

# The Minds We Need: Research and Education Infrastructure

## Inclusion, Innovation, and Competitiveness

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Research and education (R&E) infrastructure is a critical component of a national broadband plan. It complements the focus on universal access by providing a foundation for inclusion, innovation, discovery, and national competitiveness. Our national story is incomplete when diverse human potential is untapped, and competitive threats unmet. Federal investments in R&E infrastructure are a national imperative. Connecting every community college, every minority serving institution, and every college and university, including all urban, rural, and tribal institutions, empowering untapped potential, and rising to competitive challenges is possible by funding a national program of coherent, comprehensive, and highly integrated initiatives.

R&E infrastructure is more than just broadband networks. It also includes software, tools, and security resources and provides access to computational resources and data, along with the necessary human expertise to integrate and use these resources for innovation, discovery, and national competitiveness.

Thirty years after the Internet emerged at research institutions and transformed the world of research and innovation, the preponderance of community colleges, minority serving institutions, and colleges and universities still lack high quality R&E connectivity, security, and collaboration tools that would allow them to participate equitably in the digital universe. We must not find ourselves in the position that the technology leader and tribal broadband accessibility advocate, Matt Rantanen, poses: “What if the mind we need is the last mind connected?”

We know that there is talent, imagination, and the capacity for innovation in every community. What is missing in far too many communities – urban, rural, and tribal – is opportunity. Access to research and education infrastructure is now a stepping stone on a path towards a future of quality education and prosperity for all. To ensure inclusion, drive innovation, enhance competitiveness, and equalize opportunity we must:

- **Connect every community college, every minority serving institution, and every college and university, including all urban, rural, and tribal institutions** to a world-class and secure R&E infrastructure, with particular attention to institutions that have been chronically underserved;
- **Engage and empower every student and researcher** everywhere with the opportunity to join collaborative environments of the future, because we cannot know where the next Edison, Carver, Curie, McClintock, Einstein, or Katherine Johnson will come from; and
- **Ensure American competitiveness and leadership** by investing holistically in national R&E infrastructure as a sustainable system.

While the individual costs to students who remain unconnected to research and education infrastructure are tragic, the impact at the national level is also grave. The US is falling significantly behind other nations, particularly China and the nations of the European Union, in our investment in the nation's research and education infrastructure. In the research infrastructure arena, China recently announced an academy-led \$260 Billion USD *Internet of the Future* deployment. Similarly, the European Union continues to invest heavily in infrastructure for research across the EU as well as research infrastructure linking the EU to emerging economies globally.

To achieve this goal, the first year would support a systematic planning phase that identifies gaps across all community colleges, minority serving institutions, colleges and universities, and university-related research facilities and develops clear strategies for each institution, each state or region, each tribal nation, and each territory. Once locally-tuned plans are integrated into a cohesive end-to-end strategy that includes the regional and national networks, software and collaboration tools, and workforce development, full implementation will begin. Such a plan should leverage the nonprofit and institutionally-based research network collaborations that exist in most states, regionally, and nationally, while allowing for new ones to emerge where needed, and allowing for both local innovation and common national goals.

### **Action Plan and Funding Timeline:**

Our plan calls for a \$4.989 Billion one-time investment to expand the nation's research and education infrastructure, to be completed in three phases, extending R&E leading-edge capabilities to each community college, minority serving institution, college and university, enabling innovation while ensuring every college student is connected into an advanced digital fabric.

Awards in all categories should be prioritized to nonprofit R&E networks, tribal, and/or across all community colleges, minority serving institutions, colleges and universities, and university research-affiliated organizations that can then form partnerships, as appropriate, with private sector companies to implement the programs, with a goal of engaging our nation's diverse system of 3,900 accredited, degree-granting higher education institutions.

### **Phase 1: Focus on Needs Assessment, Training, Planning, Local Organizational Development, Federal Agency Coordination, and Tools Development (\$363,750 Million)**

- \$5M per state and territory planning grant resulting in a needs analysis for each
- Up to \$1.25M to each state and territory for consortia building and training
- \$10M national coordinating strategy planning grant
- \$7.5M for up to 5 multi-state consortia building and training
- \$500K per year to support inter-agency federal government coordination

### **Phase 2: Transition from Planning to Initial Implementation (\$1.425 Billion)**

- Up to \$25M per state and territory to begin implementation identified in plan
- \$50M for development of collaboration tools, security, and infrastructure at the national level
- Develop and release program rules for Phase 3 program based on Phase 1 needs analysis and Phase 2 implementation

### **Phase 3: Full Implementation Programs (\$3.2 Billion)**

- \$3.25B in needs-based grants, linked to the prior years planning activities, to address local, state, regional, national, tribal and territorial needs and gaps
- Up to \$150M of the total for undersea cable R&E capacity to connect territories, Alaska, and Hawaii

*Read the full paper and implementation recommendations: [www.mindsweneed.org](http://www.mindsweneed.org)*