National Low Income Housing Coalition



Cross-cutting Themes and Big Ideas

1. **Innovation is the heart of the Mountain West's rapid growth.** The American ethos is deeply rooted in exploration, opportunity, and discovery, signifying a commitment to confronting major challenges. This spirit is exemplified by the people and culture of the Mountain West, and it's driving economic success in the region. In 2023, Idaho experienced the fastest economic growth in the U.S., with a gross state product (GSP) increase of 5 percent. Innovation has been the central component of the Mountain West's economic identity and, as the region embraces new opportunities and continues to push boundaries, it has become a global hub for research in several critical industries that are reshaping the modern economy.
2. **The triad of innovation—Semiconductors, Cybersecurity, and Advanced Nuclear—is redefining the region (and America's global competitiveness).** The Mountain West is witnessing an evolution in its economic landscape, driven by three pivotal industries: semiconductors, cybersecurity, and advanced nuclear. Each industry is poised to redefine everyday life and work while ensuring national security.
3. **Strategic collaborations are fueling growth, in semiconductors and across the regional economy.** Idaho is emerging as a powerhouse in the semiconductor industry, bolstered by a strategic alliance among educational institutions, national laboratories, and strong government support at local, state, and federal levels. For example, the partnership between Boise State University and the Idaho National Laboratory is driving groundbreaking advancements in materials science that could transform the semiconductor sector. This collaborative effort is enhanced by government incentives that attract private investments, creating an environment that attracts firms of all sizes and is ripe for innovation and growth.
4. **Cybersecurity is a critical economic driver and is engaging the rural workforce in the innovation economy.** Protecting the digital systems integral to nearly every aspect of our lives must become a top priority for governments, businesses, and individuals. The Mountain West is working to protect these vital systems and our critical infrastructure, and in doing so the cybersecurity sector has become a vital and expanding economic force in the region. Idaho National Laboratory's Cybercore Integration Center stands out as the nation's leading facility for cybersecurity solutions, engaging industry, universities, and federal agencies to safeguard critical infrastructure. This collaborative approach enhances the region's economic viability, including providing jobs to a rural workforce, and establishes it as an essential contributor to national security.

5. **Energy is key to unlocking the region's potential, and advanced nuclear may be key.** Electricity demand has surged, largely due to data centers supporting AI, with projections to double by 2050. This growth is compounded in the Mountain West due to its rapid population growth. Nuclear power presents a clean and reliable solution, free from fossil fuel emissions and the limitations of some renewable sources. The Idaho National Laboratory is innovating in nuclear energy to extend the lifespan of current reactors and develop advanced technologies. Meanwhile, Boise State's Energy Policy Institute is crafting a sustainable nuclear future, advocating for a robust energy strategy to facilitate ongoing innovations. Advanced designs, such as modular and microscale reactors, are poised to meet increasing energy demands if regulatory frameworks are updated accordingly.
6. **Mining is not dumb, dangerous, and dirty. But it is essential to America's innovation economy.** As domestic manufacturing grows and the energy transition accelerates, access to critical minerals is essential. Beyond the need for "rare earth metals," copper, phosphate, uranium, etc. are the materials from which the U.S. economy is built. Unfortunately, mineral production in the United States is stymied by public opposition to necessary mining projects and by outdated perceptions of the industry. Ensuring we have a steady domestic supply of these inputs, and the workforce to mine them, may be as important to our economy and national security as having a robust semiconductor industry.
7. **Boost innovation requires empowering talent from two-year and technical degrees, especially in rural areas.** To maintain an innovation-driven economy, future innovators must emerge from a variety of educational pathways, not just traditional four-year colleges. In the Mountain West region, programs like "Idaho Launch" are being developed to provide funding for post-secondary education and training, including college tuition and skilled trades courses. This initiative aims to attract talent not only to four-year, but also into two-year or technical degree programs, and it is especially focused on students from rural areas who may not have previously considered innovation careers. By expanding access to these opportunities, the program seeks to bridge the talent gap and create a more inclusive innovation landscape.
8. **The boon and burden of rapid economic development.** The Mountain West economy has grown rapidly over the past decade, and the Boise metro area has nearly doubled in population since the turn of the millennium. While this growth is a response to the opportunities in the area and its attractiveness as a place to live, expansion on this scale strains local infrastructure and increases housing prices. For the region to continue to grow, investment in infrastructure and services for an expanding, high-skilled population is in constant demand.
9. **The region's business-friendly climate sparks innovation and job growth.** The Mountain West's business-friendly climate energizes growth, and its commitment to nurturing innovation and creativity fuels its economic expansion. This vibrant atmosphere opens doors to higher-paying jobs and empowers residents to develop skills in emerging industries. This close-knit ecosystem enhances personal connections while its rural roots instill a "can-do" attitude, enabling innovative institutions to effectively tackle both national and global challenges.

Behind the Scenes

A Perspective on Innovation and Leadership: A Keynote from Mayor Lauren McLean

Key Session Insights

Addressing the Mountain West Competitiveness Conversation at its welcoming dinner the evening before the Conversation, Boise Mayor Lauren McLean shared her vision for Boise as an innovator.

As the first elected female mayor in the city's nearly 160-year history, Mayor McLean is dedicated to advancing Boise as a city for everyone. The city has experienced rapid growth in recent decades, with the Boise metropolitan area nearly doubling in population since the turn of the millennium. This growth has primarily stemmed from investments in local industries, particularly semiconductor manufacturing.

The CHIPS & Science Act has significantly impacted this trend, investing billions in the American semiconductor manufacturing industry, including companies such as Boise-headquartered Micron Technology, and promoting the re-shoring of semiconductor production. As Chair of the American Conference of Mayors' CHIPS Implementation Task Force, Mayor McLean is deeply involved in the implementation of this landmark microchip manufacturing bill and understands its potential benefits for communities. She describes the bill as "integral" to Micron's decision to reinvest in Boise.

The Hon. Lauren McLean, Mayor of Boise, Idaho.

McLean emphasizes that the CHIPS Act, while incredibly significant from a funding perspective, also represents a unique opportunity to catalyze the innovation ecosystem being cultivated in Boise. Other partners—such as companies, institutions, universities, and the public sector—all have a critical role to play as well.

As an example, Mayor McLean highlighted Dr. Dan Lamborn, Executive Director of Institute for Microelectronic Education and Research at Boise State University, whose work with industry partners, federal agencies, and other research institutions across the globe is helping to develop a diverse semiconductor workforce for the future.

By actively supporting local innovation and workforce development efforts, Mayor McLean hopes to inspire ambition within the community and attract outside investors, ready to be a part of Boise's vibrant economic future.

Beyond its attractiveness as a growing city for innovation and economic opportunity, Mayor McLean highlighted another reason why CHIPS investors and future generations of workforce may be drawn to Boise—the distinct feeling of community that she believes sets Boise apart from other U.S. cities. As it happened, the Competitiveness Dinner on August 6th coincided with "National Night Out," a community engagement event that originated to raise awareness about neighborhood crime but has evolved into a celebration with block parties, fairs, and a spirit of neighborliness. This event is one of many in Boise—nearly 100 every summer in Downtown Boise alone—that celebrate community connection and contribute to the city's overall spirit. Events like these embody the values that make Boise strong and reflects the city's commitment to continually asking, "What more can we do to support our residents?"

With Boise growing rapidly and investments in innovation opening new opportunities, Mayor McLean envisions a bright future, where organizations across all sectors come together to create a vibrant and welcoming city. She thanked the attendees of the Competitiveness Conversation for choosing Boise and expressed her enthusiasm for collaborating with them to make the city an even better place to live and work in the coming years.

> "There is a lot of work to do, not only thinking about how we can collaborate and innovate, but thinking about how we can meet the needs of the residents that are going to fuel these companies and these investments."
>
> **The Hon. Lauren McLean**
> Mayor of Boise, Idaho

Opening Remarks from Conversation Co-Chairs

Session Overview

As the United States grapples with unprecedented challenges such as economic inequality, geopolitical tensions, climate change, and issues of energy and national security, the need for new and innovative solutions has never been greater. Innovation can drive the development of sustainable technologies and products, improve processes, and generate economic opportunities and growth. However, innovation is often a complex process requiring collaboration among leaders from academia, industry, and government.

These leaders must work together to create the new products, services, and processes needed to advance society.

To begin this second edition of the Competitiveness Conversations Across America, the three cohosts each provided opening remarks highlighting the challenges and opportunities they saw as critical to the success of both the Mountain West and the country as a whole.

Panel

Dr. Todd Combs
Deputy Laboratory Director for Science & Technology and Chief Research Officer, Idaho National Laboratory

Mr. Chad Evans
Executive Vice President and Chief Operating Officer, Council on Competitiveness

Dr. Nancy Glenn
Vice President of Research & Economic Development, Boise State University

Key Discussion Points

At Boise State University's Stueckle Sky Center, Boise State Vice President of Research and Economic Development Dr. Nancy Glenn welcomed attendees, including business leaders, government officials, national laboratory researchers, and university partners. She described the region as one of the country's most vibrant yet isolated urban areas.

Dr. Glenn defined the residents of the Mountain West as uniquely positioned to forge a new chapter in American innovation. Their profound respect for the land, combined with an ethic of community building and cooperation, fosters a "boots on the ground" approach to innovation. This perspective values self-reliance and local collaboration in problem-solving. Instead of hindering innovation, the region's broadly rural character enhances it.

The Mountain West's recognized success in innovation provides a unique opportunity to amplify rural voices on the national stage. Institutions in the Boise area have achieved global recognition as top-tier innovators. Dr. Glenn highlighted collaborations between Boise State University and several Japanese institutions, organized through the G7 Economic Forum, that focused on semiconductor manufacturing research. This endeavor positions Idaho and the Mountain West to transform from a relatively isolated region into a center of global research and manufacturing.

Dr. Glenn asserted that community building, collaboration, and a love of the land formed the foundations of Idaho's economic competitiveness. By building on these values, the state could become a model for innovation both in the Mountain West and nationwide.

Dr. Todd Combs, Idaho National Laboratory Deputy Laboratory Director for Science & Technology and Chief Research Officer, focused his remarks on the role of a national laboratory in an innovation ecosystem. As home to one of the 17 Department of Energy National Laboratories, Idaho has a rare advantage among states competing to be the next hub of American innovation. By leveraging the unique capabilities a national laboratory provides, the state can supercharge its research capabilities.

Dr. Combs positioned the role of a national laboratory as an institution poised to tackle the problems that are too big, hard, or expensive for

"Our individual connections to this place are deeply meaningful. Being relatively small in population and remote, we can have meaningful conversations and share a mutual love for this wonderful place. This sense of community and problem-solving spirit is a strength that is becoming increasingly rare in our nation and across the globe."

Dr. Nancy Glenn
Vice President of Research & Economic Development
Boise State University

"At Idaho National Laboratory, we do things that tend to be too big, too hard, too expensive for others to tackle alone, and we work to bridge that gap from basic and fundamental science and technology and bring about products that industry can bring to the marketplace."

Dr. Todd Combs
Deputy Laboratory Director for Science & Technology and Chief Research Officer
Idaho National Laboratory

private institutions or universities. They work on finding solutions for the most challenging problems facing the world; Dr. Combs specifically raised energy independence, critical infrastructure, cybersecurity, strategic minerals, and water as just some of the areas of focus. To address these challenges, he encouraged more boldness in innovation, what he called "Statue of Liberty" plays, so that critical challenges wouldn't go unanswered.

"We have got to work together to be incredibly creative, to be incredibly focused on reinventing America, building and developing many systems of innovation across every community of our economy. So, let us start here in Idaho."

Mr. Chad Evans
Executive Vice President and Chief Operating Officer
Council on Competitiveness

Zooming into the work of Idaho National Laboratory, Dr. Combs highlighted both three past areas of focus – nuclear development, integrated energy systems, and national security—and four new areas of interest: Fusion, advanced fission, AI, and strategic minerals—as places where the laboratory will need to partner with academia, industry, and government to succeed. While the national laboratory has incredible capabilities independently, by working with innovation allies in the region, research in the area can be supercharged.

Mr. Chad Evans, Executive Vice President and Chief Operating Officer of the Council on Competitiveness, opened the Conversation by placing the event in context with the Council's overall agenda and flagship program, the **National Commission on Innovation and Competitiveness Frontiers (Commission).** The Commission's work over the past four years has set the stage for the Competitiveness Conversations series, which emphasize the critical need to "broaden the geography and deepen the demography of U.S. innovation." Too many of the nation's 340 million people are disconnected from its innovation economy; if they could be brought into it, the American capacity for scientific and technical innovation would be supercharged.

The "next economy" of the United States would be defined by the reshoring of critical industries and materials, and one defined by an ever-greater focus on research, Mr. Evans said. However, with pressure on federal budgets, greater emphasis needs to be placed on the role of state and local leaders if this economic transition is to be successful. By coming to Boise, and to several other emerging technology hubs in the coming years, the Council hopes to seek out and amplify the practices and lessons learned in these areas to help move all parts of the U.S. economy towards a more prosperous and innovative future.

PANEL

Developing the Pillars of the Mountain West's Innovation Ecosystem

Session Overview

Kicking off the Mountain West Competitiveness Conversation, leaders in local business and government explored the key pillars of innovation as articulated in the Council's **National Commission on Innovation & Competitiveness Frontiers (Commission)**—highlighting both key challenges and opportunities for Idaho, particularly how to meet the demands of a rapidly growing innovation economy. Leaders also discussed how to create the physical and the human infrastructure required for the next stage of the region's economic expansion.

Key Session Insights

Idaho is amid a period of economic growth unprecedented in the state's history, driven by innovative industries like semiconductors, advanced nuclear, and cybersecurity. Several pillars have allowed this economic renaissance to come to fruition; Ms. Bobbi-Jo Meuleman, President & CEO of the Boise Metro Chamber of Commerce, highlighted the presence of economic "anchor tenants," such as Micron, Idaho National Laboratory, and the universities in the area as major drivers of the expansion of research-based economic activity. Combined with a robust power system and an expanding workforce, these part-

Panel

Dr. Tommy Ahlquist
CEO, Ball Ventures Ahlquist

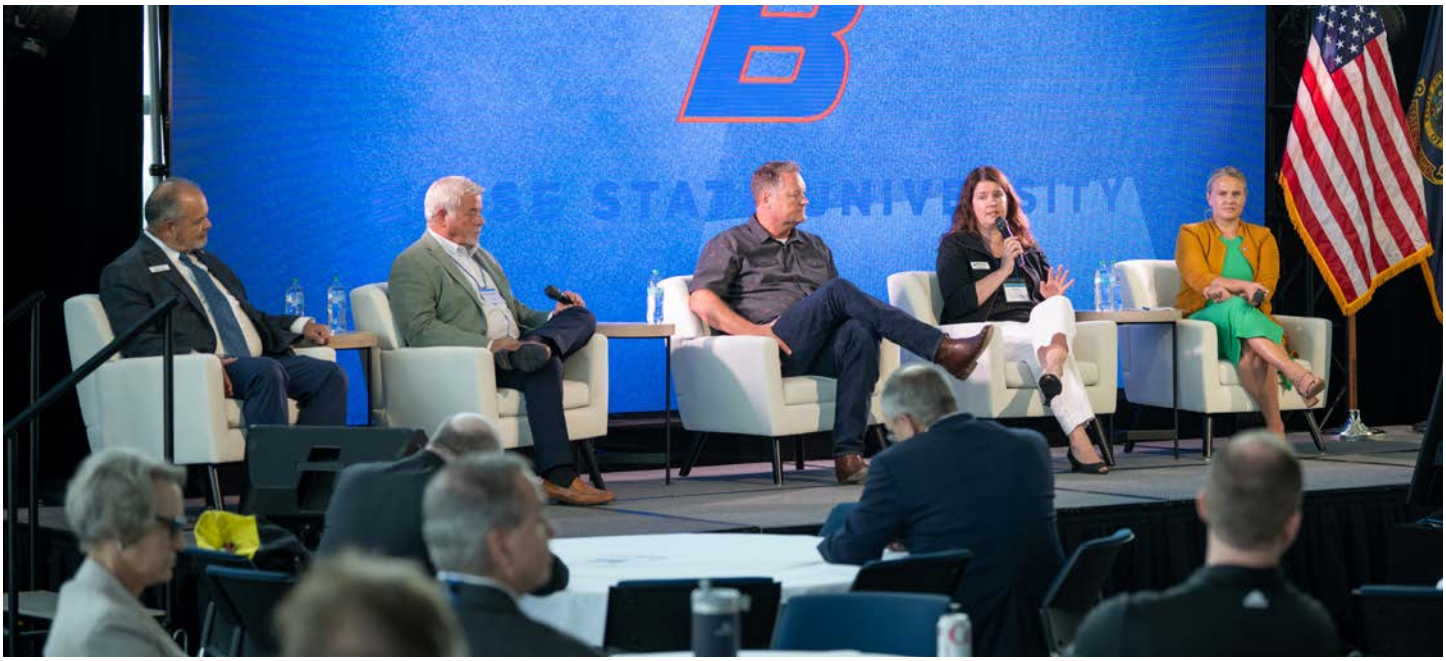
The Hon. Dave Lent
Idaho State Senator

Mr. Rick Murdock
CEO & Co-Founder, Autovol and Waypaver Intl.; & Co-Founder, Prefab Logic

Ms. Wendi Secrist
Executive Director, State of Idaho Workforce Development Council

MODERATOR

Ms. Bobbi-Jo Meuleman
President & CEO, Boise Metro Chamber of Commerce



The Hon. Dave Lent, Idaho State Senator; Mr. Rick Murdock, CEO & Co-Founder, Autovol and Waypaver Intl.; & Co-Founder, Prefab Logic; Dr. Tommy Ahlquist, CEO, Ball Ventures Ahlquist; Ms. Wendi Secrist, Executive Director, State of Idaho Workforce Development Council; and Ms. Bobbi-Jo Meuleman, President & CEO, Boise Metro Chamber of Commerce.

ners have helped to create systems of collaboration and engagement that have significantly increased the state's innovation capacity.

The first ingredient of a prosperous and innovative economy is a skilled and engaged workforce, and that begins with education. As Ms. Wendi Secrist, Executive Director of the State of Idaho Workforce Development Council, put it: "education is a pathway; the outcome is a career." Education in Idaho must remain focused on producing workers with the skills needed to enter the innovation economy. By closely collaborating with employers, educators can create curricula that will lead to good jobs and stable careers for graduates. Institutions with this mission in mind are already in place and working towards this goal, the Workforce Development Council is designed to act as a "translator" between employers and educators, allowing them to better understand each other's needs and capabilities. Further, to support an innovation economy, workforce training in all sectors needs to be enhanced; industries like hospitality or forest products, while not traditionally thought of as key innovators, are necessary to support an innovation ecosystem.

Idaho State Senator Dave Lent built on the idea of education as the first component of an innovation economy, describing a visit he made to Finland and Estonia to study their educational systems. There, a focus on flexibility and allowing students to transition between vocational and professional pathways prepared students to enter the workforce. A funding model with a far more localized focus and deemphasis on standardized testing also allowed communities to tailor their systems to match local economic opportunities and employer needs. Lent suggested that our system needs to be structured to create innovators for tomorrow's economy, and that the change needs to be immediate and disruptive, rather than gradual.

In the shorter term, there is much that can be done to assist in workforce education after students have left school. Secrist highlighted the

"I think we are lucky to be part of this and we have a bright future, but we all know to take advantage of that, there is some planning, there is some collaboration, and some ecosystem building that we need to do."

Bobbi-Jo Meuleman
President & CEO
Boise Metro Chamber of Commerce

example of the Idaho Launch program, designed to provide financial assistance to high schoolers pursuing any postsecondary education, be it college or vocational training. By making workforce training of all types accessible, more students will be able to fill critical roles beyond what requires a college degree; for example, the Launch program will pay for a Commercial Driver's License, helping steer more students into a critical and lucrative career.

Innovation does not happen in a vacuum; it requires the combined efforts of many, if not the efforts of an entire community. That's why Ball Ventures Ahlquist CEO Dr. Tommy Ahlquist believes that Idaho is poised for success. Accord-

"How do we make sure we have the right skills, the right people at the right time for our employers to grow?"

Wendi Secrist
Executive Director
State of Idaho Workforce Development Council

ing to him, the state's heritage of working together, born from its past as isolated settler communities, is going to pay dividends going forward. There is a history of major employers in the state working with the government to manage expansion and ensure communities can handle economic growth, but Ahlquist asked how government and private industry may be able to more closely cooperate and assist each other with problems neither can solve on their own. By getting away from long-standing silos, rivalries, and separations, the capabilities of the region's key players can be massively enhanced, to the benefit of all.

This sentiment around cooperation was echoed by Autovol CEO and Co-Founder Rick Murdock, who explained how, at the company he runs, a collaborative approach to work has generated impressive results. His company instituted a hiring process that looks for a collaborative mindset in new hires, and has a structure where "bosses" are replaced by "mentors." As a result, Autovol

"We are still using the same basic [educational] process we did when our grandparents and great-grandparents were riding around in horse and buggy. If we want to change that system, then why don't we re-engineer the whole process?"

The Hon. Dave Lent
Idaho State Senator

"Right now, our problem is that we are tearing each other apart most of the time on the margins. Most people care deeply about each other. We care deeply about our kids, we care deeply about our future, and there is so much that we have in common. So, getting together and finding ways to work together and finding ways to celebrate wins together, we need more of it."

Tommy Ahlquist
CEO, Ball Ventures Ahlquist

has become a leader in modular construction, a major disrupter in the industry of homebuilding. By facilitating a cooperative atmosphere and infusing it with advanced technology, Autovol is revolutionizing how homes are built and creating a more productive and innovative future.

A renewed focus on infrastructure—of every kind—will be needed to cope with the region's growth. As Idaho and the broader Mountain West grows in population and economic stature, greater strain is being placed on existing infrastructure, which will limit growth without investment. Murdock voiced his concerns about affordability in the region, especially in housing, as construction has not kept up with the influx of demand. This problem is only exacerbated by the aging workforce in the construction industry. A combination of making construction a more attractive job and increasing the productivity of construction workers, like with modular manufacturing, is necessary for keeping up with demand.

The panel went on to discuss other high-level pillars of innovation for the region:

Idaho's power infrastructure has been a historic strength for the region. Having heavily invested in hydroelectric power, the state has long

"I am looking at the character of the person we are bringing in the company because we have a family-oriented company and want to make sure that it stays that way. But what we found is when you take a different approach with youth, you get a different result. I always remind everyone if that you want to grow, train your replacement."

Mr. Rick Murdock
CEO & Co-Founder
Autovol and Waypaver Intl.;
Co-Founder
Prefab Logic

boasted one of the lowest costs of electricity in the nation. However, as demand grows for electricity and hydropower becomes less reliable due to droughts, more attention has been given to the potential of nuclear, especially given the state's long history of nuclear power research. Lent noted the incredible potential of nuclear power in Idaho and the United States but reiterated that unfounded public perceptions of hazards surrounding nuclear power need to be combatted to make that potential a reality. Education could help break down that barrier, but that needs to happen soon; China is rapidly expanding its own nuclear power capabilities, threatening to eclipse the United States if we do not begin our own comparable nuclear buildout.

For new infrastructure to be created, it first needs to be funded. Ahlquist raised noted that Idaho has a far more limited toolkit for funding infrastructure than most other states, something that could weaken efforts to expand to meet growing needs. Identifying what needs to be built is only half the battle; figuring out where funding would come from is crucial.

Infrastructure can stretch beyond just construction. Secrist raised the idea that other services, such as childcare, should be considered infrastructure, just as much as houses, roads, or power plants. Without a robust childcare system, parents will be just as unable to work as if there was no road from home to their job. By neglecting childcare, and other social services, large portions of the potential workforce would be excluded, making these services a critical priority if the goal is to bring as many people into the innovation workforce as possible.

The panel concluded on an upbeat—that despite challenges, the Mountain West is in a very strong position for economic growth. They expressed optimism for the future of the region, believing that, if any state has the capability and the will to solve the challenges facing it, it's Idaho. This optimism allows them to encourage some risk-taking and the belief that given the strengths of the region and its residents, these risks are manageable and ought to be taken. Finally, the collaborative spirit that has carried the state forward should be reinvested in; while silos have continued to come down, more work is still needed to make full, unhampered collaboration possible.

PANEL

Microchips in the Mountain West: Becoming America's Hub for Microelectronics and Advanced Semiconductors

Session Overview

Today, economies are as reliant on microchips as an input as they are on oil or minerals. The boom in AI has only grown the number of semiconductors needed for our national economy, and the growth shows no signs of slowing. However, even as the criticality of microchips for our economy becomes more pronounced, our supply of them is being increasingly called into question. The pandemic exposed vulnerabilities in the global semiconductor supply chain, and rising geopolitical tensions have led to anxieties over potential disruptions in the event of a conflict.

In light of these developments, efforts have been made to reshore U.S. semiconductor manufacturing, with players in the Mountain West poised to play key roles in both research and manufacturing. This panel examined the state of the microchip industry in the Mountain West, and what the future might hold for this critical industry, both in Idaho and nationwide.

Key Session Insights

Idaho has emerged as a semiconductor hub, for businesses both large and small. In spite of intense competition in a global semiconductor

Panel

Mr. Jeff Binford
Senior Director of U.S. Expansion Planning, Micron Technology

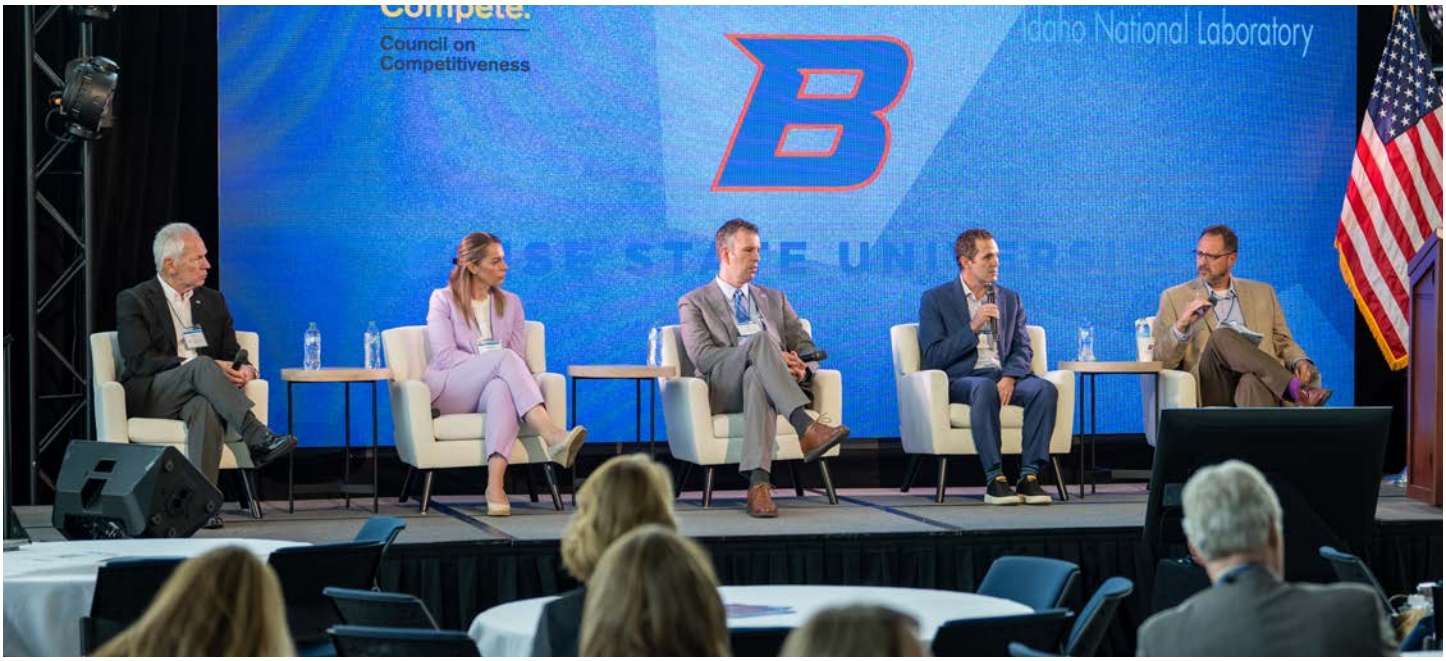
Mr. Doug Hackler
President & CEO, American Semiconductor

Dr. Dan Lamborn
Executive Director of the Institute for Microelectronics Education & Research, Boise State University

Ms. Amanda Mays
Senior Advisor for Policy, CHIPS Program Office, U.S. Department of Commerce

MODERATOR

Mr. Roger Brown
Director of Economic Development, Boise State University



Mr. Doug Hackler, President & CEO, American Semiconductor; Ms. Amanda Mays, Senior Advisor for Policy, CHIPS Program Office, U.S. Department of Commerce; Dr. Dan Lamborn, Executive Director of the Institute for Microelectronics Education & Research, Boise State University; Mr. Jeff Binford, Senior Director of U.S. Expansion Planning, Micron Technology; and Mr. Roger Brown, Director of Economic Development, Boise State University.

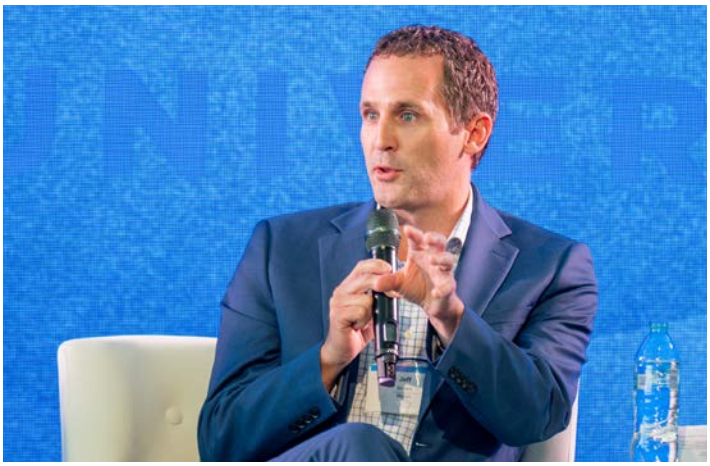
market, Idaho and the broader Mountain West have grown a significant microchip industry composed of homegrown businesses. Global semiconductor firm Micron has been joined by a host of smaller companies and manufacturers, helping to create an ecosystem, rather than just a single company. Investment in research and education, particularly at Boise State University and Idaho National Laboratory, has expanded the scope of the work being done in Idaho to include cutting-edge research and development.

The success of Micron, and the impact that has had on the local community, remains a pillar of the industry in the Mountain West. Senior Director of U.S. Expansion Planning for Micron Technology Mr. Jeff Binford noted that over 57,000 people are employed by the company, and Micron has made a huge and successful efforts to develop and recruit a local workforce. Binford highlighted the skilled workforce that exists in Idaho, the available land (including ease of related permitting), and the robustness of utilities in the state as the key ingredients allowing Micron to grow into the global company it is today.

However, the Mountain West's microchip ecosystem would not be complete without a host of smaller companies. American Semiconductor President and CEO Mr. Doug Hackler ensured attendees that the role of smaller players was critical. He described a divide in how to consider the role of small business in an industry tilted towards industrial titans: On one hand, some believe that the role of smaller companies is to provide support to the major players like Micron, serving as a part of their supply chain. However, Hackler put forward the alternative theory that the more important role of smaller businesses in the microchip industry was to serve as the incubator, and to take risks on new technologies that less nimble large players may not. In this way, the

"The good and bad of our market is that we are small, and we know everybody in the ecosystem. Typically, you can have a conversation where all the expertise and all the authority and all the political interests are served in one meeting."

Mr. Roger Brown
Director of Economic Development
Boise State University



"And as we look at the other ingredients of innovation across the region, and especially within this valley, there is really those three things: land, workforce, and utilities."

Mr. Jeff Binford
Senior Director of U.S. Expansion Planning
Micron Technology

smaller firms may serve as the "next generation" of the microchip industry; Hackler reminded the audience that Micron itself had humble origins in the basement of a Boise dentist's office.

Support needs to be offered to firms of all sizes. As businesses both large and small move to take advantage of the renewed interest in domestic semiconductor manufacturing, they will need to be offered robust support. Senior Advisor for Policy at the CHIPS Program Office in the U.S. Department of Commerce Ms. Amanda Mays, described how collaboration between industry and government at all levels is crucial for the long-term sustainability of microchip ecosystems. Further, the CHIPS and Science Act is the largest federal investment in microchip manufacturing capacity in a generation; it is critical that these funds are available for firms of all sizes. This will not only ensure that the critical support companies for the incredibly complex microchip industry are able to expand and meet growing demand, but also that smaller independent manufacturers are given fair access to resources as large players, keeping the playing field level and encouraging start-ups.

Beyond monetary support, a large expansion of semiconductor manufacturing capacity will necessitate growth in supporting infrastructure. More power will be required, as well as water, transportation connections, and internet access. Attention is

"For small business, we need to look at what innovation is coming from them, not such that we farm it and hand it over to larger organizations, but such that we nurture and grow that next generation of larger organizations that are going to lead us to the technology of tomorrow."

Mr. Doug Hackler
President & CEO
American Semiconductor

"How are we utilizing available programs to invest in the public infrastructure and the public sector needs so that projects can be successful? Connecting those dots is something that we're focused on from the federal side, not just providing incentives to a private sector company and hoping the region is able to figure out the support pieces on their own. The region, too, needs to be effective so the manufacturing firms can be successful."

Ms. Amanda Mays
Senior Advisor for Policy
CHIPS Program Office
U.S. Department of Commerce

needed on how to provide these services to semiconductor manufacturers without overtaxing local infrastructure or putting brakes on their expansion.

A successful semiconductor industry relies on a robust semiconductor workforce, and that means bringing more people into manufacturing. However, getting students involved in manufacturing today is difficult. Hackler suggested that part of the reason that microchip manufacturing declined in the United States in the first place was a lack of cultural emphasis on manufacturing as a valuable value-added job like software or IP development. Outdated notions about manufacturing as a lower-level industry or career have hampered the United States' efforts to re-shore semiconductor manufacturing, and this must be overcome.

"What things can I do to help enable a rural community to have that exposure so that they are at least aware of STEM? It does not have to be semiconductors. If they have the STEM exposure, the framework for being able to take their innovative ideas, their innovative thought processes, and actually do something with them, that's one of the big things I would like to see moving for our region forward."

Dr. Dan Lamborn
Executive Director
Institute for Microelectronics Education & Research
Boise State University

Bringing rural communities into STEM is difficult. As Executive Director of the Institute for Microelectronics Education & Research at Boise State University Dr. Dan Lamborn noted, people living in rural communities are often among the most innovative members of society, solving problems without the benefits of the significant resources and infrastructure that exist in more urban areas. Bringing them into the STEM economy would not only lift their communities, but also inject a new set of desperately needed innovators into the workforce. He highlighted the "Semiconductors for All" program, designed to help instill an interest in STEM subjects in students at an early age to help create pathways into future STEM careers. More talent and interest development programs like these can help close the gap between urban and rural communities and ensure more people are benefiting from and contributing to the innovation economy.

TECH TALK

Advanced Materials and Semiconductors

Speaker

Dr. David Estrada
Professor & Associate Director, Center for Advanced Energy Studies, Boise State University

Session Overview

Reliable power is central to modern living and economic competitiveness, but concerns have grown that the increasing power demand from data centers may put serious strain on America's electrical infrastructure. Dr. David Estrada made the case that, rather than simply seeking to add more power to the grid, we can solve the energy problem by rethinking the way semiconductors are made.

Key Session Insights

Demand for electricity is exploding at home in the United States, thanks in large part to increased usage by data centers. This process began when the economic potential of big data became apparent and was supercharged by the sudden rise of artificial intelligence in the past three years. As data centers of incredible size came online, and as the reach of AI stretches further, the strain they will place on the country's grid will increase.

"All the nuclear reactors in the world won't be able to supply the data centers by 2030. This is a fundamental materials problem at the transistor level."

Dr. David Estrada
Professor & Associate Director, Center for Advanced Energy Studies, Boise State University

Given that an AI query uses 10 times more energy than a Google search, increased reliance on AI is placing incredible strain on our energy infrastructure.

The solution to the massive problem of energy usage by data centers may lie in the microscopic problem of better materials for semiconductors.

Dr. David Estrada, Professor & Associate Director, Center for Advanced Energy Studies, Boise State University.

While it is easy to see the strain placed on the energy system as one of supply, Estrada proposed that it may be more effective to consider it as a demand problem. The reason that data centers require so much energy is because of the fundamental limitations of the way modern computers are constructed. The base material for modern semiconductors is silicon, cut into wafers, on which computing components can be built. But silicon as an element has fundamental material limitations; while billions of dollars of investment and decades of research has optimized silicon-based computing components, we are approaching the limit of how much energy we can put through a silicon semiconductor before it melts. These limitations mean that data centers are required to use more computing components at the same time to meet their needs, driving up their energy usage.

Estrada suggested that the limitations of silicon may soon be surpassed by a new class of computing components built out of new materials. Dubbed "2D" materials, these new creations, only a handful of atoms thick, are far more energy efficient. While these materials are in development, if commercialized the power savings may forestall the need for a large-scale buildout of additional grid capacity.

Much of the work to develop these new materials is being done in the Mountain West, specifically at Boise State University. The school has invested in a new machine – the first of its kind at a university – that will allow it to test new materials far beyond what was previously possible. Traditional methods of testing allow the creation of materials made up of two or three elements; the new facility at Boise State will allow Estrada and his team to use up to eighteen, allowing researchers at Boise State explore a host of new possibilities for 2D materials, including designing components that survive in harsh conditions like inside of nuclear reactors.

PANEL

Cyber Frontier: Establishing Idaho as an Epicenter of Cybersecurity

Session Overview

The world we live in is an increasingly digital one. Our intense reliance on cyberspace has made cybercrime more attractive and lucrative. As cyber threats escalate, the need for robust cybersecurity infrastructure to protect sensitive data and our national security from increasingly sophisticated attacks has never been more critical. This panel explored what threats our country faces in the cyber domain, how we are responding to them, and what that means for the economy of the Mountain West.

Key Session Insights

Digital systems have transformed the American way of life in innumerable ways, and our reliance on them leaves us uniquely vulnerable. It would be impossible to fully catalogue the number of ways that computer systems have been integrated into everyday life. Everything from banks to stores to military contractors have become dependent on a vast network of serves and computers to function. This has led to many major gains in efficiency, productivity, and quality of life for Americans, but society is now increasingly vulnerable to malicious actors.

Panel

Mr. Matthew Bott
Foreign Affairs/ Legislative Affairs Officer, Bureau of Cyberspace & Digital Policy, U.S. Department of State

Chief Jerred Edgar
Director of Cyber Training / CISO, Idaho Army National Guard

Dr. Sin Ming Loo
Professor of Electrical & Computer Engineering & Director of the Cyber Operations & Resilience Program, Boise State University

MODERATOR

Mr. Zach Tudor
Associate Laboratory Director for National & Homeland Security, Idaho National Laboratory

Chief Jerred Edgar, Director of Cyber Training / CISO, Idaho Army National Guard; Dr. Sin Ming Loo, Professor of Electrical & Computer Engineering & Director of the Cyber Operations & Resilience Program, Boise State University; Mr. Matthew Bott, Foreign Affairs/ Legislative Affairs Officer, Bureau of Cyberspace & Digital Policy, U.S. Department of State; and Mr. Zach Tudor, Associate Laboratory Director for National & Homeland Security, Idaho National Laboratory.

Associate Laboratory Director for National & Homeland Security at Idaho National Laboratory Mr. Zach Tudor opened the panel by highlighting the need for robust structures to protect potentially sensitive data as cybersecurity threats mount. The fragility of the modern digital ecosystem became evident a few weeks before the panel convened, as an innocuous software update by CrowdStrike ground much of the global economy to a halt as computer systems worldwide became inoperable. While an accident, the incident underscores how easy it would be for a potential bad actor to wreak havoc on our digital infrastructure.

The CrowdStrike outage highlighted another challenge facing our digital system: resilience and, what Director of Cyber Training and CISO with the Idaho Army National Guard Chief Jerred Edgar called, "technical debt." Many of the systems we rely on are built on an unstable foundation, underpinned by outdated and potentially vulnerable technologies. Through a lack of will, funding, or understanding of the risk, these systems have not been updated in years, making them easy targets for a cyberattack. Edgar posited that, while the U.S. needs resilience in its cyber systems, it currently does not have it.

Professor of Electrical & Computer Engineering & Director of the Cyber Operations & Resilience Program at Boise State University Dr. Sin Ming Loo described resiliency as having four parts: robustness, redundancy, resourcefulness, and repeatability. As an educator, he has tried to instill these values so that his students can "think on their feet," but made it clear there is still a long way to go before this model is the nationwide default.

Cybersecurity has become a central part of national security and diplomacy, rather than a sideshow. As the importance of cybersecurity has become more apparent, the national security and diplomatic apparatuses of the United States are giving it greater attention. As Foreign and Legislative Affairs Officer for the Bureau of

"Our infrastructures are so intertwined, and we are so reliant on them, that a simple mistake can cause global outages."

Mr. Zach Tudor
Associate Laboratory Director for National & Homeland Security
Idaho National Laboratory

Cyberspace & Digital Policy at the U.S. Department of State Mr. Matthew Bott described, his bureau at the State Department was founded to better coordinate how the United States engages external partners on cyber issues. One of their main goals is to push for a new set of norms to govern global cyberspace, so that the internet remains a rights-respecting domain worldwide, rather than under the top-down control of authoritarian actors. Beyond pushing for a new norms structure to govern global cybersecurity, Bott also put forth the goal of having the United States be the global "first responder" to large cyberattacks, such as when it assisted Costa Rica in the wake of a crippling cyberattack. Since then, Costa Rica has been a major hemispheric partner in cyber matters, a model that he hopes can be replicated.

"If you found that your day was wrecked by CrowdStrike, you might want to look at having some additional ways to conduct your business."

Chief Jerred Edgar
Director of Cyber Training / CISO
Idaho Army National Guard

While cybersecurity has major implications in an economic context, it is just as critical in a security context. Edgar explained how the United States armed forces are partnering with military units in allied countries through NATO to expand their cybersecurity capabilities. This has led to unforeseen challenges, such as how to integrate the cyber operations of countries, which may have varying levels of digital sophistication. Edgar highlighted the importance of having multiple ways to get a message through and accomplish a mission, a critical concern for those working in a military environment. Bringing it back to the economic implications, he highlighted how the same should be true for businesses and other institutions; if a cyber event like the CrowdStrike outage can derail your entire organization's ability to function, then you need to consider alternative ways to do business.

"Cyber is no longer just another thing that we work on. It's completely foundational to our country's defense, our country's economy, our country's freedom or lack thereof."

Mr. Matthew Bott
Foreign Affairs/Legislative Affairs Officer
Bureau of Cyberspace & Digital Policy
U.S. Department of State

"Everybody wants to hire experienced people, even for entry-level jobs. They have been told they do not have enough experience. Well, it is an entry-level position, so how would they go about getting that experience?"

Dr. Sin Ming Loo
Professor of Electrical & Computer Engineering
Director of the Cyber Operations & Resilience Program
Boise State University

To be a cybersecure nation, we need a cybersecure workforce. The need for cybersecurity has never been more apparent; however, a significant gap exists between industry demands and the available workforce. Loo emphasized the disparity between the skills universities teach and those that employers seek. This divide creates challenges for newly graduated students entering the workforce, as employers often require experience for entry-level positions, making it difficult for them to launch their careers. Consequently, this situation contributes to a decline in the number of qualified cybersecurity professionals nationwide.

Loo also noted that while the private sector may not be too adversely affected by this shortage, as they can pay market rates, state and federal government agencies and other organizations with tighter budget constraints struggle to attract a sufficient workforce.

To bolster the cybersecurity workforce, new talent pipelines into the field needs to be built, and existing ones need to be expanded. One of the major areas of both challenges and opportunities for the cybersecurity industry is how to include rural residents. Bott noted that in rural communities both in the United States and abroad, cyber infrastructure is far less sophisticated and more vulnerable, leading to massive risks for these communities. Today, there is not enough emphasis on bringing rural workers into the workforce

to help solve these problems. Both he and Loo noted the importance of making cybersecurity education accessible to rural communities, potentially through online programming like those Loo has spearheaded at Boise State. However, this must be combined with a campaign to make rural residents aware that there are cybersecurity jobs in their own communities, meaning that they can find work without having to leave home.

A Perspective on Innovation and Leadership: A Keynote from Senator James Risch

Introduced by Boise State Senior Advisor for Government Relations Mr. Peter Risse, United States Senator James Risch (R-ID) laid out his vision of the "state of play" in the global nuclear power industry, with the United States, the progenitor of nuclear power, facing challenges to its position as the global nuclear leader. Senator Risch highlighted the opportunities associated with nuclear, and what America risks if it does not take the initiative in global nuclear technology once again.

Key Session Insights

In his keynote address following lunch on the first day of the Mountain West Competitiveness Conversation, United States Senator James Risch (R-ID) began by reminding the participants that economic competitiveness was not a political issue. While national political discourse has become increasingly polarized in recent years, all of the nation's political leaders, regardless of party affiliation, want the United States to be competitive, innovative, and world-leading. To that end, there has been successful, bipartisan progress made on a host of competitiveness issues, though these successes have not been as well publicized as the many higher-profile political fault lines that exist today.

The Hon. James Risch, United States Senator.

Nuclear technology was born in Idaho and may yet have its future in the state. From a few lightbulbs lit by an experimental reactor at Idaho National Laboratory in December 1951, the nuclear industry in the United States has come a long way. The nuclear power sector flourished in the half-century following that initial experiment, with Idaho National Laboratory remaining the flagship lab for the American nuclear industry. Since then, the lab has built more than fifty experimental reactors of all kinds, with more yet still to come. These experimental reactors, including microreactors and modular mobile reactors, promise to pave the way for a new golden age

"To date, the US has set the world's standards on nuclear safety and nonproliferation. We do so in part by building nuclear power plants in other countries where, with our technology, we export our values and our standards. As Americans, we should not abdicate our world leadership in that regard. We cannot march backwards on nuclear energy, and the global community cannot accept standards set by problematic regimes like Beijing and Moscow. The United States has no choice but to move with urgency, or we will continue to suffer significant economic losses while risking global security."

The Hon. James Risch
United States Senator (R-ID)

of nuclear power in the United States. Although there has never been an operating commercial nuclear plant within the state itself, the future of the nuclear industry in Idaho looks bright.

However, Senator Risch cautioned participants that it would not be a straight line toward a renewed nuclear power sector in the United States. To date, the United States has built 103 commercial nuclear reactors for energy generation, a number that, in his opinion, should be higher. However, the expansion was curtailed by the emergence of a strong bias against nuclear power due to safety concerns. Following the Three Mile Island incident and disasters in Chernobyl and Fukushima, many turned against nuclear. Senator Risch doesn't believe that these fears were founded; he himself bore witness to the 1999 Taiwan earthquake where, despite the severe disaster, the island suffered no incidents at its three nuclear facilities. Today, as we are further removed from historical disasters, safety standards have improved, and the need for clean energy continues to grow, the biases against nuclear power are beginning to fade, potentially paving the way for a nuclear renaissance in the United States.

The global nuclear power market is of critical importance, and the United States faces major competition from unfriendly nations. While the domestic nuclear power industry in the United States may be on the verge of a new golden age, the global nuclear power industry is already at a new peak of activity. As a host of nations worldwide industrialize and find themselves in need of greater power requirements, nuclear energy has become an attractive option. However, very few nations are capable of supporting a domestic nuclear power industry without significant international support and contracting, and competition over these projects has become a new battleground of geopolitical competition. Beyond the moneymaking potential of foreign contracts to build nuclear plants, a partnership to create a nuclear plant automatically creates a decades-long relationship between the nation building and the nation buying the plant, as these contracts almost always include provisions for sustained maintenance and even operations, if the host country cannot do so with domestic workers.

Dr. Todd Combs, Deputy Laboratory Director for Science & Technology & Chief Research Officer, Idaho National Laboratory; The Hon. James Risch, United States Senator (R-ID); Dr. Nancy Glenn, Vice President of Research & Economic Development, Boise State University; and Mr. Chad Evans, Executive Vice President and Chief Operating Officer, Council on Competitiveness.

While the United States invented nuclear technology, several other nations have developed robust, independent nuclear power sectors. While the mature and sophisticated French nuclear sector may be an economic competitor, the nuclear power industries in Russia and China turn the global nuclear power sector into a front in the broader competition between democratic and autocratic systems.

According to Senator Risch, China and Russia have honed their nuclear power industries as a tool of statecraft. They have several advantages over the U.S. nuclear industry. First, while the U.S. nuclear sector is driven by private corporations bidding on foreign projects out of a profit motive, Russian and Chinese bids are state-backed and heavily subsidized, making it easy for them to undercut American bids without similar government support. Further, American bids, to be approved, are legally required to implement "123 agreements." These agreements, a product of nonproliferation concerns, requires host countries to take restrictive steps to ensure that nuclear technologies are not exported. Russian and Chinese bids do not have such stringent requirements, meaning that, while they end up being a greater proliferation concern, they may be more attractive to states interested in nuclear construction.

But the American nuclear industry has its advantages. Its technology is superior to competitors, and strong American rule of law means that projects are more likely to be completed without unexpected delays and strongarming. But these advantages are not enough, as Russia and China currently control 87 percent of the global nuclear market.

The United States needs to reform its nuclear strategy to take full advantage of the renewed interest in nuclear power. While new technologies and increasing demand have made nuclear energy a more attractive investment, Senator Risch believes there is still much more to be done

to make sure we are ready to take advantage of this momentum. First and foremost, the existing nuclear fleet, which has an average age of 42 years, needs investment to ensure that existing facilities remain online. Secondly, regulations surrounding nuclear power need to be updated to handle the growth of new technologies. The Senator touted bipartisan legislation to improve nuclear regulation. Finally, the United States remains critically vulnerable in its supply of uranium to fuel its reactors. Today, much of the supply of fuel for the U.S. nuclear power industry is sourced abroad, with a large percentage even coming from Russia. This is, according to the Senator, an unacceptable vulnerability that must be fixed immediately, which is why he helped stand up a Department of Energy program to address this potential hazard.

To conclude, the Senator reminded participants of the enormous value nuclear power could bring to the United States. Nuclear energy is America's creation and, in Senator Risch's view, powered America's ascent. It may yet be able to power the reshoring of American manufacturing and a new economic golden age for the country.

PANEL

Innovation to Achieve Energy Targets: Advanced Nuclear and Beyond for Idaho, America, and the World

Mr. Rinaldo Hunt, Executive Director for Business Development & Strategic Partnerships, Purdue Applied Research Institute; Dr. Kathleen Araújo, Professor, Sustainable Energy Systems, Innovation & Policy; & Director, CAES Energy Policy Institute; Boise State University; Ms. Lisa Grow, President & CEO, IDACORP & Idaho Power; Dr. Shannon Bragg-Sitton, Director of Integrated Energy & Storage Systems, Idaho National Laboratory; and Mr. John Revier, Director of External Engagement and Communication, Idaho National Laboratory.

Session Overview

The demand for abundant and sustainable energy has never been higher. Driven by economic and population growth, the reshoring of industrial capacity, the transitioning of transportation-related energy burdens onto the grid, and the expansion of data centers, the United States is seeing a surge in electricity demand. This is exacerbated in the Mountain West where there is both large-scale population and economic growth. On this panel, leaders in Idaho's energy industry discuss the region's needs, how they might be met, the role of nuclear, and what opportunities Idaho has to lead in energy production.

Panel

Dr. Kathleen Araújo
Professor, Sustainable Energy Systems, Innovation & Policy; & Director, CAES Energy Policy Institute; Boise State University

Dr. Shannon Bragg-Sitton
Director of Integrated Energy & Storage Systems, Idaho National Laboratory

Ms. Lisa Grow
President & CEO, IDACORP & Idaho Power

Dr. Scott Holcombe
Vice President of Engineering, Lightbridge Corporation

Mr. Rinaldo Hunt
Executive Director for Business Development & Strategic Partnerships, Purdue Applied Research Institute

MODERATOR

Mr. John Revier
Director of External Engagement and Communication, Idaho National Laboratory

Key Session Insights

It is a critical time in Idaho's power sector, rife with both challenges and opportunities. With the state's economy growing and expanding at a breakneck pace, the need for electricity has never been higher and shows no signs of slowing its climb. President & CEO of IDACORP & Idaho Power Ms. Lisa Grow, leading the state's flagship electrical utility, sees the present moment as a once-in-a-generation moment to expand and clean up the Idaho grid. But she cautioned that clean energy was not the only factor being considered; the ethos of Idaho Power is, as she put it, energy that was "safe, reliable, affordable, and clean, in that order." While sustainability was an important goal, she stressed it couldn't be realized without first considering impacts on consumers.

The utility is interested in producing clean power, however; with more than fifty percent of production coming from hydroelectric dams, Idaho Power is already very clean by national standards. But wind, solar, and battery cannot, in Grow's view, meet the needs of the state, especially in wintertime. In a particularly ironic example, she noted how, thanks to the wildfire smoke hanging over the state, solar power production had fallen by a third. While a cleaner system would be desirable, it cannot come at the expense of reliability, capacity, and affordability. Rather, a diversified mix of both clean and traditional power sources is the path forward.

The call for diversification was echoed by Professor of Sustainable Energy Systems, Innovation & Policy and Director of the CAES Energy Policy Institute at Boise State University Dr. Kathleen Araújo. She noted that Idaho has some of the country's cheapest electricity, an economic pull factor that has drawn in many large commercial operators. But overreliance on a single source could ultimately prove detrimental; Idaho has

"We have this just once-in-a-generation opportunity to diversify and clean up and expand this amazing grid. I often tell people that it is one of mankind's most amazing engineering accomplishments that we generally don't think about, unless it is not on."

Ms. Lisa Grow
President & CEO
IDACORP & Idaho Power

historically been heavily reliant on its hydropower sector, but drought and heat have diminished reservoir levels, and thus, generation capacity. With water being an increasingly scarce commodity, overreliance on hydropower risks making electricity production more expensive and politically fraught as multiple interest groups look to secure their own water supplies. A greater diversity of supply will be critical to keep electricity affordable and reliable.

The Idaho energy mix is already changing in response to new demand and new priorities. However, Grow made it clear that change

"Diversifying our mix matters and, with that, we can be enhancing our self-sufficiency as well as our resilience."

Dr. Kathleen Araújo
Professor, Sustainable Energy Systems, Innovation & Policy;
Director, CAES Energy Policy Institute
Boise State University

wouldn't happen overnight. A major buildout of new infrastructure in short order would be difficult; she described permitting as a "complete and utter disaster," hindering any short development. While she described Idaho Power as looking forward twenty years towards a cleaner energy future, Grow also highlighted the need for the utility to survive today. To that end, natural gas, while still a fossil fuel, is going to be a part of the energy mix for the foreseeable future. While half as dirty as coal, it is still a fossil fuel, and ideally something to move away from. But she highlighted that the ability for utilities to do R&D on how best to move away from fossil fuels was limited; Idaho Power, and other utilities like it, are relying on universities and national labs to help them come up with tomorrow's solutions.

"You can go to a bank and get a loan for a house, a commercial building, you cannot go get one for an SMR, right? Because there is no secondary market that is mature enough to create a financial opportunity for investors, banks, or institutional capital to finance them."

Mr. Rinaldo Hunt
Executive Director for Business Development & Strategic Partnerships
Purdue Applied Research Institute

"We are not moving away from fossil fuels tomorrow. We have a long way to go to get to that, so we need to look at the steps we need to take now and how these different assets come together to give us that reliable, resilient, affordable, and clean energy that we need every day."

Dr. Shannon Bragg-Sitton
Director of Integrated Energy & Storage Systems
Idaho National Laboratory

Idaho is the original home of nuclear research. It may soon be a home to commercial nuclear power. The nuclear power plant was invented in Idaho, at Idaho National Laboratory, but the state itself has never hosted a commercial nuclear power plant. Director of Integrated Energy & Storage Systems at Idaho National Laboratory Dr. Shannon Bragg-Sitton proposed that the state may be approaching the point where nuclear power becomes a necessary part of the local energy mix, driven by both a need for more power and a desire for a cleaner energy system. While she reiterated the earlier point that fossil fuels are not going away, that does not mean that nuclear has no role; Idaho has the potential to host multiple energy technologies. As just one example, advanced nuclear technologies like modular reactors could be deployed to fit the needs of individual facilities with unique power requirements, rather than being deployed only to meet general grid demand. Indeed, parts of the nuclear fleet are already coming under pressure from renewables who threaten their share of baseload power. To cope with the changing nature of demand, Bragg-Sitton described a pilot project where three

"There is a lot of things that are hidden away from public view when you look at this nice rendering of a pretty building. There is an enormous amount of engineering and physical fabrication and laboratory work that needs to go into that. And Idaho National Lab is actually a place where all of that happens."

Dr. Scott Holcombe
Vice President of Engineering
Lightbridge Corporation

nuclear power plants are using excess capacity to generate hydrogen, ensuring full usage of their energy-generating potential.

According to Bragg-Sitton, five years ago, the idea of building more large-scale nuclear power plants was mostly off the table thanks to the two Vogtle reactors in Georgia. The most recently completed in the United States, they were billions of dollars over budget and several years behind schedule, leaving the industry jaded on the prospect of more nuclear mega-projects. However, in just the few years since, the AI-driven explosion in data centers has shattered projections for power requirements, bringing nuclear power back into the discussion. Furthermore, advances in nuclear technology have expanded the scope of nuclear applications. Modular reactors can increase flexibility of deployment, bringing down costs. Microreactors can serve remote locations, military facilities, or emergency response roles. If larger systems offer economies of scale, smaller ones may soon be able to offer similar economies of quantity.

However, any buildout of nuclear will require a rethink of the permitting process as it exists today. As Executive Director for Business Development & Strategic Partnerships at the Purdue Applied Research Institute Mr. Rinaldo Hunt points out, any new deployment of more nimble nuclear technologies will be predicated on updating the regulatory environment. Right now, outdated regulations are a large part of the huge costs of new nuclear plants, making it difficult to garner investment. While the spiking power demand nationwide may trigger subsidies for nuclear power, this is not in his view a long-term solution. Only by modernizing nuclear construction codes can costs be brought under control, making nuclear plants a worthwhile investment. By doing this, the financial instruments necessary to support a nuclear industry buildout, like financing tools and a robust manufacturing ecosystem, can build out.

If Idaho does pursue nuclear power, it is in an enviable position to do so. Araújo pointed out that the Idaho valley region has the highest per capita concentration of nuclear engineers in world due to Idaho National Laboratory, which Vice President of Engineering at the Lightbridge Corporation Dr. Scott Holcombe described as a "one stop shop" for getting a reactor designed, built, tested, and deployed.

As the panel concluded, noted the final hurdles nuclear power would face would be local. For nuclear power, especially small modular reactors, to make their way out of laboratories and into communities, there needs to be both a willingness to accept them and a workforce ready to operate them. Araújo pointed to how, where her institute had asked remote communities what their concerns over nuclear power were, waste storage was top of mind. While enthusiasm for the opportunities such reactors could bring did exist, they were tempered by a healthy skepticism that needs to be addressed before any buildout begins.

In addition to concerns over safety and waste, talent needs to be developed in local communities for SMRs to be implemented in them, but that talent pipeline is not as wide as it needs to be. Many people have no idea that working in nuclear power is a job opportunity, let alone a potentially lucrative one. Bragg-Sitton suggested that a concerted push to make nuclear work a “sexy” career path would help pave the way towards a nationwide rollout by laying the knowledge foundation required.

While Idaho has challenges to overcome in its search for abundant and reliable energy, it also has many opportunities. The state not only can fulfill its growing energy needs, but also help the rest of the country fulfill theirs as well.

A Perspective on Innovation and Leadership: A Keynote from the Secretary of State

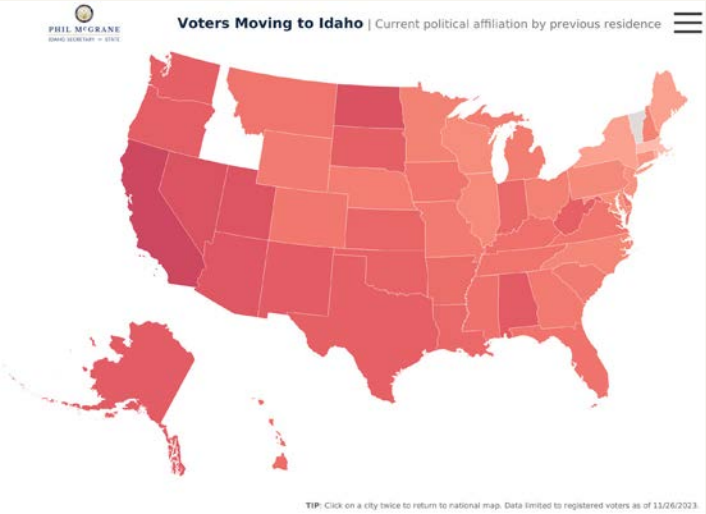
The Mountain West Competitiveness Conversation welcomed The Hon. Phil McGrane, Idaho Secretary of State. Introduced by Senior Advisor for Government Affairs for Boise State Mr. Peter Risse, McGrane gave the participants in the Conversation a window into the demographic and political changes driving interstate migration.

The Hon. Phil McGrane, Idaho Secretary of State.

Key Session Insights

In his keynote address concluding the first day of panels at the Mountain West Competitiveness Conversation, Idaho Secretary of State Phil McGrane began by highlighting some of the state's successes and reasons for optimism. The $15 billion Micron investment through the CHIPS & Science Act is a huge opportunity for the state to grow its semiconductor industry, both creating economic growth for residents and boosting the state's standing in a critical industry. Combined with investments from Meta, Simplot, Idaho Power, and others, the state has become one of the nation's fastest growing economies, and all that opportunity has become a major attractor for people nationwide.

The people moving to Idaho are not an even mix of the rest of the country; they skew heavily conservative. It is no secret that Idaho, as a state, tilts conservative and Republican politically. What may be more surprising, though, is the degree to which the same can be said for those moving to Idaho. In an eye-opening display, Secretary McGrane showed a map of the voter affiliations of those moving to the state, based on their state of origin. For 48 out of the 49 other states, the plurality of voters moving to the state were Republicans; the lone exception, Vermont, had Democrats come out on top by only a single new resident. The Secretary described this as evidence of American's "voting with their feet," moving to areas that not only offered economic opportunity and quality of life improvements, but also reflected their political beliefs.



"It used to be when you moved, you focused on schools. 'Where are my kids going to grow up, and what is the community like?' More and more, we are seeing people say, 'Where are the people like me, because I want to be with more of them.'"

The Hon. Phil McGrane
Idaho Secretary of State

The influx of out-of-state voters has strained the political environment of the state, creating notable disconnections between newcomers and long-time residents. For instance, while water remains a critical and volatile issue affecting farmers and local businesses, it is not receiving the attention it deserves in the state legislature. Instead, more focus has shifted to the grievances and perspectives brought in by newcomers, prompting reactions from established residents. This dynamic has led to both a blending of and conflict between ideologies as the state navigates the presence of newcomers.

A particularly contentious area of debate revolves around the state's relationship with Big Tech. These large firms promise economic opportunity and growth but also require substantial resources and threaten local ways of life. In contrast, the agricultural industry, despite its deeper historical ties to the state, has struggled to compete with external pressures from multinational companies and new voters who may lack a longstanding connection to agriculture.

The possibility of local patterns of life being disrupted is real. In a striking example, the Los Angeles Times spent considerable time covering the mayor's race in Eagle, Idaho, a Boise suburb. This seemingly bizarre decision makes sense when noted that Eagle, Idaho, is the largest recipient of California public dollars outside of the state, through the pensions of former Californians who have moved there. In fact, the city's mayor and the majority of its city council are former Californians, amplifying concerns that local residents may be overwhelmed by the political influence of newcomers.

As Idaho deals with a wave of new residents wanting to take part in the state's growing and dynamic economy, they are bringing with them "political baggage" that has the potential to weigh down the state. It is difficult to stay focused on competitiveness issues when politics becomes divided and polarized by countervailing ideas of what the trajectory of the state should be, and what it ought to prioritize. In Secretary McGrane's view, a lack of external competition since the end of the Cold War has led to U.S. citizens beginning to turn on each other, leading to our divided and contentious political climate. Perhaps a silver lining of the increasing competition from global adversaries such as China and Russia is that it will force Americans to rediscover how to work together.

PANEL

Harnessing Technology, Energy, and Natural Resources to Transform Industries

Session Overview

Mines, farms, forests, and the supply chains that connect them are critical to powering the innovation economy and fueling America's national laboratories, universities, factories, and utilities. Without them, none of the other industries that America aspires to build and maintain would be possible. Leaders in the Mountain West's natural resource production and agriculture industries sat on this panel to discuss the importance of these fields to reindustrialization and innovation, the hurdles they face, and how to overcome them.

Key Session Insights

Idaho and the Mountain West have a rich history in mining, agriculture, and forestry. Today, technology is driving them to new heights. It was these industries that drove the state's early growth, attracting gold rush miners and homesteaders to begin carving out a new life in the 19th century. Fast forward to the 21st century, and these same industries continue to be major economic drivers in the region. According to the Administrator of the Idaho Office of Energy & Mineral Resources Mr. Rich Stover, Idaho and

Panel

Ms. Catherine Cantley
Center Director, studio\Blu

The Hon. Walter Copan
Vice President for Research & Technology Transfer, Colorado School of Mines

Mr. Benjamin Davenport
Executive Vice President, Idaho Mining Association

Mr. Ken Dey
Director of Government & Public Affairs, J.R. Simplot Company

MODERATOR

Mr. Rich Stover
Administrator, Idaho Office of Energy & Mineral Resources

The Hon. Walter Copan, Vice President for Research & Technology Transfer, Colorado School of Mines; Mr. Benjamin Davenport, Executive Vice President, Idaho Mining Association; Mr. Ken Dey, Director of Government & Public Affairs, J.R. Simplot Company; Ms. Catherine Cantley, Center Director, studio\Blu; and Mr. Rich Stover, Administrator, Idaho Office of Energy & Mineral Resources.

the broader Mountain West have an enormous advantage due to the natural resources present. This advantage is amplified by world-leading research into the technologies that make these critical industries more productive, efficient, clean, and safe.

Partners in the region are fully aware of the critical role new technologies will play in natural resource production in the years to come. Vice President for Research & Technology Transfer at the Colorado School of Mines Dr. Walter Copan explained how his school is partnering with institutions across the region, including Idaho National Laboratory, to create the technologies that will move the mining industry forward. Being a world leader in mineral extraction, his school is already leading the development of AI, better communications, and quantum sensing that promises to revolutionize the industry. But beyond gains in efficiency and productivity, he also raised the need for better reprocessing technologies, allowing for a more closed-loop mineral system.

The need for mineral reprocessing is not borne only out of a desire to reduce the environmental impact of mining. As the energy transition continues, the amount of materials required to sustain it will balloon. Approximately 700 million metric tons of copper have been mined in human history; if formed into a cube, it would be a quarter of a mile on a side. Copan believes that, in the next twenty years, we will need again as much copper to sustain the energy transition. The scale of the problem is almost beyond comprehension.

Despite its critical importance, the mining sector faces many man-made hurdles. As Executive Vice President of the Idaho Mining Association Mr. Benjamin Davenport reminds us, even those who oppose mining as an industry are consuming its products. This public opposition has led to difficulties permitting mines, hamstringing the industry's ability to meet demand. These difficulties are only increased by the geological reality that miners cannot choose where to mine; they must go where the minerals are. If there is

"The old image of a miner panning for gold in the rivers or the farm worker out there sowing the fields behind his mule, that's not what's happening. There are massive advancements in technology happening here."

Mr. Rich Stover
Administrator
Idaho Office of Energy & Mineral Resources

not enough domestic supply, we will be forced to import materials from abroad. As Davenport put it, we can rely on potential adversaries and "kids in the Congo," or we can figure out how to produce these inputs ourselves.

Much of the opposition to mining comes from a perception of it as a dirty, environmentally harmful, and unsafe industry. But today's mines bear little resemblance to this image. If the industry is to succeed and expand to meet demand, it needs to reach out and talk to people who want the benefits of a clean energy transition but do not want to allow the mining that will make that possible, educating them on how central a robust mineral production system is to that effort.

"We need more materials to support the energy transition now than we have had in any time in human history."

The Hon. Walter Copan
Vice President for Research & Technology Transfer
Colorado School of Mines

The agriculture industry is facing a moment of unparalleled risks and opportunities. Director of Government & Public Affairs, J.R. Simplot Company Mr. Ken Dey described the importance of the food production system: "without agriculture, there is no culture." By 2050, there are expected to be more than nine billion people on the planet, and falling levels of hunger worldwide, while an incredible victory, means the amount of food being produced will go up by 65 percent by then. At the same time, farmland is becoming increasingly scarce; in the past quarter century, Idaho has lost a quarter of its farmland, primarily to development. The same story is playing out worldwide, in some places spurred on faster by desertification thanks to a warming planet. All these factors conspire to place mounting stress on the industry, and on the firms and farmers who sustain it.

"We need to find a way to have the conversation with people that do not like to break the egg but want to eat the omelet."

Mr. Benjamin Davenport
Executive Vice President
Idaho Mining Association

"You cannot defend a nation if you cannot feed a nation."

Mr. Ken Dey
Director of Government & Public Affairs
J.R. Simplot Company

Beyond the pressure placed on it by the broader need to feed more people on less land, the agriculture industry also faces supply chain vulnerabilities. Modern food production is dependent on fertilizers to create high yields. These fertilizers are primarily composed of phosphate, which must be mined, leaving food production with many of the same vulnerabilities as the general mining sector. If the United States cannot produce its own fertilizer, it will be reliant on imports from abroad, leaving it critically vulnerable. This problem is compounded by stricter U.S. regulations governing phosphate mining, making it easier for foreign suppliers to undercut domestic producers. For Dey, phosphate and other fertilizer inputs should be on the critical minerals list as much as any rare earth element.

Further pressure is placed on agriculture by public opposition to one of its most powerful tools, GMOs. Strains of crops modified for better yields, resistance to adverse conditions or pests, less need for pesticides, and other desirable traits have massively increased the productivity and resilience of the agriculture sector. While this has traditionally been done via selective breeding, a long and expensive process without guaranteed results, modern bioscience has made this process far faster and easily controllable and allowed for far greater possibilities for modification. Simplot was an early adopter of CRISPR, the modern gene modification technology. However, despite GMOs remarkable benefits, public distrust of the technology has lessened its potential benefits. GMOs are tightly regulated, and broader hesitance by consumers to use them lessens their market value.

The resource industries need a new public image to attract a new kind of worker. While new technologies and techniques are rapidly transforming the ways that resource production industries like mining or agriculture operate, their public image is still often stuck in the past. The image of mining and farming as low-paid,

"We are touring [students] around manufacturing plants, so they get a different idea of what manufacturing is and saying, you know what? I think I belong there. It does not look like what I thought manufacturing looked like, but I belong there."

Ms. Catherine Cantley
Center Director
studio\Blu

unskilled, dangerous, dirty work remains embedded in popular consciousness. This mental disconnect between perception and reality has enormous implications for these industries as they seek to attract the skilled workers they need.

The decline in people entering the mining workforce has had a detrimental impact on our ability to train new miners. A lack of demand and emphasis has led to the shuttering of mining schools and bureaus nationwide, leading to a dearth of new entries to the field. Today, half of the mining workforce, or about a quarter of a million workers, are nearing retirement age. While this is a challenge that needs to be overcome, it also presents an opportunity. Reliant on new, technology-driven techniques for their work, mining could be an attractive career path for many new entrants to the workforce at all levels. Ms. Catherine Cantley, Center Director for studio\Blu, a Boise State University-based center for career development and exploration, described how she has had to fight misperceptions that these jobs are low paying, when in fact their salaries can be thirty to forty percent higher than other industries. Further, these industries are requiring greater familiarity with high-tech methods of production, increasing their desirability to new tech-savvy graduates. Cantley and Davenport espoused how today's food processors and miners are more likely to work in an office supervising machinery or running tests than doing manual labor in a mine or in a processing plant.

Progress is being made in directing students at all levels towards these careers. Dey praised the Governor's Launch program as a good start, but expected that more steps would be needed, especially in bringing in workers with technical degrees. Copan likened the need for a new partnership between industry and education to the search for Olympic athletes: potential and interest needs to be identified and encouraged at a young age, rather than waiting for them to make a career choice in college or later before making a pitch. The Colorado School of Mines is already engaging with a growing student body, producing half of the country's mining professionals.

As the panel wrapped up, they made clear that an innovation economy would be impossible to sustain without food and mined resources. Rather than seeing sectors like mining and agriculture as low-tech laggards divorced from the innovation economy, the United States must prioritize the crucial role they will play in growing our innovation ecosystem.

TECH TALK

From Imagination to Insight—Leveraging Computation and Storytelling to Affect Change

Speaker

Dr. Eric Jankowski
Associate Professor & Director, Micron School of Materials Science & Engineering
Boise State University

Session Overview

To fully realize the potential of new technologies and industries discussed at the Mountain West Competitiveness Conversation, advancements in materials science are essential. Today's students and researchers benefit from powerful computing tools, enabling significant breakthroughs that were previously unattainable. However, attracting individuals to this critical field necessitates a reevaluation of how engineering is communicated and a redefinition of who can be considered an engineer.

Key Session Insights

Materials education is essential to reindustrialization, innovation and competitiveness. According to Associate Professor & Director of the Micron School of Materials Science & Engineering at Boise State University Dr. Eric Jankowski, any discussion about moving towards an innovation economy in the Mountain West based on semiconductors, clean energy, or nuclear power will require enormous materials science work. To him, it is a way to make a big impact by paying attention to small details. But for this critical work to be done, a new generation of materials scientists needs to be attracted to the field and trained in cutting-edge techniques, a task that is easier said than done.

Dr. Eric Jankowski, Associate Professor & Director, Micron School of Materials Science & Engineering, Boise State University.

For Jankowski, there are two crucial elements to making this new materials workforce a reality: computational skills and storytelling. The ever-increasing capabilities of supercomputers has opened possibilities in materials design, with researchers discovering useful and interesting molecules in a virtual environment, rather

"The pursuit of science is figuring out what's true about the world, and engineering is ultimately the application of those truths to help others."

Dr. Eric Jankowski
Associate Professor & Director
Micron School of Materials Science & Engineering
Boise State University

than relying solely on slower and more expensive real-world testing. This dramatically scales the possibility of discovery, allowing for possibilities that may have gone unrealized due to resource restrictions to suddenly be on the table. As just one example, Jankowski brought with him a sample of a flexible solar panel that used polymers designed on a supercomputer to create electricity. Flexible, robust, and easily manufactured, this product could not have taken shape without these computational processes. For him, this was a powerful demonstration of the need for engineers of all types, not just materials scientists, to be computationally literate. Not only would it increase their job prospects, but it would sharpen their creative problem-solving skills. In his eyes, anyone can learn to love programming, so long as they are given a meaningful problem to solve. An accessible introduction to programming with quality professors will be a necessity for engineers of all types in the years to come.

However, just as crucial as the "hard skill" of computational literacy is the "soft skill" of "storytelling." To him, this means both connecting with the people that you work with and building trust with them. Jankowski identifies two components of trust: competence and warmth. Competence, the belief that someone can deliver on their promises, is the easier of the two to create, through rigorous coursework, academic standards, and the reputation of previous graduates. Warmth, defined by him as the belief that a person has our best interest at heart, is too often missing from large organizations, leading to a dearth of trust, hampering cooperation and collaboration. To help build that "warmth," he argues that storytelling, or building a narrative around one's career, interests, and desire to work with a specific partner, are just as critical as any other more traditional engineering skill. By helping students learn how to relate to their colleagues through storytelling, Jankowski believes that they will ultimately be more productive, successful, and innovative than by focusing purely on traditional engineering training. As engineering disciplines are rigorous and demanding, it is often easy to become discouraged and detached, leading to a drop in productivity and motivation and, potentially, to a withdrawal from the field overall. By more closely relating to their career path, students have a better chance of thriving in it. In one example, he explained how a study where students were asked to relay a personal narrative around their chosen career path led to better identification with their field, an effect even more pronounced in historically disadvantaged groups.

Jankowski identified, as one of the themes of the overall Conversation, that everyone across the innovation ecosystem in Idaho, from industry to education to government, is committed to providing opportunities for students to succeed in high-tech industry. One part of that is undoubtedly providing them with the high-tech tools, job opportunities, and ability to grow professionally. But just as important is giving them the chance to fully identify with their field and become therefore a more confident and capable practitioner of it. By teaching them the value of computation and storytelling, they will be, in his view, in a far better position to do both.

PANEL

Unleashing State, Regional, and National Competitiveness with Radical Collaboration

Session Overview

The future of innovation will rely increasingly on multidisciplinary and multidomain partnerships that connect the research, development, and deployment of new technologies at scale. While the individual players in the Mountain West's innovation ecosystem are capable of incredible things on their own, their ability to compete nationally and globally will be supercharged if they work together to solve pressing issues and turn new ideas into reality.

Key Session Insights

For regions to benefit from a collaborative spirit, the first step may be to change the way we define them. Radical collaboration is an idea borne out of the first Competitiveness Conversation in Tennessee from remarks of Vanderbilt University Chancellor Daniel Diermeier, challenging listeners to go further in their regional innovative partnerships. Senior Advisor for Government Relations at Boise State University Mr. Peter Risse began by asking a foundational question: if regional collaboration is so important, what do we

Panel

Dr. Elizabeth Cantwell
President, Utah State University

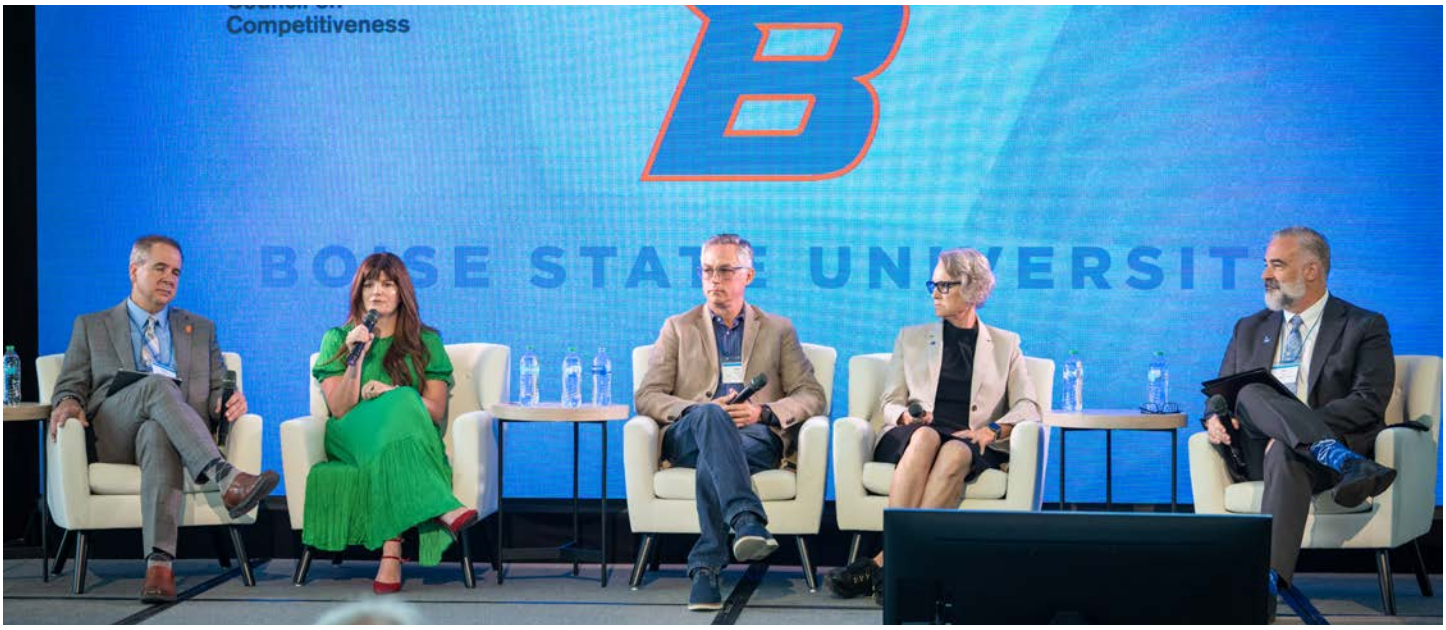
Ms. Dana Kirkham
Senior Director of Regulatory & Strategic Affairs, Idaho Environmental Coalition

Dr. Glen Murrell
Community & Regional Engagement Director, Idaho National Laboratory

Dr. Robert Wagner
President, Idaho State University

MODERATOR

Mr. Peter Risse
Senior Advisor for Government Relations, Boise State University



Dr. Robert Wagner, President, Idaho State University; Ms. Dana Kirkham, Senior Director of Regulatory & Strategic Affairs, Idaho Environmental Coalition; Dr. Glen Murrell, Community & Regional Engagement Director, Idaho National Laboratory; Dr. Elizabeth Cantwell, President, Utah State University; and Moderator, Mr. Peter Risse, Government Relations, Boise State University.

mean by "region?" Preconceived or intuitive ideas of what a region is or isn't may be standing in the way of valuable partnerships and opportunities.

The first to answer was Community & Regional Engagement Director for Idaho National Laboratory Dr. Glen Murrell, who raised up the experience of Wyoming as an example. Having previously worked in the oil and gas industry there, he has seen the transformation of the way the state things about regional integration. In the earlier part of his career there, Wyoming was content to "go it alone" as far as fossil fuel exploitation went. However, as the industry has diversified, the state eventually found that it wouldn't have the research and technology resources to execute on new opportunities alone. This all but required a regional partnership approach, the state working with Idaho National Laboratory among others to develop local capabilities. A similar story is playing out with Idaho National Laboratory itself, as a focus only on southeastern Idaho where it is located would hamper its ability to function. Instead, it, along with other Idaho institutions, have formed networks to allow easier exchanges of ideas and information, and better cooperation. In Murrell's view, while geography is important, it is these networks that define a region.

This view was echoed by President of Utah State University Dr. Elizabeth R. Cantwell, who pointed out that a region can also be defined as a function of common problem-sets. The Mountain West region faces challenges that are unique to it compared to every other part of the country; it may be worthwhile to view the region as the sum of the people dealing with the same problems. In this manner of thinking, geographic distance becomes far less of a determining factor than similarity of the economic, social, and technological conditions. By bringing together a group of people and organizations to address shared grand challenges, regions can be at once defined and have greater capacity to solve these issues.

"How do we as the United States, make sure that we are bringing together everything that we can in different regions, to maximize our ability to carry on?"

Mr. Peter Risse
Senior Advisor for Government Relations
Boise State University

Even beyond collaboration between institutions, individual organizations have the opportunity to engage in region-making activities. President of Idaho State University Dr. Robert Wagner described his school's approach to community engagement. In each of the four communities where the school has campuses, it is the ethos of Idaho State to ask what jobs, opportunities, and expertise they can contribute. In this way, the school itself begins to build a region of communities with a common linkage to the school, and able to draw on resources from both the university system and other parts of the state it is connected to.

The Mountain West is already home to many successful partnerships, but there is always room for more. One of the fields that the Mountain West is emerging as a leader in is advanced energy production, and to support the growth of this ecosystem, the Idaho Advanced Energy

"My perspective is that we do not lack for shared or shareable vision almost at all. We lack for the multiplicity of skills."

Dr. Elizabeth Cantwell
President
Utah State University

Consortium (IAEC) was founded. Senior Director of Regulatory & Strategic Affairs at the Idaho Environmental Coalition and Co-Chair of the IAEC Ms. Dana Kirkham described the goal of the Consortium as bringing together industry, educators, government, and suppliers to strengthen the regional ecosystem. With focuses on workforce pipeline development, organizing the supplier network, and educating state and local leaders to "speak the language" of advanced energy so they can be effective advocates, the IAEC aspires to build a cadre of people and organizations ready to take Idaho's advanced energy ecosystem to the next level.

One partner who garnered universal praise from panelists was Idaho National Laboratory, with its ability and willingness to cooperate on a host of project areas seen as an invaluable resource for the region. Both Wagner and Cantwell described how the collaboration between researchers, comprising both students and faculty, at their universi-

"In this context of regional competitiveness, geography is important, but it is not the be-all and end-all of everything. It's really about networks and connecting nodes of like-minded and complementary areas of economic activity that would commonly align towards a common goal."

Dr. Glen Murrell
Community & Regional Engagement Director
Idaho National Laboratory

ties and Idaho National Laboratory had produced stunning results that would not have been possible alone. Cantwell specifically called out AI as an area of particular success, noting that, while funding was still an open question, these partnerships had allowed them to assemble all the pieces of an AI-driven sector in the Mountain West. However, as national laboratories have access to unique revenue streams through their status as a public agency, they can help galvanize new economic structures both where they are physically located and where they have partnerships.

"Regional competitiveness from the perspective of the university means how are we contributing? What are we bringing to the workforce? What are we bringing as far as research, as far as development, as far as the spirit of innovation, as far as the spirit of collaboration?"

Dr. Robert Wagner
President
Idaho State University

However, there are major impediments to building out these partnerships even further. One of the most disruptive is the inordinate amount of regulatory oversight associated with technology transfer. Limits on what can and cannot be transferred out of national laboratories or federally funded university research projects hamstrings the abilities of these research institutions to work with businesses and other partners to get their innovations out into the wider world. It is not difficult to find examples of such limits; universities and national laboratories may at times face statutory restrictions on partnerships, especially on a geographic basis, despite the earlier point that innovation

may be bolstered by being more flexible in how we define regions. Further, long and burdensome processes to approve technology transfers has a chilling effect on partnerships. As Kirkham put it, "You can't accelerate innovation or tech transfer if it takes seven years to get a license to start." Reforming these regulatory structures will take a straitjacket off collaboration, allowing for new possibilities that, before, would have been economically infeasible. But these reforms can only come if pushed for collectively.

Establishing sustainable ecosystems and governance structures can supercharge innovation. While partnerships between institutions are valuable tools that can produce incredible results, even broader, more wide-ranging collaborations can help shift the entire regional paradigm. As Murrell pointed out, the governance problems that inhibit innovation exist at all levels but could be bypassed by common governance. A single, unified structure for innovation partnerships could help bypass the conflicting and multi-layered sets of rules governing partnerships and technology between national laboratories, universities, businesses, and other organizations. He put forward the Tennessee Valley Authority as an example of an institution that had successfully convened to solve the innovation issue of electrification and suggested that the lack of a comparable authority in the Mountain West to deal with its own innovation problems was a missed opportunity. He made the ambitious proposal that the players in the region create a "Mountain West Infrastructure Authority" to oversee the expansion and implementation of common innovation projects, bypassing the often-limiting governing structures that currently exist.

Regional collaboration can yield great rewards, if partners can get out of their silos. As the panel concluded, the participants noted that, besides all the steps towards better collaboration already discussed, one overarching issue remained: getting away from previous divisions. Kirkham put forward two goals to make that a reality. First, institutions and individuals in the region need to listen better, putting aside an "I'm right" mentality to better understand the perspectives of those in other contexts. Second, innovators in the Mountain West need to speak to everyday citizens in the region, rather than just those who participate in events like the Competitiveness Conversations. By putting aside ego, better solutions and partnerships can be found.

"We have to address regulatory reform, and we have to start pushing for that collectively. The reality is you can't accelerate innovation or have technology transfer if it takes seven years to get a license just to start."

Ms. Dana Kirkham
Senior Director of Regulatory & Strategic Affairs
Idaho Environmental Coalition

PANEL

Mapping the Enabling Conditions for the Mountain West's Competitiveness Strategy for the Next 25 Years

Session Overview

During the Mountain West Competitiveness Conversation, attendees heard from experts on a variety of topics—spanning semiconductors, cyber security, advanced nuclear energy technologies; and the growing talent challenges and opportunities facing the Mountain West. This final panel tied together the multiday summit, examining the enabling conditions essential for the region to remain competitive over the next quarter century. As the state plans for its future, it is critical to understand the factors at the intersection of policy, infrastructure, education, innovation, energy, and workforce development propelling the Mountain West forward.

Key Session Insights

As Executive Vice President and Chief Operating Officer of the Council on Competitiveness Mr. Chad Evans made it clear, the Mountain West has a lot of opportunity to look forward to. The two previous days of panels convincingly made the case that the region has numerous challenges and opportunities ahead of it in building an inno-

Panel

Dr. Todd Combs
Deputy Laboratory Director for Science & Technology & Chief Research Officer, Idaho National Laboratory

Dr. Nancy Glenn
Vice President of Research & Economic Development, Boise State University

MODERATOR

Mr. Chad Evans
Executive Vice President and Chief Operating Officer, Council on Competitiveness

Dr. Nancy Glenn, Vice President of Research & Economic Development, Boise State University; Mr. Chad Evans, Executive Vice President and Chief Operating Officer, Council on Competitiveness; and Dr. Todd Combs, Deputy Laboratory Director for Science & Technology & Chief Research Officer, Idaho National Laboratory.

vation-based economy. In a world of increasing competition, radical change, and evolving technologies, innovation is an issue of both economic and national security. But as the need for leadership in innovation grows by the day, an unbridled Mountain West has the opportunity to make transformational changes, both at home and nationwide.

This change cannot come too quickly, as the challenges facing both the region and the nation continue to mount. The critical infrastructure systems that underpin our modern society are increasingly intertwined, leaving the whole vulnerable to both malicious acts and unforeseen accidents that can cause havoc. Cybersecurity grows as an area where proactive and radical change is needed, as digital infrastructure becomes an integral part of every facet of our lives. Electricity demand is growing at an unprecedented pace, having doubled in North America in just the past few years and showing little sign of slowing down. While these challenges could hamstring the nation's ability to innovate, they also present the Mountain West with a once-in-a-generation opportunity to lead the nation in solving them.

Mr. Evans asked both of his fellow panelists what they perceived as the biggest opportunities and challenges facing the Mountain West over the next quarter century. Vice President

"I think the ability to really unbridle the Mountain West's innovation capacity will not only transform this region, but it will transform the nation."

Mr. Chad Evans
Executive Vice President and
Chief Operating Officer
Council on Competitiveness

"Without the human infrastructure and without everybody coming to the table at different levels with different skills, we cannot be innovative or competitive."

Dr. Nancy Glenn
Vice President of Research &
Economic Development
Boise State University

of Research & Economic Development at Boise State University Dr. Nancy Glenn put forward that the two biggest areas to focus on were education and climate. While an incredible innovation ecosystem is developing in the Mountain West, and in Idaho specifically, its growth will be limited if it doesn't have the workforce to supply it. From her perspective, the state's current efforts to get workers into the innovation workforce are inadequate and require a "radical" rethink. From the perspective of a university, whose primary function is to educate students who will ultimately form the innovation workforce, Glenn asked how Boise State and other higher education institutions can better partner with industry to create opportunities for students to engage with, and eventually become a part of, that ecosystem. For climate, the Mountain West faces unique vulnerabilities including farmland desertification and pressure on water supplies critical for industry, consumers, and power generation. A reminder of the region's vulnerability to climate change was brought home by the cloud of wildfire smoke that hung over Boise for the duration of the Competitiveness Conversation. But while the region faces vulnerabilities, it also has opportunities to lead the fight against climate change. Advanced energy production is a cornerstone of the emerging innovation ecosystem, meaning that Idaho is well-positioned to help blunt the effects of climate change while also securing the enormous economic opportunities that entails.

"We talked a little bit about grid resilience and energy resilience and everything else, but there's an entrepreneurship, there's a can-do attitude, and there's a resilience of the people in the Mountain West, I think, that's special."

Dr. Todd Combs
Deputy Laboratory Director for Science & Technology & Chief Research Officer
Idaho National Laboratory

Deputy Laboratory Director for Science & Technology & Chief Research Officer for Idaho National Laboratory Dr. Todd Combs echoed his colleague's view that climate change was both a challenge and an opportunity for the region. In his view, more attention needs to be paid to the question of securing supplies of the critical minerals needed to fuel an energy transition. Going one step further, he suggested that the country expand its focus from critical minerals to strategic materials, including things like copper, phosphate, and uranium that, while not currently getting as much attention as a vulnerability, nonetheless are an absolute requirement for the functioning of a clean economy. Of course, mining as an industry has a negative reputation when it comes to environmental concerns, but Combs suggested that, like the nuclear industry, better education about the realities of modern mining and the unparalleled necessity of mining to our national competitiveness may help. But along with securing critical materials, there also needs to be attention paid to building out the region's infrastructure. Finding investment for new infrastructure – like EV chargers – necessary to sustain the region's growth will be a deciding factor in the rate at which the Mountain West can expand. Finally, Combs agreed that education and workforce development are still huge challenges. It has proven difficult to get people interested in the research path, but better advertising the desirability of innovation as a career may prove successful. For example, Combs noted that at Idaho National Laboratory the average salary is $120,000. Making the case of innovation as a lucrative career path may be invaluable in drawing in greater public interest.

Local leaders wanted participants to leave Idaho with a sense of the people who lived there. When asked what they wanted Conversation attendees to leave Boise with, both leaders responded by outlining what made the people of the Mountain West unique. For Combs, that was a spirit of entrepreneurship, resilience, and a can-do attitude that is ready to face the challenges presented to the region and turn them into opportunities, making the Mountain West the envy of innovators the world over. For Glenn, it was the people's connection to the land that defined them, describing how residents of Idaho come together to work to solve problems based on their common appreciation of the natural environment that they live in. Together, these attributes, shaped by the region's rural character, deep personal connectivity, and history of self-reliance, position the Mountain West to take its place as a leading innovation hub, both for the United States and the world.

Conclusion

As we reflect on the Competitiveness Conversations, it is clear the Mountain West is positioned to become a major player in America's innovation economy. Idaho's economy is growing due to its business-friendly climate, commitment to innovation, and the creativity and drive of its people who are now gaining access to higher-paying jobs and opportunities to develop skills in emerging industries. We recognize the immense contributions the region is already making to the nation's future, but also the remarkable potential that lies within the region. To keep the innovation engine humming, the region must continue to invest in education and research.

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For more than three decades, the Council on Competitiveness (Council) has championed a competitiveness agenda for the United States to attract investment and talent, and spur the commercialization of new ideas.

While the players may have changed since its founding in 1986, the mission remains as vital as ever—to enhance U.S. productivity and raise the standard of living for all Americans.

The members of the Council—CEOs, university presidents, labor leaders and national laboratory directors—represent a powerful, nonpartisan voice that sets aside politics and seeks results. By providing real-world perspective to Washington policymakers, the Council's private sector network makes an impact on decision-making across a broad spectrum of issues—from the cutting-edge of science and technology, to the democratization of innovation, to the shift from energy weakness to strength that supports the growing renaissance in U.S. manufacturing.

The Council's leadership group firmly believes that with the right policies, the strengths and potential of the U.S. economy far outweigh the current challenges the nation faces on the path to higher growth and greater opportunity for all Americans.