



## **Building Businesses on the Border: The Bi-National Sustainability Laboratory as an Engine of Economic Change**

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Imagine the U.S.-Mexican border as the home to advanced, emerging technology businesses with an entrepreneurial spirit akin to Silicon Valley or the Boston Corridor – but with a spicy international flavor and attitude.

These cutting-edge, bi-national enterprises would span the entire length of the border's 2,000 miles from the Gulf Coast cities of Matamoros/Brownsville to the Pacific Coast cities of Tijuana/San Diego. It would be anchored in the center by advanced aerospace and automotive industrial activities in the Paso del Norte region of West Texas, Southern New Mexico and Northern Chihuahua, with growing nodes of wealth-generating enterprises in such cities as Laredo, Nogales, Mexicali and El Paso.

The intellectual capital generating and supporting these technology enterprises would flow from the regional universities and national research laboratories and centers, working in strategic partnership with the private sector and supported by public policy and programs at the federal, state and local levels.

This is the vision that drives the newly created Bi- National Sustainability Laboratory (BNSL) based in Santa Teresa, New Mexico.

### **Early history**

The BNSL was at least five years in the making. In the late 1990s, New Mexico's Sandia National Laboratory was exploring the concept of applying advanced technologies to economic development, with the goal of reducing political tensions at borders caused by economic disparities. Initial ideas focused on the Middle East, but they quickly determined that the U.S.-Mexico border would be a better focus for their efforts.

They found strong support for the BNSL concept with the U.S.-Mexico Foundation for Science (FUMEC), a binational organization founded in 1992 by U.S. Congressman George E. Brown. Headquartered in Mexico City with an office in Washington, D.C., and a border office at the University of Texas at El Paso, FUMEC's primary purpose is to promote and support scientific and technological collaboration between Mexico and the United States.

FUMEC had pursued a similar strategy with another binational program, the Materials Corridor Initiative. That initiative focused more narrowly on advanced materials and materials processes for potential economic development opportunities. The five-year, multi-million-dollar program identified 12 deployable materials technologies, two of which actually became start-up companies in the border region at the end of the initiative.



The BNSL project spans the entire 2,000 miles of the U.S.-Mexico border, from the Gulf Coast cities of Matamoros/Brownsville to the Pacific Coast cities of Tijuana/San Diego.

Based on that earlier success, and given FUMEC's overall mandate to act as a bi-national science and technology catalyst, Sandia and FUMEC worked energetically to obtain support and funding from both federal governments. In October 2004, they secured a two-year grant for \$400,000 from the U.S. Economic Development Administration and a matching commitment from Mexico's Consejo Nacional de Ciencias y Tecnología (CONACYT), Mexico's equivalent to the National Science Foundation.

FUMEC worked closely with Sandia and border state academic institutions (Texas A&M, the University of Texas at El Paso, Universidad Autónoma de Ciudad Juárez, and others) in obtaining support for the BNSL. They also worked closely with the Border Governors Conference, led in 2004 by Governor Bill Richardson of New Mexico and subsequently by Governor Martin of Coahuila, Mexico. Today, the list of BNSL's strategic stakeholders also includes New Mexico's Economic Development Department, New Mexico State University, New Mexico Tech, Monterrey Tech (Juarez), Delphi Corporation

(Juarez), Team Technology, Verde Realty, the national Advanced Materials Research Center (CIMAV) of Chihuahua, New Mexico's TVI Community College, El Paso Community College and others.

In September 2005, the BNSL formally opened its doors at a 4,600-square foot facility in Santa Teresa, to begin fulfilling the hopes and vision of its creators.

### **BNSL vision and structure**

The BNSL, a non-profit corporation, sees itself as an engine of research excellence for sustained economic development on the U.S.-Mexico border. Its mantra is "building border businesses." The BNSL's goal is to create bi-national, public-private partnerships for economic development in the entire U.S.-Mexico border region, from the Gulf of Mexico to the Pacific Ocean. These partnerships will combine the "triple helix" of business, academia and government to work collaboratively in achieving the overall vision of the BNSL.

The BNSL envisions using distributed facilities and activities appropriate to the strengths and opportunities of specific border regions. While initially focusing its attention on the Paso del Norte (central border region), the BNSL expects to expand rapidly by creating centers of focus, or nodes, in other regions of the border as opportunities and resources permit. While the facilities and activities are expected to be dispersed, the various programs and projects will be coordinated and managed through a central leadership under a single Executive Director and a bi-national board of directors.

### **How does it differ?**

The BNSL differs from existing approaches by focusing binational, public-private resources on business formation and expansion, using applied technology research and a proactive commercialization process. The closest comparison would be to global corporate laboratories, which – while having many technical and business assets and strengths – lack the BNSL's ability to partner widely.

The BNSL's approach goes beyond typical business development and incubator initiatives by focusing on the aspects of technology commercialization typically characterized as the "valley of death" – the place between technology prototype and commercial product. Its staff and partners will provide expertise in technology development, product realization, business planning and project financing. This approach will not only increase the number of successful transitions from prototype to company but also address the problem of new concepts whose developers lack the skill, or will, to commercialize the products themselves. The BNSL will link the diverse cultures of academia and the business and financial world, looking for market "pull" in lieu of technology "push."

The BNSL's bi-national synergy is further emphasized by the strength and breadth of its board, which consists of 14 high-level business leaders (CEOs, vice presidents, directors, etc.), academic professionals and governmental officials from both sides of the border and representing the diverse geographic regions of the 10 border states.

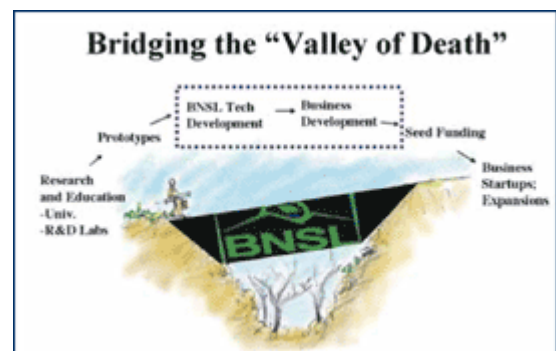
Strategies for economic development include applied research, technology/product development, advanced training, business planning, mentoring, incubation, business and technology acceleration and marketing, among others. The Santa Teresa facility has some 1,600 square feet of office and lab space and 3,000 square feet of high-bay light industrial space. The flexible facility can accelerate or incubate between seven to 10 companies or start-ups.

### **Program and project examples**

The BNSL has identified some two dozen programs and projects that may form the basis of its initial activities. Several of those programs and projects include:

- **MEMS (Micro Electro-Mechanical Systems) Packaging Cluster.** MEMS represents a major emerging technology with direct applications in the automotive, aerospace, defense, homeland/border security, health and communications fields, among others. Because of the extreme environments in which these fragile systems are expected to work, packaging technologies are critical in the adaptation of these devices.

The Paso del Norte (PDN) MEMS Packaging Cluster was established in February 2004 and currently includes FUMEC and BNSL; universities and community colleges, including the University of Texas at El Paso (UTEP), New Mexico State



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University (NMSU), Universidad Autónoma de Ciudad Juárez (UACJ), New Mexico Tech (NMT), El Paso Community College (EPCC), TVI Community College, and Tecnológico de Monterrey – Juárez Campus; government research laboratories (Sandia National Laboratories and CIMAV – Centro de Investigación de Materiales Avanzados); and industry (Delphi Corporation, Team Technology).

The long-term intent of the cluster is to establish core competencies among the members in the area of MEMS packaging that will lead to research, innovations, product developments, technology commercialization and economic development. Currently, the MEMS cluster is drafting a funding proposal to submit to the National Science Foundation for the development of the cluster and associated projects.

The cluster will use the BNSL's MEMS packaging technical support facility being created at Santa Teresa, and its commercialization activities will be conducted in conjunction with the BNSL. In addition to laboratory space, the BNSL and its partners will provide a range of specialized services aimed at bridging the gap between concept development and commercial success. New start-up companies are expected to be created and physically located on both sides of the border, with wealth creation and economic benefits to both sides.

**Refinery Sciences, Inc.** Refinery Sciences, Inc. is a new start-up based in part on jointly owned UTEP-CIMAV intellectual property created as part of the Materials Corridor Initiative. This technology focuses on advanced catalysts for converting heavy crude petroleum materials to light petroleum. The catalysts have a major potential use in developing remaining petroleum stocks in the United States, Mexico, other parts of Latin America and the world.

Refinery Sciences, Inc. currently is continuing laboratory research of its catalytic material in partnership with the University of Texas at El Paso. However, in order to go to the next level – creating prototype quantities of the advanced catalysts to be tested in actual petroleum refineries – Refinery Sciences will take advantage of high-bay space at the BNSL and install specialized equipment at the Paso del Norte facility. The BNSL will also work closely with the company to find appropriate partners and opportunities for use of this new advanced material in the U.S. and Mexico, as well as globally.

**Materials Corridor Initiative (MCI) projects.** As already noted, the Materials Corridor Initiative resulted in more than a dozen projects that were considered as deployable. Two of these projects became new start-up corporations (Mayan Pigments, Inc. and Refinery Science, Inc.) at the end of 2004. The BNSL is analyzing the remaining projects and looking for appropriate private sector partners, particularly in Mexico, to advance some or all of these projects to the start-up stage as rapidly as possible. These projects also have the potential for continued research support from Mexican government research centers to ensure greater connectivity to Mexican private sector interests. If needed, seed funds from the BNSL will be used to help leverage additional support for advancing these projects.

### **A technology engine on the border**

The recent meeting of President Bush, Mexican President Vicente Fox and Canadian Prime Minister Stephen Harper in Cancun underscores the importance of establishing and maintaining strong economic collaborations among the NAFTA partners to fulfill the Security and Prosperity Partnership program for enhanced North American competitiveness. We expect the BNSL to provide a unique and important mechanism for achieving the economic goals of our governments and the aspirations of their citizens in the border region.