

Exceptional service in the national interest



Tribal Technology Transfer – Tribal Energy Businesses

Sandra Begay-Campbell

Principal Member of the Technical Staff

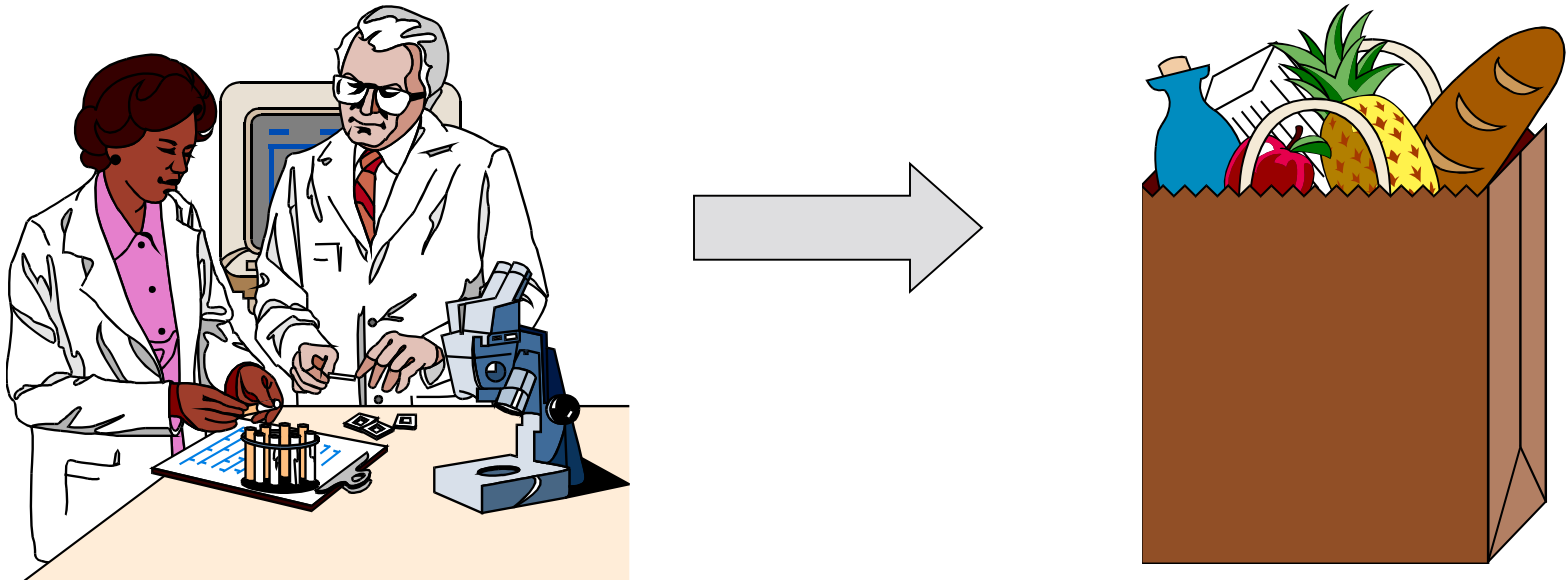
Board Chair, Science & Technology Corporation @ University of New Mexico



Sandia National Laboratories is a multi-program laboratory managed and operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corporation, for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000. SAND NO. 2011-XXXXP

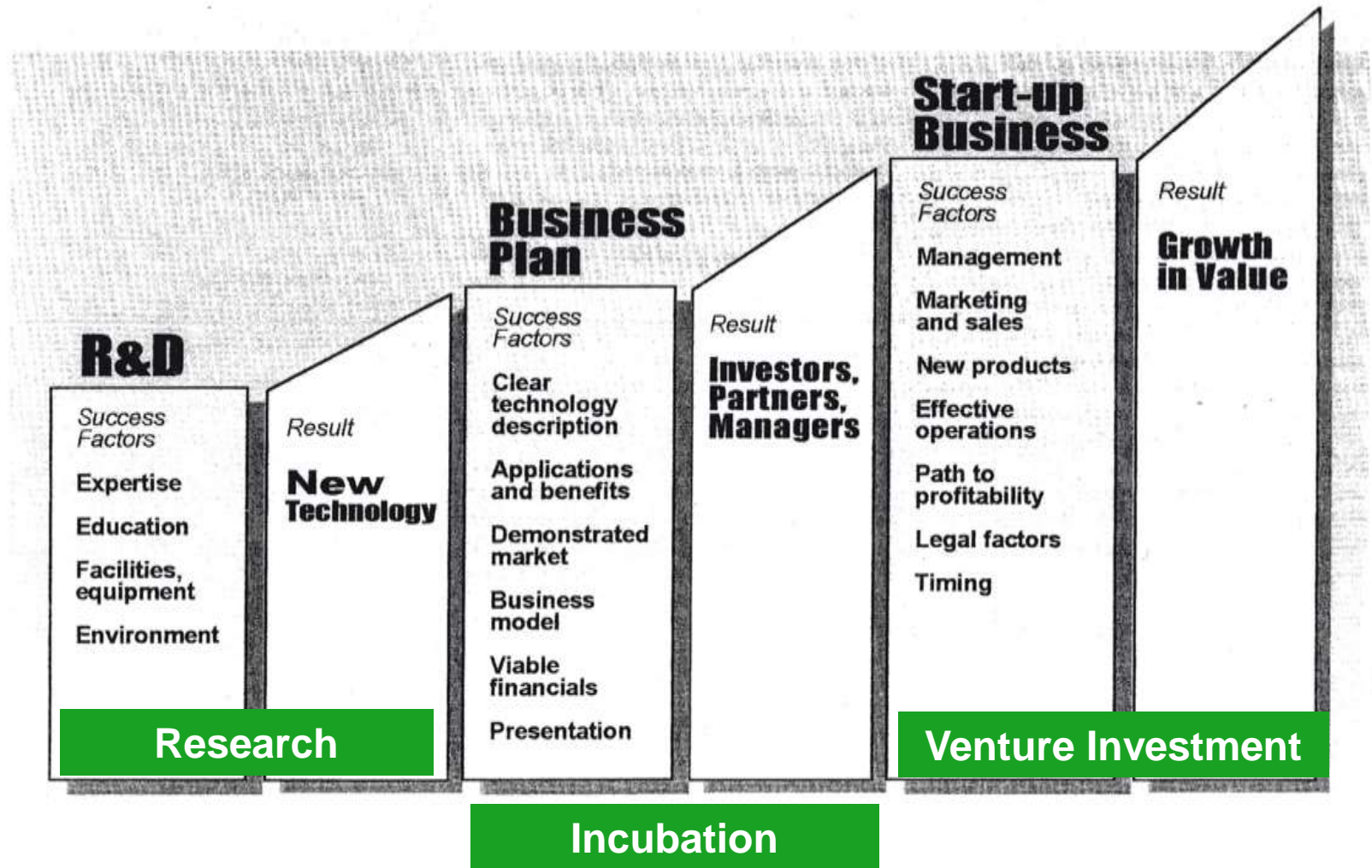
Technology Transfer Objectives

Industry technology transfer is the process of moving research results from the laboratory to the marketplace.



Slide Used with Permission from STC.UNM

The Incubation Process



Slide Used with Permission from STC.UNM

A process of technology implementation



A process of technology implementation over time of energy projects is recommended

Each set of recommendations are ranked from very cost efficient approaches to conventional technology demonstrations to advanced technology demonstrations

It is understood that additional funding will be needed for first cost of many technologies and investment of business start up

The model process developed would provide a progression of lessons learned which have been implemented by Sandia's military customers.

Tribal Example of Technology Transfer – Businesses

- The Delaware Nation, OK - LED lighting & PV
 - “Green technology is the wave of the future and it certainly fits in with our culture,”
Chairman Holton
 - Lenape Lighting & Manufacturing LLC Sandy, UT
 - Unami Solar – Trenton, NJ

- Assiniboine & Sioux Tribes of the Fort Peck, MT - GSHP
 - Train 6 installers of Ground Source Heat Pumps (GSHP)
 - Install 8 GSHP on Tribal houses
 - Certified to install GSHP; business development pursued

- Sacred Power – PV, Small Wind, Hybrid Systems
 - Isleta business enterprise (8A Certified)
 - Solar carports, off-grid hybrid units

- Navajo Nation – Off grid PV/ Small Wind Units

- Lakota Solar Enterprises – Solar Hot Air Systems

Navajo Tribal Utility Authority Residential off-grid systems

..1993.....1999-2001.....2002-2003.....2003-2004.....2015

240-260 Watt



Business potential realized

640 Watt



Standardization achieved

Phase I 880 Watt Hybrid



Battery bank powered by hybrid design

Phase II 880 Watt Hybrid



Economic Development: Units assembled on Navajo Nation

Lakota Solar Enterprises (LSE)

100% Native American owned and operated renewable energy companies.

LSE began as an expansion of Trees, Water & People solar heater work on Pine Ridge.

Straightforward technology:

Sunlight falling on the glass panels is routed into the home via ductwork and a fan; inside the house a thermostat controls the fan and another duct carries cold air out of the house and into the back of the solar panel where it is warmed and blown into the house. The fan is the only moving part. The panels and support structures are manufactured at LSE and installed by the LSE crew.



LSE is headed by Henry Red Cloud, a respected Lakota elder and a fifth-generation descendent of Chief Red Cloud, the last Lakota war chief.