Accelerating eBeam Technology Commercialization: A US-Mexico case study

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Vision

Harness E-Beam and X-ray Technologies To Clean, Heal, and Feed the World and Beyond……

Harnessing E–Beam and X–Ray Technologies to Clean, Heal, and Feed the World,, and Beyond…

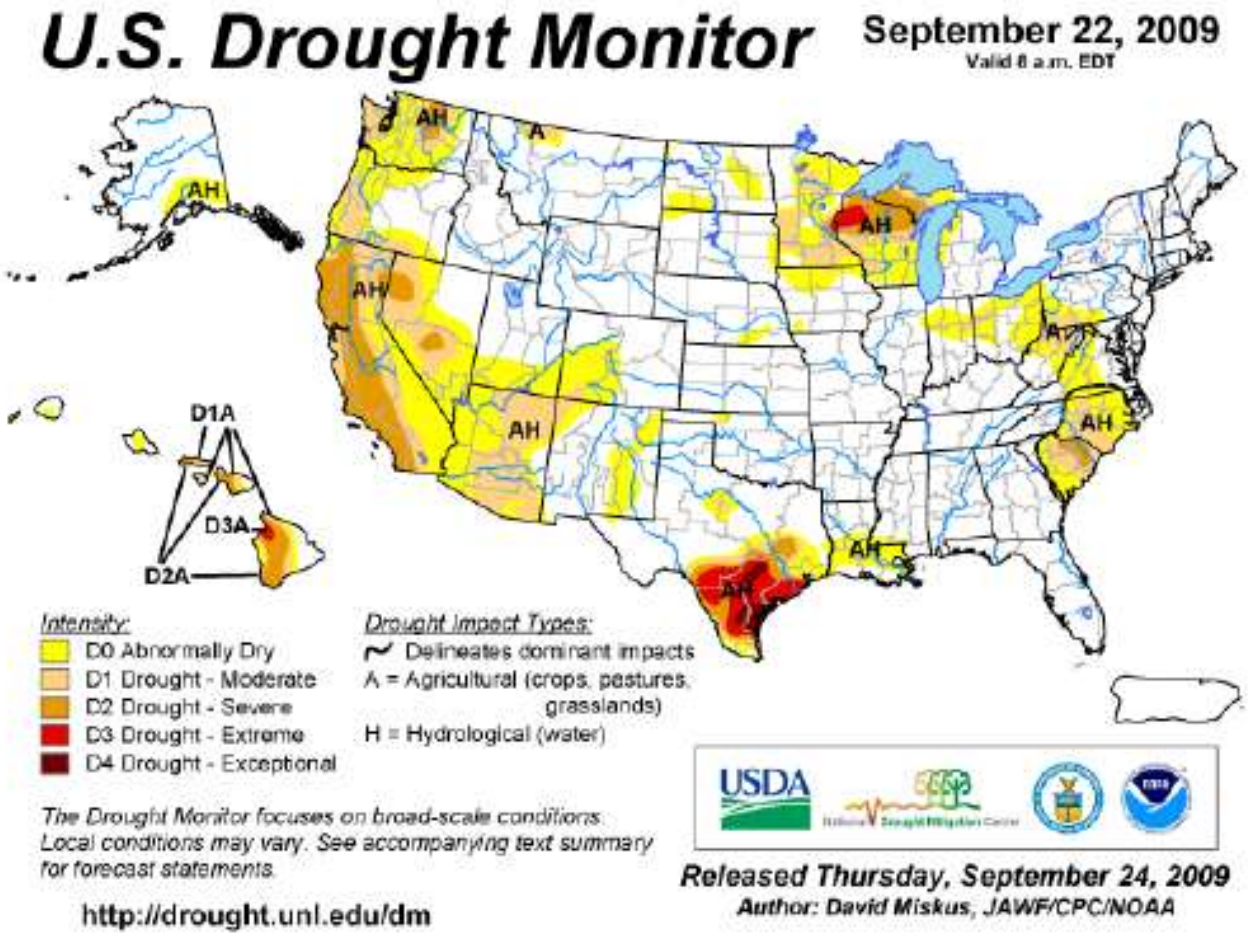
Mexico and US share a Common Border

Common Border: 3145 km

Texas and Mexico share a Common Border

Common Border: 2020 km

Water is a Precious Commodity



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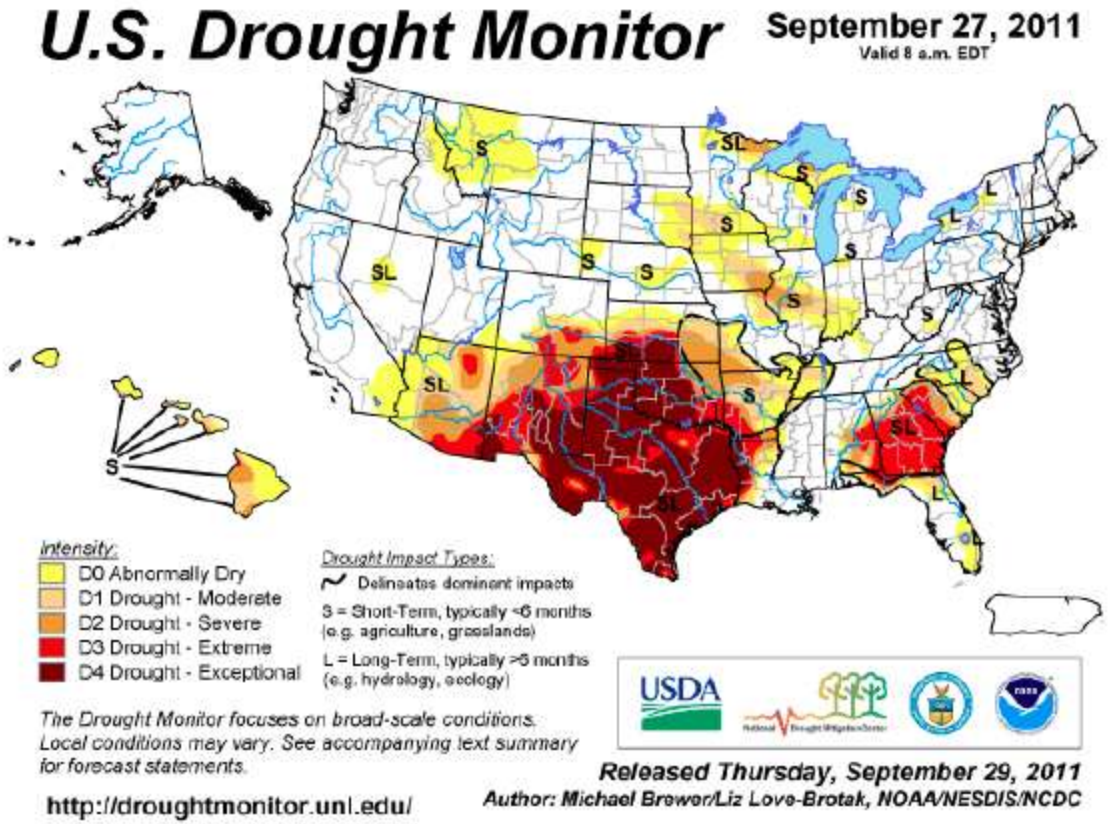

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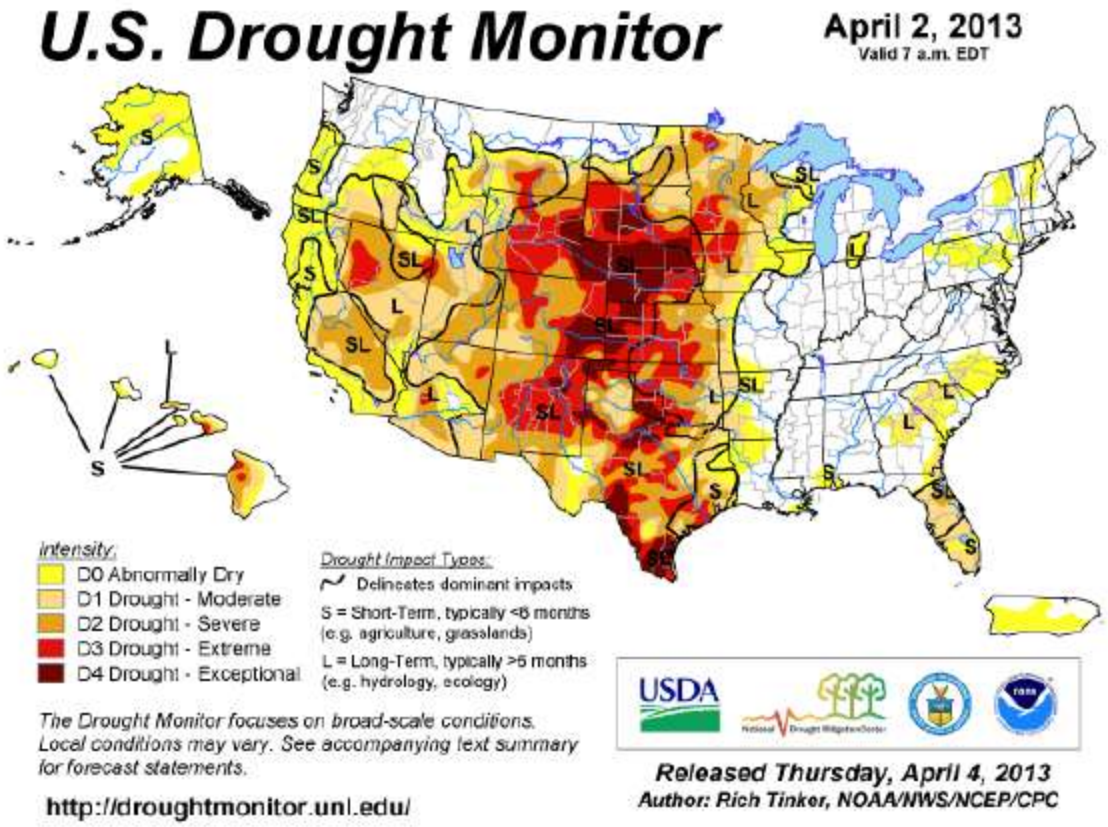


Water Wars

DOES THE SOLUTION LIE BENEATH US?

As lakes and rivers run dry and Earth's surface water disappears, the solution might lie beneath us, in the vast (and largely untapped) network of underground aquifers. The United Nations cites over 23,400,000 km^3 of water in aquifers, 547 times more than all of Earth's rivers combined. 98% of Earth's accessible water is thought to reside in aquifers, much of it "fossil" water more than a million years old. Until recently deep aquifer pumping was out of the question (a cubic yard of water weighs one ton), but core-drilling technologies developed by the oil industry are changing the picture. Many of these aquifers span national borders, making access rights a huge matter of contention, and possibly a cause for future conflict.

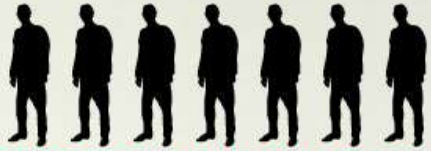
GUARANI AQUIFER
Could provide 100 liters of water a day to 5.5 billion people for 200 years

- MAJOR AQUIFER

NUBIAN SANDSTONE AQUIFER
Volume is 500,000 times the annual flow of the Nile, but the desert climate above fails to replenish the aquifer below, making aquifer pumping an unsustainable solution.

Glass HALF EMPTY

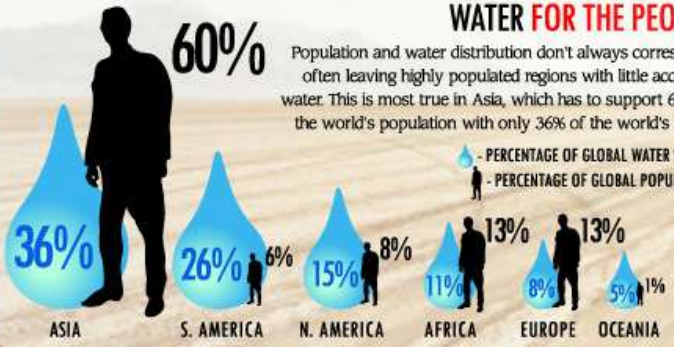
THE COMING WATER WARS



EVERY MINUTE, 7 PEOPLE DIE FROM BAD WATER OR NO WATER

WATER FOR THE PEOPLE

Population and water distribution don't always correspond, often leaving highly populated regions with little access to water. This is most true in Asia, which has to support 60% of the world's population with only 36% of the world's water.



WILL THERE BE WAR?

Of all the water on Earth, only 2.5% is fresh, and less than 0.007% is readily available to people through rivers, lakes, and streams. As worldwide populations surge, temperatures rise, climates change, and diseases spread, clean water will become ever more essential (and ever more rare). In 2000, United Nations Secretary-General Kofi Annan warned that national rivalries over water could harbor "the seeds of violent conflict." Opinions are split on the likelihood of "Water Wars". In the past 50 years, there have been 1,831 water-related interactions between countries. Of these, the vast majority (1,228) ended peacefully. Only 21 involved actual military violence (18 between Israel and its neighbors). Furthermore, there are few places in the world where a water-poor country is in a military position to attack a water-rich neighbor. Still, many experts believe that as water shortages become increasingly urgent, countries (or at least local communities) will resort to violence to quench their thirsts.

BEST WATER	WORST WATER
1) Finland	1) Belgium
2) Canada	2) Morocco
3) New Zealand	3) India
4) United Kingdom	4) Jordan
5) Japan	5) Sudan

1970 WARNING SIGNS

In 1970, water consumption worldwide was half what is is today. With 80% of all sickness in the developing world linked to polluted water, and with populations sharply on the rise, the urgency of water management became apparent.

2003 DRY AND DIRTY

Over 1.3 billion people have no access to clean water. At least 2.2 million people die annually from diseases related to poor sanitation and contaminated drinking water - that's about 10,000 deaths from bad water (or no water) each day.

2025 PARCHED POPULACE

The United Nations estimates that the world's per capita water supply will drop by 1/3 in the next 20 years. The worst strain will be in Africa and the Middle East, where populations are growing fast and rivers are running dry.

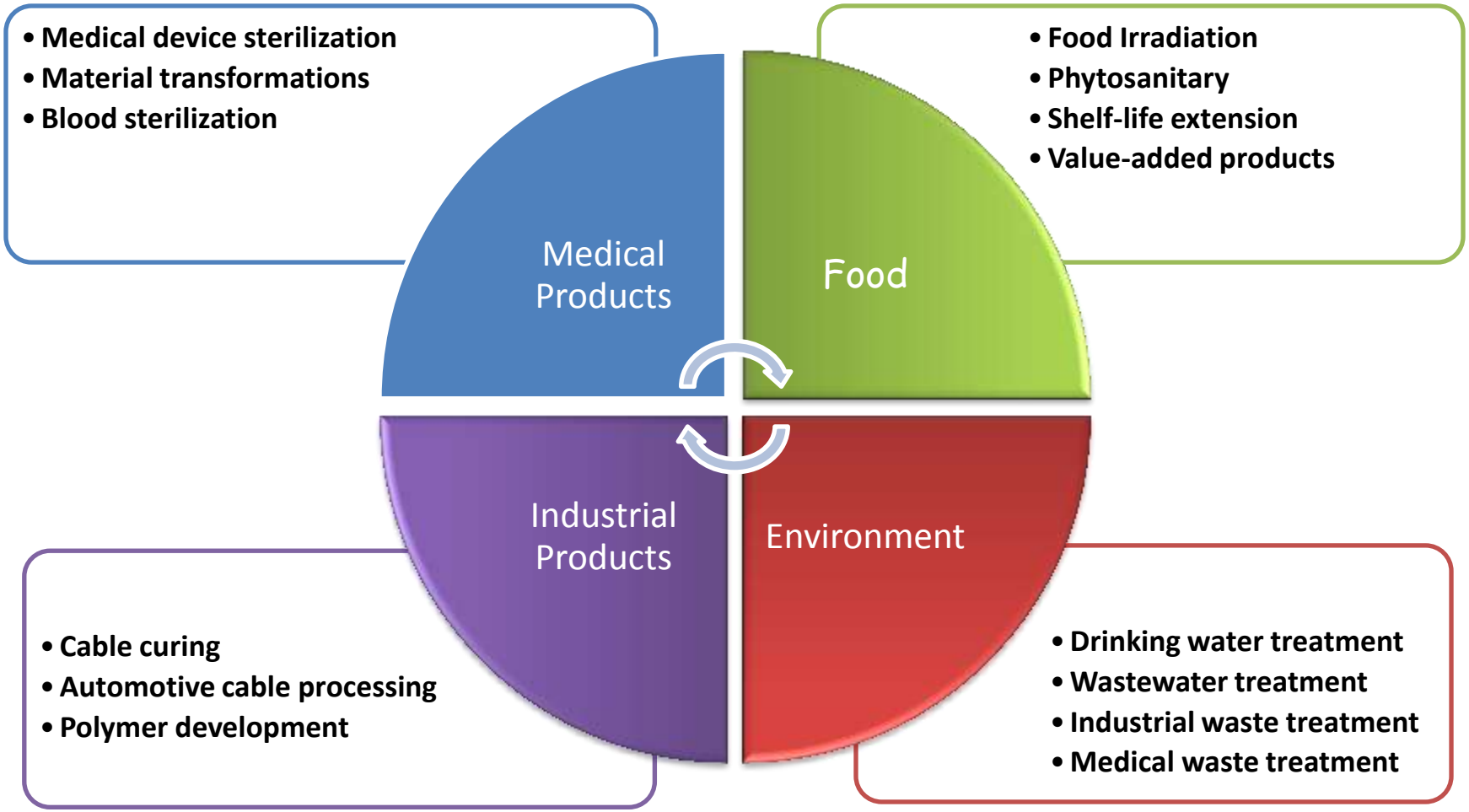
WHO WILL HAVE THE WATER?

PERCENTAGE OF WORLD WATER SUPPLY BY NATURAL ECONOMIC REGION

SOURCE - UNESCO

SOURCES - UNITED NATIONS - MONTREAL GAZETTE - UNESCO - NEW YORK TIMES - INTER PRESS SERVICE

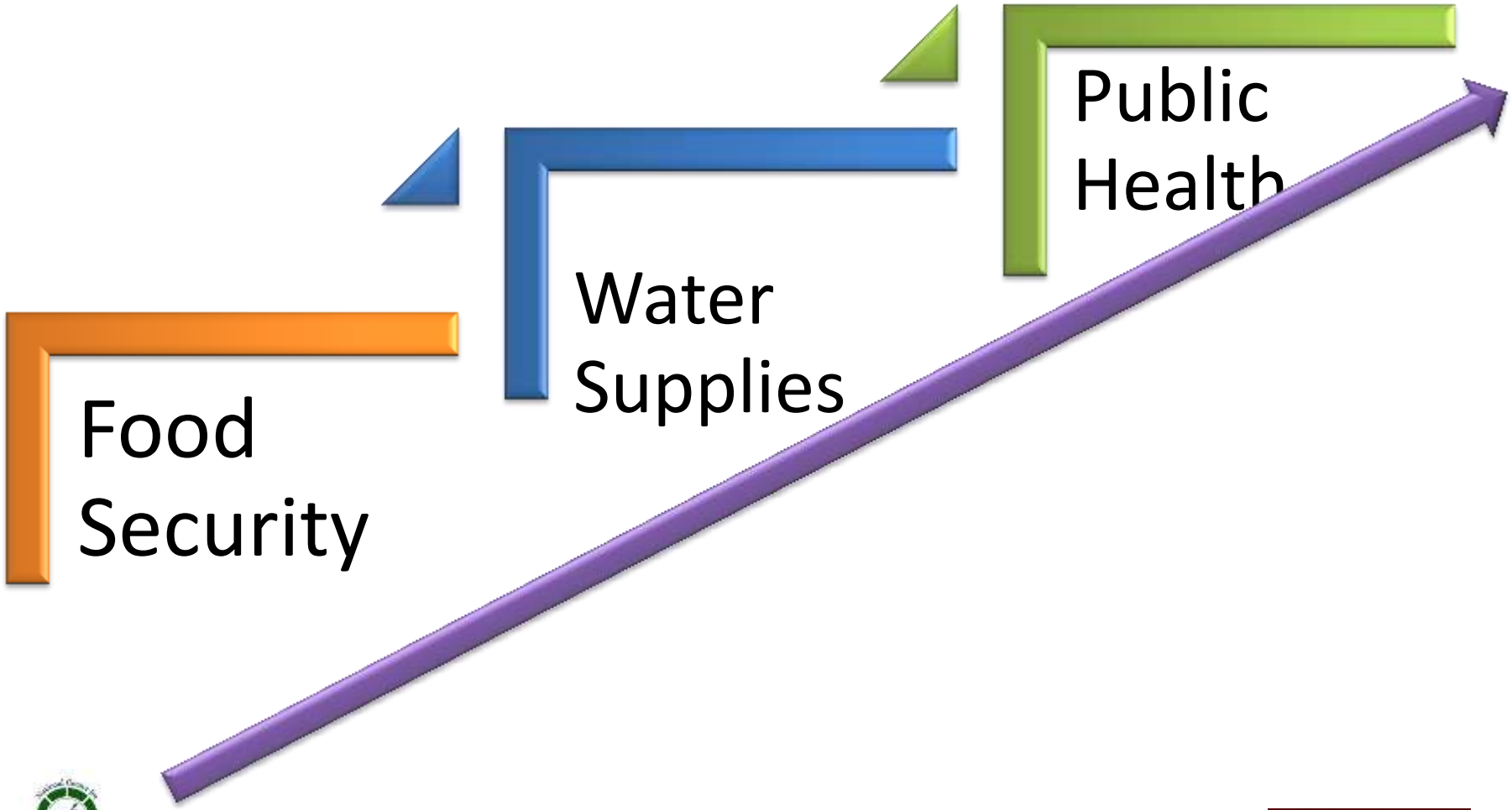
eBEAM TECHNOLOGY APPLICATIONS



Opportunities for Mexico

Water Quantity	• eBeam for effluent treatment
Secure Foods	• eBeam against insects & pests
Safe Foods	• eBeam against foodborne pathogens

Opportunities for Mexico



Refining the Vision

Food Safety Applications

Environmental Applications

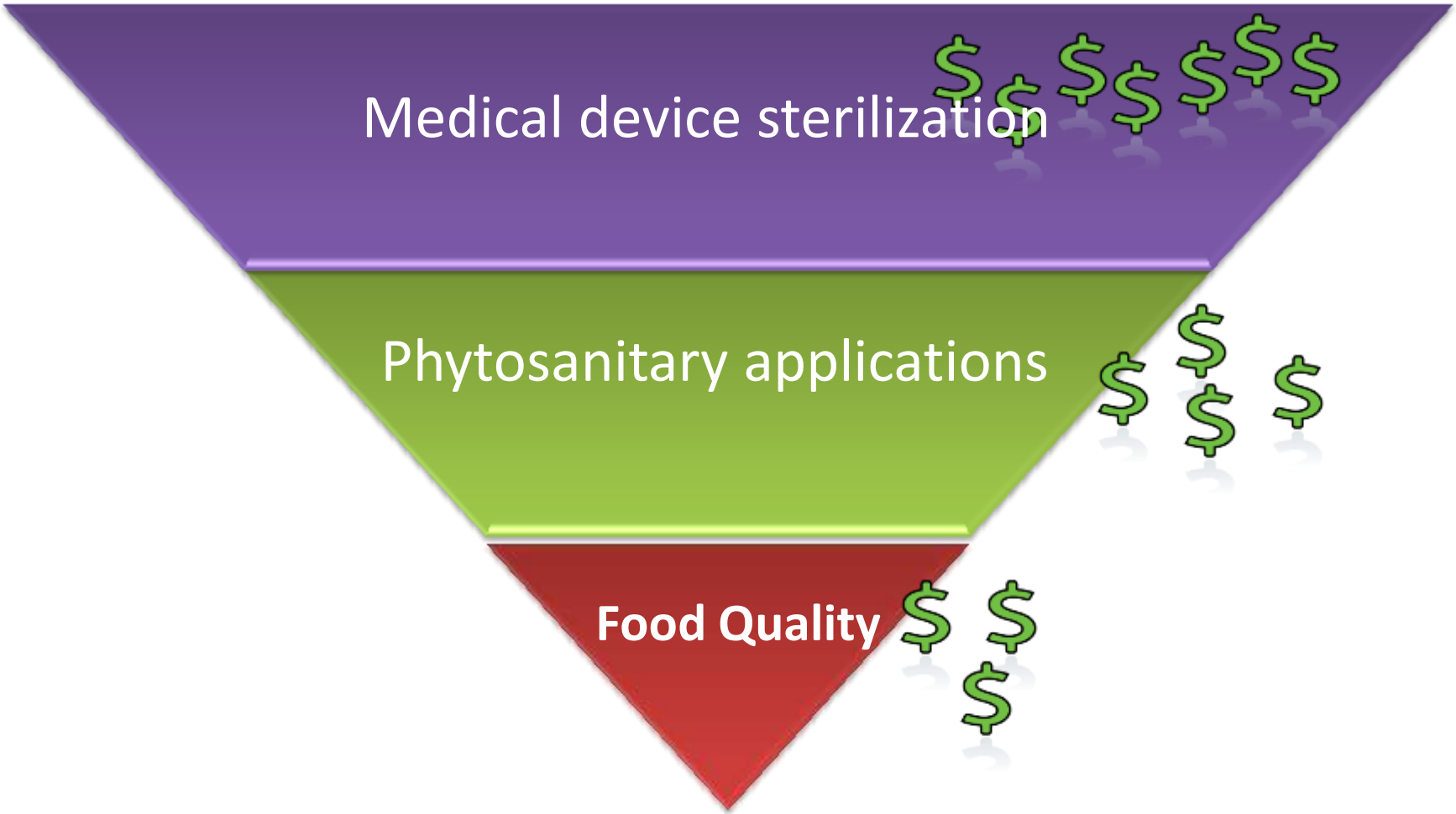
Polymer Modifications

Vaccine Development

Phytosanitary/ Quarantine Applications

Medical Device Sterilization

The Reality Based on Return of Investment (ROI)



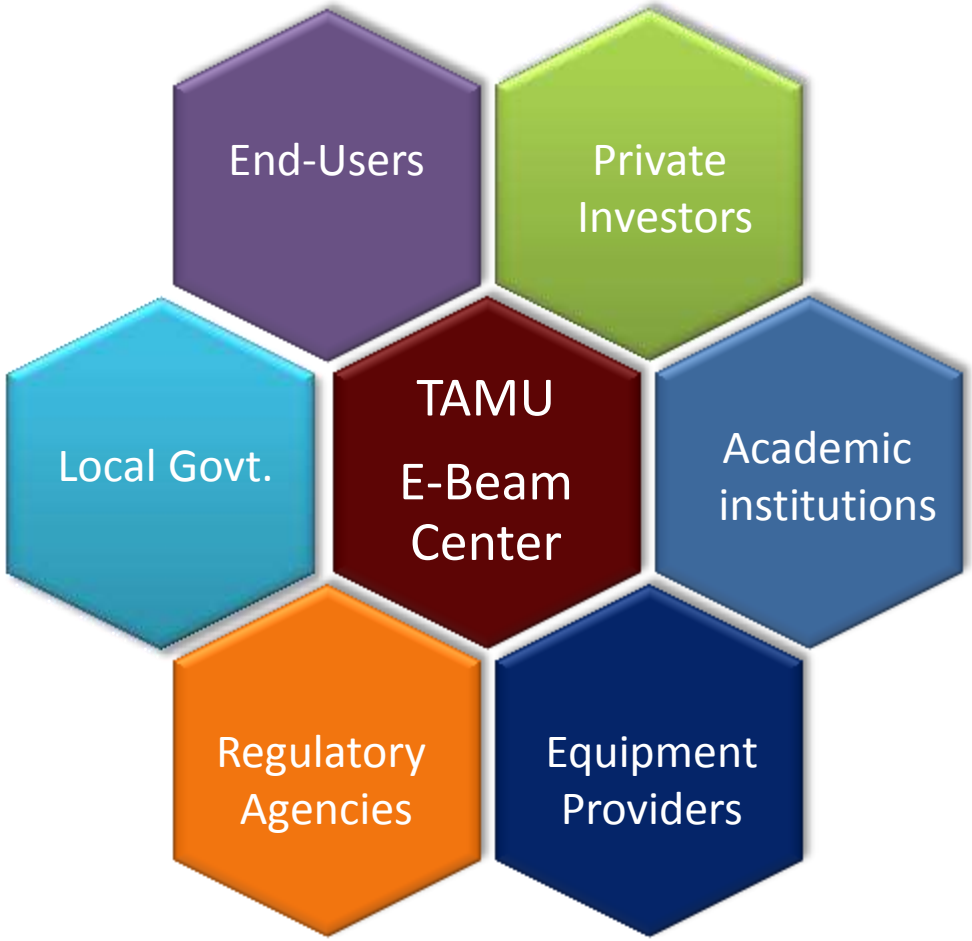
Executing the Vision

- Mexico # 1 for medical product/device exports to the US
- Mexico exports > $2.5 billion in advanced life-sciences technology products to the United States
- Costa Rica is quickly becoming a hub for medical device manufacturing
  - A direct threat to Mexico's manufacturing industry

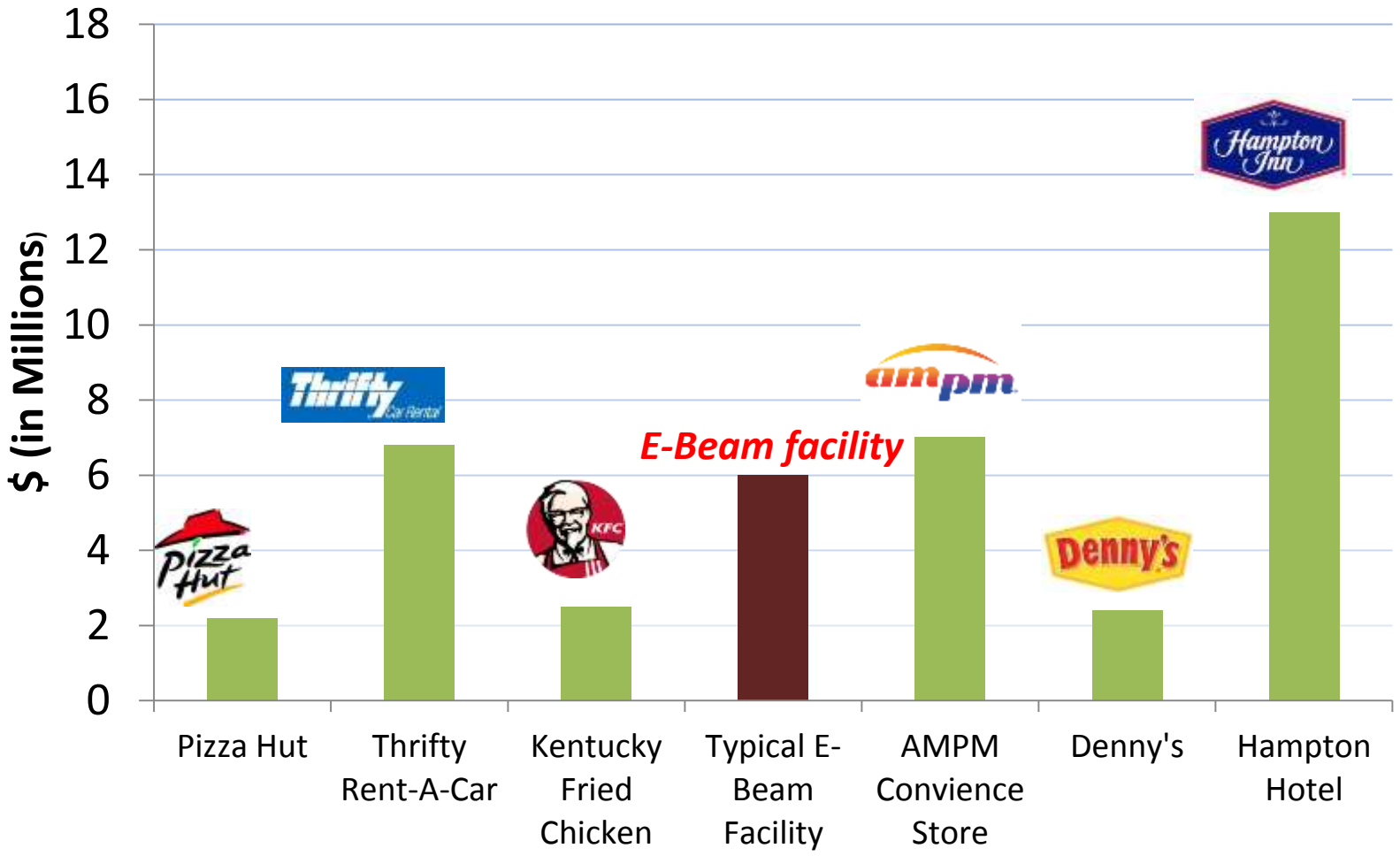
Current Challenges

- Need to pack, transport across border, E-Beam irradiate and bring it back across the border
- Excessive amount of paperwork
- Significant time delays
- Need to maintain excess inventory
  - Cash flow implications

Partnership Model



Installing eBeam Technology – Putting investments into perspective



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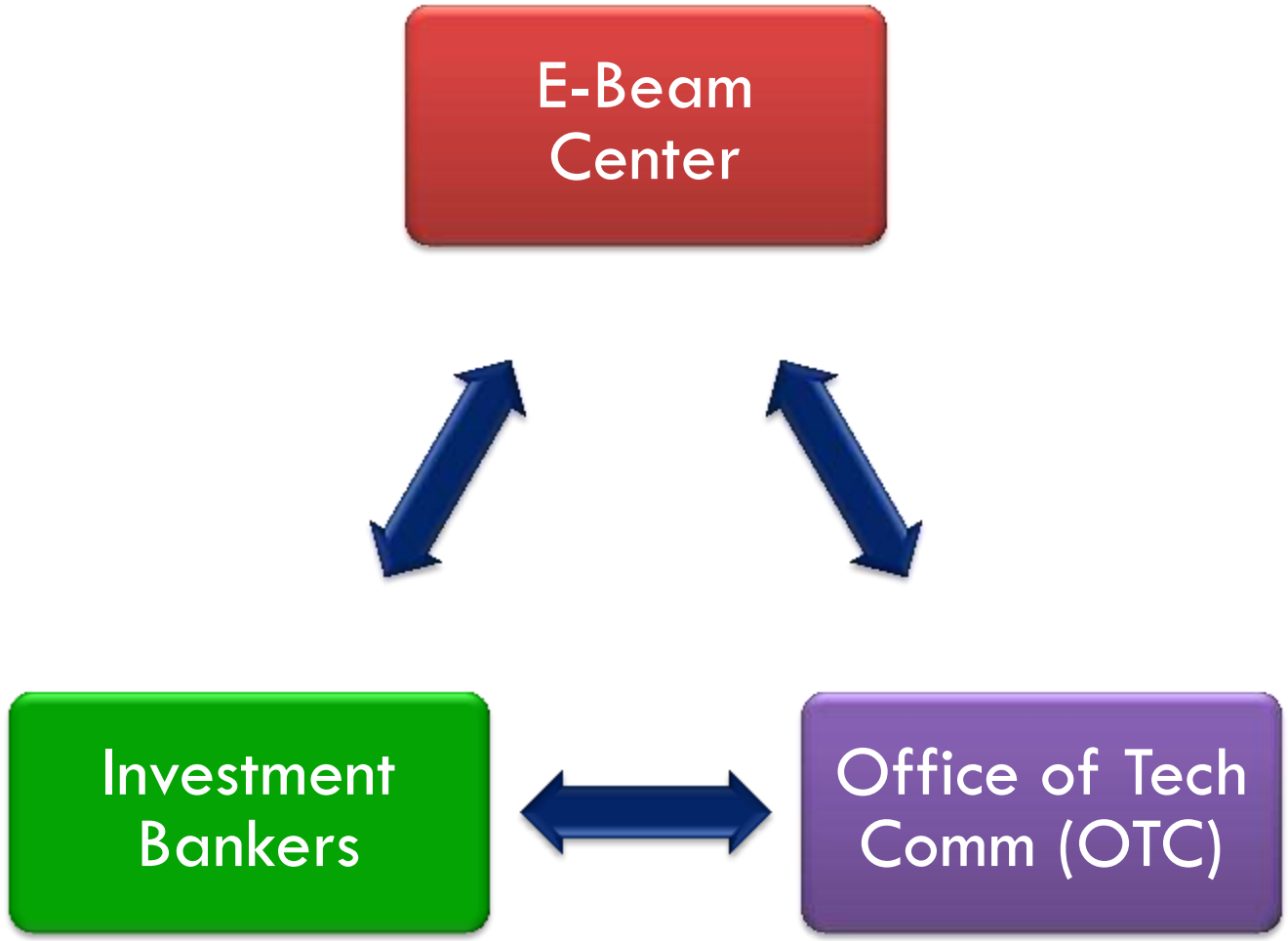

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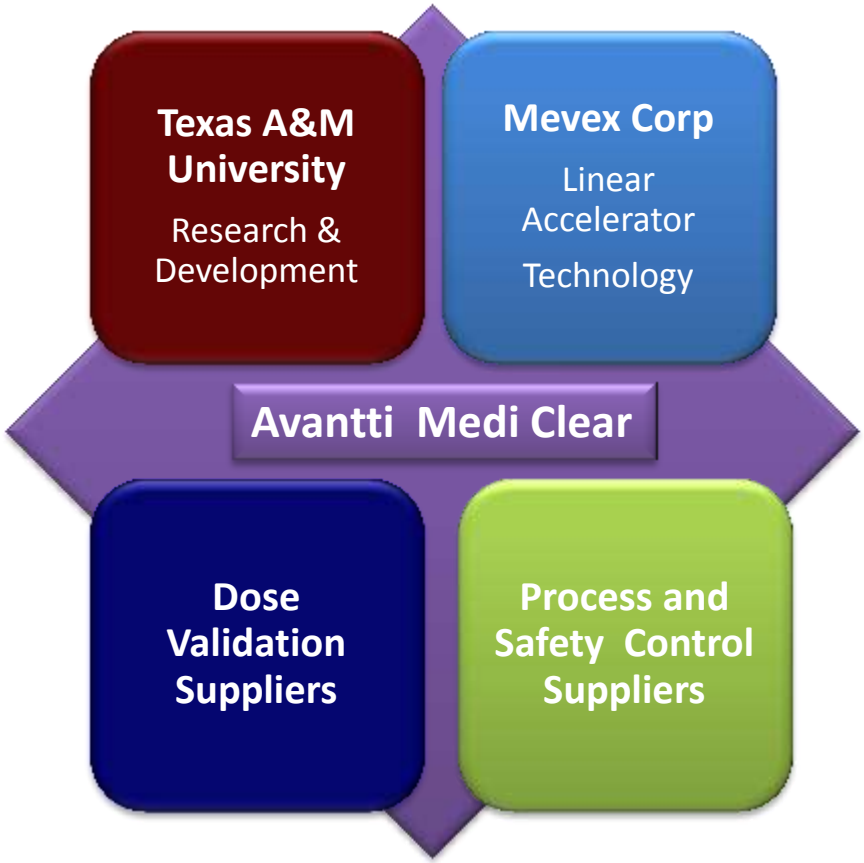
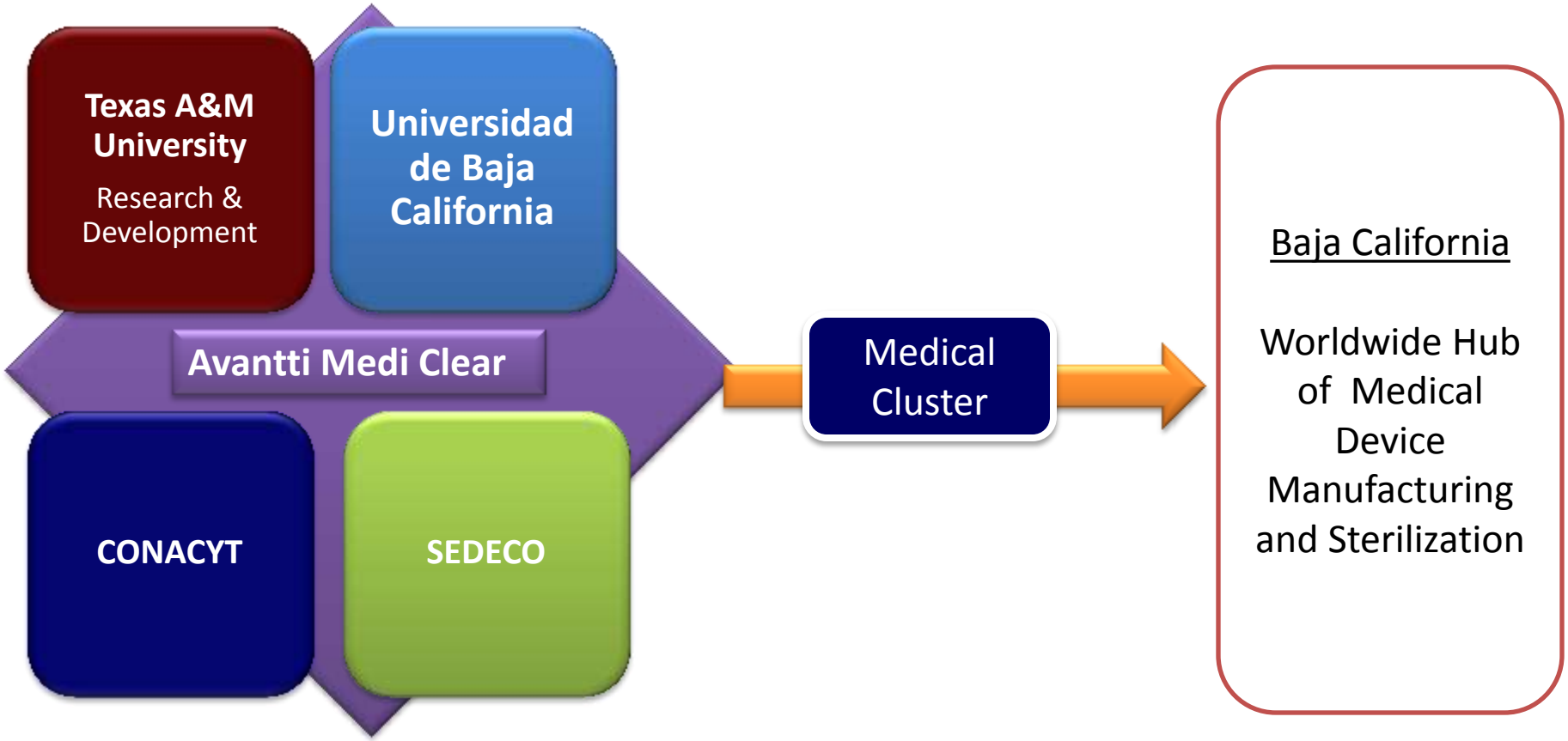


Making it Sustainable!!!



Value Proposition of eBeam Technology to Mexico

- Completely New Jobs!!
  - eBeam plant managers
  - Sterilization specialists
  - Dosimetry QA/QC specialists
  - Linear accelerator operators
  - Product package design specialists
  - Microbiology testing laboratories
  - Linear accelerator maintenance specialists

Realizing the Vision

E-Beam facility # 1: Under construction – expected start date Jan 2013

Focused on medical device sterilization (US $ 8 million facility)

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