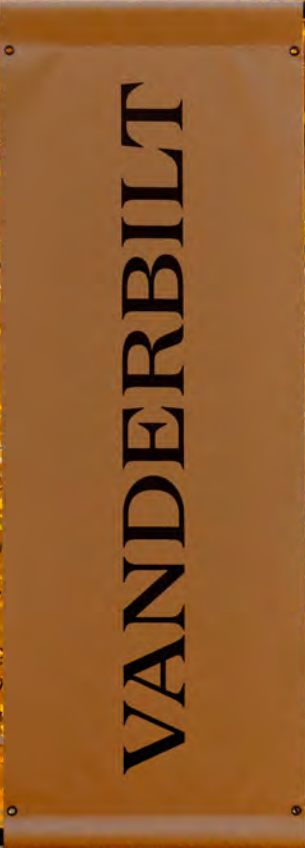




Competitiveness Conversations Across America

# Tennessee—Redefining Place & Building the Future Innovation Ecosystem for Mobility, Energy & Manufacturing

Vanderbilt University  
Nashville, Tennessee  
April 25-26, 2024



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# Letter From The Honorable Deborah L. Wince-Smith, President and CEO, Council on Competitiveness

Dear Council Community,

For nearly four decades, the Council on Competitiveness has been at the forefront of advocating for the significance of innovation, and exploring ways to enhance our nation's innovation capacity and capabilities. From pioneering the concept of "clusters of innovation" in the 1990s to spearheading the nation's inaugural Innovation Summit in 1998, and crafting the "Innovate America" agenda in 2003, which has significantly influenced national discourse and legislation over the past twenty years, our organization has been a trailblazer in shaping the innovation landscape.

Nearly five years ago, Council leadership recognized the convergence of multiple disruptive technological revolutions, which would be presenting over the coming decades both unparalleled challenges and opportunities for the nation's long-term security, productivity potential, and goals for inclusive prosperity. Breakthroughs in addressing national and global challenges related to food, energy, national security, and many other sectors are on the horizon, promising to usher in a new era of societal transformation.

With the understanding that the prosperity of the United States hinges on our ability to optimize our society for a future ever more dependent on innovation, the Council launched the National Commission on Innovation and Competitiveness Frontiers (National Commission). This flagship

multi-year initiative brings together more than 60 National Commissioners from across geographies and sectors, all focused on bolstering innovation capacity and capability to drive long-term productivity and inclusive prosperity throughout the United States.

Phase 1 of the National Commission's work, 2020-2023, looked at how the widespread access to new tools like generative AI and emerging business and workforce models are empowering individuals and institutions across America to innovate, conceptualize, develop, and scale new products and services to an unprecedented degree. However, despite the opportunities created by these new technologies and models, much of America's talent remains on the sidelines. With this understanding, the National Commission identified the need to redefine "place" beyond the historic innovation hotbeds on the coast to ensure every community in the United States can contribute to and reap the benefits from the evolving innovation economy.

In line with this effort, and under the auspices of the National Commission, the Council's leadership launched the "Competitiveness Conversations Across America" series of high-level, multi-stakeholder, local, state, and regional gatherings to understand emerging, next and best innovation practices, and to amplify the country's cutting



*Co-hosts of Competitiveness Conversation, Tennessee—Redefining Place & Building the Future Innovation Ecosystem for Mobility, Energy & Manufacturing: Dr. Donde Plowman, Chancellor, University of Tennessee, Knoxville; Dr. Daniel Diermeier, Chancellor, Vanderbilt University; The Hon. Deborah Wince-Smith, President & CEO, Council on Competitiveness*

edge to national attention. Our goal with the series is to deepen, broaden, and engage a larger portion of the nation in the innovation economy.

The inaugural edition of the Competitiveness Conversations, themed “Tennessee—Redefining Place & Building the Future Innovation Ecosystem for Mobility, Energy & Manufacturing,” took place at Vanderbilt University on April 25-26, 2024. Thanks to the close partnership, talents,

and generous resources of my co-hosts, Vanderbilt University Chancellor Daniel Diermeier and University of Tennessee, Knoxville Chancellor Donde Plowman, both National Commissioners, the debut Competitiveness Conversation inspired the more than 250 attendees from across Tennessee and the country. From this Conversation, I am energized by the promise of Tennessee—which is seeing remarkable growth across sectors, rising per capita income, and a rapid population expansion—and for the nation as a whole.

Over the two-day Competitiveness Conversation, we heard from 15 exceptional sessions, including panels, “tech talks,” and keynotes. Speakers included Governor Bill Lee, U.S. Senator Marsha Blackburn (R-TN) and U.S. Senator Bill Hagerty (R-TN), Chattanooga Mayor Tim Kelly, Knoxville Mayor Indya Kincannon, and economic development leaders from Memphis and Nashville. We gained a regional perspective, learned from university leaders and those advancing the state’s research initiatives at Oak Ridge National Laboratory, and received valuable insights from CEOs and C-suite executives representing global firms, including Deloitte, FedEx, Ford, Nissan, Oracle, Volkswagen, Bridgestone, the Tennessee Valley Authority, Google, and many others.

From these leaders, we uncovered how Tennessee is fostering an environment that attracts investment, propels business expansion, and is strengthening its pipeline of knowledge and

technical workers to fuel its growing innovation economy. By convening leaders from across Tennessee's innovation ecosystem and the broader Council community, we uncovered best practices to create a powerful national framework for innovation. Six strategic factors underpinning Tennessee's rise as an innovation hub stood out to me:

- 1. Leadership is broad and deep.** Leadership in Tennessee involves extensive collaboration among current and former governors, industry, academia, and government leaders at all levels working to foster an innovation-based future for the state. Moreover, diverse partnerships across sectors support efforts to build innovation ecosystems, epitomized by Governor Lee's reference to Tennessee's flag now representing "Grand Alliances" rather than Grand Divisions, Chancellor Diermeier's concept of "Radical Collaboration," and Chancellor Plowman's emphasis on "People, Places, and Partnerships."
- 2. A good place to be.** Business leaders who have relocated to Tennessee find it an appealing place for both companies and families due to its attractive natural assets, lack of state income tax, and favorable business environment. Moreover, the state provides flexible education and training programs, offering diverse opportunities for individuals to acquire the necessary knowledge and skills for career advancement.
- 3. Focus on the future.** Tennessee's forward-looking vision and strategic investments, championed by both business and political leaders, attract significant capital, and enable infrastructure developments to support future growth and innovation.
- 4. Educators and trainers focused on developing the workforce businesses need.** Educators in Tennessee collaborate with industry across various education levels to tailor workforce training programs, exemplified by Ford's partnership with universities to develop curricula for its new truck factory, and Oracle's collaboration with local schools and universities to create training programs for careers in the growing healthcare sector.
- 5. Building on current assets as a springboard to future industries.** For example, in Tennessee, a coalition of over 100 public and private entities, including businesses and educational institutions, is collaborating to establish the state as a hub for mobility innovation, leveraging existing assets and resources across research, education and regulatory domains to foster the growth of novel mobility solutions.
- 6. Catching up with their new reality.** Tennessee grapples with balancing successes in AI, data centers, and nuclear energy with challenges like affordable housing, infrastructure, and workforce development. Universities, power producers and policymakers are all having to step up expansion and activity to keep pace with increasing investments and rapid population growth.

In addition to valuable insights, the venue and experience of the Tennessee Competitiveness Conversation sets a very high bar for future Conversations. I would especially like to thank Chancellor Diermeier and Chancellor Plowman for their partnership in co-creating and hosting this pivotal summit. I am also grateful for the service, insights, and help from a highly distinguished Steering Committee, comprising of 16 innovation leaders—

listed below—representing various sectors from business, higher education, national laboratories, government, and non-governmental organizations who helped frame the agenda and attract participants to the Conversation. Thank you also to Vanderbilt University and its dedicated staff for their many efforts in making this event possible, as well as to all of our incredible and inspirational speakers for sharing the drivers of Tennessee's economic growth. And I would like to thank the Council team, led by our Executive Vice President Chad Evans who shepherded this Conversation and was instrumental in creating the overall concept for this effort that will extend across our great country over the coming years.

As a final reflection, the Council's National Commission is on a mission to extend the benefits of its innovation and high-tech economy to more communities. By uncovering the successful models like those at work in Tennessee, we are now better positioned to promote and replicate these successes on a broader scale across communities nationwide. The Council looks forward to working with all of you to take what we learned and to put in practice in more places, expanding prosperity and competitiveness across America.



Sincerely,

A handwritten signature in black ink that reads "Deborah L. Wince-Smith". The signature is fluid and cursive, with the first letters of the first and last names being capitalized and prominent.

**The Honorable Deborah L. Wince-Smith**  
President and CEO  
Council on Competitiveness

# Tennessee Competitiveness Conversation Leadership

## Hosts



**Daniel Diermeier**  
Chancellor  
Vanderbilt University



**Donde Plowman**  
Chancellor  
University of Tennessee,  
Knoxville



**Deborah L. Wince-Smith**  
President & CEO  
Council on  
Competitiveness

## Steering Committee



**Bob Corker**  
Former United States  
Senator



**Deb Crawford**  
Vice Chancellor for  
Research, Innovation, &  
Economic Development  
University of Tennessee



**Chad Evans**  
Executive Vice President  
Council of Competitive-  
ness



**Paolo Ferrari**  
BSAM Executive Chair-  
man  
Bridgestone West CEO  
Bridgestone Corporation  
Joint Global COO



**Senator Bill Frist M.D.**  
Former United States  
Senator

## Steering Committee (Continued)



**Bill Hardgrave**  
President  
University of Memphis



**Chad Holliday**  
Co-Chair  
Mission Possible  
Partnership; and Chair  
Emeritus, Council  
on Competitiveness



**Jeffrey (Jeff) J. Lyash**  
President & Chief Exec-  
utive Officer Tennessee  
Valley Authority



**Sidney McPhee**  
President  
Middle Tennessee State  
University



**Stuart McWhorter**  
Commissioner  
TN Department of Eco-  
nomic and Community  
Development



**Freddie O'Connell**  
Mayor  
Metropolitan Nashville  
& Davidson County



**Jérémie Papin**  
Chairperson, Nissan  
Americas  
Member of the Global  
Executive Committee &  
Sr. Vice President  
Nissan Motor Co., Ltd.



**Padma Raghavan**  
Vice Provost  
Research and Innova-  
tion  
Vanderbilt University



**Stephen Streiffer**  
Director  
Oak Ridge National  
Laboratory



**Ann Thompson**  
Workforce Development  
Manager  
Ford Motor Company



**Nathan Green**  
Vice Chancellor  
Government & Commu-  
nity Relations (ex officio)  
Vanderbilt University



# Agenda

**Thursday, April 25, 2024**

## Noon Registration

### 1:10 Putting Competitiveness in Context—Challenges and Opportunities for 2024

Leadership will share the policy vision for the “Competitiveness Conversations Across America”—under the auspices of the Council on Competitiveness “National Commission on Innovation and Competitiveness Frontiers”—in context of the economic, global, and political realities facing the State and the United States in 2024.

**Daniel Diermeier**

Chancellor, Vanderbilt University

**Donde Plowman**

Chancellor, University of Tennessee, Knoxville

**Deborah L. Wince-Smith**

President and CEO, Council on Competitiveness

### 1:30 The Pillars of Innovation: Deploying Tech-based Innovation at Speed and Scale, Accelerating the Future of Sustainability, and Defining the Future of Work and the Workforce

Leaders explore the key pillars of innovation as articulated in the Council’s “National Commission on Innovation & Competitiveness Frontiers”—highlighting both key challenges and

opportunities in the State, as well as suggesting best practices to scale nationally, with a goal of dramatically increasing the nation’s innovation capacity and capabilities.

**Robert (Rob) Carter**

Executive Vice President, FedEx Information Services, Chief Information Officer of FedEx Corporation

**Pablo Di Si**

President & CEO, Volkswagen Group of America; CEO of Volkswagen Brand North American Region

**Paolo Ferrari**

BSAM Executive Chairman, Bridgestone West CEO, Bridgestone Corporation J GCOO

**Jérémie Papin**

Chairperson, Nissan Americas, Member of the Global Executive Committee & Sr. Vice President, Nissan Motor Co., Ltd.

## Moderator

**Dan Helfrich**

Chair and CEO, Deloitte Consulting LLP

### 2:15 Redefining “Place” in the 21st Century: Broadening and Deepening Tennessee’s Innovation Ecosystem

As competition in the global innovation landscape intensifies, there is a growing urgency to capitalize on untapped talent, technology, investment, and

infrastructure. To boost competitiveness, the United States—and Tennessee—must focus on expanding and deepening both the demography and the geography of innovation, meaningfully engaging different communities and diverse populations as workers, innovators, entrepreneurs, and beneficiaries.

#### **Jamari Brown**

Director of Economic and Community Development, Metropolitan Government of Nashville and Davidson County

#### **Tim Kelly**

Mayor, City of Chattanooga

#### **Indya Kincannon**

Mayor, City of Knoxville

#### **Ted Townsend**

President & CEO, Greater Memphis Chamber

#### **Moderator**

#### **Chad Evans**

Executive Vice President, Council on Competitiveness

### **3:00 Competitiveness Conversation Coffee Break**

### **3:15 Innovation Talks: Leveraging Tennessee's Tech & Innovation Prowess to Amplify America's Potential**

### **3:15 Tech Talk No. 1: TDOT I-24 MOTION Project**

How Tennessee built the smartest roadway in the world along a six-mile stretch of I-24.

#### **Jonathan Sprinkle**

Professor of Computer Science, Vanderbilt University

#### **Josh Westerhold**

Senior Manager, Mobility, Nissan Americas

#### **Dan Work**

Associate Professor of Civil and Environmental Engineering, Vanderbilt University

### **3:30 Tech Talk No. 2: Quantum Information Science**

#### **Katherine (Kate) Evans**

Director, Computational Sciences and Engineering, Oak Ridge National Laboratory

### **3:45 Developing Tennessee's Innovation Economy**

The future of innovation will rely increasingly on integrated, multidisciplinary, and multidomain partnerships that span and connect research, development, and deployment of new technologies at scale. This panel is a case study on Tennessee's bid to connect, compute, power, fuel, and lead.

#### **Lindsey Cox**

Chief Executive Officer, Launch Tennessee

#### **Deb Crawford**

Vice Chancellor for Research, Innovation, & Economic Development, University of Tennessee, Knoxville

#### **Susan Hubbard**

Deputy Laboratory Director for Science and Technology, Oak Ridge National Laboratory

#### **Jason Maynard**

Executive Vice President, Oracle

#### **Moderator**

#### **Joe Hoagland**

Vice President of Enterprise Relations and Innovation, Tennessee Valley Authority

### **4:30 Day 1 Wrap-Up—and Day 2 Preview**

#### **Daniel Diermeier**

Chancellor, Vanderbilt University

### **4:40 Chancellor Reception**

### **6:15 Competitiveness Conversation Dinner**

United States Senator Bill Hagerty

### **8:00 Dinner Concludes**

## Friday, April 26, 2024

### MORNING

#### 7:30 Registration & Breakfast

#### 8:30 Day 2 Kickoff

Donde Plowman

Chancellor, University of Tennessee, Knoxville

#### 8:40 Powering Tennessee's Future— Leveraging the State's Energy Portfolio to Build and Advance Industries

This leadership panel will explore the energy productivity-driven renaissance in research, services, and manufacturing across the State—and explore how leaders are creating and using an energy matrix to support growth across many industry sectors.

**Brent Baker**

Vice President—Chief Customer and Innovation Officer, Nashville Electric Service

**Jeff Lyash**

President & CEO, Tennessee Valley Authority

**Katie Ottenweller**

Southeast Lead, Energy Policy & Markets, Google

**Padma Raghavan**

Vice Provost for Research and Innovation, Vanderbilt University

**Stephen Streiffer**

Director, Oak Ridge National Laboratory

#### Moderator

**Chad Holliday**

Chair Emeritus Royal Dutch Shell, Chair Emeritus, Council on Competitiveness, Co-Chair Mission Possible Partnership

#### 9:30 Tech Talks #3 and #4: Leveraging Tennessee's Tech & Innovation

## Prowess to Amplify America's Potential

Tech Talks highlighting the state's tech and innovation assets.

#### 9:30 Future of Energy

**Brian Wirth**

Governor's Chair Professor for Computational Nuclear Engineering, University of Tennessee, Knoxville

#### 9:45 Tech Continuum Across the State— Urban to Rural

**Michael Aikens**

Founding Director, Center for Rural Innovation; Chair, Rural Reimagined Grand Challenge, Office of Research and Economic Development at Tennessee Technological University

#### 10:00 Taking Tennessee's Talent to the Next Level—Mobilizing the State's Workforce for a More Innovative Future

This leadership panel will explore the talent conundrum. Hailed as the State's greatest asset and in many ways its greatest challenge, ensuring Tennessee has the skilled workforce to prosper in an increasingly turbulent local, state, national, and global economy is the critical competitiveness challenge. Lessons learned here can also inform national strategies for building the most agile and resilient workforce of the 21st century.

**Bill Hardgrave**

President, University of Memphis

**Joe Bales**

Vice President for University Advancement, Middle Tennessee State University

**Jothany Reed**

Vice Chancellor for Academic Affairs, Tennessee Board of Regents

**Deniece Thomas**

Commissioner, Tennessee Department of Labor

and Workforce Development

**Moderator**

**Liliana Ramirez**

Director of Workforce Development, Ford Motor Company

**10:45 Competitiveness Conversation Coffee Break**

**11:00 Tennessee Governor's Address with Governor Bill Lee**

**11:30 Mapping the Enabling Conditions for Tennessee's Competitiveness Strategy for the Next 25 Years**

This leadership panel will examine the enabling conditions essential for Tennessee's competitiveness strategy over the next 25 years. As the state plans for its future economic growth and prosperity, it is important to identify and understand the key factors that will drive competitiveness in various sectors. The panel will explore the intersection of policy, infrastructure, education, innovation, and workforce development, aiming to provide insights into creating an environment conducive to sustainable economic advancement.

**Randy Boyd**

President, University of Tennessee System

**Stuart McWhorter**

Commissioner, Tennessee Department of Economic and Community Development

**Daniel Diermeier**

Chancellor, Vanderbilt University

**Donde Plowman**

Chancellor, University of Tennessee, Knoxville

**Moderator**

**Deborah L. Wince-Smith**

President and CEO, Council on Competitiveness

**12:15 Tennessee Competitiveness Conversation Concludes**

# Creation of the Competitiveness Conversations Across America Initiative

As competition in the global innovation landscape intensifies, there is a growing urgency to capitalize on untapped talent across America. Innovators in Silicon Valley and other coastal hubs have helped position the United States as a global science and technology leader, but many communities and regions have yet fully to join, engage in, and benefit from the country's innovation economy. The innovation workforce is highly concentrated in major metropolitan areas, with the top five metro areas—Boston, San Francisco, San Jose, Seattle, and San Diego—accounting for more than 90 percent of the nation's innovation-sector growth over most of the past two decades.

But the costs of this hyper-concentration are playing out in real time. Coastal tech clusters are increasingly facing congested transportation, skyrocketing costs of living, and constrained housing, while other regions trying to keep pace are excluded from participating in or benefitting fully from the concrete benefits of U.S. innovation.

The Council's flagship project, the [\*National Commission on Innovation and Competitiveness Frontiers\*](#) began to explore this critical issue in the 2020 and 2022 reports, [\*Competing in the Next Economy\*](#) and [\*Competing in the Next Economy: Adapting to a Changing World\*](#). Key early recommendations from both reports included, for example: restructuring economic development to focus on regional innovation, fostering local talent

by increasing exposure and access to innovation tools, and connecting communities of need to funding and mentoring opportunities.

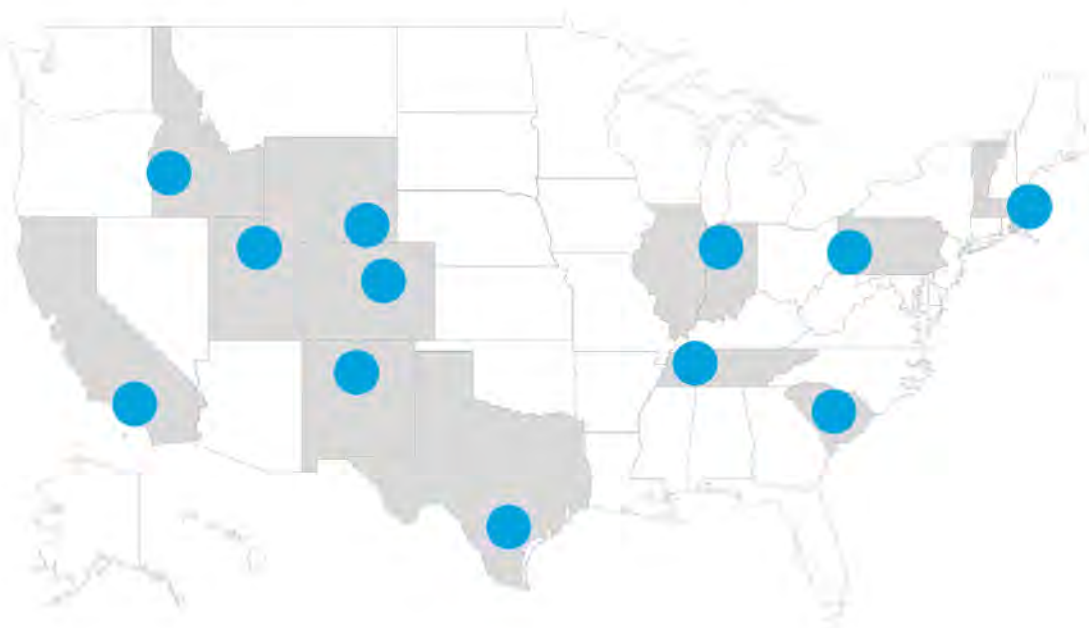
But in 2023, the Council's Board and National Commissioners called for more—to focus our community of leaders on expanding the geography and deepening the demography of innovation in the United States; broadening the innovation workforce; and capitalizing on untapped potential in regions across the country.

And this call to action set the rationale and framework for the Commission's newest effort and platform for engagement, the "Competitiveness Conversations Across America"—which are meant over the coming years to move stakeholders and policymakers beyond past nomenclature and understanding of "clusters of innovation" (created by the Council in the last 1980s and early 1990s) and regional innovation hubs.

In the next phase of work—creating a new vocabulary and building out new ingredients for innovation—the National Commission and its "Competitiveness Conversations" will explore how to support and amplify local efforts to spur innovation, while also elevating to the attention of policymakers the need for investments that expand the footprint of the U.S. innovation ecosystem—itsself not a monolith but a system of systems.

## National Commission on Innovation &amp; Competitiveness Frontiers

## Competitiveness Conversations Across America

**2022 Conversation**

Jun. Wyoming

**2023 Conversation**

Mar. Davis, CA

**2024 Conversations**

Apr. Nashville, TN

Aug. Boise, ID

Sep. West LaFayette, IN

**2025 Conversations**

Feb. Columbia, SC

Mar. San Antonio, TX

May Santa Fe, NM

Jun. Boston, MA

Sep. Salt Lake City, UT

Oct. Pittsburgh, PA

*We should be careful not to restrict place-based innovation. Instead, we need to focus on making places that have the necessary ingredients for growth (e.g., workforce, housing, quality of life, start-ups, universities). We need to focus on what it takes to scale innovation in every corner of our \$20 trillion continental economy.*

This triggers two important questions: (1) is there a standard vocabulary, set of metrics, or even “ingredients” needed to create—to make—a successful innovation ecosystem to underpin inclusive growth, digital inclusion, productivity gains, sustainability, and socio-economic transformation; and (2) how can we assess those ingredients at the local level to identify strengths, gaps, and opportunities for catalysis and scale-up? Addressing these questions is crucial to building local innovation ecosystems.

As leaders across the country face an historic influx of place-based and place-making funding through the Inflation Reduction Act (IRA), the CHIPS & Science Act, and other investments, understanding where and how to direct funding will be crucial. The Council’s goal with each Competitiveness Conversation and beyond is to build the next generation toolkit to empower local, state, and regional leaders to assess their communities, capitalize on opportunities, and build vibrant innovation ecosystems—and also to help national policymakers understand the complexity, diversity, and vibrancy of our “system of systems,” ensuring investment flows to strategic opportunities: north, south, east, and west; rural and urban.

This following, “first look” at Tennessee—a dive into some of the state’s fundamentals—shaped the Council’s early thinking in crafting the agenda and programming deployed in Nashville. This First

Look: Tennessee covers five fundamentals and a “special snapshot” of one of the emergent themes explored in the April 2024 Competitiveness Conversation:

1. A Local Economic Snapshot
2. Investing in an Innovation Economy
3. Business Activity & Entrepreneurship
4. The Future of the Workforce
5. Innovation Readiness
6. Special Snapshot for TN: “Investing in the Future of Transportation”

I look forward to any thoughts around this glimpse into Tennessee’s vibrant, complex, dynamic, and interconnected economy—not meant to be comprehensive but I hope indicative of key trends and opportunities on which to build even more.



A handwritten signature in black ink, appearing to read "CHAD EVANS", enclosed within a large, loopy, handwritten oval.

**Chad Evans**

Executive Vice President, Board Secretary and  
Treasurer  
Council on Competitiveness

# A First Look: Innovation & Competitiveness—Tennessee

## 1. Local Economic Snapshot

The TN economy is experiencing rapid economic growth.

Source: Total Value-Add by Industry (US Bureau of Economic Analysis)

- Tennessee's GDP totaled over \$523 billion in 2023. The state's real GDP is up more than 20 percent since 2017—the 8th highest growth rate of any state over the same period.
- Manufacturing remains Tennessee's top industry in, adding ~\$70 billion to the state economy in 2023. Within manufacturing, the food, beverage, & tobacco and motor vehicles & parts sectors outpaced other sectors by a wide margin.
- Amongst the largest industries, professional, scientific and technical services has experienced the fastest growth from 2017 to 2023, with an impressive 67 percent jump in just over half a decade.

TN has opportunities to drive employment growth in high value-add areas.

Source: Occupation by Industry (US Census Bureau)

- Tennessee's employment figures paint a different picture than its GDP. The state's leading employment sector is educational services, health care, and social assistance, which employ almost 22 percent of the state's workers.

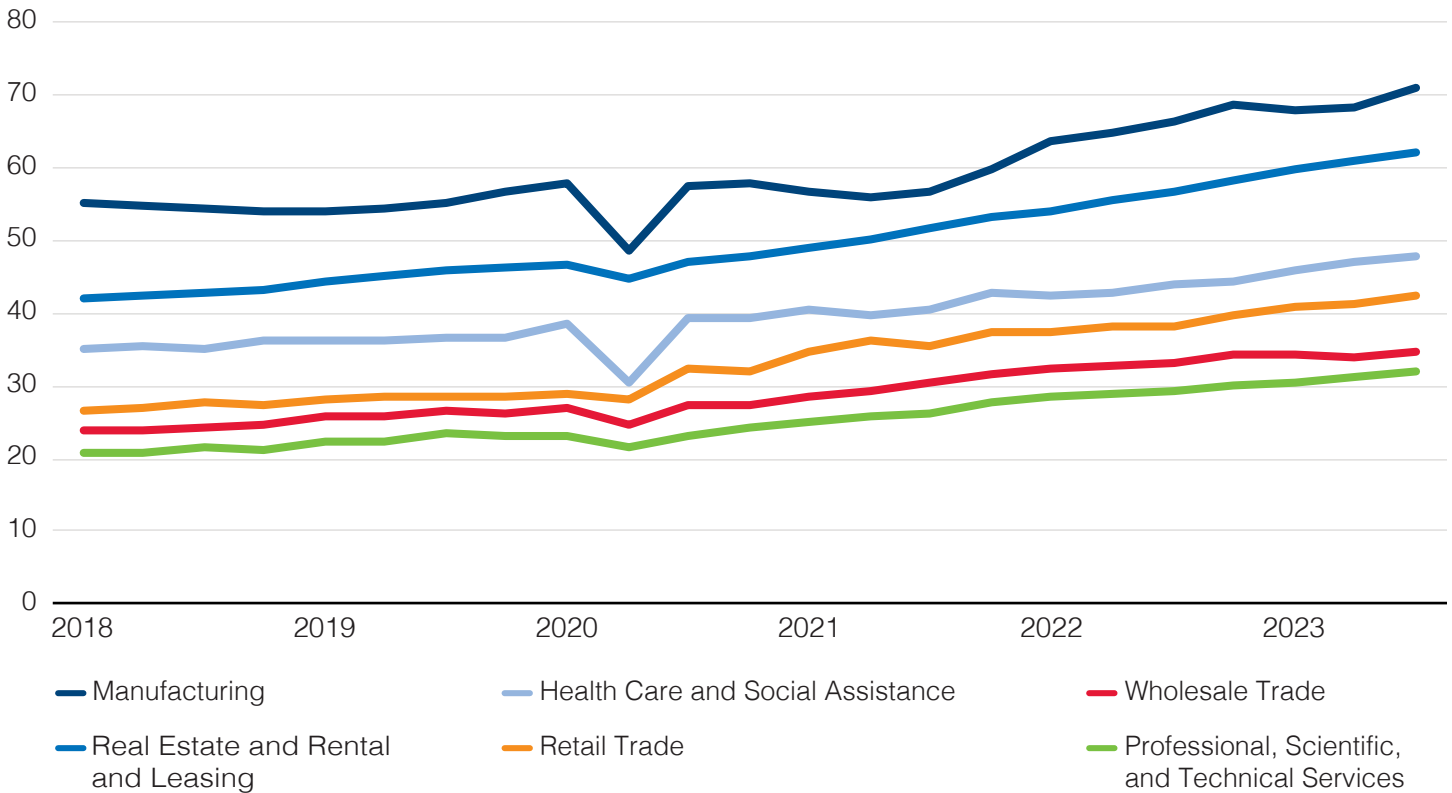
Nashville boasts lowest jobless rate in the nation.

Source: Metro Area Employment Summary (US Bureau of Labor Statistics)

- In February 2024, the Greater Nashville metro area posted a 2.2 percent unemployment rate, the lowest in the nation among all major U.S. metro areas. This is emblematic of TN's strong post-pandemic economic recovery.

## Tennessee's Leading Industries Continue Steady GDP Growth

Source: U.S. Bureau of Economic Analysis, USD Billions (Annualized), 2018–2023, Seasonally Adjusted



## 2. Investing in an Innovation Economy

Billions of dollars are flowing into TN to fund innovation.

Source: Investments Associated with the Biden Administration (Center for American Progress)

- Public and private investments in Tennessee stemming directly or indirectly from the Inflation Reduction Act (IRA), the bipartisan infrastructure law, and the CHIPS and Science Act have so far totaled over \$55 billion. The majority has been associated with the bipartisan infrastructure law, but as IRA and CHIPS funding begins to be awarded and disbursed, this amount is likely to rise substantially in the coming years.
- These federal investments have also pulled nearly \$14 billion in private investment into Tennessee, led by major projects like Ford's SK BlueOval City, the LG Chem Clarksville battery plant, and the Ultium Cells Spring Hill battery plant.

### Venture capital investments are strong and growing rapidly.

Source: Venture Capital Funding (Pitchbook)

- In 2023, Tennessee businesses received \$1.57B in venture capital investment. This represents the state's largest venture capital year in recorded data and an over 42 percent increase compared to 2022.

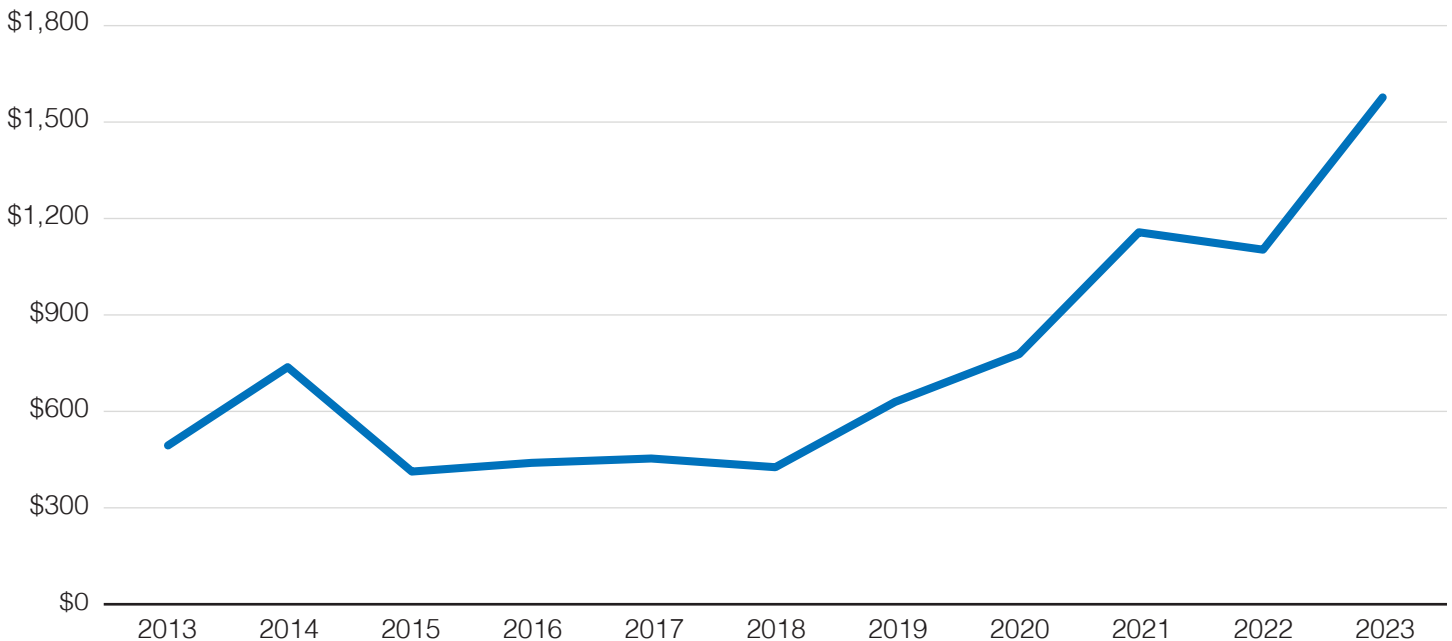
### There is room to increase TN private sector R&D.

Source: R&D by Sector and Source (NCSES)

- In 2021, Tennessee ranked 25th overall in R&D expenditures, combining state, business, and higher education R&D expenditures. In total, R&D spending in Tennessee totaled an estimated ~\$7.9 billion in 2021.
- Business sector R&D in the state accounted for ~\$2.8B in 2021, coming in 29th nationally. Finding ways to boost private-sector R&D could propel the state's emerging status as a hub for innovation.

### Venture Capital Deal Value in Tennessee, 2013–2023

Source: Pitchbook, USD Millions



### 3. Business Activity & Entrepreneurship

#### TN is supporting robust business creation.

Source: Initial Business Filings (TN Quarterly Business and Economic Indicators)

- The first three quarters of 2023 represented the largest recorded number of quarterly new business filings in Tennessee's history.
- Since the pandemic, the rate of new business formation in TN has generally outstripped the national average.
- In 2021, a little over 80 percent of start-ups in TN survived their first year—demonstrating resilience in the face of COVID-related headwinds.

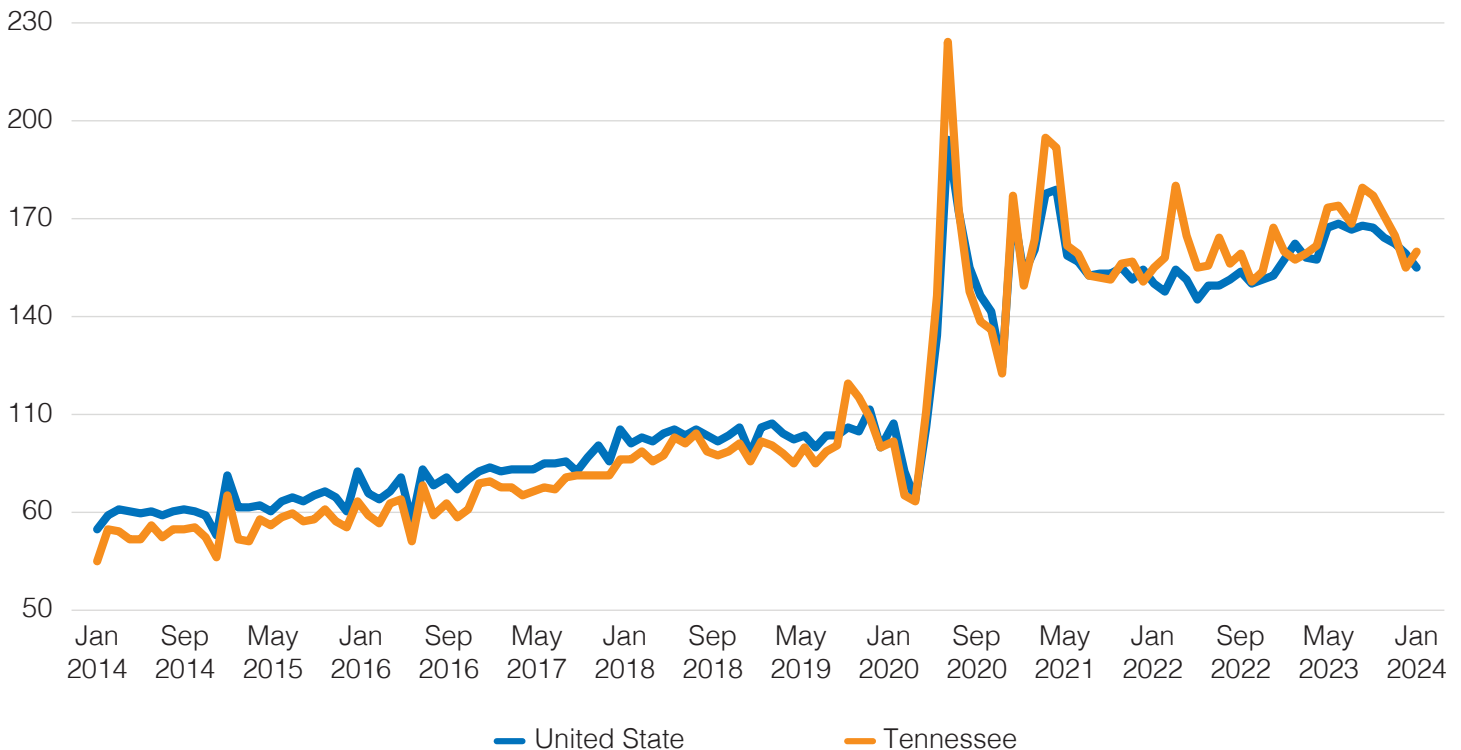
#### TN businesses and individuals are innovators.

Utility Patents Granted in 2022 (USPTO)

- In 2022, individuals and business in Tennessee created 1,175 utility patents, the 25th highest number in the nation.

### Monthly Business Formations

Source: U.S. Census Bureau, Indexed to January 2020



## 4. The Future of the Workforce

Incomes in TN are rising quickly, positioning the state as a regional leader.

Source: Income per Capita (Bureau of Economic Analysis)

- In the fourth quarter of 2023, Tennessee had the third highest income per capita of any state in the Southeast, at \$61.5k/year.
- From January 2019 to December 2023, income per capita in Tennessee grew 27 percent, slightly beating out the national average growth rate.

Workers in science and engineering related fields are faring even better.

Source: Median Earnings by Field of Bachelor's Degree (US Census, American Community Survey)

- Amongst workers that earned a bachelor's degree, those with science and engineering-related degrees have achieved higher earnings—nearly \$68k/year—than the state average.
- This equates to a nearly \$3.5k yearly premium for a science or engineering degree. For women, this premium is almost \$8.5k/year.

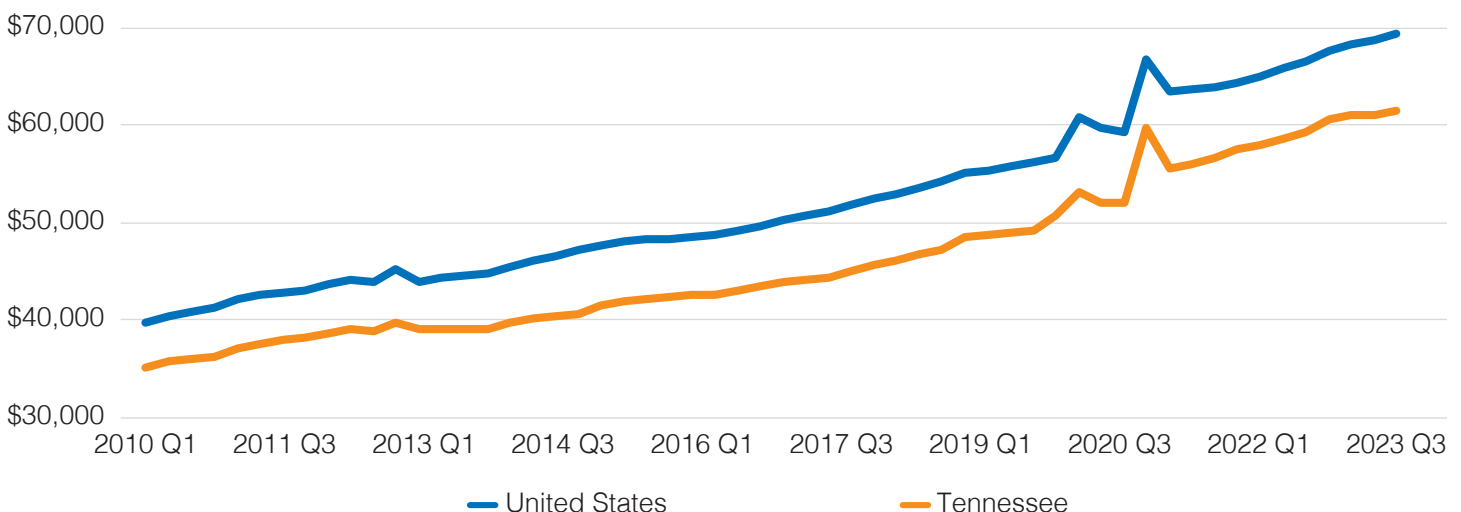
TN is striving to make higher ed accessible.

Source: Integrated Postsecondary Education Data System (NCSES)

- Tennessee hosts 153 post-secondary educational institutions, the 11th most of any state in the country. Among these top 11 states, Tennessee has the lowest population by almost 2 million people.
- During the 2020-21 school year, the average cost of attending a public 4-year university in Tennessee as an in-state student was \$20.6k/year—the 25th lowest in the country.

### Per Capita Personal Income, 2010–2023

Source: USD, Bureau of Economic Analysis



## 5. Innovation Readiness

**TN has opportunities to dramatically increase its innovation capacity through increased internet access.**

Source: Access to Broadband and Internet Subscriptions (US Census Bureau)

- 16 percent of households in Tennessee do not have access to an internet subscription—nationally, only about 9 percent of households lack internet service. In fact, almost half of the counties in the state have over 20 percent of households without internet.
- Amongst the lowest-income bracket (those making \$20k/year or less), almost 40 percent of Tennessee households lack internet, compared to ~25 percent nationally. While internet connectivity is a relative weakness in Tennessee, bridging this digital gap could bring an immense amount of talent into the state's innovation economy.

**TN has concentrated pockets of “innovation ready” communities.**

Source: Distressed Communities Index (Economic Innovation Group)

- ~19 percent of Tennessee's population is living in a prosperous zip code. ~22 percent of its population lives in a distressed zip code. Many of the prosperous zip codes are located in and around major cities, while distressed areas tend to be more rural. Finding creative ways to invest in rural areas could unlock new talent and opportunities.

**TN's major counties are ripe for investment.**

Source: Economic Development Capacity Index (Economic Development Administration/Argonne National Lab)

- According to the Economic Development Capacity Index, which scores counties' economic capacity along five dimensions, Tennessee's four most populous counties—surrounding the cities of Memphis, Nashville, Knoxville, and Chattanooga—generally have the necessary infrastructure to support high levels of investment.

### Economic Development Capacity Levels for Most Populous Counties

Source: Economic Development Administration

	Shelby County	Davidson County	Knox County	Hamilton County
<b>Human Capital</b>	Limited	Elevated	Elevated	Elevated
<b>Financial</b>	Moderate	Elevated	Elevated	Limited
<b>Industry</b>	High	High	High	Elevated
<b>Infrastructure</b>	Elevated	High	Elevated	High
<b>Institutional &amp; Partnerships</b>	Moderate	Elevated	Limited	Low

## 6. Special Snapshot: Investing in the Future of Transportation

TN has emerged as a national leader in electric vehicle production.

Source: Investments in EV Manufacturing (EDF; TN Department of Environment & Conservation)

- Roughly \$18.4 billion of electric vehicle investment was announced in Tennessee in the 12 months after the passage of the Inflation Reduction Act (IRA), the third highest amount of investment in any state.
- More than 20,000 new EV jobs were announced in Tennessee in the 12 months after the passage of IRA, the second highest in the country.
- Auto industry heavyweights, such as Volkswagen, General Motors, and Nissan, are major local employers and contribute to local economic activity, as well as help solidify Tennessee's role as a leader in the domestic EV industry.

Investments are also being made in the state to expand the domestic EV supply chain.

Source: Utility Patents Granted in 2022 (USPTO)

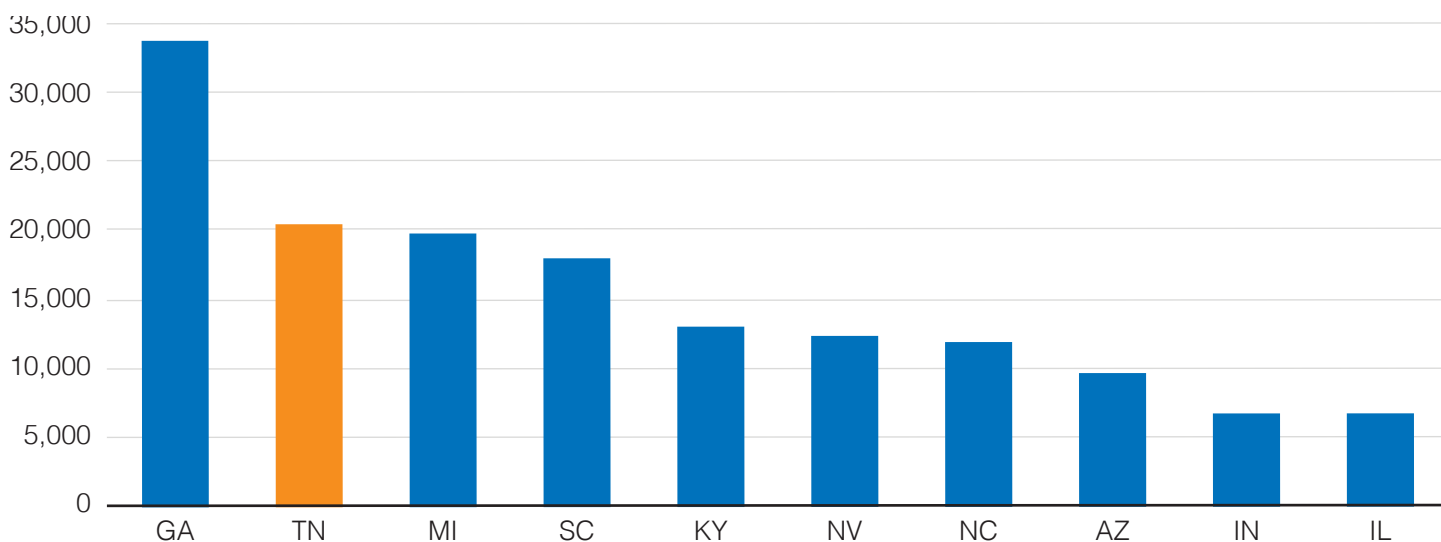
- In 2023, three new battery manufacturing projects were announced in Madison, Rutherford, and Montgomery counties.
- Total estimated capital expenditure on these facilities is well over \$400 million USD.
- Likewise, one new graphite manufacturing facility, with an estimated capital expenditure of almost \$30 million USD, was announced in Maury County in 2023.

TN is investing in the future of mobility.

- The Tennessee Department of Environment & Conservation and the Tennessee Valley Authority recently inked an agreement to fund a network of fast charging stations across the state, a project with an anticipated cost of \$20M.

### Top 10 States for New EV Job Announcements, August 2022–August 2023

Source: Environmental Defense Fund



# Cross-cutting Themes & Big Ideas

- 1. Innovation-driven economies create a virtuous cycle.** Innovation hubs mature because they create virtuous cycles in which policies, investment, and culture combine to create a place where companies want to be. This in turn drives economic growth and prosperity that compounds through community re-investment and attracts other businesses. Within this framework, the importance of being a place where people want to live and raise a family is hugely important: culture, people, talent, amenities, security, social environment, schools, and other quality-of-life factors play a major role in building innovation-driven economies.
- 2. “Hubs” do not emerge accidentally.** Tennessee has been intentional about creating a mobility hub. Universities have unique research capabilities and access to industry resources, businesses have access to research partners with relevant experience, government regulators are open and knowledgeable about innovating in the mobility space, and suppliers have a critical mass of demand and activity to set up operations in Tennessee. For example, the electric vehicle (EV) ecosystem needs a suite of technologies and solutions to scale at different stages of development and deployment. Many different companies are working on different pieces of that ecosystem in Tennessee.
- 3. “Radical collaboration” between industry, academia, and government is essential for driving innovation.** Collaborations and partnerships infuse fresh insights and combine areas of expertise and resources. Some collaborations are conventional or expected like research partnerships between industry and higher education (e.g., Vanderbilt computer science professors and Nissan partnering on AI and traffic research) or between a utility and its industrial customers (e.g., Tennessee Valley Authority and Google data centers strategically scheduling power usage). Other productive partnerships, like data sharing between Oracle and its competitors to improve health outcomes are, as Jason Maynard of Oracle put it, more like “strange bedfellows.”
- 4. Integrated data and data transparency—not just more data—are needed for innovation.** Being co-located and building relationships with competitors, researchers, and supply chain vendors makes it easier to share data and collaborate. Oracle spoke about needing access to large data resources to enable AI innovations in health care, for example.

- 5. Innovative companies look for ecosystems, not short-term policies, when choosing where to locate and invest.** Nissan, Bridgestone, and Volkswagen all emphasized that policy and regulatory issues (tax rate, tax incentives) matter somewhat but are not the deciding factor of where to they build headquarters, production, or R&D facilities. Under a more holistic long-term framework, successfully building an ecosystem is more important to businesses and innovators than individual policies.
- 6. Innovation is about more than delivering the next products or services, it is also about improving processes.** Automotive companies focus on integrating digital technologies into their existing processes as one of their next frontiers in innovation; universities innovate by forging new partnerships to fund growth; and the Tennessee Valley Authority upgrades transmission conductors to double or even triple the capacity of existing transmission lines, maximizing the use of its existing infrastructure. By making processes and services more efficient, growth can be sustained and enhanced even without breakthrough technologies.
- 7. Sustainability is a differentiator in business.** The benefits of sustainability go both to society and to businesses. Regions aspiring to become innovation hubs must prioritize sustainability initiatives, and for businesses to be competitive, they must be more efficient at every step of their value chain to reduce carbon emissions and costs.
- 8. Secure and sustainable energy is a prerequisite for American competitiveness in innovation.** The AI revolution, increasing computing power, digitization, and the electrification of transportation are all increasing electricity demand. Significant “hard” and “soft” (i.e., process) innovations are needed in the power sector to meet rising demand without sacrificing reliability, sustainability, or affordability. These innovations will require partnerships, utility and consumer alignment, policymaking, investment, and a willingness to think decades ahead.
- 9. The energy transition demands a mix of technologies, strategies, and policies tailored to local needs and conditions.** When transitioning to cleaner, more sustainable power, regions cannot let perfect solutions stand in the way of practical improvement. Embracing a variety of options—from renewables to nuclear energy to efficiency improvements to updated infrastructure to load management—rather than one-dimensional solutions is necessary for rapid and steady progress toward achieving climate and energy goals.
- 10. Nuclear power is crucial for the future energy mix, but readiness is key.** Nuclear power is a clean, reliable, and safe source of electricity. The research behind nuclear is also improving, but regulatory complexity and other hurdles threaten its potential in the United States. Preparing for a nuclear-powered future requires overhauling regulations, investing in workforce development, upgrading infrastructure, and strengthening material supply chains to enable rapid scaling of advanced nuclear technologies.

**11. Education must extend beyond the traditional four-year model.**

Alternative educational paths, such as technical community colleges, must be expanded and accessible for those who cannot pursue a traditional four-year college, ensuring they can re-enter or reskill and succeed in the high-skill labor force.

**12. Industry and educational institutions must create positive feedback loops to develop the needed workforce.**

Tennessee needs roughly 10,000 new engineers annually to support the companies that have come to the state, especially in the advanced manufacturing and mobility sectors. All higher education institutions—including 2- and 4-year degree programs—are thinking about how to respond to growing pressures for an innovation workforce (including securing more state resources to make the capital investments needed in their infrastructure and capacity). In turn, industry is partnering with universities to “bring a sense of reality into the classroom.” For example, electric vehicles (EVs) need fewer parts and less maintenance but are more digitally connected than traditional internal combustion vehicles. So, Nissan is working with higher education institutions to increase the number of engineers and grow a more digitally savvy workforce. Similarly, Oracle is working with local high schools and universities to build training curricula and internship programs that equip students to be successful at Oracle immediately after graduating.



## Day 1 — April 25

### Behind the Scenes









# 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 initiate this dialogue, the three hosts of the Tennessee Competitiveness Conversation—the first event in the “Competitiveness Conversations Across America” series under the auspices of the Council’s flagship “National Commission on Innovation and Competitiveness Frontiers”—each provided opening statements. These statements set the stage by framing the economic, global, and political realities facing Tennessee and the nation in 2024.

## Panel



**Daniel Diermeier**  
Chancellor, Vanderbilt University



**Donde Plowman**  
Chancellor, University of Tennessee, Knoxville



**MODERATOR**  
**Deborah L. Wince-Smith**  
President and  
CEO, Council on  
Competitiveness



*Daniel Diermeier, Chancellor, Vanderbilt University; Deborah L. Wince-Smith, President and CEO, Council on Competitiveness; and Donde Plowman, Chancellor, University of Tennessee, Knoxville.*

## Key Discussion Points

**Kicking off the Tennessee Competitiveness Conversation at Vanderbilt's Student Life Center, Vanderbilt Chancellor Daniel Diermeier** welcomed the more than 250 attendees from across Tennessee and the nation, including business leaders, government officials, national laboratory directors, and university leaders.

Diermeier provided initial context for the event and drove home the importance of the Competitiveness Conversation, noting that the United States faces a challenging predicament in how to maintain its own global competitiveness while promoting prosperity for all U.S. citizens. The key driver in achieving this dual mission, he noted, is

innovation, which involves improving both processes and products. With a more innovative economy—built on the invention, development and deployment of new products and services—businesses and industries, jobs and communities can all flourish.

Chancellor Diermeier went on to highlight what sets Tennessee apart: “radical collaboration.” That phrase became a throughline for many of the conversations that followed over the two-day summit. Chancellor Diermeier said, “Whether you are in government, private business, academia, or the nonprofit sector, we are all in this together.”

In the Chancellor's view, to tackle problems like energy security and transition, food and water security, improved healthcare, and climate change, all contributors to innovation must cut across traditional boundaries of disciplines or organizations to collaborate in the pursuit of discovery. The perspectives provided by different groups have proven a boon to finding new solutions to problems facing America.

**Donde Plowman, Chancellor of the University of Tennessee, Knoxville**, focused her remarks on Tennessee's distinctive strengths. The pathway to innovation does not have to take a one-size-fits-all approach, she noted, and Tennessee should use its individual distinctive advantages to develop its own version of an innovation hub. As Chancellor Plowman shared, “We know Ten-

“As a leading research university, Vanderbilt has innovation at the heart of its mission, and innovation is uniquely shaped by one of our core values. Radical collaboration, that is what we call it here. Radical collaboration requires faculty, researchers, and students to work together across disciplines, schools, and subject areas. It also calls us to reach out across sectors to work with other colleges and universities, government agencies, research laboratories, and military bases.”

**Daniel Diermeier**

Chancellor, Vanderbilt University

nessee has a tremendous story to tell about how to advance innovation—by building a knowledge-based economy, leaning into our strengths, and being unapologetically ourselves.”

**Deborah L. Wince-Smith, Council on Competitiveness President and CEO**, opened the Conversation by placing the event in context with the Council’s overall agenda and core effort, the “National Commission on Innovation and Competitiveness Frontiers.” The Commission’s work over the past four years has set the stage for this—and additional—Competitiveness Conversations—emphasizing emphasized the critical need to “broaden the geography and deepen the demography of U.S. innovation.” She exhorted that too many communities and people across America find themselves disconnected from the incredible innovation engine that distinguishes and powers the U.S. economy. Wince-Smith implored participants to focus over the coming two days on solutions to connect and to bring more Americans into the national innovation economy, noting we are not in a position to leave behind anyone in our vast country.

Ms. Wince-Smith, after concluding her remarks, introduced a special video to attendees from **United States Senator Marsha Blackburn**.



"The Council on Competitiveness is convening some of the brightest minds in science, education, industry, government, and more. The "Competitiveness Conversations Across America" is an initiative assembling groups around the country to think about how we drive forward our economy and our global competitiveness."

**Donde Plowman**

Chancellor, University of Tennessee, Knoxville



"Today the Council's National Commission is kicking off a three-year series of Competitiveness Conversations Across America. We will go to these places to listen, learn, and examine in depth their strategies and investments for their future."

**Deborah L. Wince-Smith**

President and CEO, Council on Competitiveness

## VIDEO ADDRESS

## Senator Marsha Blackburn—Innovation Drives Tennessee's Prosperity

In a brief video address, United States Senator Marsha Blackburn (R-TN) commended Tennessee for its allure as a prime destination for living, working, and raising families, attributing this appeal to its favorable business environment and lack of state income tax. She lauded the state's efforts in training a skilled workforce, particularly in advanced manufacturing, citing impressive figures of students trained and Tennesseans employed in the sector.

Senator Blackburn then shifted focus to her endeavors in Washington, notably her work on the Securing Semiconductor Supply Chain Act. This legislation aims to fortify the U.S. semiconductor industry by fostering collaboration between the government, private sector, and state economic development bodies to attract investment and bolster domestic production. She emphasized the act's significance in reducing reliance on foreign chip manufacturers, stimulating local economies, and repatriating jobs and innovation. To conclude, Senator Blackburn expressed pride in the innovative contributions of Tennesseans to the state's prosperity.

"In Tennessee, we have proven to be the state where people want to live, to work, to rear their family. We have a great business environment, with no state income tax. We have been chosen by so many people as the place to be, and every time I hear from people about workforce, I cannot help but think what a great job we are doing, training the workforce."



**Marsha Blackburn**

United States Senator (R-TN)

## PANEL

# The Pillars of Innovation: Deploying Tech-based Innovation at Speed and Scale, Accelerating the Future of Sustainability, and Defining the Future of Work and the Workforce

## Session Overview

What are the key factors to building an innovative economy? Kicking off the Tennessee Competitiveness Conversation, global business leaders with major operations in Tennessee explored the key pillars of innovation as articulated in the Council's "National Commission on Innovation & Competitiveness Frontiers"—highlighting both key challenges and opportunities for Tennessee, particularly within the automotive and mobility sector, and in advanced manufacturing. The leaders also

explored best practices for scaling regional innovation to more places across the country, with the goal of dramatically increasing the nation's innovation capacity and capabilities.

## Key Session Insights

In the past five years, Tennessee has experienced massive leaps in its economic and industrial development. As session moderator Dan Helfrich—Deloitte Consulting LLP Chair and CEO,

## Panel



**Robert (Rob) Carter**  
Executive Vice President, FedEx Information Services; Chief Information Officer of FedEx Corporation; Co-President and Co-CEO, FedEx Services Leadership



**Pablo Di Si**  
President & CEO, Volkswagen Group of America; CEO of Volkswagen Brand North America



**Paolo Ferrari**  
Joint Global COO and Global Chief Digital Transformation Officer, Bridgestone Corporation; Chief Executive Officer, Bridgestone West; Executive Chairman, Bridgestone Americas; Chairman, BSEMEA (formerly BSEMIA) Supervisory Board



**Jérémie Papin**  
Chairperson, Nissan Americas; Member of the Global Executive Committee and Sr. Vice President, Nissan Motor Co., Ltd.



**MODERATOR**  
**Dan Helfrich**  
Chair and CEO, Deloitte Consulting LLP; Business Vice Chair, Council on Competitiveness



*From left to right: Robert (Rob) Carter, Executive Vice President, FedEx Information Services, Chief Information Officer of FedEx Corporation, and Co-President and Co-CEO, FedEx Services Leadership; Pablo Di Si, President & CEO, Volkswagen Group of America, and CEO of Volkswagen Brand North American Region; Paolo Ferrari, Joint Global COO and Global Chief Digital Transformation Officer, Bridgestone Corporation, Chief Executive Officer, Bridgestone West, Executive Chairman, Bridgestone Americas, and Chairman, BSEMEA (formerly BSEMIA) Supervisory Board; Jérémie Papin, Chairperson, Nissan Americas, Member of the Global Executive Committee & Sr. Vice President, Nissan Motor Co., Ltd.; Dan Helfrich, Chair and CEO, Deloitte Consulting LLP, and Business Vice Chair, Council on Competitiveness.*

and Council on Competitiveness Business Vice Chair—points out, many companies, including Deloitte Consulting, have made significant investments in Tennessee due to its economic, innovation, and business-friendly climate. Helfrich said that five years ago Deloitte Consulting had a few hundred people in Tennessee; today, the company is eclipsing 2,000 employees in the state.

What has Tennessee done to catalyze this rapid development? In this panel, business leaders from across Tennessee discussed how the state has transformed itself into a hub of industry, manufacturing and, increasingly, innovation. Based on their experience and leadership in building workforces and production within the state, the leadership panel identify several “pillars of innovation” that have influenced the region’s economic dynamism, and they explored how others can learn from their experiences, and build on these pillars for growth and prosperity.

mism, and they explored how others can learn from their experiences, and build on these pillars for growth and prosperity.

**To build a prosperous economy that creates jobs and attracts investment, the business environment needs to be innovative.** As Pablo Di Si, President and CEO of Volkswagen Group of America emphasizes, innovation is the seed that grows other opportunities throughout an economy: “I always say that anybody can bend metal, but not everybody can design a vehicle. So, if you have the knowledge, if you have the innovation, the manufacturing jobs will follow.” Innovation grows regional economies by identifying challenges and creating new businesses to solve them. Within organizations, innovation improves productivity through new processes or product lines. This creates value, wealth, and new



“Regions that focus on sustainability will also become more competitive.”

**Dan Helfrich**

Chair and CEO, Deloitte Consulting LLP,  
Business Vice Chair, Council on Competitiveness



“I always say that anybody can bend metal, but not everybody can design a vehicle. So, if you have the knowledge, if you have the innovation, the manufacturing jobs will follow.”

**Pablo Di Si**

President & CEO, Volkswagen Group of America; CEO  
of Volkswagen Brand North American Region

jobs, all of which are important for the strength of communities. But how does a region foster greater innovation?

**One answer from the panel: cross-sectoral collaboration.** There is an interdependent relationship between academia and business across Tennessee that is a supportive, driving force for new innovations. For example, the automotive manufacturing and mobility hub maturing in Tennessee is possible because of the regional ecosystem made up of transportation infrastructure, talent, energy, research and development, a business-friendly environment and incentives, a culture of collaboration, and other factors oriented to supporting the industry’s special needs. The ecosystem brings stakeholders together, along the value chain, forging collaboration between businesses, academic institutions, national labora-

tories, and government entities. This collaboration drives discovery and allows rapid scaling of those discoveries for the benefit of the regional and national economy, as well as the businesses making up the mobility industrial base in Tennessee.

**To drive further innovation, academics and research institutions need to communicate and partner with businesses to better understand the challenges each business faces and determine how to implement successfully and to scale solutions.** As Chairperson of Nissan Americas Jérémie Papin recounted, large suppliers like his company can play a key role in coordinating how an idea can scale. “There is plenty of capital available for a good idea, but [large suppliers] can help by solidifying revenue streams or making a very concrete road to scale, which is basically going to be the make-or-break of any startup.”



“We want to be a go-to company for the best people, the best students and teachers. We want to bring a sense of reality into the classroom. We want bright minds to work on solving the problems that we have.”

#### Jérémie Papin

Chairperson, Nissan Americas;

Member of the Global Executive Committee and Sr. Vice President, Nissan Motor Co., Ltd.

Fortunately, this type of collaboration is happening in Tennessee. For example, the Tennessee Valley Authority (TVA), the sixth largest power supplier in the United States, and the U.S. Department of Energy’s Oak Ridge National Laboratory (ORNL) are actively conducting clean energy research important to significant drivers of the Tennessee economy, like the automotive and mobility businesses. The goals of such research are beneficial to all four automakers with large-scale presence in Tennessee, and for the citizens of Tennessee, as the research is looking to develop more sustainable automotive technologies and processes.

#### **Building a collaborative environment for innovation only goes so far without the talent to drive forward new ideas.**

A workforce equipped with skills relevant to technology-heavy industries will scale the new ideas born from collaborations. For the future development of a region, innovators cannot solely rely on importing workers from other states or from around the world to fulfill their demands. Instead, the panelists stressed that a region needs to train its local, indigenous workforce to align with dynamic industry demands.

Tennessee has three R1 research universities, which are universities known for extensive research facilities, high levels of research funding, and making significant contributions to academic scholarship and doctoral education. These include the University of Tennessee, Knoxville, Vanderbilt University, and the University of Memphis. The R1 universities, along with technical and community colleges, as well as other four-year institutions are working diligently to upskill and reskill the state’s workforce to meet the evolving demands of industry. Often, they are doing this in partnership with industry. For example, Nissan is working with the Tennessee Centers for Applied Technology to help guide their curriculum towards training more Tennesseans in generative AI rather than traditional mechanical skills.

To build a workforce for technology-heavy industries, education systems must develop pathways to attract young people into engineering programs and fields. Pablo Di Si of Volkswagen commented young people will not commit to studying engineering solely on the merits of engineering. Instead, early in a young person’s life, they should be exposed to engineering through challenges and games to provoke their interest in the field. Gamify engineering, Di Si suggested, is an approach that could attract more young people into the field.

**Continued, sustained investment in state infrastructure is a lynchpin for long-term workforce development and cross-sector collaboration.** Paolo Ferrari, Joint Global COO and Global Chief Digital Transformation Officer of Bridgestone Corporation, understands long-term investments can be politically difficult when short-term factors can help win elections, but he explained Bridgestone makes its investment decisions based on a region's perceived long-term viability. "Bridgestone makes investments thinking 20, 30 years from now. You do not make \$10 billion investments on just a tax break for a couple of years."

**The panel then highlighted developing specialized areas of excellence is one of the best ways to reduce a region's investment risk.** The agglomeration of excellence and resources can attract both more suppliers and buyers, ensuring suppliers have a constant stream of customers. The increased concentration of buyers, in turn, attracts more suppliers, creating an even greater concentration of expertise in a region, boosting competition, and further strengthening the region's supply chains. As Paolo Ferrari stated, "It is more important to make sure that in certain places we have hubs, scale—an ecosystem. I was reading about Oracle moving to Nashville. Of course, that is great news. And why? The company's leadership mentioned that a key reason is to be closer to Nashville's healthcare hub. There's this concept that you want to be in a hub where you can have scale, you can connect to the ecosystem."

**In addition to having a hub of producers, policymakers need to support the overall innovation ecosystem by investing in infrastructure to support specific areas of excellence.** For example, FedEx's growth as a global transportation, e-commerce, and business services company is tightly coupled to its Memphis location,



"Connectivity has always been critical to the development and evolution of trade and value creation, from the Roman roads and the silk roads, and onto shipping lanes. In Tennessee, we are blessed with that centrality. The international airport in Memphis is always either the first or second largest air cargo airport in the world."

**Robert (Rob) Carter**

Executive Vice President, FedEx Information Services and  
Chief Information Officer, FedEx Corporation

which boasts tremendous access to people and markets through rail, roads, air, water and, increasingly vital, fiber. As emphasized by Rob Carter, Chief Information Officer of FedEx Corporation, a key component of Tennessee's success has been its connectivity. By having the infrastructure to support an interconnected supply chain, Tennessee has expanded its production reach globally.



“I believe strongly in the concept of the economy of ecosystems. And, of course, there are ecosystems in healthcare around Nashville and across Tennessee. We have one in mobility as well. It is an ecosystem of solutions and parts providers, large global original equipment manufacturers, and massive fleet companies. The ecosystem works together on converging interests, purposes, and platforms, whether they are business platforms or digital platforms. But we need a glue. And I think the glue is partially technology and data.”

**Paolo Ferrari**

Joint Global COO and Global Chief Digital Transformation Officer, Bridgestone Corporation; Chief Executive Officer, Bridgestone West; Executive Chairman, Bridgestone Americas; Chairman, BSEMEA (formerly BSEMIA) Supervisory Board

Policymakers can support the development of regional hubs and attract long-term investment from organizations looking to innovate by investing in and maintaining existing or new specialized infrastructure. For example, Jérémie Papin of Nissan, cited how Tennessee’s charging network system in Tennessee has been a boon to the proliferation of electric vehicles throughout the state.

**The panel of global leaders also emphasized the increasingly important competitive advantage of sustainable operations and products. As Bridgestone’s Ferrari succinctly said, “what’s good for society is good for business.”** According to the panel, for regions to become hubs of innovation, they need to be sustainable. For example, designing tires that last longer not only reduces waste but also results in a better-functioning final product. Volkswagen’s Di Si discussed how making more efficient vehicles at Volkswagen both reduced costs and made their cars more sustainable. “When you reduce the weight of the vehicle, you use fewer materials, you produce less CO<sub>2</sub>, and you become more competitive,” Di Si said.

Sustainability is crucial at every step of the production process, so companies must integrate it into their operations and product development processes to succeed. By making products more sustainable, producers can also enhance their efficiency and competitiveness. For example, Volkswagen has partnered with Electrify America, a company that provides charging for electric vehicles through solar panels. Through this partnership, Volkswagen is in the process of installing solar panels on the rooftops of all its dealerships.

**As a concluding point, the panel noted that all the aforementioned pillars of innovation—innovative culture and collaboration, talent, investment, regional specialization, and sustainability—are amplified through the use of digital technology.** Innovation is not just a matter of improving products. Innovation is also about improving processes, and digital technology has

allowed for people and organizations to operate more efficiently. As Bridgestone's Ferrari noted, it has become the glue that connects different parts of the economic ecosystem together. Today, almost every company is a technology company.

With greater access to information, firms can ensure their products are more efficient and sustainable. Bridgestone's creation of a digital twin for electric vehicles, for example, allows for better fleet management at a potentially lower cost. And the creation of an interconnected data infrastructure allows firms to operate more efficiently and sustainably.

## PANEL

# Redefining “Place” in the 21st Century: Broadening and Deepening Tennessee’s Innovation Ecosystem

## Session Overview

As competition in the global innovation landscape intensifies, there is a growing urgency to capitalize on untapped talent, technology, investment, and infrastructure. To boost competitiveness, the United States—and Tennessee—must focus on expanding and deepening both the demography and the geography of innovation, meaningfully engaging different communities and diverse populations as workers, innovators, entrepreneurs, and beneficiaries. Led by Chad Evans and consisting of mayors and economic development leaders

from across the state, this panel explores how Tennessee has tapped its strengths to become a “place” of innovation.

## Key Session Insights

**Chad Evans, Executive Vice President of the Council on Competitiveness**, welcomed a powerful slate of mayors and economic development leaders from the four big cities in Tennessee to reimagine the concept of place in the context of an ever-evolving, hyper-competitive, national innovation ecosystem. “In today’s fiercely competitive tech-driven landscape, it is imperative

## Panel



**Jamari Brown**  
Director of Economic and Community Development, Metropolitan Government of Nashville and Davidson County



**Tim Kelly**  
Mayor of Chattanooga, TN



**Indya Kincannon**  
Mayor of Knoxville, TN



**Ted Townsend**  
President & CEO, Greater Memphis Chamber



### MODERATOR

**Chad Evans**  
Executive Vice President, Council on Competitiveness



From left to right: Ted Townsend, President & CEO, Greater Memphis Chamber; Indya Kincannon, Mayor of Knoxville, TN; Chad Evans, Executive Vice President, Council on Competitiveness; Tim Kelly, Mayor of Chattanooga, TN; Jamari Brown, Director of Economic and Community Development, Metropolitan Government of Nashville and Davidson County

we leverage all our assets and capabilities. That means harnessing the full potential of the talent, the technology, and the infrastructure in our communities to drive innovation and economic expansion,” Evans said.

But according to Evans, a vast majority of the emerging technology and growth of cutting-edge industries has been concentrated in a handful of metropolitan areas, primarily along the coasts. He noted, “Between 2005 and 2017, 90 percent of private sector innovation and related job growth occurred in five metropolitan areas: Boston, Seattle, San Francisco, San Jose, and San Diego.”

**Turning to the panel, Evans asked how places like Tennessee and communities across America can build the capacity to become hubs of innovation.** One central idea posited by the panel was for communities—rural and urban—to avoid the trap of trying to mirror other regions and, instead, focus on amplifying their distinctive strengths. That is, success comes

when government, business, and civic leaders develop “place-making” innovation strategies that embrace the particular characteristics of their region as a strength.

Indya Kincannon, Mayor of Knoxville, shared a great example from her city: Knoxville’s geography is hilly, which, over time, made development challenging and even uneconomical in some cases. This supposed weakness, long held as a limit on the city’s progress, is now viewed as a strength, as the attractive undeveloped hillsides have become an essential part of Knoxville’s park system—a magnet for talent looking for balance and a better place to work and live. Knoxville has developed an image of being a clean, safe, and sustainable community while offering robust infrastructure and transportation options, good schools, and access to clean and reliable energy. These characteristics help attract the highly-demanding, high-skilled workforce a community needs to run an innovation-driven economy. And

“Today we realize innovation ‘places’ are both physical and virtual, transcending all sorts of traditional boundaries. The Council’s work in the late 90s and early 2000s to define innovation clusters led to a seminal breakthrough in realizing economic activities transcend traditional political boundaries...



...So today and looking ahead, I ask this panel, what does place mean for Tennessee? Are Chattanooga, Knoxville, Memphis, Nashville as natural a ‘place’ together as say, Chattanooga, Chicago, and Calgary? Knoxville, Kyoto, and Kuala Lumpur? Memphis, Mumbai, and Mexico City? Nashville, Nairobi, and New Delhi?...

...The question is no longer how do we become the next Silicon Valley. Rather, it is how do we make our communities the most innovative, creative, and inclusive they can be to compete in this world of turbulence and transition?”

#### Chad Evans

Executive Vice President , Council on Competitiveness

it’s paying off for Knoxville. Mayor Kincannon noted that while five metro areas, including Boston and San Francisco, represent most of the growth in tech jobs, Knoxville ranks eighth in the U.S. for R&D capacity.

Moreover, across the state, Tennessee’s cultural assets, educational institutions, and international partnerships have helped create attractive, welcoming communities that increasingly appeal to a diverse workforce. That is particularly important as cities like Nashville and Memphis become even more global hubs of innovation. For exam-

ple, in addition to Nashville’s healthcare industry prowess, another key reason Oracle has decided on Nashville is its high scores on many quality-of-life factors.

**Another important topic surfaced by the panel was the importance of investing in the infrastructure that supports innovation.** However, a challenge with innovation-enhancing investments like roads, railways, waterways, airports and, increasingly, advanced fiber is that they often require a very long-term commitment and strategy—a perspective that is often risky for policy-



“For every dollar you put into pre-K for childcare, the return to society is eightfold. But those are investments you do not see in 10 years. It is 20 years later. And it is in our innovation economy. I think this is an area where we are making progress, but we could double down on this.”

**Indya Kincannon**  
Mayor of Knoxville, TN



“What I would share with other communities and leaders is this: you have to take the risk of putting in a long-term investment knowing it might not pay off for you in the short term. Nashville has been on this rollercoaster for 30 years. There were investments made 30 years ago that are now paying off.”

**Jamari Brown**  
Director of Economic and Community Development,  
Metropolitan Government of Nashville and Davidson  
County

makers focused on shorter terms, and facing an electorate with immediate needs and demands.

Jamari Brown, the Director of Economic and Community Development for the Metropolitan Government of Nashville and Davidson County, noted the conundrum policymakers face when investing in long-term innovation projects: “You are taking the risk of making investments today that will probably not see a return in your administration. And I think that is very difficult for politicians to do—to take a risk today. They are often

thinking ‘I need to run again in four years,’ or ‘I need to run again in two years.’” The implication? Many policy positions and decisions across the United States are often focused on the political calendar and political dynamic.

What is one way to overcome this challenge? Policymakers and community leaders must engage heavily to help educate their constituents of the importance of long-term infrastructure investment as additive to a community’s attractiveness for outside investment, long-term growth, and overall well-being.

Tim Kelly, Mayor of Chattanooga, shared how this worked in his city as it made major investments in its municipal fiber network, providing 1G fiber internet for \$67 a month—investments viewed at the time as controversial and risky. However, this investment paid off. Chattanooga's fiber network is now one of the most advanced in the nation, may become an important factor in a growing quantum network in the region, is attracting significant economic development dollars, and has been a magnet for talent, especially among those with hybrid and flexible work options.

**The imperative of inclusive growth and the need to integrate all sectors of society into the burgeoning innovation economy was a frequent discussion point among the panel.**

The mayors shared a common vision of transcending traditional economic models to foster a more inclusive growth strategy, with Mayor Kincannon emphasizing that prosperity is not a zero-sum game and Mayor Kelly advocating for intentional efforts to revitalize the black community in Chattanooga.

Mayor Kincannon stressed that “Tennessee cannot afford to waste a single person. We need everybody.” Leaders and entrepreneurs can emerge from anywhere, so more opportunities are needed for people who traditionally have had less access to science, technology, engineering, and mathematics (STEM) resources and the innovation economy. Tennessee has taken steps to promote inclusivity—for example, Chattanooga has appointed a chief equity officer and established an office for New Americans to support its immigrant community.

One city in Tennessee that has embraced its diversity as a strength is Memphis, the largest majority Black city in the United States, and also home to a large Hispanic population. Ted Townsend, President and CEO of the Greater Memphis Chamber, highlighted the allure of Memphis as a beacon for global talent, bolstered by its globally recognized brands like FedEx, its geo-



“We are working really hard at making sure that everybody in Chattanooga can take advantage of these historical infrastructure investments, and we can use this incredible opportunity to heal our historical wounds. The good news is we can fix this.”

**Tim Kelly**  
Mayor of Chattanooga, TN

graphic proximity and transportation infrastructure, its welcoming culture, and a high concentration of medical device manufacturers. “We are truly an internationally connected city,” he noted.

But how do communities embrace the full diversity of their populations in their innovation economies? According to Nashville’s Jamari Brown, it takes collaboration across institutions and sectors, but that only works when there is trust. Innovators need the confidence that when sharing their ideas, they will still not lose control or the ability to profit. Information is siloed and larger projects either never start or sputter. Additionally, trust



“We are seeing more and more advanced industries, namely in manufacturing, come to Memphis. Why? Because they know if they make a product in Memphis, they can get it to anywhere else in the world through all of the modalities of transportation at their disposal.”

**Ted Townsend**

President & CEO, Greater Memphis Chamber

is critical for sharing the information essential to deliver larger projects requiring diverse groups of institutional partners. With a culture of trust, ideas spread, innovations scale, and projects and businesses expand.

In addition to trust, the panelists also emphasized that access to educational opportunities must be inclusive to ensure that members across the community are able to participate in the innovation economy. Initiatives like Chattanooga 2.0, which focuses on aligning education with industry needs and creating career pathways for students, are good ways to develop a region’s innovative

capabilities. As an example, Chattanooga has been actively working with Volkswagen to prepare a local workforce to meet the needs of the company and the manufacturing industry more broadly. Nashville’s Jamari Brown also brought up the Academies of Nashville community program as an example of a successful model. The Academies of Nashville allows students to have the opportunity to work with the private sector to job shadow, participate in dual credit programs, and earn industry certifications along with college scholarships. Academies of Nashville includes 35 different programs students can enroll in across 12 Nashville high schools.

As the conversation drew to a close, the panelists reflected on the broader implications of their local efforts, suggesting that the strategies they employ could serve as a blueprint for other regions striving to enhance their innovation ecosystems. The collective insight from the panel underscored a pivotal narrative: for Tennessee to thrive on the national and global stage, it must leverage its distinctive regional strengths, foster strategic collaborations, and most important, ensure its economic growth benefits all communities equitably.

In an era in which geographical and demographic inclusivity can drive significant advancements in technology and economic development, Tennessee’s leaders are poised at the forefront, redefining what it means to be a place of innovation in the 21st century.

## TECH TALK NO. 1

# Solving Mobility Challenges—The TDOT I-24 MOTION Project

## Speakers

**Dan Work**

Associate Professor of Civil and Environmental Engineering, Vanderbilt University

**Josh Westerhold**

Senior Manager, Mobility, Nissan Americas

**Jonathan Sprinkle**

Professor of Computer Science, Vanderbilt University

## Session Overview

While being caught in traffic may feel like an inconvenience to you, the cumulative cost on the economy is massive. A study by mobility analytics company Inrix found that Americans lost a total of 51 hours, and traffic congestion cost the United States more than \$81 billion in 2021. Considering the high cost of traffic, a radical new approach to managing traffic flow on American infrastructure is needed. The team behind the I-24 Motion Project stepped up to find a new solution and, in so doing, built the smartest road in the world along a four-mile stretch of I-24 in Nashville, Tennessee.

## Key Session Insights

The Tennessee Department of Transportation (TDOT) I-24 Motion project began with a single mission: to discover the root causes of traffic jams. If those root causes can be addressed, traffic could be less severe for everybody on the I-24 roadway and, if it worked on the I-24, apply the learnings and technology from the project to highways across the country.

A key challenge in solving traffic problems on the I-24 in Nashville is minimizing “phantom traffic jams.” Dan Work, Professor of Civil and Environmental Engineering at Vanderbilt University, explained that these jams are caused by a ripple effect in traffic flow. When one car brakes abruptly, it disrupts the entire stream of traffic. As Work described, “When you tap the brakes, the driver behind you, who may not be paying full attention, has to brake harder to avoid a collision. The next driver reacts even more aggressively, creating a ripple effect that results in a phantom traffic jam with no apparent cause, but it’s due to the way we drive.”

Dan Work and Jonathan Sprinkle, Professor of Computer Science at Vanderbilt University, were part of the CIRCLES Consortium, a collaboration of researchers from across multiple universities who came to Nashville to carry out a bold experiment: to dampen phantom traffic waves to save



*Dan Work, Professor of Civil and Environmental Engineering, Vanderbilt University; Josh Westerhold, Senior Manager, Mobility, Nissan Americas; and Jonathan Sprinkle, Professor of Computer Science, Vanderbilt University.*

energy, using 100 cars that ran AI algorithms. The Vanderbilt team worked closely with Josh Westerhold, Senior Manager of Mobility at Nissan Americas, to carry out this first experiment on the TDOT I-24 Motion testbed. The team had three major challenges to overcome:

1. Invent an AI system to control cars on the freeway.
2. Source the one hundred cars needed to deploy on the freeway to run their experiment in an economically feasible way.
3. Build a system that could accurately measure the impact of the experiment.

Despite these challenges, the team, and the organizations they represented, saw the potential for the project to deliver positive systemic change, and their respective organizations looked creatively for ways to say “yes” to the project.

**Here’s what the project teams did:** To mitigate costs, Vanderbilt partnered with Nissan to lease 100 cars that were temporarily modified for the experiment. When working through the terms with Nissan, Vanderbilt’s Sprinkle said they ensured the automaker that Vanderbilt’s graduate students would be trained to prepare these leased vehicles for the experiment without damage.

**But a big question to be answered was how to measure, and therefore research, phantom traffic jams, which are unpredictable.** To solve the problem, the team created algorithms to use the sophisticated camera system that is part of the TDOT I-24 Motion Testbed. TDOT installed 4K resolution cameras throughout the four-mile zone of the experiment. Using an AI system to process the data of the traffic patterns, the team studied the behavioral patterns of drivers that precipitated phantom traffic jams. From this research, CIRCLES researchers built a traffic management AI system that strategically changed the speeds of “influencer” automobiles. By adjusting the influencer cars and speed limits, the system effectively helped optimize traffic flows and limit phantom traffic jams.

What may be most important in this story is not the improved safety, conservation of time, and sustainability benefits, but the value of strategic partnerships across leading organizations to push innovation forward. The collaboration between Vanderbilt, Nissan, the Tennessee Department of Transportation, and the other universities in CIRCLES created synergies by bringing together resources, ideas, talent, technology, and infrastructure in a way no single organization could



“Nissan’s desire to partner was about improving everyone’s thinking through and affecting a large systemic change that will ripple down to our customers at the end of the day. And we can be a leader at the forefront.”

**Josh Westerhold**

Senior Manager, Mobility, Nissan Americas

manage on its own—all to help more efficiently manage Nashville’s, and the country’s, daily commute. This public-private partnership provided the security for the researchers to test their innovation before scaling it. Moreover, the federal government played a role, as the U.S. Department of Energy and the National Science Foundation provided funding for the university teams.

## TECH TALK NO. 2

# A Primer on the Future of Computing—Quantum Information Sciences

**Speaker**

**Kate Evans**

Director, Computational Sciences and Engineering, Oak Ridge National Laboratory

**Session Overview**

Dr. Kate Evans of Oak Ridge National Laboratories gave a crash course of quantum sciences—and potential impacts the domain may have on U.S. innovation and competitiveness.

**Key Session Insights**

Using quantum mechanics in computing can greatly increase the efficiency of computer processes. In traditional computing, to find the most efficient process, the computer must simultaneously iterate over many alternative solutions. This process, known as parallel computing, is costly due to the need of running many iterations. Kate Evans, Director of Computational Sciences and Engineering at Oak Ridge National Laboratory, likened this process to having many mice in a maze, all searching for the fastest path to the cheese at the end. Although one of the mice will eventually find the fastest path to the cheese, it will take a long time and a lot of trips to find the optimal path.

“Doing things more efficiently and more securely is the innovation revolution that we could realize through quantum.”

**Kate Evans**

Director, Computational Sciences and Engineering, Oak Ridge National Laboratory

Quantum computing provides a different option. Evans said a quantum mouse in this analogy could explore all the paths at once and find the cheese in the quickest way possible once asked to look. “You do not need all the energy, but you can get all the speed [of a traditional computer.] That is the promise.”

**How does it work? Dr. Evans shared that quantum computing is based on the idea that at a quantum level, there is the possibility for any number of states to exist between supposedly binary options.** “The key to quantum computing is you have a one and zero option in classical computers, but little (quantum) objects can actually be a combination of the one and zero, and you do not have to figure out which until you look at it.”

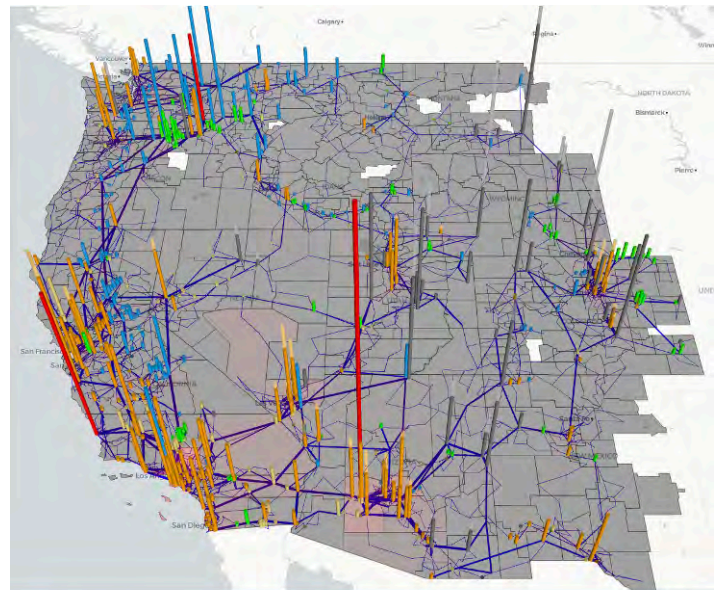
**Since quantum computing could carry out complex processes more efficiently, it is invaluable for monitoring complex systems.**

For example, a multilab team including ORNL has used the ORNL’s AMD Frontier system, the largest in the world for science right now, to analyze an example disaster scenario—a wind power shut-down within the Western electrical grid—within 15 minutes. ORNL scientists are interested in exploring potential improvements to this analysis using quantum computers. This vision is that this disaster scenario could be identified, and the information securely transferred and optimized for the grid using data and algorithms in a quantum computing environment to determine how the grid should respond in real time. Evans notes that quantum computing allows us to more accurately model and predict complex and random phenomena, such anomalies on a large energy grid. This capability enables researchers to better understand and develop mitigation and response strategies.

**But Dr. Evans warned quantum computing is not the right tool for every problem, and it must be brought to scale to meet its full promise.** Researchers need to collaborate with different organizations to help spread the adoption of this technology across the country. Dr. Evans stressed that ORNL wants to work with the entirety of the

Department of Energy national laboratory complex and other partners across the nation to help scale quantum computing.

In addition, ORNL and other government institutions can provide services and safeguards to help quantum computing scale and realize its potential security benefits. This collaboration is necessary to achieve the greater goal of a national quantum network. There are already some local quantum networks around the country, and Dr. Evans is hopeful that ORNL's and the nation's first commercial quantum network at the Electric Power Board (EPB) in Chattanooga can be connected to each other, and then to these other regional systems someday. To that end, Dr. Evans shared that ORNL is working with organizations in Tennessee to scale up quantum technologies throughout the state and region. ORNL has been working actively with the EPB to advance quantum networks, as well as partnering with the University of Tennessee, Knoxville, Chattanooga, and industry partners like the Tennessee Valley Authority to demonstrate and expand these new and more secure quantum networks.



**Today:** Using all of Frontier, we produced an optimal power-flow analysis for the entire western US grid in 15 minutes.

**Tomorrow:** Real time and secure

## PANEL

# Developing Tennessee's Innovation Economy

## Session Overview

The future of innovation will rely increasingly on integrated, multidisciplinary, and multidomain partnerships that span and connect research, development, and deployment of new technologies at scale. In this panel, leaders across academia, government, and business discuss how to build innovation ecosystems that support the technologies of today and the industries of the future.

## Key Session Insights

**America faces unprecedented challenges, and innovation is our greatest means to solving them.** And as part of the discussion's open, Susan Hubbard, the Deputy Laboratory Director for Science and Technology of Oak Ridge National Laboratory, reminded the Competitiveness Conversation attendees of America's long history overcoming challenges by developing new technologies. While Oak Ridge was originally started to help us win World War II, she noted,

## Panel



**Lindsey Cox**  
Chief Executive Officer,  
Launch Tennessee



**Deb Crawford**  
Vice Chancellor for  
Research, Innovation, &  
Economic Development,  
University of Tennessee,  
Knoxville



**Susan Hubbard**  
Deputy Laboratory  
Director for Science and  
Technology, Oak Ridge  
National Laboratory



**Jason Maynard**  
Executive Vice President  
of Revenue Operations,  
Oracle



**MODERATOR**  
**Joe Hoagland**  
Vice President of  
Enterprise Relations and  
Innovation, TVA



*Joe Hoagland, Vice President of Enterprise Relations and Innovation, Tennessee Valley Authority; Jason Maynard, Executive Vice President of Revenue Operations, Oracle; Susan Hubbard, Deputy Laboratory Director for Science and Technology, Oak Ridge National Laboratory; Deb Crawford, Vice Chancellor for Research, Innovation, and Economic Development, University of Tennessee, Knoxville; and Lindsey Cox, Chief Executive Officer, Launch Tennessee.*

the laboratory today is combatting existential problems. Hubbard said is now focused on the missions of today, including clean energy transition, national security, and the development of emerging technologies. Given the importance of innovation for overcoming our biggest challenges, a strategy for producing and scaling innovation is needed, Hubbard said.

**A common point brought up throughout the Tennessee Competitiveness Conversation, and resurfaced in this panel, is that radical collaboration is a key catalyst for innovation.**

To develop Tennessee further as an innovation hub, organizations need strategically to foster partnerships across sectors to bring together a diversity of expertise. Joe Hoagland, Vice President of Enterprise Relations and Innovation for the Tennessee Valley Authority, acknowledged during his panel set up and moderation that collaboration is not always easy. It can lead to “strange bedfellows,” he said. “We all have our own drivers, but if we can bring them together in common places, that is where we will see success.”

Building on the theme of radical collaboration and linking to healthcare, Jason Maynard, Executive Vice President of Revenue Operations at Oracle—which announced in the days leading up to the Competitiveness Conversation that it is moving its global headquarters to Nashville to leverage a multitude of opportunities around the city’s emergent and thriving healthcare innovation ecosystem—emphasized how sharing patient information across the healthcare network also improves patient outcomes. “We have got to find a way to open up patient data because ultimately it is about ensuring that someone who comes into an emergency room—or even a regular doctor visit—receives the best possible treatment.” That requires quick access to accurate patient data—a problem Oracle is on a mission to solve. To do so, the global firm is tapping Nashville’s innovation ecosystem and, in the truest form of radical collaboration, working with competitors, partners, suppliers, research universities, and other critical stakeholders.



“In a world of incredible challenges, everything is resource limited. But if we can figure out what to bet on, what our portfolio approach should be, I think we have a much better chance of achieving the critical mass—and of starting to grow that critical mass—needed for long-term, sustainable innovation.”

**Susan Hubbard**

Deputy Laboratory Director for Science and Technology,  
Oak Ridge National Laboratory

**And it was this theme of sharing—whether research and development findings, or other resources—between a wide range of stakeholders that panelists emphasized as totally necessary for Tennessee’s innovation economy to emerge and thrive.** Oracle’s Maynard built on the idea: “If you want to change radically the delivery of healthcare to have better patient outcomes, you cannot do it on your own.”

Collaborations also enable researchers to uncover a wider number of challenges—and ensuing opportunities—to explore, as well as expand their



“Everybody keeps talking about radical collaboration. It seems to be the phrase. I think what we want to talk about now is: ‘how do we do radical collaboration?’”

**Joe Hoagland**

Vice President of Enterprise Relations and Innovation,  
Tennessee Valley Authority

view of possible solutions. The UT-Oak Ridge Innovation Institute (UT-ORII), for example, catalyzes collaboration and allows experts across organizations to take a longer view by working to identify areas of cross-disciplinary study and innovation that will be important for the state, and the nation, over the next decade.

However, not all ideas or partnerships lead to success. As Chief Executive Officer of Launch Tennessee Lindsey Cox explained, one of the biggest challenges in developing an innovative economy is managing the risk of failure. A key approach to mitigating this risk is to create an environment where innovation can thrive across industries.

Given the unpredictability of innovation, the greatest advancements often emerge from developing cross-sectoral ecosystems that foster an inherent tolerance for the risks associated with innovation. For example, ORNL’s Hubbard explained that

many of the advancements at ORNL stemmed from its investment portfolio in emerging technologies. “We have an internal investment portfolio in our ecosystem from which we draw to advance and connect promising people and technologies. In doing so, we also begin to foresee and define new frontiers. In fact, some of our investment portfolio assets are what catalyzed several years ago our quantum efforts today. It is what started our computing efforts.”

**Nonetheless, Tennessee’s success in attracting and growing businesses comes with a major challenge: finding the people with the technical skills to meet growing demand from industry.** And that’s a topic Deb Crawford, the Vice Chancellor for Research, Innovation, and Economic Development at the University of Tennessee, Knoxville, jumped on with thoughts and solutions. Crawford summarized the problem Tennessee is facing in this way: “One of the challenges we have in Tennessee is preparing the workforce for the innovation economy of the future. We have heard recently from the State that we need to produce an additional 10,000 engineers a year to meet the needs of industry across Tennessee.” To support the growth of technology and innovation hubs in Tennessee, policies and investment are needed to actively train and attract workers that can help support technology heavy industries, specifically by expanding STEM education at all levels of educational attainment across the state.

**The panel shifted the discussion to focus on Tennessee’s start-up environment.** As happens in most parts of the United States, startups that spin up activity in Tennessee often reach a point where they face a decision to stay or leave. Historically, many have left the state to land in regions with, for example, a greater concentration of STEM talent and opportunities to attract private capital. University of Tennessee, Knoxville’s Crawford stressed the importance going forward in actively supporting and maintaining Tennes-



“(To engage in and activate innovation) we are taking an approach to be open, to be interoperable, to make sure that all of our systems, and all of our applications work with everyone—including our biggest competitors.”

**Jason Maynard**

Executive Vice President of Revenue Operations, Oracle

see’s start-up community, calling for greater resources—and arguing that could trigger a new, more virtuous cycle of attracting additional start-ups and venture capital to the state. Lindsey Cox then shared how Launch Tennessee is actively working to do that: creating a supportive environment through a variety of investment opportunities, mentorships, collaborations, and other resources that help more Tennessee innovators become Tennessee entrepreneurs who stay—as well building a softer landing for start-ups looking for a place to establish their future.

**The panel concluded with a discussion around how the resources needed to develop the region’s innovation capabilities are cur-**



“Tennessee is not too big that you cannot find somebody who is connected to somebody else really quickly. And I think that is one of the wonderful things about the innovation culture here—people are willing to help. It is easy to partner.”

**Deb Crawford**

Vice Chancellor for Research, Innovation, & Economic Development, University of Tennessee, Knoxville

**rently unequally distributed, with a concentration in urban areas.** They recommended that private and public organizations work to promote access to training and infrastructure resources in rural communities, as this will ensure everyone can engage in, and benefit from, the growing innovation economy in Tennessee.

Fortunately, there is work underway across the state to extend research and innovation, and the many benefits brought by it, to more places in Tennessee. For example, the University of Tennessee, Knoxville, through its agricultural extension program, reaches every region across Tennessee. As Deb Crawford noted, “We reach a lot of kids through agricultural extension and engage them



“What are we going to bet on in Tennessee? On what are we going to apply a 30-year vision and declare this is where we are going to put our financial and brainpower assets to work? Tennessee is a very industry diverse state, so there is a lot of opportunity. I do not think we have to pick just one winner. We can lean in to innovation as a whole.”

**Lindsey Cox**

Chief Executive Officer, Launch Tennessee

in STEM programs that give them a sense of what careers in STEM might look like in the future.” Launch Tennessee has also taken big steps to expand entrepreneurship across the state. Cox shared how her organization has provided resources and best practices with innovators and entrepreneurs to spark business startups in 84 of 95 counties in Tennessee.

# Day 1 Closing Remarks—Innovation Ecosystems Create a Positive Flywheel Effect



## Daniel Diermeier

Chancellor of Vanderbilt University

To conclude the first day of the Competitiveness Conversation, Chancellor Daniel Diermeier reflected on how the culture of “radical collaboration” in Tennessee has been essential to its innovative economy. Diermeier also focused on the importance of prioritizing long-term investment for the future of the state.

## Key Session Insights

**Through its supportive business environment, Tennessee has attracted talented workers and companies willing to relocate or expand in the state.** “This willingness and this ability to work together is really key for the region.” Cross-organizational collaborations have helped Tennessee develop innovative projects in quantum and advanced mobility, like the I-24 Motion Project, a public-private partnership to develop an integrated traffic management and safety system that relies heavily on artificial intelligence.

Chancellor Diermeier also highlighted the need for long-term planning to accommodate the states increasing population, driven by its attractiveness and business climate. Although Tennessee has seen significant progress in its development, this growth has also led to a greater demand on the state's public services and infrastructure. "There have been challenges of rapid growth in Nashville—and now we are experiencing them in Knoxville, Chattanooga, and Memphis, as well—which has to do with affordable housing and transportation infrastructure. It is challenging to catch up with all the activity we are experiencing."

To meet the needs of a growing population, Chancellor Diermeier emphasized the importance of long-term strategies and investments, which can be difficult for politicians focused on re-election. But with public engagement and an attractive vision, political leaders can balance the election cycle while planning for the future.

United States Senator Bill Hagerty (R-TN) was introduced and welcomed by Vanderbilt Chancellor Daniel Diermeier at the Competitiveness Conversation Dinner. For his keynote address, the senator focused his remarks on how America and Tennessee can realize their economic potential by taking advantage of their distinctive competitive advantages and unleashing the competitive and entrepreneurial spirit.

"A couple of things stuck with me from the day. One was the importance of people and culture. This willingness and ability to work together is really key for the region. And the second important idea is that innovation ecosystems can drive a positive flywheel effect, and universities need to play a crucial role to get it going."

**Daniel Diermeier**

Chancellor, Vanderbilt University

## DINNER KEYNOTE

# Senator Bill Hagerty—Harnessing Tennessee's Competitive Advantages to Unleash the State's Full Economic Capability

**Bill Hagerty**

United States Senator, Tennessee

United States Senator Bill Hagerty (R-TN) was introduced and welcomed by Vanderbilt Chancellor Daniel Diermeier at the Competitiveness Conversation Dinner. For his keynote address, the senator focused his remarks on how America and Tennessee can realize their economic potential by taking advantage of their distinctive competitive advantages and unleashing the competitive and entrepreneurial spirit.

**Key Session Insights**

In his keynote address to conclude Day 1 of the Tennessee Competitiveness Conversation, United States Senator Bill Hagerty (R-TN) began with the powerful observation that to unleash economic activity in a region, you must understand the basic elements of competitive advantage. The Senator asked the audience, "What drives your competitive advantage as a company, as a state, as a nation?" According to the Senator, who has many years of experience in management consulting and business, one-size-fits-all approaches

“We need to be thinking about what makes America strong and therefore makes the world stronger. I can assure you of this: the world needs a strong America like never before.”

**Bill Hagerty**

United States Senator (R-TN)

to economic development does not exist, as regions have their own distinctive strengths and characteristics that must be identified and harnessed to release their full economic capabilities.

Tennessee is harnessing its competitive advantage to develop its own innovation economy. “We thought really hard about the state’s competitive advantage. And guess what it is? It is something that you cannot change, but it is something we are blessed to have. It is our location. Think about where Tennessee is situated. You can get to two-thirds of the U.S. population within a day’s drive.” By leveraging its geographic advantage, Tennessee built itself into a logistics hub of America, including FedEx’s headquarters.

**To unbridle a region’s competitive advantages, the Senator argued policymakers should build a business-friendly, competitive environment to free up innovation.** Businesses have the potential to organically innovate if they are not constrained by unnecessary barriers. The Senator made the point that a key institutional feature to expanding investment and business activity is the existence of a strong rule of law. With it, including property rights protection, people and organizations can have the necessary security to invest in capital intensive projects.

**Senator Haggerty also believes that by developing its competitiveness, America can build its global partnerships and stand as a leader of the free world.** Prioritizing competitive advantages allows regions to find mutually beneficial partnerships with economies around the world. Tennessee’s development led it to become the number one state for creating jobs through foreign direct investment, with 60 percent of that foreign investment coming from Japan. Tennessee’s close partnership with Japan was bolstered by the United States’ political relationship with the country, as Japanese liquid natural gas (LNG) investment in America was driven by the need for a long-term energy partnership with America, its ally, as opposed to Russia.



*From left to right: Deborah L. Wince-Smith, President and CEO, Council on Competitiveness; Daniel Diermeier, Chancellor, Vanderbilt University; Bill Hagerty, United States Senator (R-TN); Donde Plowman, Chancellor, University of Tennessee, Knoxville*

Focusing on our competitive advantage is crucial to securing our own independence and economic vitality. With key products such as solar panels and batteries increasingly being developed by China, America needs to take cultivate these and other critical industries of the present and future to maintain its position as the leader of the free world.



## Day 2—April 26

### Behind the Scenes

#CompeteConvo | [Compete.org/Tennessee](https://Compete.org/Tennessee)





# Opening Remarks—People, Partnerships, and Place



## Donde Plowman

Chancellor

University of Tennessee, Knoxville

Chancellor Donde Plowman opened the second day of the inaugural “Competitiveness Conversations Across America” with a compelling vision for the future. Addressing a gathering ripe with potential collaborators, Plowman highlighted the significance of place in cultivating an innovation ecosystem. “Place makes a difference,” she affirmed, emphasizing the transformative synergy of people and partnerships in Tennessee.

## Key Session Insights

Plowman shared an enlightening personal revelation about her past teaching experiences with business strategies, notably with frameworks from the Boston Consulting Group, underscoring an underappreciated connection between Tennessee and historical strategic thought. “I taught business strategy for 20 years using their (Boston Consulting Group) matrix, and I did not know anything about the amazing story that Senator Hagerty shared with us last night,” she reflected, underscoring Tennessee’s role in jumpstarting

two of the world's pre-eminent business consulting firms, and showcasing Tennessee's potential as an emerging role as America's next great innovation hub.

Facing the assembled leaders, Plowman posed a pivotal question: "How do we sustain momentum?" Her response outlined a focused strategy: celebrating incremental successes while keeping an eye on the broader goal of establishing Tennessee as a national leader in innovation.

She detailed her strategic blueprint, termed the "Three Ps": People, Partnerships, and Place. Plowman stressed that innovation is fundamentally about people who are empowered across all levels of an organization. She called, for example, for leaders to push forward a workforce collation of more than 100 organizations to foster broad-based innovation in advanced mobility—a pillar for future innovation and competitiveness.

Partnerships, she argued, form the skeleton of Tennessee's nascent innovation ecosystem. Plowman praised the day's gathering of industry and academic leaders as an achievement that would have been improbable five years ago, illustrating the state's growth in collaborative capacity. She advocated for using the University's expertise in building research coalitions to enhance partnerships across communities, funding agencies, and industries.

"We are going to become the next great hub of American innovation right here in Tennessee. And it is because we have the people, we have the partnerships, and we have the place. We are the place."

**Donde Plowman**

Chancellor, University of Tennessee, Knoxville

Lastly, Plowman celebrated the unique attributes of Tennessee as a place, noting, "Co-location makes a difference." She envisioned outsiders perceiving the state not only as a hub of top-tier workforce and infrastructure, but as a community offering connectivity and an appealing quality of life.

With a blend of reflective insight and forward-looking enthusiasm, Chancellor Plowman's opening remarks set the tone for a day dedicated to exploring and expanding Tennessee's innovation landscape. "We have all the pieces. Let us keep building," she concluded, positioning her address not just as a commentary, but as a clarion call for continued growth and collaboration.

## PANEL

# Powering Tennessee's Future: Leveraging the State's Energy Portfolio to Build and Advance Industries



*Chad Holliday, Chair, Global Federation of Competitiveness Councils, Co-Chair, Mission Possible Partnership, Chair Emeritus, Royal Dutch Shell, and Chair Emeritus, Council on Competitiveness; Stephen Streiffer, Director, Oak Ridge National Laboratory; Padma Raghavan, Vice Provost for Research and Innovation, Vanderbilt University; Katie Ottenweller, Southeast Lead for Energy Policy & Markets, Google; Jeff Lyash, President & CEO, Tennessee Valley Authority; and Brent Baker, Vice President—Chief Customer and Innovation Officer, Nashville Electric Service.*

## Session Overview

Perhaps no industry underpins the U.S. economy more critically than the energy sector. Keeping Tennessee, and the rest of the country, powered will be a crucial challenge, especially as demand surges and legacy fossil fuel plants phase out in favor of a lower-carbon energy mix. Led by Chad Holliday and consisting of participants across the energy sector, from researchers to producers to consumers, this panel explored the future of the Tennessee energy grid, its criticality to the growth of the state's economy, and what steps are needed to keep it dependable and sustainable.

## Key Session Insights

**Council Chair Emeritus Chad Holliday kicked off this panel by sharing an insight from U.N. Secretary General Ban Ki-moon: energy is the “golden thread” that connects every facet of modern life.** Historically, a robust power grid has been a major competitive advantage for the United States, serving as a reliable foundation on which the nation has built a modern economy and a robust middle-class workforce. The consistency and availability of power across the country has been taken for granted for the better part of a century, owing in large part to the Rural Electrifi-

## Panel



**Brent Baker**

Vice President—Chief Customer and Innovation Officer, Nashville Electric Service



**Jeff Lyash**

President & CEO, Tennessee Valley Authority



**Katie Ottenweller**

Southeast Lead for Energy Policy & Markets, Google



**Padma Raghavan**

Vice Provost for Research and Innovation, Vanderbilt University



**Stephen Streiffer**

Director, Oak Ridge National Laboratory



**Chad Holliday**

Chair, Global Federation of Competitiveness Councils; Co-Chair, Mission Possible Partnership; Chair Emeritus, Royal Dutch Shell; Chair Emeritus, Council on Competitiveness



“I asked U.N. Secretary General Ban Ki-moon, with all the wars and conflicts going on, how do you find time to focus so much of your personal attention on energy? He had a very simple answer. When nations have a modern effective energy system, you do not have all those wars and conflicts. He was working on the root cause.”

### **Chad Holliday**

Chair, Global Federation of Competitiveness Councils;

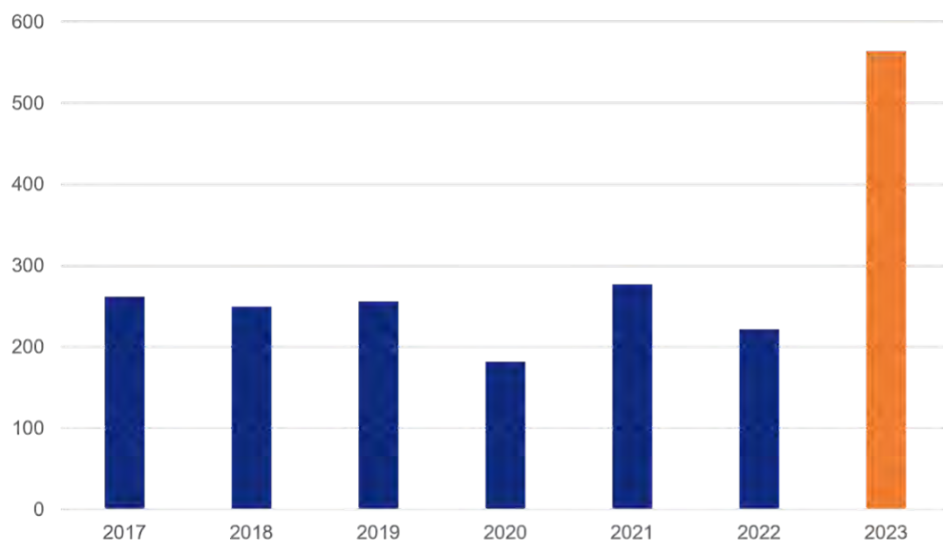
cation Act of 1936. With virtually all U.S. homes and businesses connected to the grid, generation infrastructure expanded exponentially, allowing for unprecedented growth, both economically and in quality of life.

However, the nation—and states like Tennessee in particular—is facing an unprecedented challenge: economic and population growth are beginning

## Projections for New Energy Demand in North America Doubles

9-year growth forecast for demand for new electricity (1,000 GW hours)

Source: North American Electric Reliability Corporation Long Term Reliability Assessment, 2017–2023.



to outpace the supply of electricity. The growth of data centers and the electrification of many sectors, notably transportation, has also been a major contributor to this new dynamic. Over the past 70 years, according to TVA President and CEO Jeff Lyash, electricity has grown from two percent of the energy Americans use to 22 percent, and it is expected to hit the 50 percent level by mid-century. Further, this increase in demand coincides with the push to redesign the energy system to dramatically reduce its carbon emissions. These challenges cannot be met with a business-as-usual approach to meeting demand growth; a radical rethink and retooling of the state's energy infrastructure and strategy is needed if the power grid is to remain a regional strength. The same is true in many regions across the country. Without such an effort, the grid that has served as the stable bedrock of the American economy and way of life may not be able to meet demand, jeopardizing a century of progress and putting future growth in question.

**A significant portion of this growth in power demand is coming from the expansion of data centers.** For example, the computers required to train and operate AI systems and run modern big-data calculations consume small cities' worth of power; according to ORNL Director Stephen Streiffer, the lab's Frontier computer uses as much energy as the city of Oak Ridge itself. Without close alignment between large energy users, like Oak Ridge or Google, and the utilities that supply them, the growing demand on the energy grid could quickly become unsustainable and limit a region's economic growth. But with long-term planning and vision, the potential of AI, proper partnerships, and robust investments across a multitude of strategic electricity production and efficiency solutions, the energy needs of the growing number of data centers can be met.

**Building partnerships between energy producers and consumers is vital for getting the most out of our energy system.** With the spike in demand for power from industry, communica-



“We must invest in technologies that are not yet mature. Looking ahead 5-20 years toward a fully decarbonized future, we are going to need long-duration energy storage, fusion, geothermal. At Google, we are signaling that we have demand for these technologies to trigger investment and commercialization.”

**Katie Ottenweller**

Southeast Lead for Energy Policy & Markets, Google

tion and collaboration from all industry stakeholders is essential. And that starts with understanding both what energy consumers need and what energy producers can put on the grid affordably and reliably, and what constraints there are. This two-way communication allows for the dynamic shifting of loads and investments in innovative infrastructure that requires less energy or can

deliver electricity more efficiently. Collectively, these efforts can lessen demand and the premature need for generation expansion, affording utilities more room to maneuver. As an example from the panel, Google Southeast Energy and Policy Lead Katie Ottenweller and TVA President and CEO Jeff Lyash discussed how closely they work together to match their energy needs, both today and in the future. Having a clear understanding of the energy that TVA can produce affordably, reliably, and cleanly helps Google plan for how it operates in the region.

**In addition to increasing communication and collaboration, the panel discussed how meeting the growing energy demand requires everyone, and every energy user and producer has a deep responsibility to help meet it. And that's especially true for businesses.**

As the push to transition to a lower-carbon-emission electrical system intensifies, the transition away from fossil fuels must be done in a way that does not undercut the reliable and abundant power supply Tennessee relies on. Businesses and other large organizations are among the heaviest consumers of electrical power and so have a responsibility to increase their energy efficiency to both lower costs and improve the energy resilience of the region.

Fortunately, these challenges are beginning to be faced. For example, according to Google's Ottenweller, the company's Tennessee infrastructure is serving as a leader in efficient computing, getting 1.5 times more computing power per watt than a standard data center, and still improving. By working to decrease their needs, businesses will not only lower their own costs, but also better serve the environment and help lessen the strain they place on the grid.

**But what role do individuals have?** The panel discussed how consumers can use technology to moderate their power usage, which collectively could have a big impact on energy demands on



“Unless we get fusion, unless we get fission, and unless we get renewables onto the grid, I start to fear about tipping points in climate, where we see dramatic climate changes that are just incredibly disruptive to the way we live in the world, to food production, to water production and utilization—all of the things that have kept the world at peace for the last decades.”

**Stephen Streiffer**

Director, Oak Ridge National Laboratory

the grid. One bridging technology allowing for the increased efficiency is demand response, which softens spikes in peak energy demands on the grid. But consumers will only adapt and implement these technologies if they feel it is worthwhile from a financial and/or a sustainability perspective.

Consumers also wield power through politics and litigation, including around major infrastructure projects like the expansion of the grid. TVA’s Lyash reported the overwhelming amount of litigation TVA faces for any new expansion project they work to undertake. One partial solution the panel discussed was increasing consumer education. Through education about the benefits of demand response technologies, like smart thermostats and expanded energy infrastructure, cities and utilities can work more nimbly to modernize the grid in Tennessee and beyond.

**In the short term, communication and efficiency gains can help utilities keep pace with growing energy needs, but profound innovation in electricity generation is needed to meet the ever-growing energy demand.**

New technologies, such as advanced solar, long-term energy storage, and even nuclear fusion have the potential to alter radically the energy production landscape. Few expect the energy mix of the future will closely resemble that of the past, or even today.

Much of the work to bring these new technologies to fruition is being done at universities and the DOE National Laboratories, in Tennessee at Oak Ridge National Laboratory and sister labs across the country. Innovations from these research institutions are keys to the energy grid of the future. Investment, a long-term vision, and proper planning is needed to implement these new technologies at the scale and pace needed to support the transition.

And this capacity has already been recognized. Vanderbilt University’s Vice Provost for Research and Innovation Padma Raghavan highlighted how the TVA and Nashville Electric Service are already working with Vanderbilt and the University of Tennessee, Knoxville, to do two things: first, to invest in green infrastructure; and second, to research how to deploy green technologies. The intentional focus on



“Tennessee is the Volunteer State, but we are also the partnership state. And we are also pioneers. I think we can get ahead of these (energy) challenges, and I think we will work together to do that.”

**Padma Raghavan**

Vice Provost for Research and Innovation, Vanderbilt University

these partnerships was represented across the panel, a demonstration of how seriously stakeholders across the state and region take these relationships.

**But as important as new energy discoveries and technologies are to our future, scaling unproven technologies in a meaningful way requires enormous, high-risk investments.**

To make the energy transition happen, new projects and technologies need to become attractive to investors. The DOE National Laboratories play a critical role in de-risking technologies by taking on much of the initial research and development



“We need to get out of the ‘what will not work’ mindset and think more openly about what is possible.”

**Brent Baker**

Vice President—Chief Customer and Innovation Officer, Nashville Electric Service

work, and they can spur large-scale investment via public-private partnerships. ORNL Director Streiffer made it clear how central he saw de-risking new technologies to the lab's mission.

But the DOE National Labs are not the only ones with a role to play in de-risking technology for investment. With a more local focus and direct accountability to residents, public power companies have the potential to pioneer the adoption of new energy strategies that benefit residents. Ninety years ago, the founders of the TVA created the organization under the philosophy that affordable, reliable, and clean power can fundamentally improve the lives of people in a community. With this as their yardstick of success, public utilities like TVA often have more freedom to experiment than profit-driven private utilities and can consider

more community welfare factors when judging the merits of a policy or strategy. As CEO Lyash noted: “We need to figure out how to share that risk and/or bring risk profiles down so that capital markets are able to drive innovation within their risk appetite. This will require alignment among industry, research, academia, government policy, and capital markets.”

Lyash put the utility's three-part mission of energy, economic development, and environment front and center, highlighting their commitment to community betterment. Nonprofit, government-owned utilities, like the Nashville Electric Service (NES), can play a similar role, with a scope of responsibility more explicitly linked to public welfare than that of a for-profit utility. Public power companies often serve as laboratories of the energy transition, pushing the boundaries of what is possible.

Entities like the TVA and the NES have already begun to show how quickly they can move, with NES Chief Customer and Innovation Officer Brent Baker highlighting the utility's partnerships that have catapulted Nashville to being the second biggest adopter of renewables in the Tennessee Valley. These sorts of investments will pay dividends in the long run as utilities test what is feasible today, and as consumers and society begin to see the benefits.



“The world agenda will be shaped by the strongest economy. The future strength of any economy depends on the strength of its energy system. So, energy is critical to talking about international competitiveness.”

**Jeff Lyash**

President & CEO, Tennessee Valley Authority

**When making investments, TVA's Lyash warned that we should not let the "perfect" solution be the enemy of the good.** When discussing these strategies for modernizing the energy system, the merits of one new technology or energy source are often debated and contrasted with those of another to determine which is worth investment. While debating and discussing methods of renewable energy is laudable, the exercise misses a key point: multiple technologies and strategies, working in concert, are needed to expand successfully our energy production capabilities, and to make them cleaner and more resilient.

Renewables, such as wind and solar; novel nuclear designs; ideas for greater grid efficiency; natural gas as a bridge energy source; long-term energy storage; and even future fusion power are all on the table for discussion as pathways to curb emissions and build capacity and reliability. But each strategy or technology has its own bespoke use cases and restrictions on implementation. And each region requires its own energy mix based on its distinctive characteristics. For example, solar may be ideal in one part of a state but completely uneconomical in another. Rather than trying to find a single "best" solution, investing money across the board is more likely to yield long-term results—balancing, of course "letting

a thousand flowers blossom" and achieving true, strategic, critical mass and results. This panel discussed nuclear, solar, efficiency gains, and more as means to strengthen the Tennessee energy system; putting all of them to work and more in a strategic way is what is needed.

## TECH TALK NO. 3

# Future of Energy—Making the Case for Nuclear



## Speaker

**Brian Wirth**

Governor's Chair Professor for Computational Nuclear Engineering, University of Tennessee, Knoxville

## Session Overview

Nuclear power, while becoming a significant part of the nation's energy mix, has never supplied the plurality of the country's electricity. Today, however, as the need for clean, abundant energy becomes sharper than ever, nuclear power is getting a second look. The potential for the nuclear

energy is great. But, as this Tech Talk explores, there are significant challenges facing wider deployment and implementation. Even so, use of nuclear energy has the potential to revolutionize the nation's energy infrastructure, lifting Tennessee and the nation economically in the process.

## Key Session Insights

**Nuclear energy is the future.** Brian Wirth—the Governor's Chair Professor for Computational Nuclear Engineering at the University of Tennessee, Knoxville—invited Competitiveness Conversation participants to imagine a future in which the majority of the country's power comes from nuclear energy. The density of energy provided by nuclear fuel far outstrips any other power source, creating the opportunity to produce an abundance of clean, reliable power with a comparatively small geographic footprint.

Nuclear plants are also somewhat versatile in where they can be placed, needing a reliable water source to operate safely. A nuclear power plant can always be "on," providing a steady stream of electricity at all hours and in all conditions, removing the need for the potentially complex and expensive power storage facilities renewable sources often require.

As newer, larger, more power-intensive data centers come online and as electric vehicles increasingly shift the energy burden of transport

to the grid, power consumption is expected to double by 2050 in Tennessee. This will require a dramatic expansion of baseload power, especially as communities decommission coal plants. But as nuclear power re-enters the public consciousness, Wirth believes there is an opportunity to begin to invest in the technology at levels not seen in decades.

**However, the growth and proliferation of nuclear energy faces major policy, investment, and talent hurdles.** Beginning with regulatory constraints, Wirth notes that approval for nuclear power plants and ongoing regulatory compliance are enormously high barriers that make a large-scale buildout of nuclear infrastructure expensive, time consuming, and risky.

For example, while the United States has only recently started to build a handful of nuclear power plants, such as the new units at the Vogtle power station in Georgia, the cost overruns and long timelines have exposed what Wirth called an “atrophied” capacity for nuclear plant construction. This is happening even as other nations, such as the UAE and South Korea, complete twice as many reactors in the same time and with two-thirds of the budget, demonstrating that it is not an issue with nuclear power itself, but with the red tape in the United States today.

Despite the headwinds, there is significant work underway to ensure nuclear power is ready to meet the expanding demand for clean energy. Nuclear engineering college programs, including at the University of Tennessee, Knoxville, are expanding and attracting greater student interest. Enrollment in the program Wirth leads has more than tripled over the past decade. Alongside student interest is greater investment in the research of nuclear technologies. Designs for novel fission reactors and modular nuclear plants are being created. And fusion power, the holy grail of clean energy technologies, is being strenuously pursued.

“There is no discussion that does not include nuclear. Nuclear is clean, it is safe, it is resilient, it is always on, and it is an important part of the diversity of supply.”

**Brian Wirth**

Governor's Chair Professor for Computational Nuclear Engineering, University of Tennessee, Knoxville

While Wirth, his colleagues, and his students are all enthusiastic about nuclear fusion, he stressed that, if achieved, it is critical to have the infrastructure and regulatory systems in place to scale rapidly this technology. If not, fusion power expansion will face the same roadblocks that traditional fission plants have, making finding capital investment difficult. He also notes that for nuclear to be the power source of the future, we need secure, resilient supply chains. Investing now in key materials and educational programs to produce tomorrow's nuclear engineers and technicians will allow us to hit the ground running when these technologies become viable.

**The fact that Tennessee is ahead of many other states in nuclear should be no surprise.**

The state sits at the nexus of several R1 educational institutions, Oak Ridge National Laboratory, and more than 150 nuclear industry firms. In fact, many of Wirth's “Top 10” nuclear energy facts highlight the need for partnerships and investments made in nuclear innovation and education in the state.

Wirth concluded that Tennessee has a unique opportunity to serve as a leader in the nuclear power renaissance, especially in the Southeast where clean energy is, for now, lagging. Investing in nuclear energy is a uniquely Tennessee approach to addressing the sustainability challenge the state and the nation faces.

# UT Nuclear Engineering Top 10 Facts



1

Established in 1957, UT's Department of Nuclear Engineering was the first in the U.S.

2

Enhanced by partnerships with ORNL, Y-12 Nuclear Security Complex, TVA, UCOR, and many local companies

3

Produced over 1,400 graduates in the past 60 years

4

18 faculty members, 2 UT-ORNL Governor's Chairs, 3 non-UT joint faculty, 2 professors of practice, 1 NAE member, 8 ANS Fellows

5

Ranked 4<sup>th</sup> in Scholarly Research Index among NE Depts by ACADEMIC ANALYTICS

6

Strong focus on nuclear power (current LWRs, advanced fission & fusion) and nuclear security with emerging emphasis on nuclear isotopes

7

\$17.2 Million of Research in 2022-2023

8

Moved into the new Zeanah Engineering Complex in 2021

9

New facilities include 27 new laboratories, including space for a flexible neutron source

10

2023-2024 enrollment: 212 UGs, 157 graduate students; Fall 2024 – 71 freshman indicated plan to enroll in Aug 2024 + 6 transfers



Rather than going all in on renewables that may or may not be ideal for Tennessee, the state is instead leveraging its established and growing nuclear talent and business pools to build a new power sector where it already has a competitive advantage. In doing so, the state has the potential to not only meet its own needs, but stake a claim on an industry that will be critical for the nation's future energy needs.

## TECH TALK NO. 4

# Building a Robust Tech Continuum— from Rural to Urban, with Understanding and Empathy



## Speaker

### Michael Aikens

Founding Director, Center for Rural Innovation;  
and Chair, Rural Reimagined Grand Challenge,  
Office of Research and Economic Development,  
Tennessee Technological University

## Session Overview

While many people and organizations have the goal to assist economically distressed areas, especially rural ones, far fewer know how to do so. This talk explored how a range of stakeholders can work together to uplift rural communities—with understanding and empathy.

## Key Session Insights

As the Founding Director of the Center for Rural Innovation and the Chair of the Rural Reimagined Grand Challenge at Tennessee Technological University, Michael Aikens has helped complete over 900 economic development projects in rural Tennessee. Through that experience, he has learned that the key ingredient to success is stepping back and evaluating the relationship with the target community. And the key to getting projects off the ground in rural Tennessee, where people may be wary of outsiders, is building community support through listening and active engagement before the project even begins.

Understanding the perspectives held by local citizenry helps build a greater awareness of local issues and trust. Aikens and his team have developed what he calls the “community immersion mechanism” to engage holistically with rural communities rather than dictating to them what they need.

### **As an example, Aikens shared how one project to build electric vehicle (EV) charging stations in rural Tennessee was derailed because community members turned against the project.**

Adding EV charging stations to rural places is a chicken-and-egg dilemma. To jump-start the adoption of EVs in these areas, infrastructure is needed to make an EV practical. But why would a local community

“We, of course, want to bring innovation and prosperity that will ultimately affect positive change in rural communities...But these communities’ interpretation of what we are offering may be different, and we must be aware of that. We must be empathetic to rural communities’ points of view because, ultimately, it is up to us to immerse ourselves into the communities, establish trust, display authenticity, effectively communicate, and make good on our intentions and promises.”

**Michael Aikens**

Founding Director, Center for Rural Innovation; and Chair, Rural Reimagined Grand Challenge, Office of Research and Economic Development, Tennessee Technological University

invest in EV charging stations when a vast majority of the community’s residents have not adopted EV vehicles? To jumpstart EVs in this rural town and, even more so, attract outside tourists to the downtown area, a project was spun up to install a charging station in the town. That project was stopped when a small number of concerned citizens, feeling the charging station was forced upon them by outsiders, organized against it. Supporting Aikens’ broader point about the value of community engagement, the project’s leaders engaged in greater empathetic listening and community education, and the project was reinstated and successfully delivered.

## PANEL

# Taking Tennessee's Talent to the Next Level: Mobilizing the State's Workforce for a More Innovative Future

## Session Overview

This leadership panel explored the complexities of Tennessee's talent landscape, emphasizing the necessity of skilled workforce development in maintaining competitiveness in a dynamic economic environment. The discussion provided valuable insights into creating a more agile and resilient workforce, not just for Tennessee but as a model for nationwide strategies.

Moderated by Liliana Ramirez, Director of Workforce Development at Ford Motor Company, the session, brought together leading figures from academia and industry to explore solutions for building a resilient and skilled workforce.

## Key Session Insights

**Bridging education and industry—higher education and business have a symbiotic relationship that is best when collaborative.** Without R1 research universities, community colleges, and technical schools, employers are handcuffed without the talent they need to discover and scale new innovations, products, and services. However, educational programs need to be responsive to industry demands to ensure relevant skill development. In turn, employers are responsible for guiding educational priorities, as well as motivating students with good-paying jobs upon the completion of degree programs. Additionally,

## Panel



**Joe Bales**  
Vice President for University Advancement,  
Middle Tennessee State University



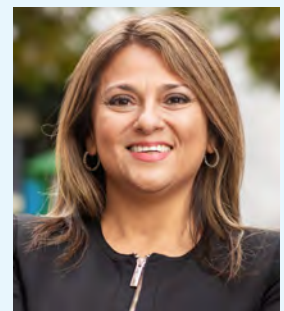
**Bill Hardgrave**  
President, University of Memphis



**Jothany Reed**  
Vice Chancellor for Academic Affairs,  
Tennessee Board of Regents



**Deniece Thomas**  
Commissioner,  
Tennessee Department of Labor and Workforce Development



**MODERATOR**  
**Liliana Ramirez**  
Director of Workforce Development, Ford Motor Company



Liliana Ramirez, Director of Workforce Development, Ford Motor Company; Deniece Thomas, Commissioner, Tennessee Department of Labor and Workforce Development; Jothany Reed, Vice Chancellor for Academic Affairs, Tennessee Board of Regents; Bill Hardgrave, President, University of Memphis; and Joe Bales, Vice President for University Advancement, Middle Tennessee State University.

employers have a big responsibility in training their workforce, no matter the level of formal education those workers may have had. For higher education and employers to build Tennessee's next-generation workforce, "radical collaboration" is needed.

Ford Motor Company's Director of Workforce Development Liliana Ramirez defined radical collaboration as intense and innovative cooperation between individuals, organizations, or entities to achieve common goals or objectives, going beyond traditional forms of collaboration by encouraging open-mindedness and creativity. Taking this approach can reap enormous benefits for educators, for employers like Ford, for students, and for every resident of Tennessee.

**Radical partnerships and in-depth community engagement are critical.** Jothany Reed, Vice Chancellor for Academic Affairs at the Tennessee Board of Regents, highlighted the partnership between the Tennessee Board of Regents, specifically at their Tennessee College of Applied Technology (TCAT) Stanton campus, and the Ford Motor Company to develop a new curriculum to train EV workers, particularly to support Ford's new BlueOval City. Reed shared that other companies—like Nissan—have also expressed

interest in similar programs, showing that this is not a one-off occurrence. Both educators and employers are recognizing that aligning educational programs with industry demands creates better outcomes for workers and employers alike. **Partnerships like the one forged by Ford and TCAT Stanton to tailor training to employer needs should be scaled and replicated, both in Tennessee and across the United States.**

The conversation also explored how workforce education is not uniform, and programs to meet the needs of students and employers should take many forms and be community-oriented. One big question the panel tackled was how students begin to identify a pathway to employment earlier in their studies. University of Memphis President Bill Hardgrave offered an example of how this is underway at the University of Memphis. **In a novel approach, the University of Memphis has created a its own school district with programs running from pre-K to the doctoral level, creating a continuum of education so that foundations can be laid and built upon intentionally.**

The panel then examined the question of how to create a roadmap to employment for all students, no matter their level of educational attainment.



“Radical collaboration often involves diverse stakeholders coming together, sharing resources, ideas, and responsibilities in a collective effort to drive significant change or solve complex problems... My role at Ford is to prepare the workforce, ensuring employees have the skills needed to perform their jobs.”

**Liliana Ramirez**

Director of Workforce Development, Ford Motor Company

Joe Bales, Middle Tennessee State University Vice President for University Advancement, offered an example of how this is unfolding at his institution, where a mechatronics program has been built in cooperation with industry employers and has paths to employment at every educational level. The program's curriculum is tailored to the local economic conditions of those com-



“We know one of the biggest challenges that people in rural communities face is access to education and workforce training. The integrated ecosystem that we have designed at TCAT Stanton, our relationship with Ford and the Tennessee Department of Labor, and our university partners are going to respond to that traditional challenge—meeting that rural workforce need.”

**Jothany Reed**

Vice Chancellor for Academic Affairs, Tennessee Board of Regen

munities primarily served by Middle Tennessee State. In this way, Middle Tennessee State has become a driver of change, innovation, and prosperity for the communities it serves and Tennessee as a whole.



“The employees in our training facilities—all of whom may have a high school diploma, may have gone to a technical school, or may want to pursue an advanced degree—have to continue to pay bills. They have to raise their family. Finding ways to get them through the education and training system, outside of the traditional four-year model, is going to be imperative.”

**Joe Bales**

Vice President for University Advancement, Middle Tennessee State University



“Open a window. For example, who said you cannot have a career in nuclear energy? We need to create adult pathways, not just pathways for students.”

**Deniece Thomas**

Commissioner, Tennessee Department of Labor and Workforce Development

On the topic of empowering the vulnerable and breaking educational silos, the panel discussed the challenge of stepping back into education after stepping away, exploring and sharing “on ramps” available in Tennessee for non-traditional students. There are many reasons, from cost to family priorities to health issues, that may cause students to sideline their education and training. In fact, the National Student Clearinghouse Research Center (NSCRC) reported in 2023 that the college graduation rate was only 62.2 per-

cent nationwide. Additionally, many in the workforce want to upskill to improve their employment opportunities, but it can be difficult to step back into formal education once out of it. The panel made the case for greater access to “on ramps” back into education and training. Building on that idea, Tennessee Department of Labor and Workforce Development Commissioner Denice Thomas surfaced a range of provocative ideas, including: (1) creating accessible pathways for vulnerable populations, emphasizing the importance of short-term, impactful educational opportunities that can quickly enhance employability, and (2) extending to the public the benefit from the guidance counseling and career advisory services available to current students.

The panel also discussed the need for a systematic approach to workforce development and to break down educational silos. The silos in the educational system prevent cross-collaboration and mobility for many students. President Hardgrave shared it has been historically difficult to move from a technical college to a four-year university, for example, despite the flexibility and advantages such mobility could bring to schools and students. By identifying the barriers and breaking them down, we can make the educational system more closely resemble a continuum of opportunities, rather than discrete, separated institutions. This change would be transformative for people who cannot complete their formal education in traditional formats or timeframes, and who need the additional options to succeed.



“Why have we not made it easy to go from two-year to four-year institutions? We need to break the silos. We built them. We can tear them down.”

**Bill Hardgrave**

President, University of Memphis

# Special Keynote From Governor Bill Lee—Laying the Groundwork Today for Success Tomorrow



## The Honorable Bill Lee

Governor of Tennessee

Tennessee Governor Bill Lee remarked on the State's current economic success—and future prospects.

## Key Address Insights

**Bill Lee, Tennessee's 50th Governor, made it clear that Tennessee is a success story because of its people.** Tennessee has one of the fastest growing economies of any state and is an attractive destination for interstate migrants. A low tax burden and one of the lowest debts per capita of any state helps the state maintain a business-friendly environment. But the state's remarkable growth has been achieved not by the state government, according Governor Lee, but by the efforts of individuals and organizations within the state. The government's role, by contrast, has been to act as a steward of taxpayers' money in a fiscally responsible manner, and to create an environment in which others can problem solve and innovate to build a better economy.

By keeping the focus on individuals, Governor Lee and the Tennessee state government have created policies that promote economic development and provide benefits to Tennesseans from all walks of life. The Governor's belief in a policy approach that would benefit individuals and families was conceived and reinforced during his election run, when he would drive by homes across the state and try to imagine what would matter most to the person or family behind each

mailbox. From this focus on the individual families across Tennessee came a policy agenda focused on their needs and priorities. The success of focusing on what's best for Tennesseans has been undeniable, with more than 90 percent of Tennessee's counties experiencing growth, a stark contrast to the frustratingly uneven growth in many other states.

Much of the Governor's policy focus has been on education and workforce development. Through the Governor's Investment and Vocational Education (GIVE) Act, vocational, agricultural, and technical training were expanded, helping deliver for industries across the state the workforce they need to succeed. According to Governor Lee, investing in the workforce and in people will not only benefit the state's residents but make it a more attractive destination for outside capital.

**The decades-long decline of manufacturing the United States has reversed in recent years, and Tennessee is at the center of that transformation.** As the national economy pivots toward reshoring supply chains, Tennessee is strongly positioned for growth in manufacturing—tapping both foreign and domestic investment to do so. And infrastructure expansion—with an eye on the long term in areas like water, sewer, and energy—make Tennessee a more attractive destination for businesses, outside investors, individuals, and their families.

“The longer I’m here, the more I realize the government’s incapacity and lack of resources and ability to address those challenges is all the more evident. We have the opportunity in state government to create an environment in which the people sitting in this room and leaders all across Tennessee can engage in the things they know will make life better.”

**Tennessee Governor Bill Lee**

In closing, the Governor emphasized the key to success does not primarily reside within the government, but his administration is dedicated to creating conditions that empower local leaders and communities to forge a prosperous future for Tennessee. The Governor shared long-term vision for the state: “What I think about today is not so much about what we are going to get done in this session or the next session, as it is about what we are going to do to set Tennessee up for success in 25 years.” And, this vision rests on a foundation



*Deborah L. Wince-Smith, President and CEO, Council on Competitiveness; Daniel Diermeier, Chancellor, Vanderbilt University; Bill Lee, Governor of Tennessee; and Donde Plowman, Chancellor, University of Tennessee, Knoxville.*

of financial stewardship, strategic investments in education, and a commitment to conserving the state's cherished landscape—all fundamental to making Tennessee a preferred destination for state, national, and global innovators.

## PANEL

# Mapping the Enabling Conditions for Tennessee's Competitiveness for the Next 25 Years

## Session Overview

During the Tennessee Competitiveness Conversation, attendees heard from experts on a variety of topics—spanning advanced mobility; the future of energy supply, security, and innovation; the renaissance of advanced manufacturing, from R&D, to design, to production; and the growing talent challenges and opportunities facing Tennessee. This final panel tied together the two-day summit, examining the enabling conditions essential for Tennessee 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 Tennessee forward.

## Key Session Insights

President and CEO of the Council on Competitiveness, Deborah Wince-Smith, moderated the concluding leadership panel of the Competitiveness Conversation: Tennessee, focusing on the future of the state and the factors needed to maintain its competitive edge over the next quarter century. Given the gravity of the talent challenge in supporting innovation, she began the discussion there.

## Panel



**Randy Boyd**  
President, University  
of Tennessee System



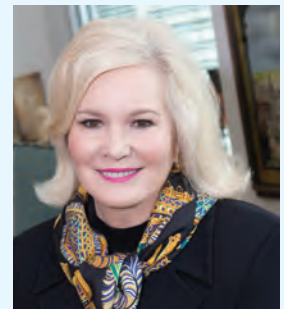
**Daniel Diermeier**  
Chancellor, Vanderbilt  
University



**Stuart McWhorter**  
Commissioner,  
Tennessee Department  
of Economic  
and Community  
Development



**Donde Plowman**  
Chancellor, University  
of Tennessee, Knoxville



**MODERATOR**  
**Deborah L. Wince-Smith**  
President and CEO,  
Council on Competitive-  
ness



Deborah L. Wince-Smith, President and CEO, Council on Competitiveness; Stuart McWhorter, Commissioner, Tennessee Department of Economic and Community Development; Randy Boyd, President, University of Tennessee System; Daniel Diermeier, Chancellor, Vanderbilt University; and Donde Plowman, Chancellor, University of Tennessee, Knoxville.

How significant is the shortage of technology workers? A 2023 Semiconductor Industry Association (SIA) study titled “Chipping Away” projects that by 2030, there will be 3.85 million new jobs in the United States requiring technical proficiency, with 1.4 million of these positions at risk of going unfilled without an expanded pipeline of skilled technicians, engineers, and computer scientists. This trend is evident in Tennessee, as well. Randy Boyd, President of the University of Tennessee System, noted that “Over the last 10 years, Tennessee has created 361,000 new jobs requiring a four-year degree. We’ve faced shortages of 10,000 engineers, 2,000 nurses, and 2,000 teachers. We desperately need to produce the talent that our four-year schools, like those in the University of Tennessee system, can provide.”

**Ms. Wince-Smith asked President Boyd to discuss the challenges of filling the talent pipeline and the broader issues facing higher education in Tennessee and across the nation.** Provocatively, President Boyd pointed out there is no place with a pool of untapped talent

ready to come work for a new business. So, to attract investment and businesses, regions need to invest in a strong community. Higher education is a critical part of that community, and not just for high-tech workers, but also to train the teachers and other critical knowledge workers who shape communities.

World-class institutions that help mold talent fit for the innovation economy attracts investment and businesses from outside the state, too. Tennessee has three R1 research universities, the highest research designation in the country given to about 130 institutions; these include the University of Memphis, Vanderbilt University, the University of Tennessee, Knoxville, the flagship in the University of Tennessee system. Expanding these universities and their number of graduates, particularly in STEM fields, will fuel regional innovation. For example, while Tennessee’s manufacturing sector has grown, much of the design work occurs elsewhere. Increasing local talent could shift more of this work to the state, enhancing its innovation capacity and growing the state’s economy.



“We heard why place matters so much: geography, history. But it is also about people, potential, purpose, possibilities, partnerships, and the Tennessee Promise going forward.”

**Deborah L. Wince-Smith**

President and CEO, Council on Competitiveness

**The panel also underscored the importance of the collaborative spirit among leaders, institutions, sectors, and regions across Tennessee.**

One specific partnership was highlighted as exemplary by University of Tennessee, Knoxville Chancellor Donde Plowman: the University of Tennessee-Oak Ridge Innovation Institute, or UT-ORII. This collaborative organization is a partnership between the two research institutions with plans to recruit more than 100 new UT and ORNL joint research faculty and 500 research graduate students by 2030 to strengthen the talent pipeline in areas of growing national need and demand. The institute is positioning Tennessee as



“For Tennessee to continue to grow, it is going to need more talent, and the best source of talent is our higher education institutions across our state. If we are a baseball team, it is great to bring in free agents. But you also want to have a good farm club. You want to have great talent production within your state, and it is up to our universities to be able to do that.”

**Randy Boyd**

President, University of Tennessee System

the “go-to” destination for top-level talent development and discovery, and it addresses emerging industry and workforce priorities. Through the exchange between the two institutions, students are prepared to innovate and solve complex problems across disciplines.



“Ultimately, the question I always like to ask business leaders is: ‘Why did you choose Tennessee? What ultimately was the deciding factor?’ And every time it is the same answer: the people.”

**Stuart McWhorter**

Commissioner, Tennessee Department of Economic and Community Development



“I think the combination of already being a great destination for talent and now preparing to be a leader in the nation’s innovation economy will determine Tennessee’s future.”

**Daniel Diermeier**

Chancellor, Vanderbilt University

**Another critical strength of Tennessee is the fiscal discipline and the strength of its balance sheet.** According to Stuart McWhorter, Commissioner of the Tennessee Department of Economic and Community Development, Tennessee maintains the second lowest debt burden per capita in the country. This has led to a top credit rating for the state and the financial resilience to weather unexpected storms. However, while financial prudence is laudable, President Boyd, who formerly held the same position as Commissioner McWhorter, asked the audience to consider whether having the second lowest debt per capita is ideal. While he described the idea as “heresy,”

he wondered aloud what opportunities the state could create if it took on more debt, particularly for bolstering the state’s educational institutions and workforce development and without weakening its financial position. President Boyd noted there is plenty of need for investment across Tennessee, including a \$7 billion need to support education alone.

**A concluding discussion point turned to the state’s identity.** According to the panel, Tennessee has not, historically, been the center of high-tech manufacturing, research, and education in the United States. Despite the presence of

flagship institutions like Oak Ridge National Laboratory, that title has traditionally belonged to hubs in the Northeast or on the West Coast. But today, Tennessee is rapidly becoming a top destination for innovators, a position that has not changed the state's culture and identity in major ways. The panel wondered if maybe it should.

Those institutions that have not changed are being caught flatfooted and unable to take full advantage of the sudden increase of investment, interest, and progress happening across Tennessee. For example, colleges within the state are seeing spikes in applications and enrollment; according to Vanderbilt Chancellor Daniel Diermeier, the school's biggest market is now New York, and the acceptance rate has crashed to 6 percent to cope with the influx. Similarly, University of Tennessee, Knoxville Chancellor Donde Plowman shared her personal motto for her university: "We need to become the university we are becoming." New infrastructure, students, research, partnerships, and scale will inevitably alter the identity of the institutions; harnessing that change will be the difference between success or failure.



"And I tell the students all the time: 'There is a lot we need to fix in this world. So we, the University, need to work with you, to help you graduate and deploy your restorative strengths to build a new world.' That is how I think about our role in creating a stronger, more innovative Tennessee. Tennessee is an optimistic state, and there is a lot of reason for hope."

**Donde Plowman**

Chancellor, University of Tennessee, Knoxville

# Conclusion



*Donde Plowman, Chancellor, University of Tennessee, Knoxville; Stuart McWhorter, Commissioner, Tennessee Department of Economic and Community Development; Deborah L. Wince-Smith, President and CEO, Council on Competitiveness; Randy Boyd, President, University of Tennessee System; and Daniel Diermeier, Chancellor, Vanderbilt University.*

After an impactful and successful two days mapping the challenges and opportunities facing the state, the co-chairs of this debut edition in the “Competitiveness Conversations Across America” series committed not only to stay the course and build on Tennessee’s tremendous successes but to reconvene in three years to assess the evolution of Tennessee’s vibrant innovation ecosystem.

# Participants

## Isaac Addae

Liaison for Small & Minority Business  
Nashville Mayor's Office

## Michael Aikens

Director  
Center for Rural Innovation  
Tennessee Tech University

## Diana Alarcon

Director Department of Transportation and  
Multimodal Infrastructure  
Metropolitan Nashville & Davidson County

## Vanessa Allwardt

Sr. Manager  
Executive and Strategic Research  
Vanderbilt University

## Roberto Alvarez

Executive Director  
Global Federation of Competitiveness Councils

## Raisa Carmen Andeme Ela

Chemical Engineering Scientist, Catalysis and  
Polymer Engineering  
Michigan Technological University

## Erika Anderson

Chief of Staff  
Boise State University

## Steven Angle

Chancellor  
University of Tennessee at Chattanooga

## Katie Archer

Vice President  
Keybridge

## Sammie Arnold

Executive Director  
Japan-America Society of Tennessee

## Brian Arrington

Chief Human Resources Officer  
Oak Ridge National Laboratory

## Ava Attari

Director  
Higher Education Partnerships  
Michigan Economic Development Corporation

## Brent Baker

Vice President & Chief Customer and Innovation  
Officer  
Nashville Electric Service

## Joe Bales

Vice President, University Advancement  
Middle Tennessee State University

## Sandy Baruah

President and Chief Executive Officer  
Detroit Regional Chamber

## Dennis Baskin

Dean, Workforce Development  
Kellogg Community College

## Charleson Bell

Director of Entrepreneurship, Mid-South Hub  
and Director, The Wond'ry  
Vanderbilt University

## Alan Bentley

Director of Technology Transfer  
Vanderbilt University

## Jason Beyer

Vice President, Data & Analytics  
Bridgestone Americas

## Nick Biniker

Vice President of Entrepreneurship & Small  
Business Development  
Williamson, Inc

## Adolpho Birch

Senior Vice President, Chief External and  
League Affairs Officer  
Tennessee Titans

## Jennifer Bischoff

Executive Director, Operations  
Vanderbilt University

## Kimberly Blair

CRA  
Icon Clinical Research

## Heather Bloemhard

Associate Director, Federal Relations  
Vanderbilt University

## Megan Boehnke

Director, Executive Communications  
University of Tennessee, Knoxville

## Robert Bogart

Executive Team  
Extreme Steel, Inc.

## Jaida Boggerty

Communications and Marketing Specialist  
Michigan Workforce Training and Education  
Collaborative

## Mark Bogle

Vice President, Global Operations Excellence  
Eastman Chemical

## Dennis Bona

Director of Workforce Education  
Michigan Workforce Training and Education  
Collaborative

## Bob Booker

Director, North America Government Relations  
DENSO International America, Inc.

## Randy Boyd

President  
University of Tennessee System

## Steven Bridges

Manager of Photography  
University of Tennessee, Knoxville

## Brian Brockman

Vice President, Corporate Communications  
Nissan

## Chad Brooks

Vice Provost  
Austin Peay State University

## Jamari Brown

Director of Economic and Community  
Development  
Nashville Mayor's Office

## Sarah Burnett

Chief of Staff  
Tennessee Chamber of Commerce

## David Butler

Vice Provost—Research and Dean, CGS  
Middle Tennessee State University

**Judith Byrd**  
Executive Director, Greater Nashville Venture  
Capital Association

**Jennifer Caldwell**  
Technology Transfer Director  
Oak Ridge National Laboratory

**Neil Calfee**  
Executive Director for Economic Development  
Arizona State University

**Janey Camp**  
Associate Director, Division of Adaptation  
and Resilience  
University of Memphis

**Heidi Campbell**  
Senator, District 20  
Tennessee State Legislature

**Chris Cannon**  
Chief Communications Officer  
Tennessee Department of Labor  
& Workforce Development

**Rob Carter**  
Executive Vice President & CIO  
FedEx Corporation

**Michael Cassidy**  
Executive Director, Emory Innovations, Inc.  
Emory University

**Eben Cathey**  
Senior Director, Local Government Relations  
Vanderbilt University

**Philip Cavalier**  
Provost  
University of Tennessee, Martin

**Carl Christian**  
Director of Sales—East Region  
Schneider Electric

**Andre Churchwell**  
Senior Advisor to the Chancellor on Inclusion  
and Community  
Vanderbilt University

**Jack Cline**  
Vice President, Federal Relations  
Northeastern University

**Drew Coleman**  
Senior Director  
MICHauto (Detroit Regional Chamber)

**Todd Combs**  
Associate Laboratory Director  
Idaho National Laboratory

**Walter Copan**  
Vice President for Research and Technology  
Transfer  
Colorado School of Mines

**Nolan Corder**  
Director, Economic Development  
Nashville Area Chamber of Commerce

**Jeff Cornett**  
Manager, Economic Development Partnerships  
Oak Ridge National Laboratory

**Lindsey Cox**  
CEO  
Launch Tennessee

**Eddie Cribbs**  
Executive Director, Auxiliary Services  
Tennessee State University

**John Crisp**  
President and CEO  
CRISP Communications

**Megan Crisp**  
Vice President  
CRISP Communications

**Benigno Cruz**  
Director, Center for Advanced Automotive  
Technology  
Macomb Community College

**Candace Culhane**  
Senior Advisor  
Council on Competitiveness

**LaMetrius Daniels**  
Associate Vice President, Dean of the Graduate  
School  
Trevecca Nazarene University

**Jessica Dauphin**  
President and CEO  
Transit Alliance of Middle Tennessee

**Rich Davies**  
Sustainable Transportation, Program Director  
Oak Ridge National Laboratory

**Nolan Davis**  
Sales Engineer  
Schneider Electric

**Brad Day**  
Associate Vice Chancellor, Research  
University of Tennessee, Knoxville

**Jeff Delaney**  
Chief Information Officer  
University of Memphis

**Jasbir Dhaliwal**  
Executive Vice President—Research  
University of Memphis

**Pablo Di Si**  
President and CEO  
Volkswagen Group of America

**Mac Dodds**  
Talent Development Liaison  
State of Michigan—Labor and Economic  
Opportunity

**London Douglas**  
Game Design

**Abhishek Dubey**  
Associate Professor, Computer Science  
Vanderbilt University

**Karen Dunlap**  
Partnerships Communication Coordinator  
Oak Ridge National Laboratory

**Taylor Eighmy**  
President  
The University of Texas at San Antonio

**Buddy Eller**  
Vice President of Communications  
Tennessee Valley Authority

**Lauren Emert**  
Director of Economic Development  
Blount Partnership  
Greater Smokies Region

**Katherine Evans**  
Division Director, Computational Sciences  
and Engineering Division  
Oak Ridge National Laboratory

**Victor Evans**  
Vice President  
Poplar Group

**Patricia Falcone**  
Deputy Director for Science and Technology  
Lawrence Livermore National Laboratory

**Chris Fall**  
Vice President, Applied Sciences  
The MITRE Corporation

**Isaac Fowler**  
Senior Producer, Office of Communications  
& Marketing  
University of Tennessee, Knoxville

**Handel Fraser**  
Executive Director, RMTc  
Kellogg Community College

**Mike Freeman**  
CEO and General Partner  
Innosphere Ventures

**Jermaine Freeman**  
Chief of Staff  
City of Chattanooga

**Jennifer Fritts**  
Director of Corporate Relations  
University of Tennessee at Chattanooga

**Karen Gandy**  
Senior Program Manager, Office of the CEO  
Tennessee Valley Authority

**Marc Gibson**  
Associate Vice Chancellor for Research,  
Innovation and Economic Development  
University of Tennessee, Knoxville

**Joanne Gikas**  
Associate Dean, College of Professional  
& Liberal Studies  
University of Memphis

**Michail Gkolias**  
Engineer  
University of Memphis

**Steve Goetz**  
Managing Director  
Plug and Play

**Carly Grace**  
Manager, Mobility Initiatives  
MICHauto (Detroit Regional Chamber)

**Nick Grimstad**  
Sales Operations Director  
Schneider Electric

**Travis Groth**  
Vice President, Economic Development  
Maury County Chamber and Economic Alliance

**Linda Haddad**  
Dean, College of Nursing  
University of Memphis

**Bill Hagerty**  
United States Senator (R-TN)

**William Haldeman**  
Vice Chancellor and Chief Strategy Officer  
University of Pittsburgh

**Rob Harlow**  
Senior Manager, NA Production Innovation  
Center  
DENSO International America, Inc.

**Kristopher Harris**  
Director, Connected Car Services  
and Mobility PMO  
Nissan

**Chassen Haynes**  
Regional Manager, State & Local Government  
Affairs  
Ford Motor Company

**Daniel Helfrich**  
Chairman and CEO  
Deloitte Consulting LLP; and  
Business Vice Chair,  
Council on Competitiveness

**Caleb Hemmer**  
Representative, District 59  
Tennessee State Legislature

**Michael Hendrix**  
Policy Director  
Office of Governor Bill Lee

**Victoria Hirschberg**  
TNGO Interim Director/UT System  
Tennessee Department of Economic  
& Community Development

**Jane Hirtle**  
Assistant Provost, Research Strategy  
Vanderbilt University

**Joe Hoagland**  
Vice President, Innovation and Research  
Tennessee Valley Authority

**Robert Hoskins**  
Executive Director  
Tennessee Valley Industrial Committee

**Jenny Howard**  
Deputy Commissioner  
Tennessee Department of Environment  
and Conservation

**Susan Hubbard**  
Deputy Director of Science & Technology  
Oak Ridge National Laboratory

**Laurie Huber**  
Project Manager  
Workforce Intelligence Network

**Don Hutchison**  
Dean, Engineering & Advanced Technology  
Macomb Community College

**Cara Ince**  
Director of Research & Innovation Public  
Partnerships  
Vanderbilt University

**Donna Ingles**  
CTTC, Director of Operations  
Vanderbilt University

**Ioannis Ioannou**  
Graduate Student  
University of Memphis

**Paul Jennings**  
Executive Director  
UT Center for Industrial Services

**Jennifer Johnson**  
Director of Research Marketing  
University of Tennessee, Knoxville

**Curtis Johnson**  
Vice President for Administration  
Tennessee State University

**Chris Jones**  
President/CEO  
Middle Tennessee Electric

**Kadi Jones**  
Vice President, Economic Development  
Nashville Area Chamber of Commerce

**Ashish Joshi**  
Dean, School of Public Health  
University of Memphis

**Joe Kaczmarek**  
Talent Solutions Specialist  
Michigan Economic Development Corporation

**Trish Kaye**  
Assistant Producer, Office of Communications  
& Marketing  
University of Tennessee, Knoxville

**Lynn Kearns**  
Argonne National Laboratory

**Paul Kearns**  
Director  
Argonne National Laboratory

**Tim Kelly**  
Mayor, City of Chattanooga

**Ben Khouri**  
Director of Executive Communications  
Vanderbilt University

**Darcy Kimmett**  
HR  
Ford Motor Company

**Indya Kincannon**  
Mayor, City of Knoxville

**Jonathan King**  
Director, Workforce Development  
Southern Company

**Betsey Kirk McCall**  
President and CEO  
Seven States Power Corporation

**Eric Kopstain**  
Vice Chancellor, Administration  
Vanderbilt University

**Maha Krishnamurthy**  
President  
UT Research Foundation

**Saso Krstovski**  
Workforce Development  
Oakland Community College

**Mandy Lalrindiki**  
Assistant Director, Innovation and Design  
Strategy  
The Wond'ry  
Vanderbilt University

**Madeline Langub**  
Executive Coordinator, Government &  
Community Relations  
Vanderbilt University

**Amy Lee**  
President  
MWTEC

**Bill Lee**  
Governor of Tennessee

**Lyndon Lie**  
Executive Vice President & Chief Engineering  
Officer  
Volkswagen Group of America

**Susie Long**  
Senior Vice President  
Talent, Engagement, Organization and Culture  
Bridgestone Americas

**Janice Lovell**  
Director, Grants & Foundation Relations  
Trevecca Nazarene University

**John Lutz**  
Vice Chancellor, Development and Alumni  
Relations  
Vanderbilt University

**Justin Maierhofer**  
Regional Vice President  
Tennessee Valley Authority

**Hendrik Mainka**  
Senior Project Lead  
Volkswagen Group of America

**Wolfgang Maluche**  
Vice President, Engineering  
Volkswagen Group of America

**Reinhold Mann**  
Vice Chancellor for Research  
The University of Tennessee at Chattanooga

**David Mansouri**  
President & CEO  
TN State Collaborative on Reforming Education

**Leon Martinez**  
Vice President and CHRO Americas  
Nissan

**Scott Massey**  
Chairman and CEO  
Global Action Platform

**Marcus Matthews**  
Assistant Vice President, Workforce  
& Economic Development  
Mott Community College

**Jason Maynard**  
Executive Vice President  
Oracle

**Kim McCormick**  
Executive Vice Chancellor  
Tennessee Board of Regents

**Victoria McCoy**  
Field Representative  
Office of Congressman Mark Green

**Rachel McGinnis**  
Director, Office of Research and  
Sponsored Programs  
Middle Tennessee State University

**Elizabeth McKay**  
Government Affairs  
Nissan

**David Mills**  
Director, Health Sciences, Gov. Relations/  
Advocacy  
University of Tennessee System

**Sabya Mishra**  
Professor  
University of Memphis

**Lindsey Moloney**  
Director of Operations, The Wond'ry  
Vanderbilt University

**Stacy Moore**  
Director of Strategic End User Business  
Schneider Electric

**Brittany Mosby**  
Director of HBCU Success, Tennessee Higher  
Education Commission

**Elias Murray**  
Group Leader for Protocol  
Los Alamos National Laboratory

**Mike Nelson**  
Vice President  
Council on Competitiveness

**Kenneth Nichols**  
Project Manager, School of Business,  
Entrepreneurship, and Professional  
Development  
Henry Ford Community College

**Sam Nienow**  
District Director  
Office of Congressman Mark Green

**Lori Odom**  
Senior Vice President, Economic Development /  
International Business  
Nashville Area Chamber of Commerce

**Kent Ohara**  
President 4R & Battery Business  
Nissan

**Okenwa Okoli**  
Dean, Herff College of Engineering  
University of Memphis

**Katie Ottenweller**  
Southeast Lead, Energy Policy & Markets  
Google

**David Owens**  
Executive Director  
The Wond'ry  
Vanderbilt University

**Sally Parish**  
Associate Vice President, Educational Initiatives  
University of Memphis

**Josh Parker**  
Chairman and CEO  
Ancora L&G

**Sally Parker**  
Associate Vice Chancellor, Strategy and  
Operations  
Vanderbilt University

**Julie Parks**  
Dean, School of Workforce Training  
Grand Rapids Community College

**McCauley Parks**  
Manager, Strategic Engagement  
University of Tennessee, Knoxville

**Michael Pedrotti**  
Vice President  
Deloitte

**Alison Petersen**  
Director, Mobility Initiatives  
Washtenaw Community College

**Dean Pighin**  
Director, Filtration Innovation Center  
Parker Hannifin Corporation

**Lindsay Porter**  
Office of the Joint Global COO  
Vice President  
Bridgestone Americas

**Todd Pray**  
Chief Strategic Partnerships Officer  
Lawrence Berkeley National Laboratory

**Shashank Priya**  
Vice President, Research and Innovation  
University of Minnesota

**Sara Pruneski**  
Director  
Hall Strategies

**Makayla Puckett**  
Executive Digital Media Coordinator  
University of Tennessee, Knoxville

**Quincy Quick**  
Associate Vice President, Research and  
Sponsored Programs  
Tennessee State University

**Holly Rachel**  
Executive Director  
Darrell S. Freeman Sr. Incubation and  
Innovation Center

**Liliana Ramirez**  
Global Director, Workforce Development  
Ford Motor Company

**Art Rebrovick**  
Founder  
Compass Executives

**Chris Reed**  
Regional Senior Vice President  
Research & Development  
Nissan

**Darren Reisberg**  
Senior Counselor to the Chancellor  
Vanderbilt University

**Linda Ricchiuti**  
Executive Director, Edson Entrepreneurship  
& Innovation Institute  
Arizona State University

**Pete Risse**  
Associate Dean  
Boise State University

**Julie Roberts**  
Chief Academic Officer  
Tennessee Higher Education Commission

**Collier Roberts**  
Project Manager, Government & Community  
Relations  
Vanderbilt University

**Christopher Rowe**  
Executive Director for Industry Collaborations  
Vanderbilt University

**Krishnendu Roy**  
Dean of Engineering  
Vanderbilt University

**Cleo Rucker**  
Associate Vice Chancellor and Chief Human  
Resources Officer  
Vanderbilt University

**Bernie Savarese**  
Vice President, Academic Affairs and Research  
University of Tennessee System

**Sydney Savion**  
Vice Chancellor for People, Culture  
and Belonging  
Vanderbilt University

**John Schmisser**  
Executive Director, UT Space Institute  
University of Tennessee, Knoxville

**Amity Schuyler**  
Chief Innovation Officer  
Senior Vice President—Workforce Development  
Greater Memphis Chamber

**Brooke Scott**  
Compliance and Economic Development  
Analyst  
Magna

**Matt Seaton**  
Director, Corporate Partnerships  
Vanderbilt University

**Brittany Sever Stone**  
Director, Talent Acquisition Americas  
Nissan

**Anil Shanker**  
Senior Vice President, Research and Innovation  
Meharry Medical College

**Gene Shanks**  
Trustee  
Vanderbilt University

**David Sholl**  
Interim Executive Director  
University of Tennessee-Oak Ridge Innovation  
Institute

**Dakota Simpson**  
Vice President, Programs  
Nashville Entrepreneur Center

**Jeff Sisk**  
Executive Director, Workforce Development  
Tennessee Board of Regents

**Christian Smith**  
Predictive Analytics  
Practice Area Lead  
LMI

**Jesse Smith**  
Manager, Industrial Partnerships and  
Economic Development  
Oak Ridge National Laboratory

**Monica Smith**  
Assistant to the President  
Community Engagement & Inclusion  
Middle Tennessee State University

**Narendran Sooriyaprabha**  
TA to Chairperson Nissan Americas  
Nissan

**Jonathan Sprinkle**  
Professor, Computer Science  
Vanderbilt University

**Jess Steen**  
Communications Strategist, Government &  
Community Relations  
Vanderbilt University

**Jim Stefansic**  
Senior Director, Corporate Development  
Cumberland Emerging Technologies

**Melissa Stooksbury**  
Deputy State Director  
Office of Senator Hagerty

**Braden Stover**  
Legislative Director  
Tennessee Department of Economic  
& Community Development

**Camilla Stringfellow**  
Director, Corporate Partnerships  
Vanderbilt University

**Jay Strobino**  
Field Representative  
Office of U.S. Senator Marsha Blackburn

**Michael Sullivan**  
State Director  
Office of Senator Hagerty

**Beth Tarcza**  
Chief of Staff  
Oak Ridge Associated Universities

**Ken Tarcza**  
Chief of Staff  
Oak Ridge Associated Universities

**Andrew Tavi**  
Senior Vice President  
Corporate and External Affairs  
Nissan

**Lindsay Theobald, CEcD**  
CEO  
Obion County Joint Economic Development  
Corporation

**Laura Thero**  
Associate Dean, Engineering Technology  
Macomb Community College

**Maddie Thomas**  
Coordinator, Mobility Initiatives  
MICHauto (Detroit Regional Chamber)

**Deniece Thomas**  
Commissioner  
Tennessee Department of Labor & Workforce  
Development

**Hadley Thomas**  
Deputy Chief of Staff  
Purdue University

**Ted Townsend**  
President & CEO  
Greater Memphis Chamber

**Abby Trotter**  
Partner  
Hall Strategies

**Schylar Turrin**  
Executive Projects, Government & Community  
Relations  
Vanderbilt University

**Dawn Turton**  
Chief of Staff  
Vanderbilt University

**Flora Tydings**  
Chancellor  
Tennessee Board of Regents

**Alexa Voytek**  
Deputy Director, Office of Energy Programs  
Tennessee Department of Environment and  
Conservation

**Robert Wagner**  
Associate Laboratory Director  
Oak Ridge National Laboratory

**David Walker**  
President, CEO  
Astra Consulting, LLC

**Jay Walsh**  
Vice President  
Economic Development and Innovation  
University of Illinois

**Jennifer Webster**  
Chief of Staff  
Office of Research  
University of Tennessee, Knoxville

**Will West**  
Target Market Specialist  
Tennessee Valley Authority

**Josh Westerhold**  
Senior Manager, Mobility  
Nissan Americas

**Mary Ellen Wiederwohl**  
President & CEO  
Accelerator for America

**George Wilson**  
Interim Director, Economic and New Venture  
Development  
Vanderbilt University

**Brian Wirth**  
Governor's Chair Professor  
University of Tennessee, Knoxville

**Patrick Withrow**  
EPIC Consortium, Administrative Manager  
Michigan Workforce Training and Education  
Collaborative

**Lydia Witty**  
Investor  
Frist Cressey Ventures

**Patrick Woehrl**  
Division Leader, Communications & External  
Affairs  
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## Contact

For more information, please contact:

### Mr. Chad Evans

Executive Vice President

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## Council on Competitiveness

900 17th Street, NW

Suite 700

Washington, D.C. 20006

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## About the Council on Competitiveness

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.