



# Economic Impact Analysis of DOE's SBIR/STTR Program

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PNNL-SA-198634

PNNL is operated by Battelle for the U.S. Department of Energy



## Technology Tracking History at PNNL

PNNL has tracked Advanced Manufacturing Office's (AMO) R&D Project portfolio since FY1980.

For the period 1976 - 2016:

- Over 1200 AMO funded R&D projects identified.
- Over 700 AMO funded R&D projects investigated further.
- Over 500 technologies resulting from AMO R&D funding.
- Over 350 technologies commercialized or in use.
- **Also included SBIR (Small Business Innovation Research) and STTR (Small Business Technology Transfer) awards**
- Value from Tracking
  - Budget defense
  - Institutional memory
  - Strategic planning
  - Effective management of R&D programs
  - Benefits (qualitative)
  - Energy savings
  - Emissions SO<sub>x</sub>, NO<sub>x</sub> Particulates etc.
  - Technology adoption, marketing etc.

# Technology Definitions

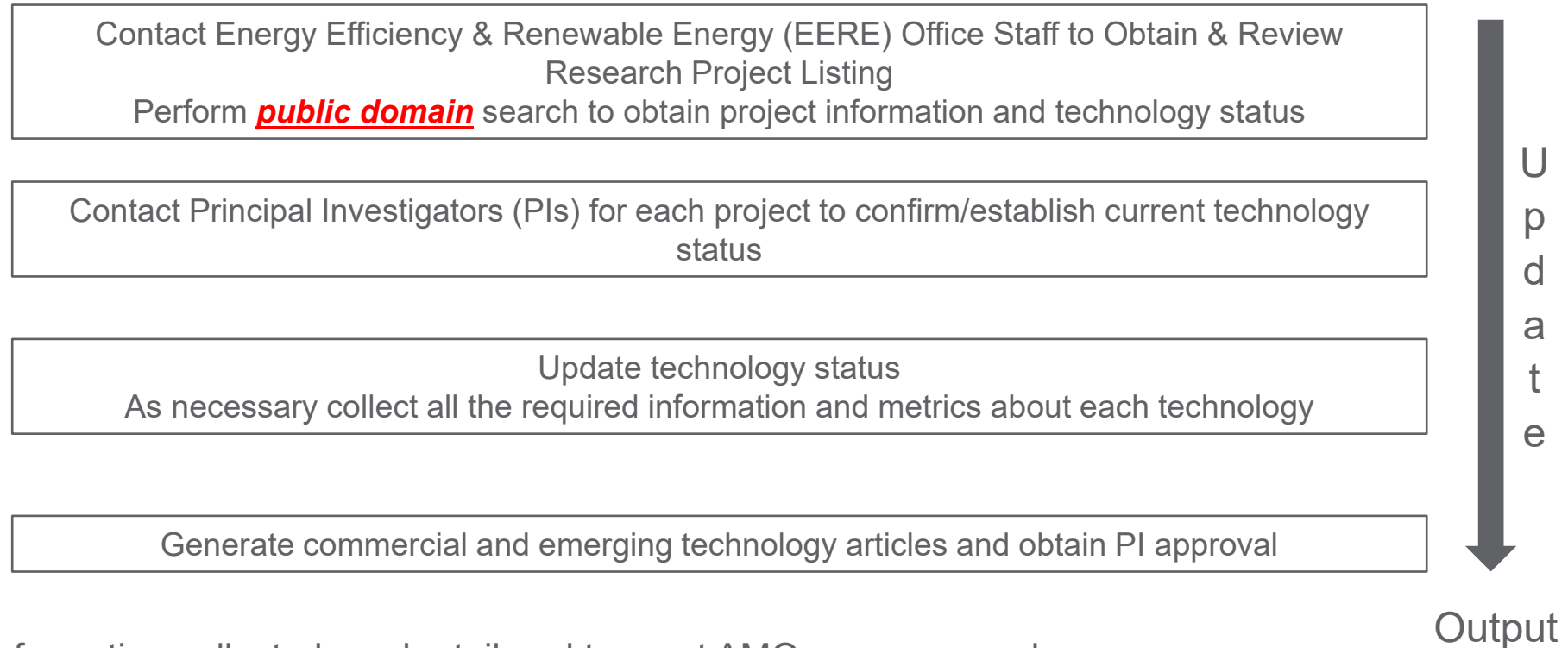
## Commercial Technology Defined

A commercial technology is defined as an invention or intellectual property that is developed into a technology (hardware, process, technique, design, machine, tool, material or software) and enters the domestic market as “first sale,” “in-use in a production application,, or “sale of a commercial license.”

- **Commercial**: full-scale unit operational in United States and available for sale
- **Emerging**: under development; commercialization expected within next 3 years
- **Potential**: under development but commercialization expected more than 3 years
- **Historical/Archived**: after 10 years in commercial operation no longer tracked

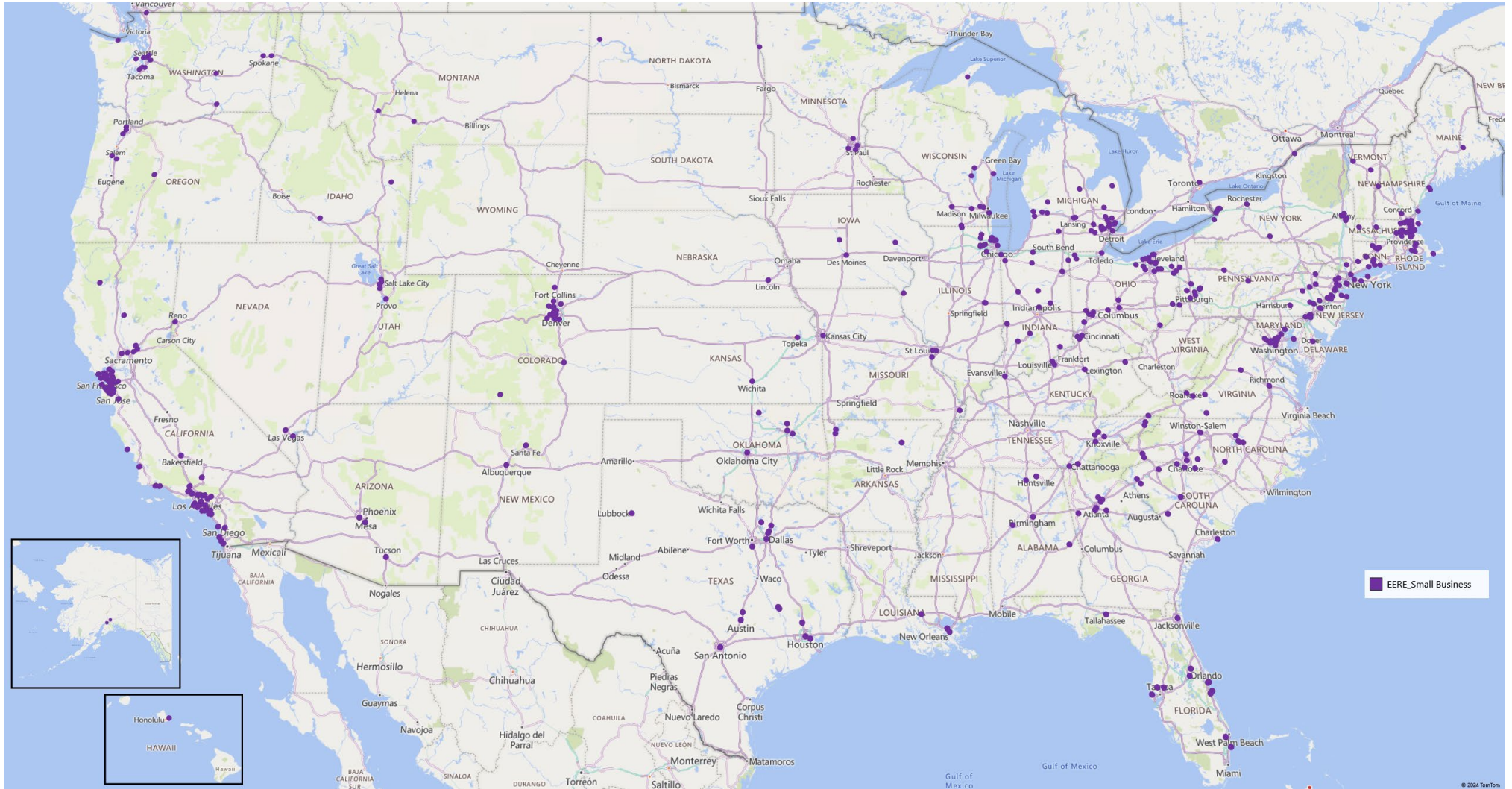
# Technology Tracking DATA GATHERING PROCESS

## Technology Tracking Process Flow

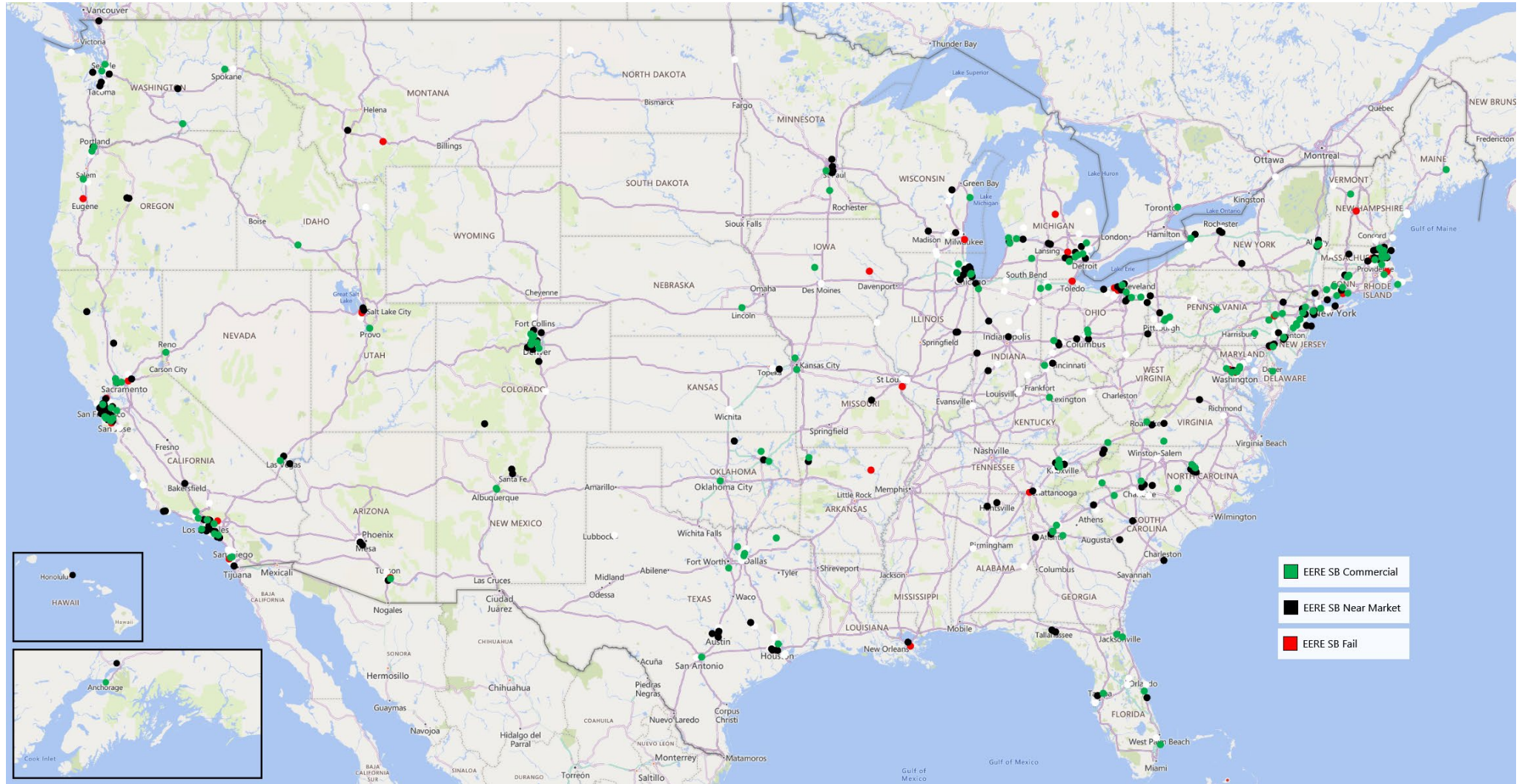


- Information collected can be tailored to meet AMO program needs
- Information collected to be stored in database (more later)
- PNNL has been reformatting and “re-metricizing” tracking data (dynamic)
- “Re-metricizing” – new looks/analysis e.g., collaboration, time to market.

# EERE Small Business Technology Development (PNNL Technology Tracking)



# EERE Small Business Tech to Market (PNNL Technology Tracking)



# Data Sets Analyzed – 2002-2023

## EERE SBIR, STTRs and Technologies Developed

### EERE Technology Development Counts (includes SBIR-STTRs)

Tech Dev	No. of Techs	%	Success	%
Commercialized	195	17%	572	50%
Near Market	377	33%		
TBD	485	42%		
Failed	96	8%		
Total	1153			

# Motivation

- How commercialized technologies have benefited the economy
  - Employment Impacts
    - R&D Phase
    - Sales in year *of* commercialization
    - Sales in years 2 and 3 following commercialization
  - Income Impacts
    - R&D Phase
    - Sales in year *of* commercialization
    - Sales in years 2 and 3 following commercialization
  - Disadvantaged communities (DACs) (work-in-progress)



# Methodology

- SBIRs/STTRs
- Commercialized (Tech Status: 1)
- Funding year: 2002- 2023
- Economic Impact Modelling in IMPLAN
- Parse out impacts to DACs (work-in-progress)

# Data Sets Analyzed – 2002-2023 EERE SBIR, STTRs and Technologies Developed

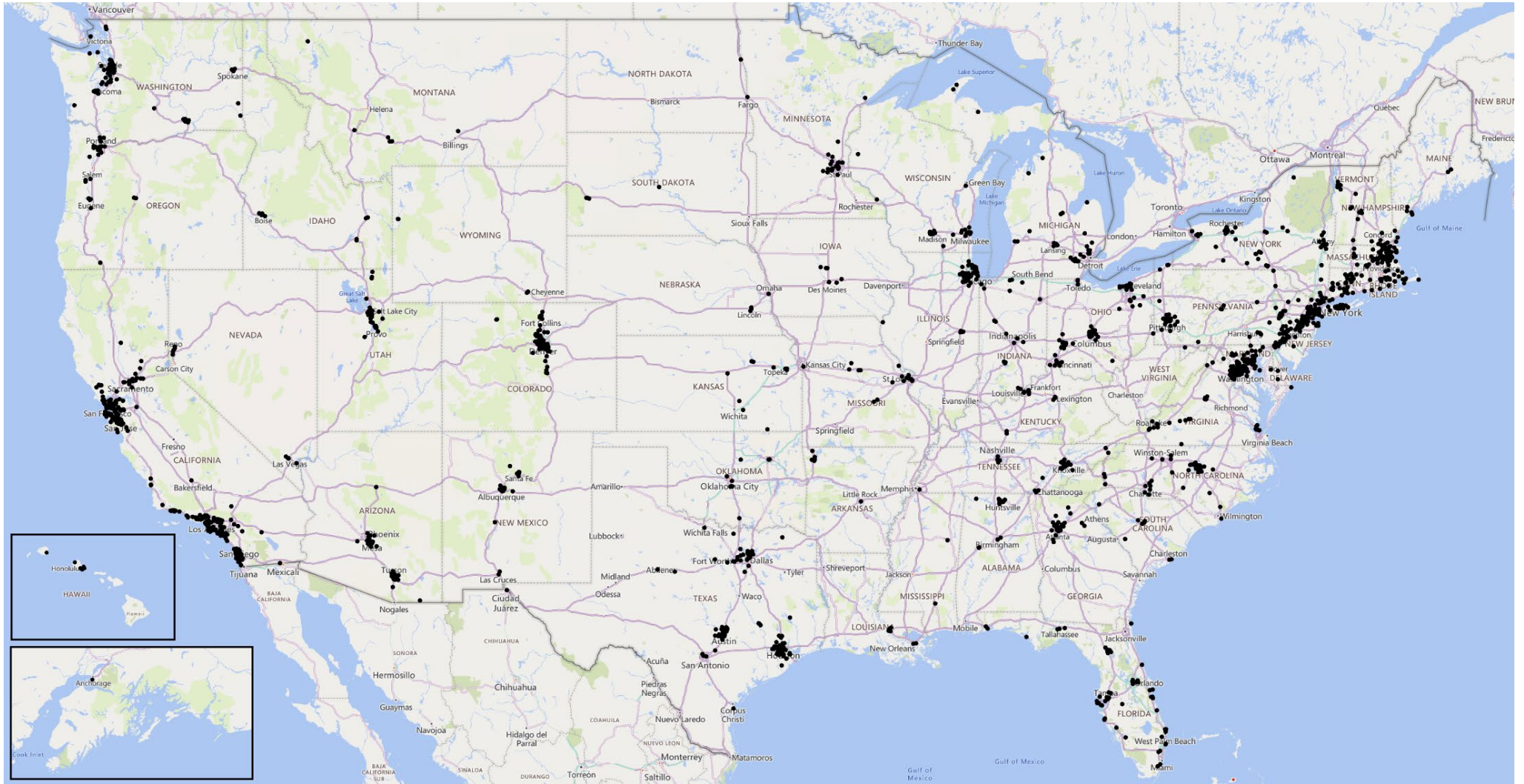
## SBIR-STTR Phase I & II 2002-2023

Phase I	Phase II	Phase I->II %
7718	3432	44%



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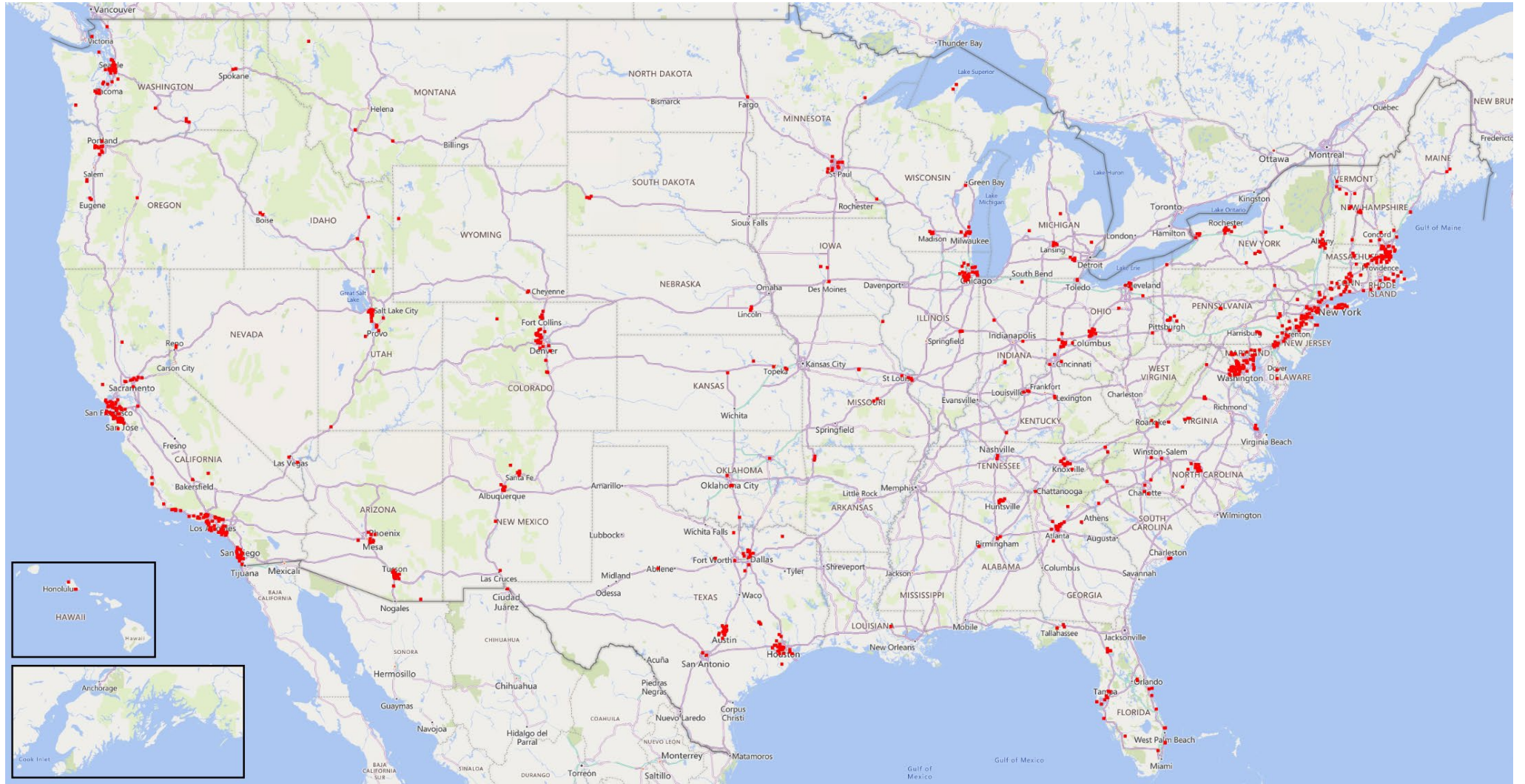
# SBIR-STTR Phase I 2002-2023





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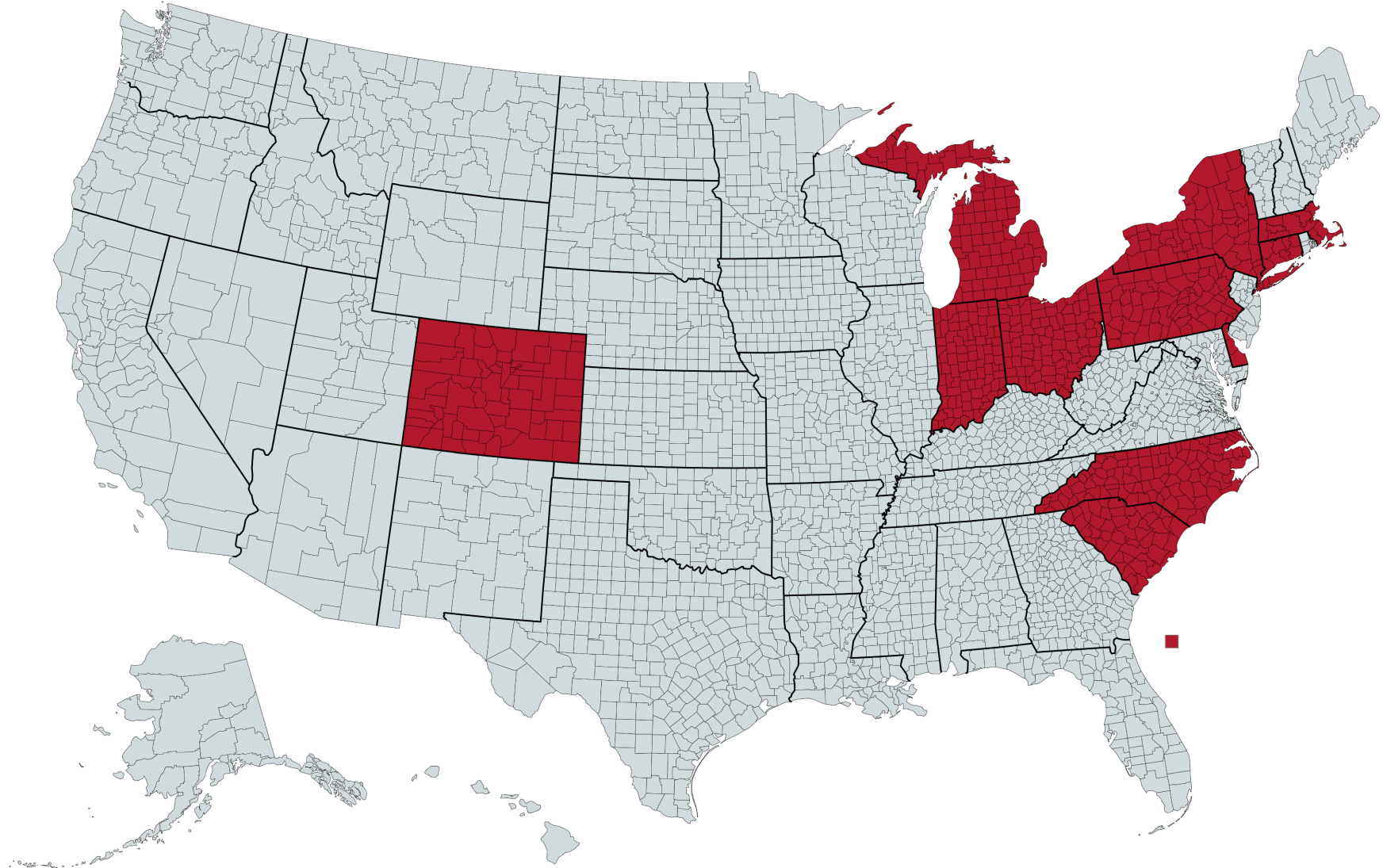
# SBIR-STTR Phase II 2002-2023





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# Commercialized SBIRs & STTRs (Tech Status 1): 2002-2023

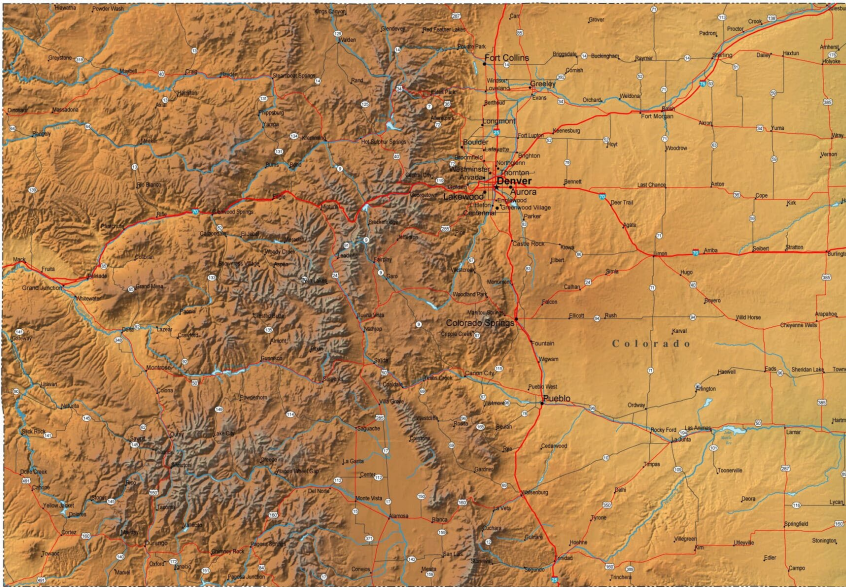




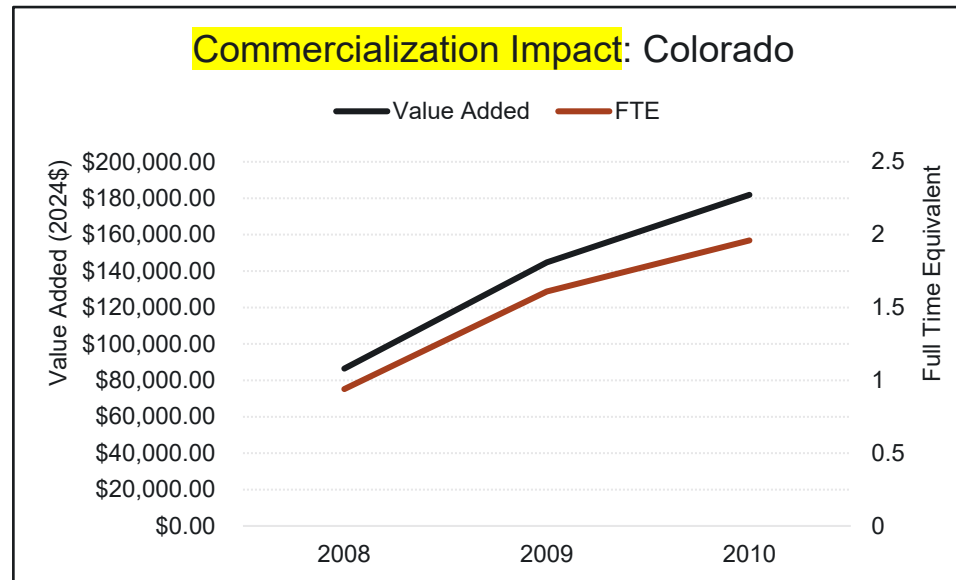
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# AnemErgonomics, LLC, Arvada, CO

- **SBIR I & II** (start year: 2007, market year: 2018)
  - \$1.2 Mn over a 3-year period
  - NAICS: 332312 (Barge sections, prefabricated metal, manufacturing )
- **Total (Direct, Indirect and Induced) R&D funding related jobs: 1.29 FTE**
- **Total R&D funding related Value Added: \$ 144084 (2024\$)**



**Commercialization Impact: Colorado**

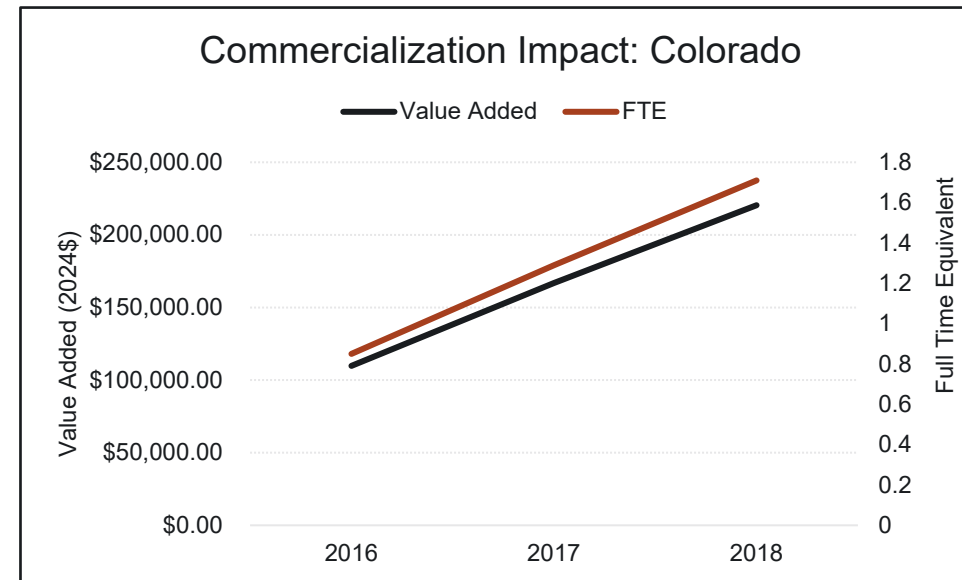
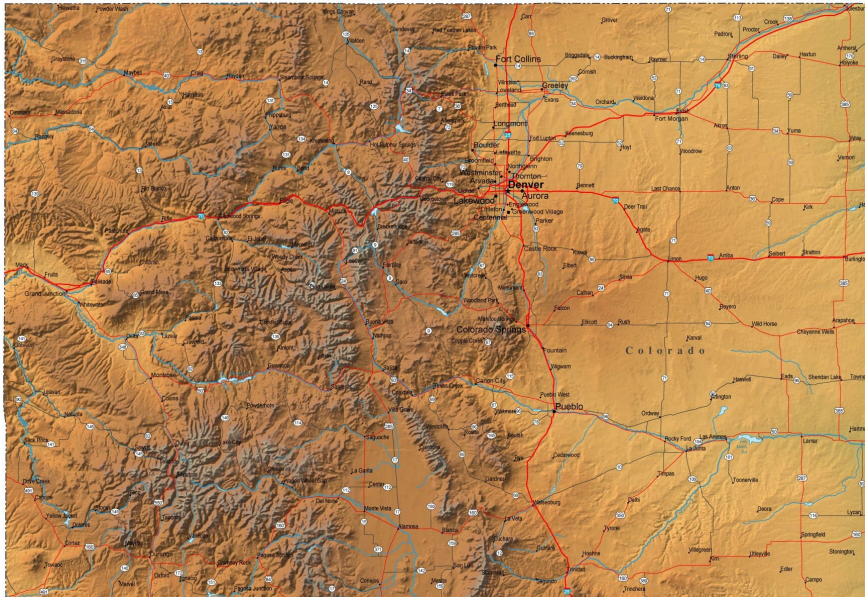




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# Composite Technology Development Inc., Lafayette, CO

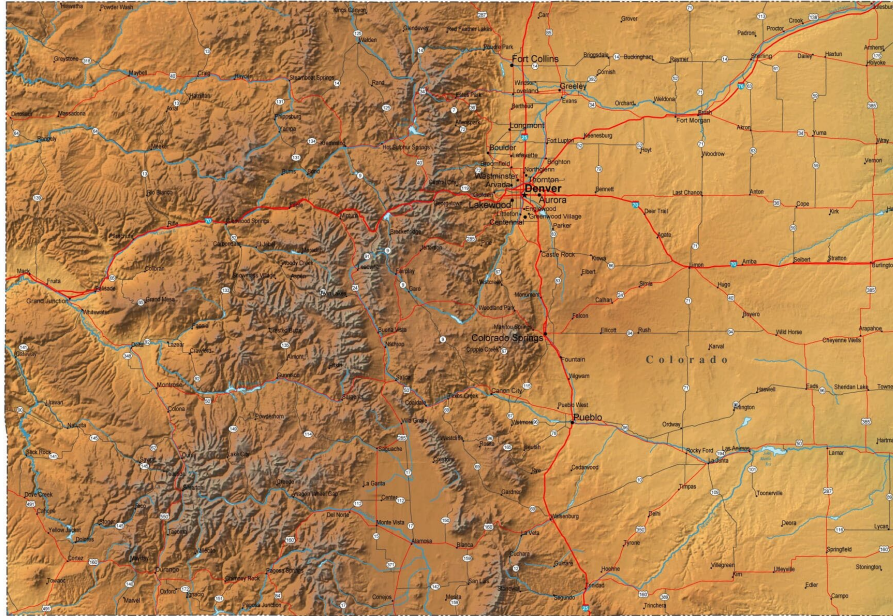
- SBIR I, II & III (start year: 2008; market year: 2016)
  - \$3 Mn over a 3-year period
  - NAICS: 325211 (Acetal resins manufacturing )
- Total (Direct, Indirect and Induced) R&D funding related jobs: 32.58 FTE
- Total R&D funding related Value Added : (2024\$) \$ 3,503,096



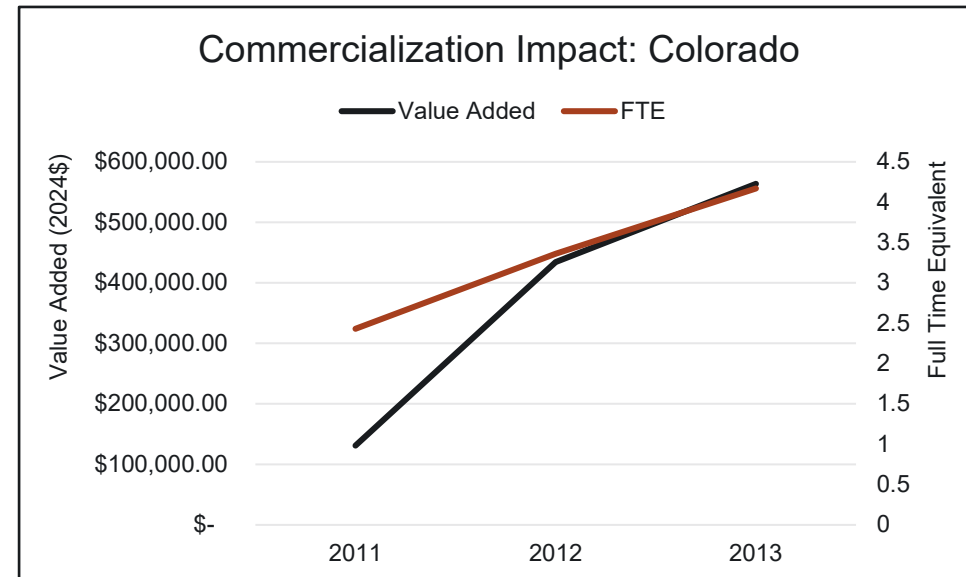


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# Sulfa Trap Inc., Arvada, CO



- SBIR I, II & **III** (start year: 2010, market year: 2011)
  - \$3 Mn over a 3-year period
  - NAICS: 334413 (Diodes, solid-state (e.g., germanium, silicon), manufacturing )
- Total (Direct, Indirect and Induced) R&D funding related jobs: 31.92 FTE
- Total R&D funding related Value Added : \$ 3,532,846 (2024\$)



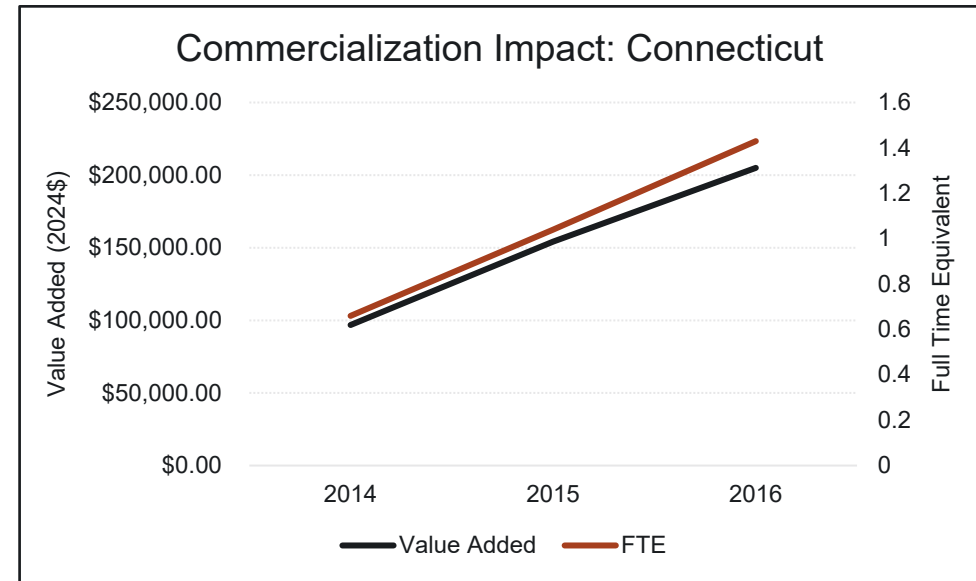
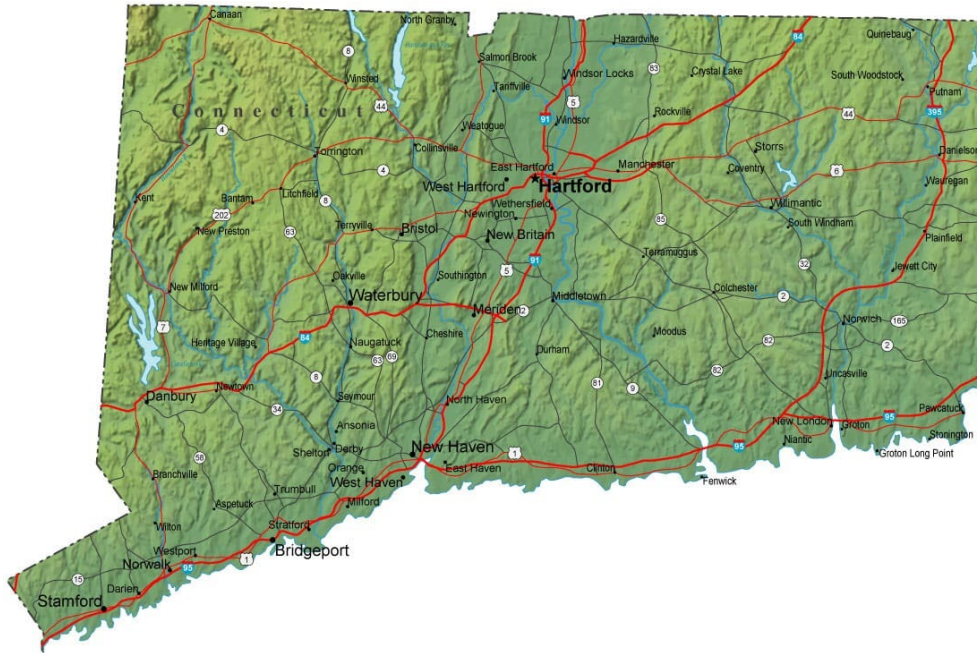




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# Skyre Inc., Lafayette, CT

- SBIR I & II (start year: 2007; market year: 2014)
  - \$1.2 Mn over a 3-year period
  - NAICS: 335999 (Amplifiers, magnetic, pulse, and maser, manufacturing)
- Total (Direct, Indirect and Induced) R&D funding related jobs: 0.87 FTE
- Total R&D funding related Value Added : \$ 136,578 (2024\$)

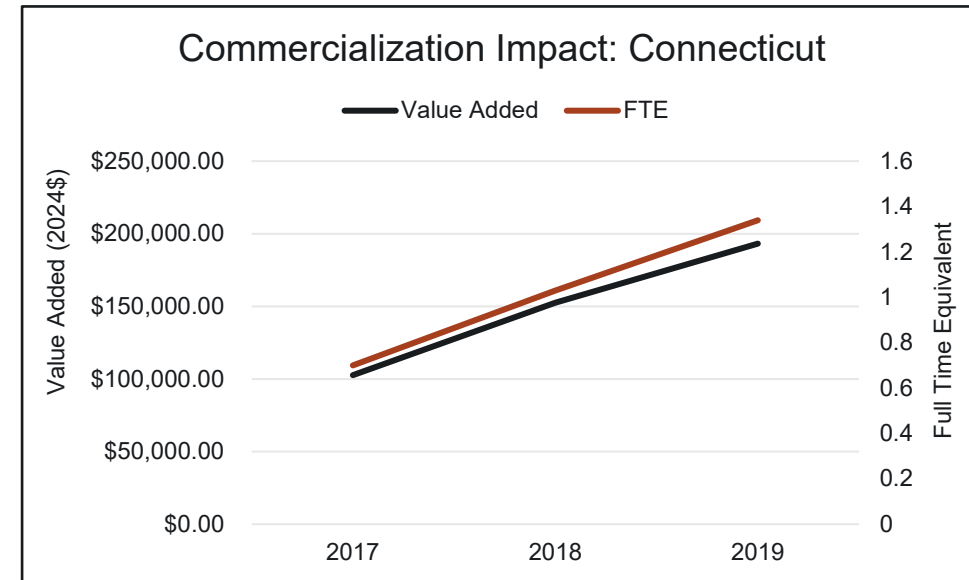
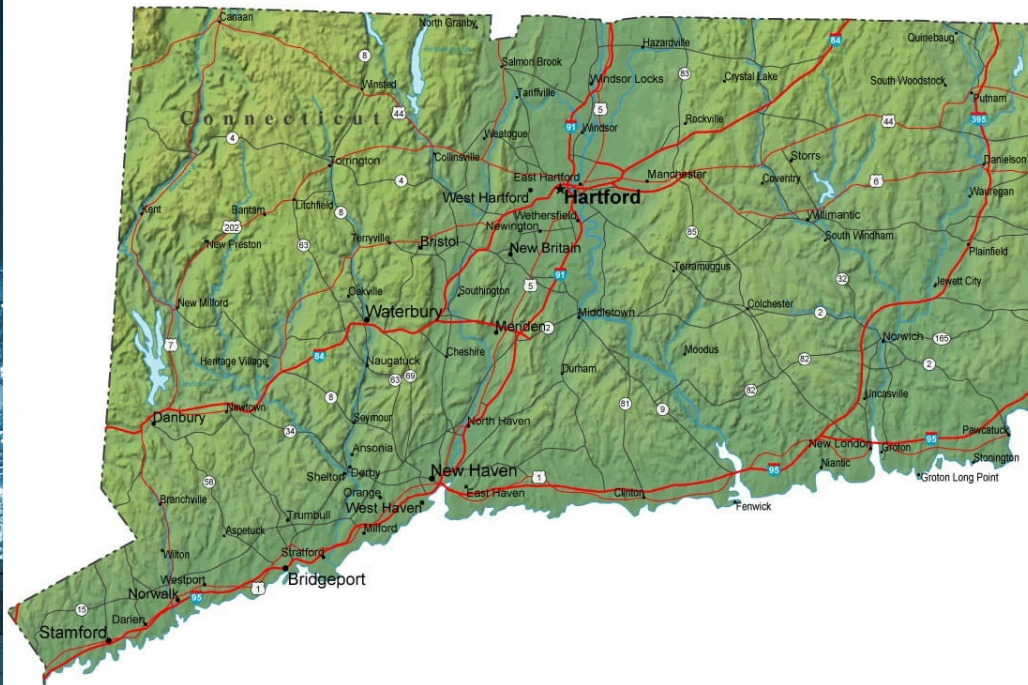




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# Proton Onsite dba NEL Hydrogen, Wallingford, CT

- SBIR I & II (start year: 2009; market year 2017)
  - \$1.2 Mn over a 3-year period
  - NAICS: 335999 (Amplifiers, magnetic, pulse, and maser, manufacturing)
- Total (Direct, Indirect and Induced) R&D funding related jobs: 1.02 FTE
- Total R&D funding related Value Added : \$ 142,261 (2024\$)

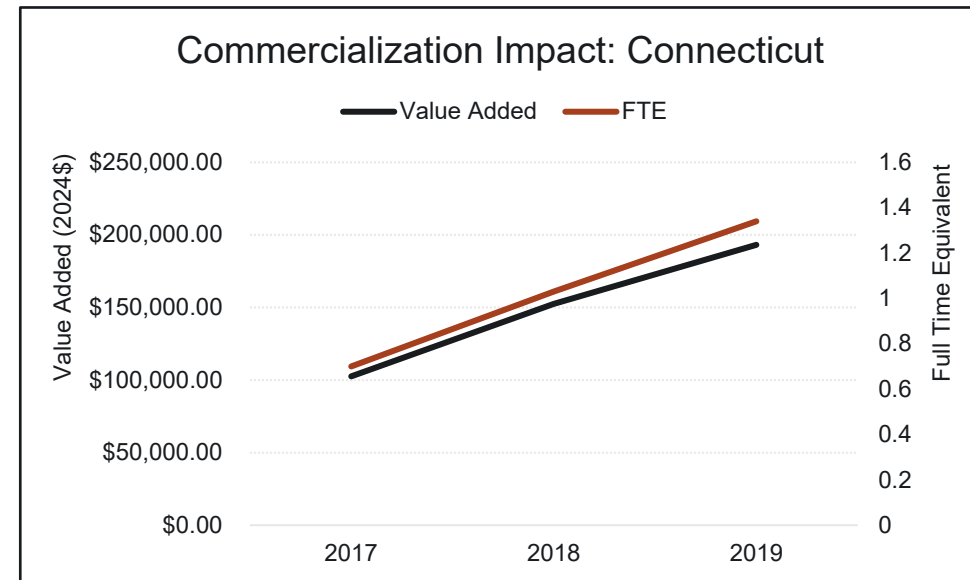
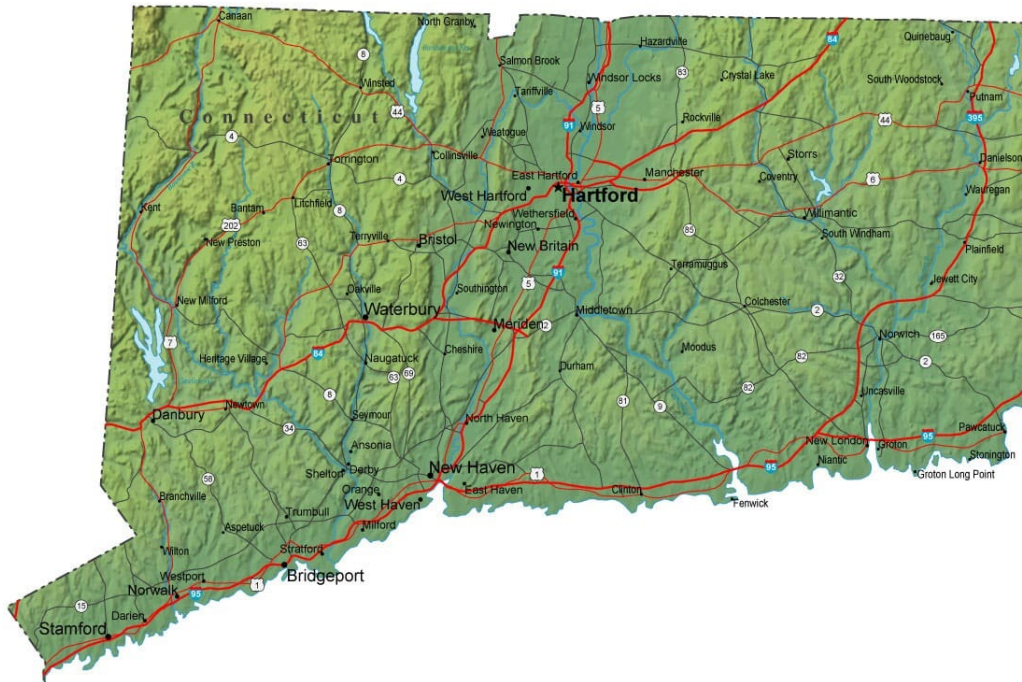




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# Proton Onsite dba NEL Hydrogen, Wallingford, CT

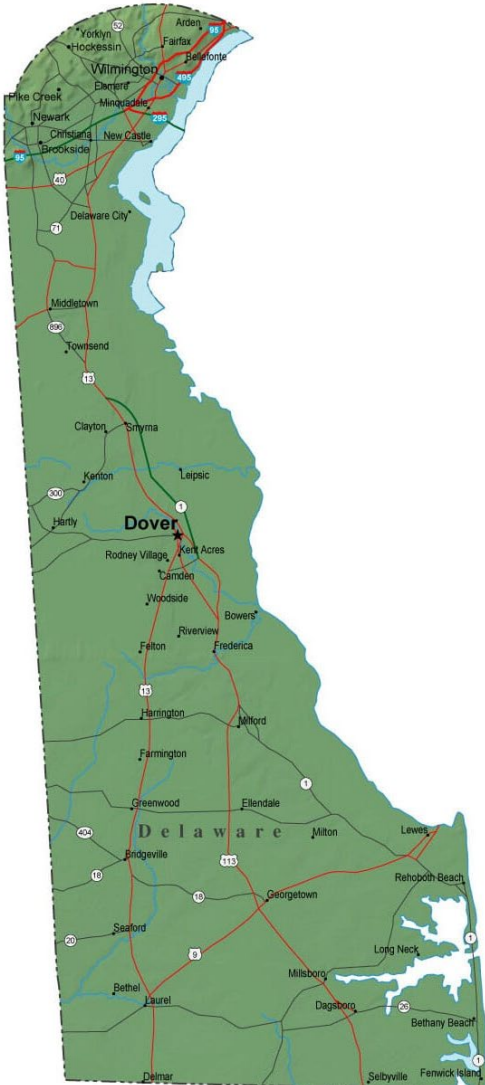
- SBIR I & II (start year: 2010; market year 2017)
  - \$1.2 Mn over a 3-year period
  - NAICS: 335999 (Amplifiers, magnetic, pulse, and maser, manufacturing)
- Total (Direct, Indirect and Induced) R&D funding related jobs: 1.02 FTE
- Total R&D funding related Value Added : \$ 139,297 (2024\$)



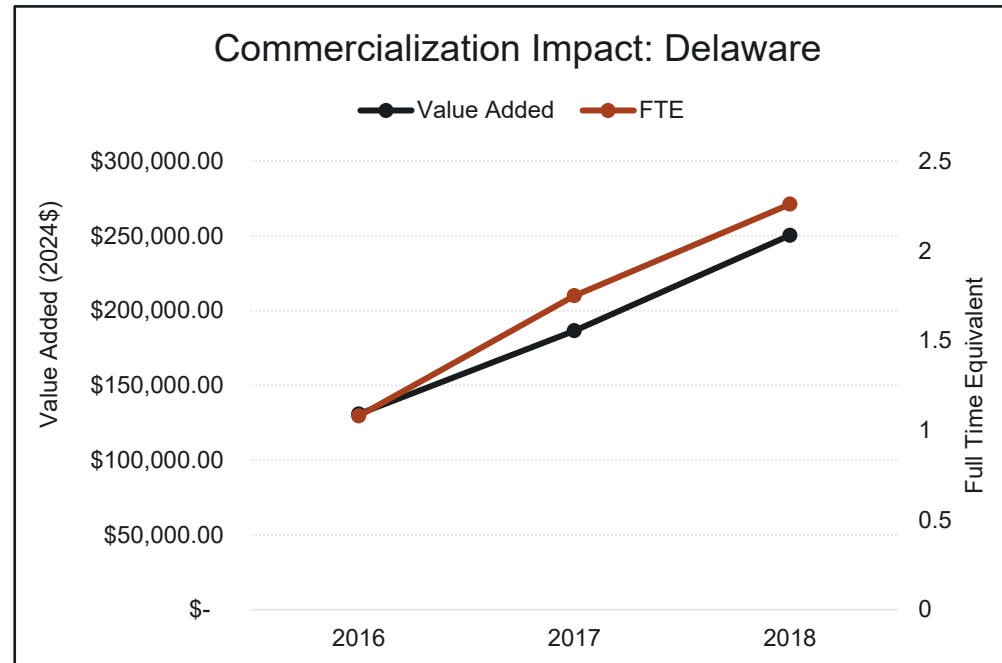


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# Compact Membrane Systems Inc, New Castle, DE



- SBIR I & II (start year: 2010; market year 2016)
  - \$1.2 Mn over a 3-year period
  - NAICS: 541380 (Testing laboratories or services)
- Total (Direct, Indirect and Induced) R&D funding related jobs: 0.99 FTE
- Total R&D funding related Value Added : \$ 131871 (2024\$)

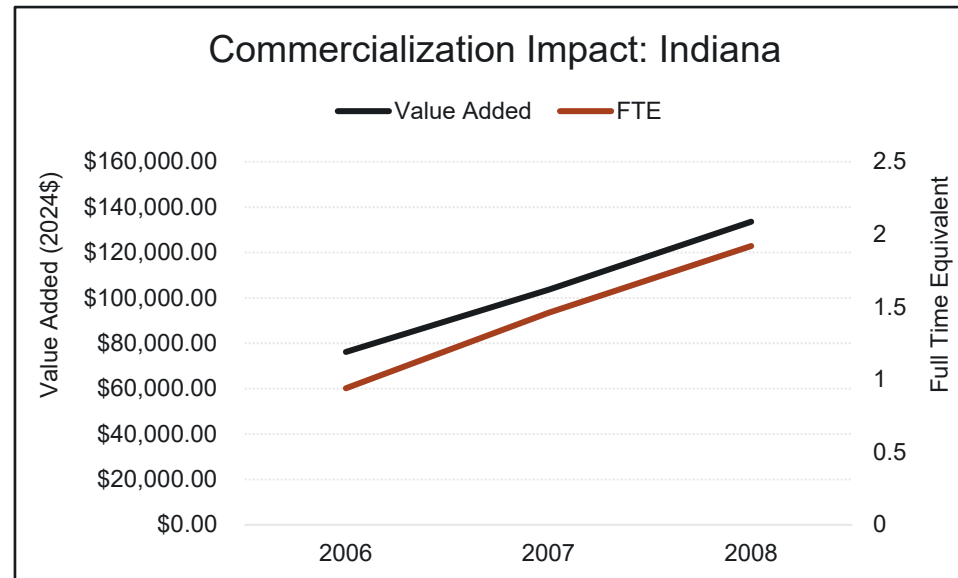




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# NuVant Systems Inc., Crown Point, IN

- SBIR I & II (start year: 2004, market year: 2006)
  - \$1.2mn over a 3-year period
  - NAICS: 335999 (Amplifiers, magnetic, pulse, and maser, manufacturing)
- Total (Direct, Indirect and Induced) R&D funding related jobs: 1.02 FTE
- Total R&D funding related Value Added : \$ 118469 (2024\$)

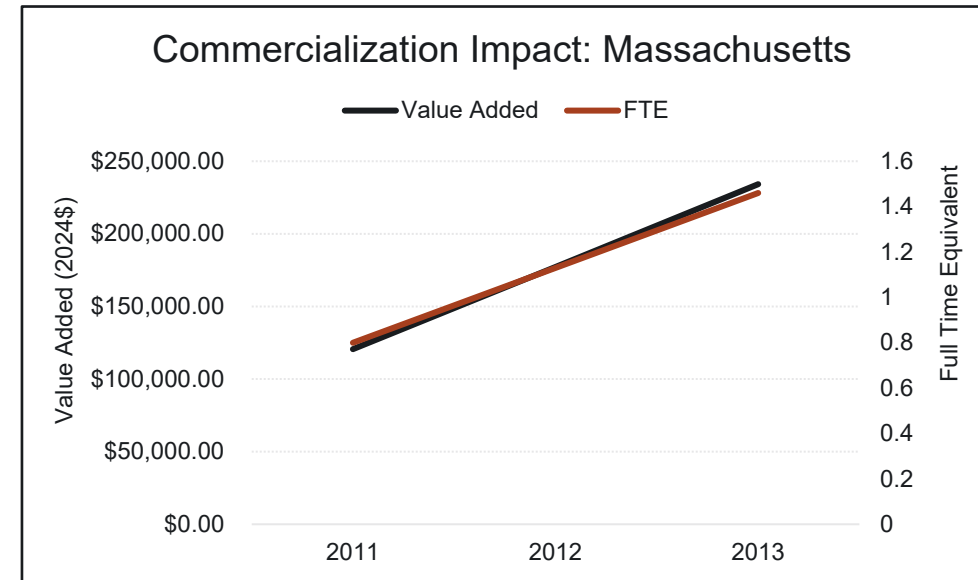




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# Giner Inc., Newton, MA

- SBIR I & II (start year: 2008, market year: 2011)
  - \$1.2 Mn over a 3-year period
  - NAICS: 334413 (Diodes, solid-state (e.g., germanium, silicon), manufacturing )
- Total (Direct, Indirect and Induced) R&D funding related jobs: 1.05 FTE
- Total R&D funding related Value Added : \$ 147937 (2024\$)

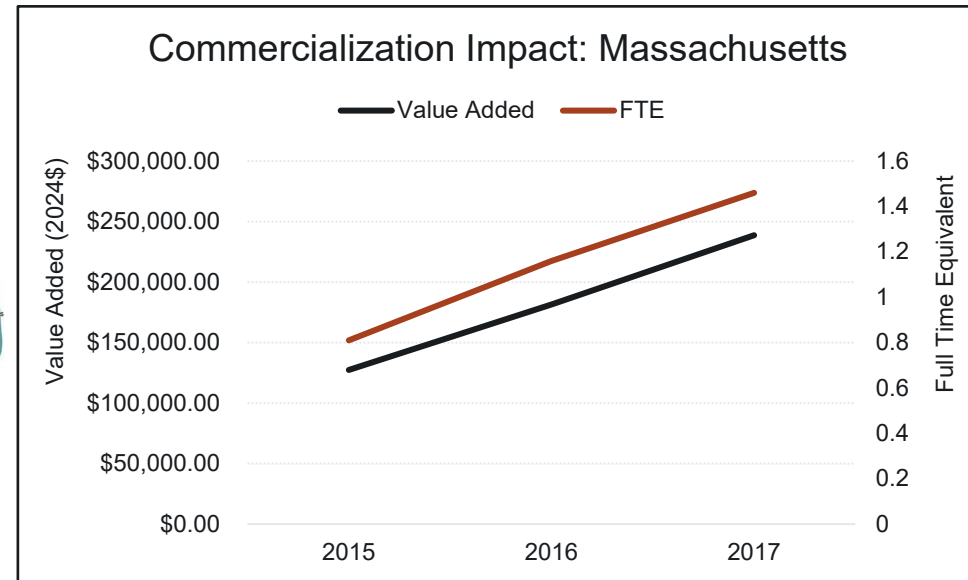




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# Giner Inc., Newton, MA

- SBIR I & II (start year: 2009; market year 2015)
  - \$1.2 Mn over a 3-year period
  - NAICS: 334413 (Diodes, solid-state (e.g., germanium, silicon), manufacturing )
- Total (Direct, Indirect and Induced) R&D funding related jobs: 1.05 FTE
- Total R&D funding related Value Added : \$ 149976 (2024\$)

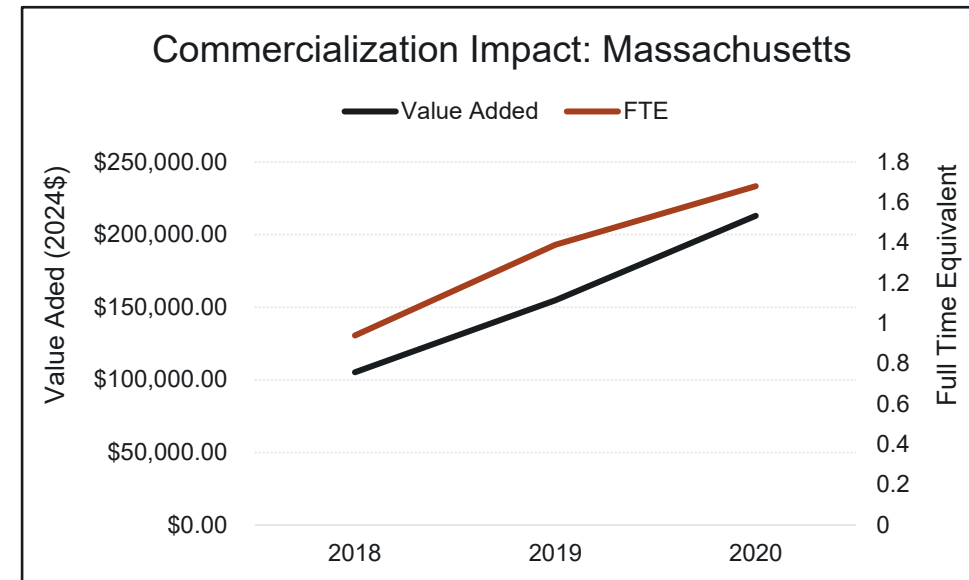




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# OG Technologies, Ann Arbor, MI

- SBIR I & II (start year: 2009; market year 2018)
  - \$1.2 Mn over a 3-year period
  - NAICS: 334519 (Abrasion testing machines manufacturing)
- Total (Direct, Indirect and Induced) R&D funding related jobs: 1.35 FTE
- Total R&D funding related Value Added : \$ 139,449 (2024\$)



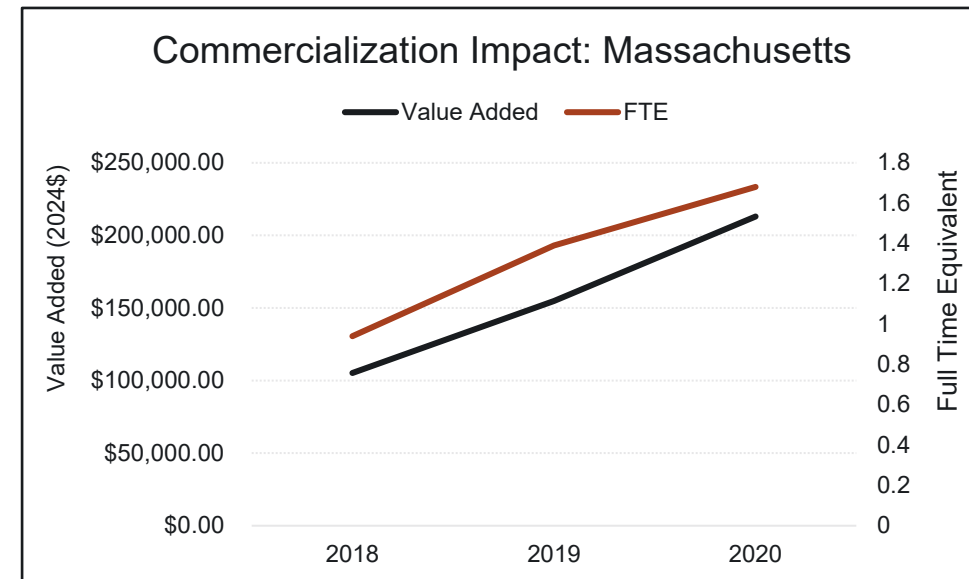




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# OG Technologies, Ann Arbor, MI

- SBIR I & II (start year: 2013; market 2018)
  - \$1.2 Mn over a 3-year period
  - NAICS: 334519 (Abrasion testing machines manufacturing)
- Total (Direct, Indirect and Induced) R&D funding related jobs: 1.35 FTE
- Total R&D funding related Value Added : \$ 138,392 (2024\$)

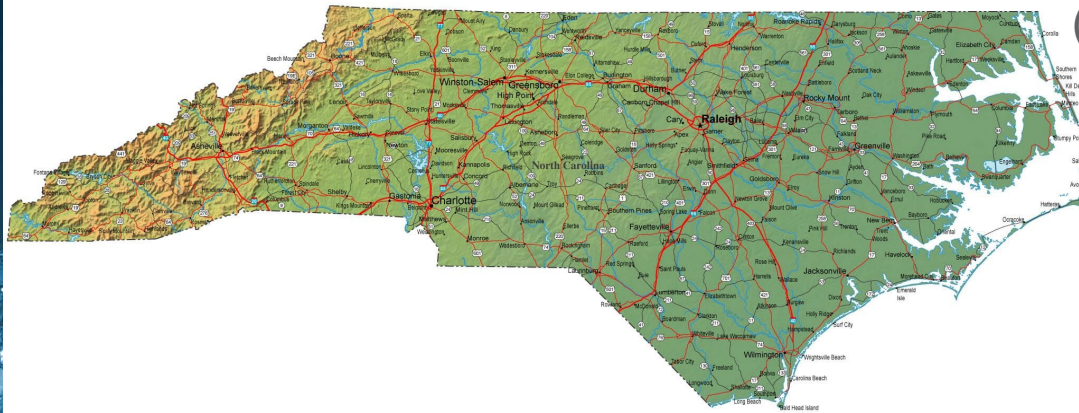




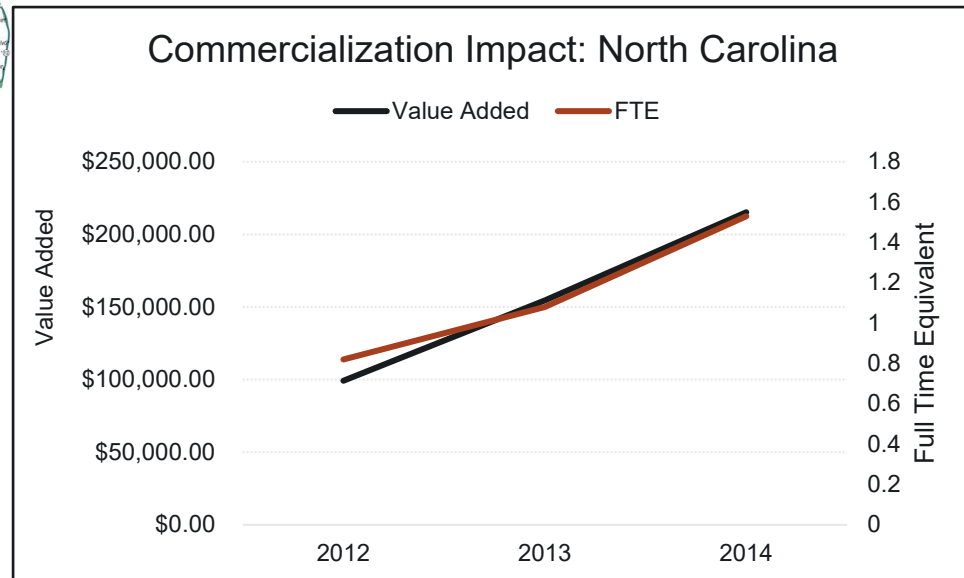
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# Scribner Associates Inc., Southern Pines, NC

- SBIR I & II (start year: 2006; market 2012)
  - \$1.2 Mn over a 3-year period
  - NAICS: 334413 (Diodes, solid-state (e.g., germanium, silicon), manufacturing)
- Total (Direct, Indirect and Induced) R&D funding related jobs: 1.08 FTE
- Total R&D funding related Value Added : \$ 122986 (2024\$)



Commercialization Impact: North Carolina





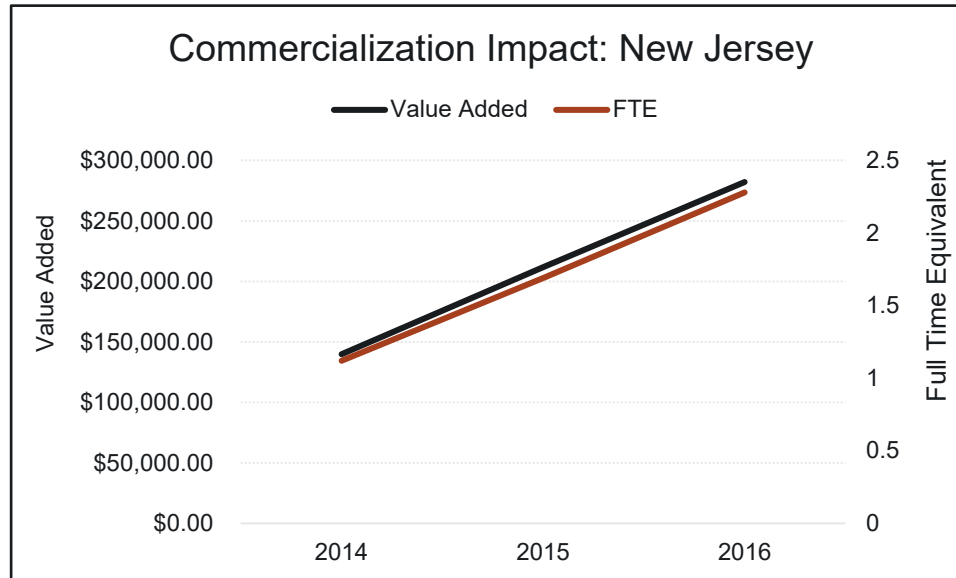
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# Continuum Dynamics Inc., Ewing Township, NJ

- STTR I & II (start year: 2010, market year: 2014)
  - \$1.2 Mn over a 3-year period
  - NAICS: 541330 (Acoustical engineering consulting services)
- Total (Direct, Indirect and Induced) R&D funding related jobs: 0.96 FTE
- Total R&D funding related Value Added : \$ 144811 (2024\$)



Commercialization Impact: New Jersey

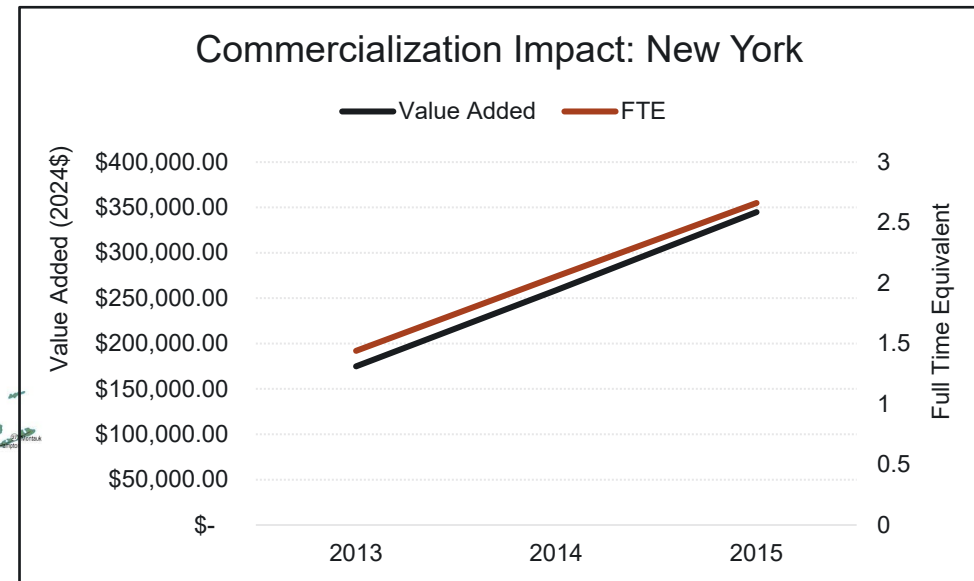




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# Sentient Corporation, Buffalo, NY

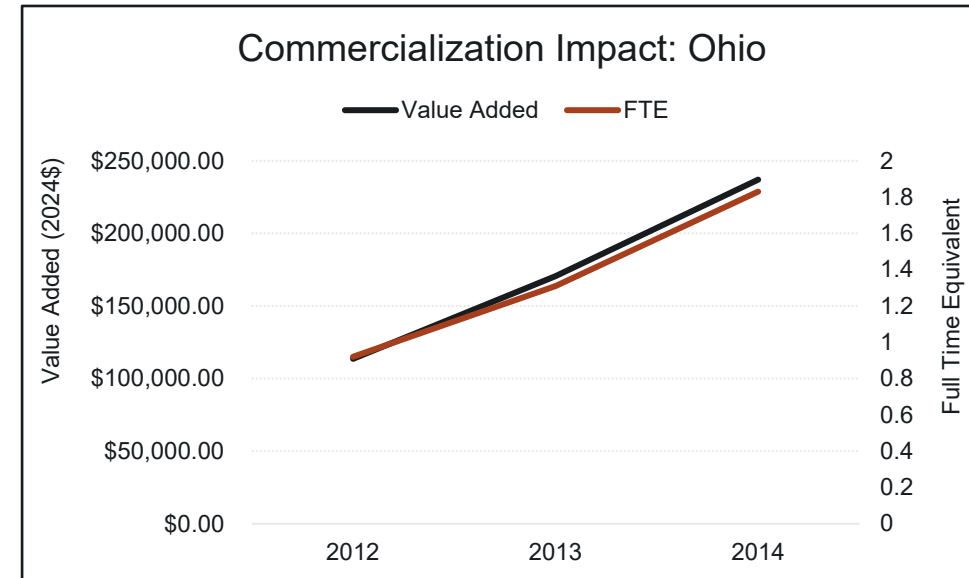
- SBIR I & II (start year: 2007, market year: 2013)
  - \$1.2 Mn over a 3-year period
  - NAICS: 541511 (Applications software programming services, custom computer)
- Total (Direct, Indirect and Induced) R&D funding related jobs: 1.08 FTE
- Total R&D funding related Value Added : \$ 138934 (2024\$)





# Faraday Technology, Inc., Englewood, OH

- SBIR I & II (start year: 2002, market year: 2012)
  - \$1.2 Mn over a 3-year period
  - NAICS: 334413 (Diodes, solid-state (e.g., germanium, silicon), manufacturing)
- Total (Direct, Indirect and Induced) R&D funding related jobs: 1.38 FTE
- Total R&D funding related Value Added : \$ 135162 (2024\$)

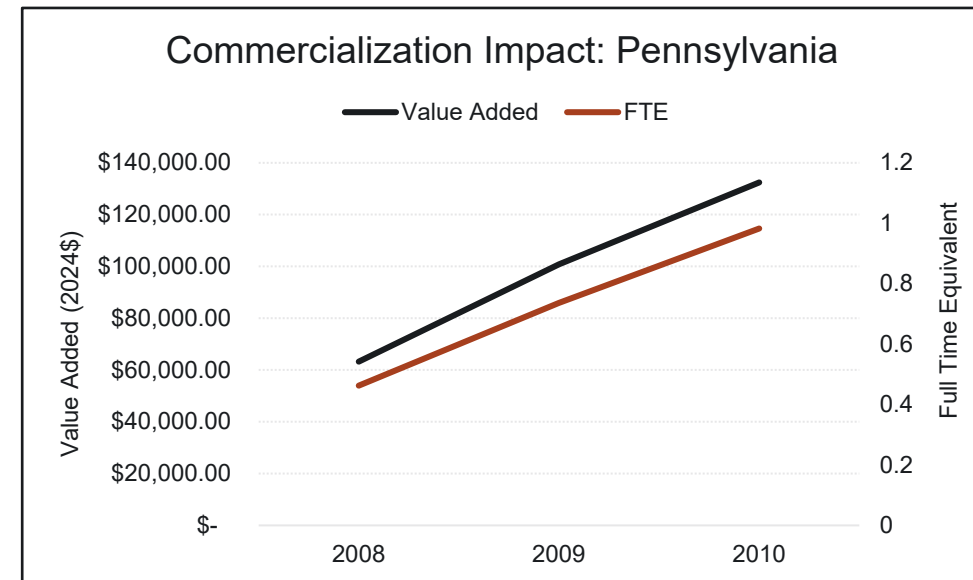
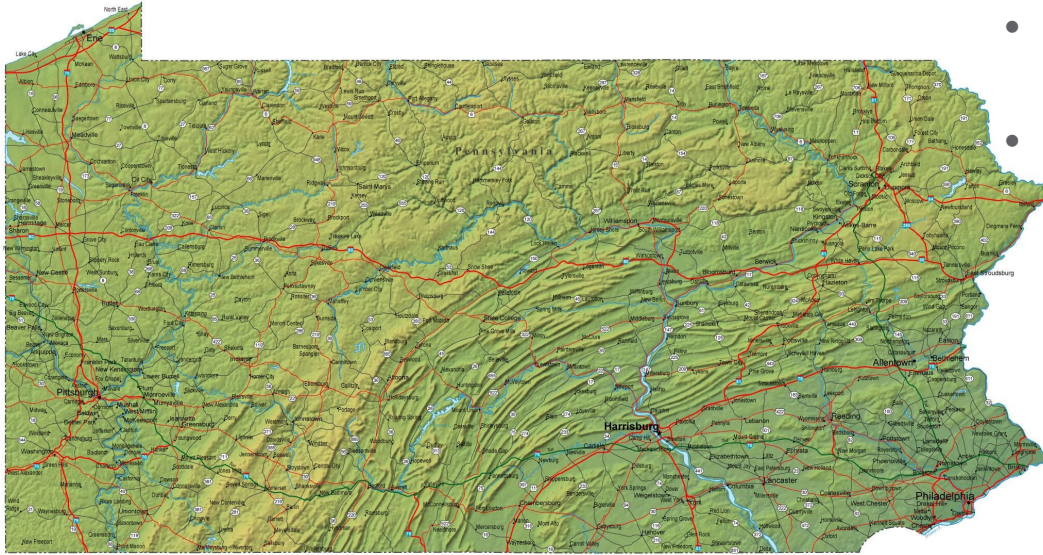




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# Dynalene Inc., Whitehall, PA

- SBIR I, II & III (start year: 2005, market year: 2008)
  - \$3 Mn over a 3-year period
  - NAICS: 424690 (Other Chemical & Allied Products Merchant Wholesalers)
- Total (Direct, Indirect and Induced) R&D funding related jobs: 30.21 FTE
- Total R&D funding related Value Added : \$ 3,392,248 (2024\$)

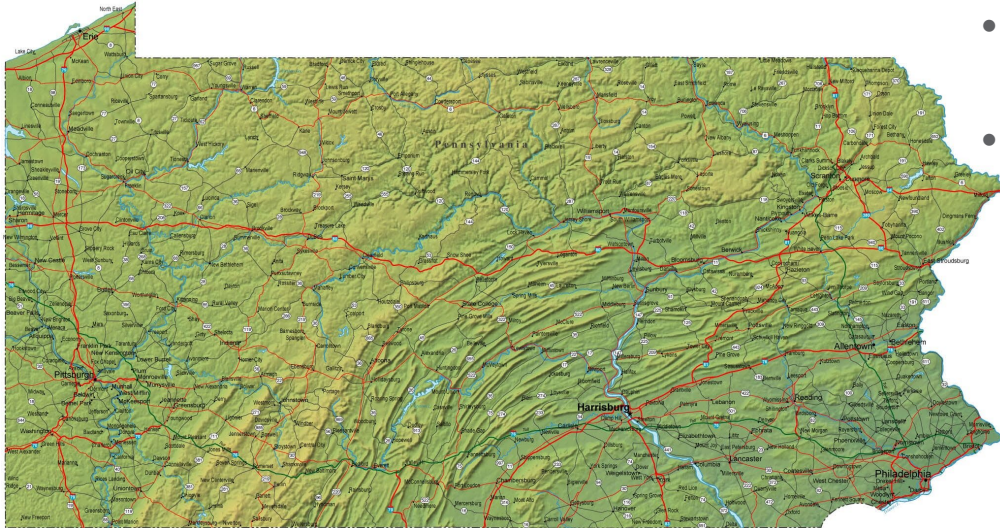




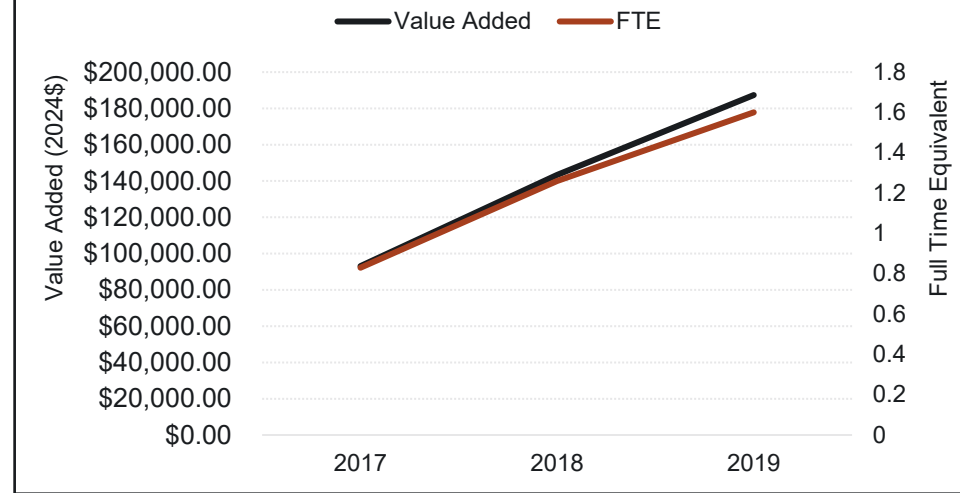
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# Advanced Cooling Technologies Inc., Lancaster, PA

- SBIR I & II (start year: 2010, market year: 2017)
  - \$1.2 Mn over a 3-year period
  - NAICS: 333414 (Baseboard heating equipment manufacturing)
- Total (Direct, Indirect and Induced) R&D funding related jobs: 1.14 FTE
- Total R&D funding related Value Added : \$ 136,012 (2024\$)



Commercialization Impact: Pennsylvania

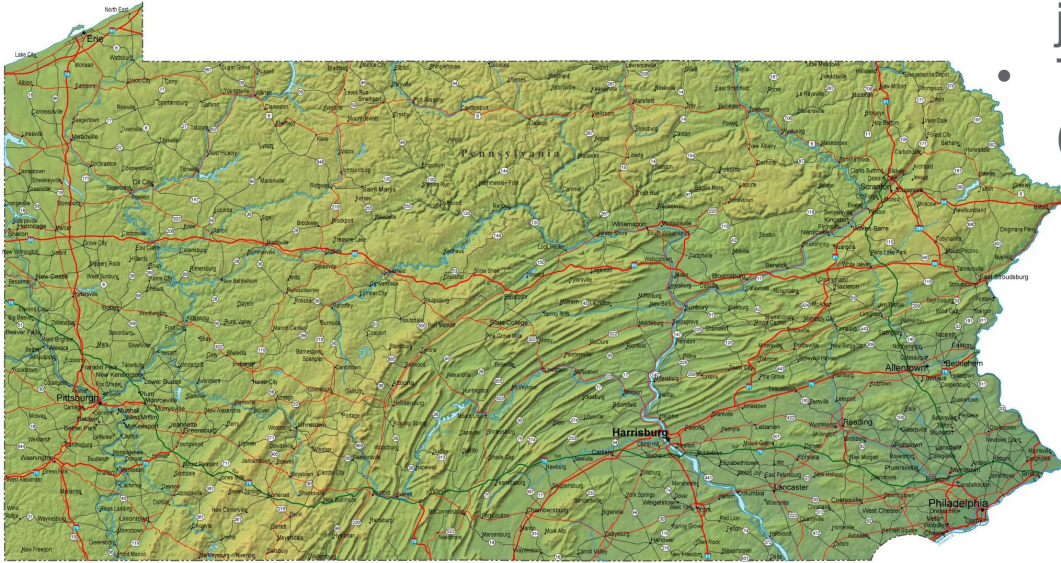




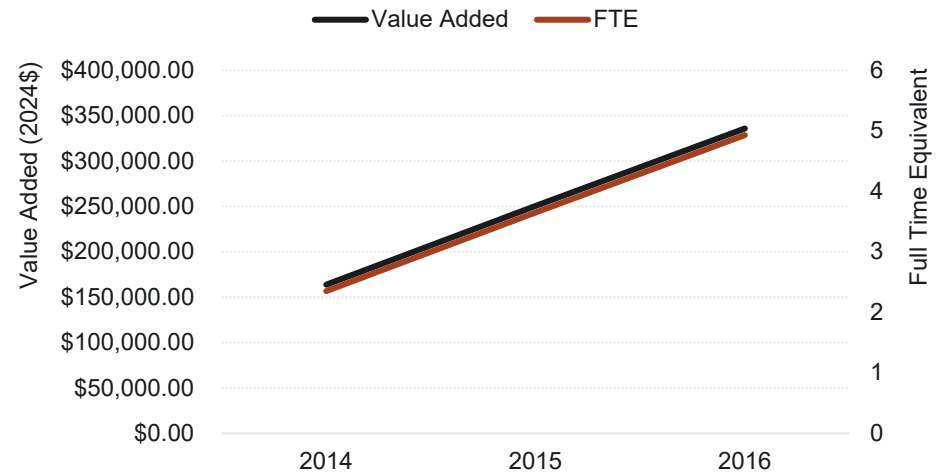
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# Media & Process Technology Inc., Pittsburg, PA

- SBIR I & II (start year: 2011, market year: 2014)
  - \$1.2 Mn over a 3-year period
  - NAICS: 541910 (Broadcast Media Rating Services)
- Total (Direct, Indirect and Induced) R&D funding related jobs: 1.17 FTE
- Total R&D funding related Value Added : \$ 135,922 (2024\$)



Commercialization Impact: Pennsylvania



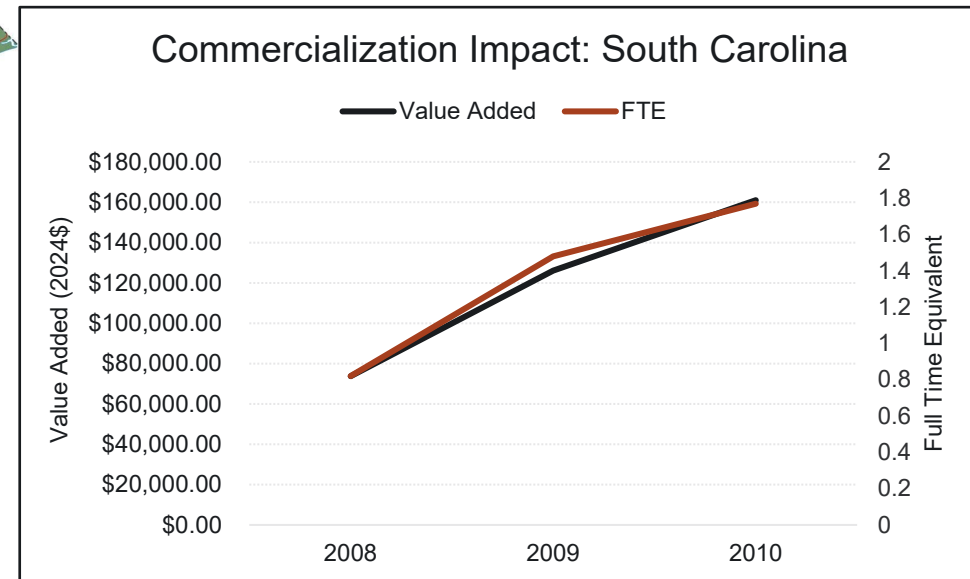




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# Milliken & Company, Spartanburg, SC

- SBIR I & II (start year: 2007, market year: 2008)
  - \$1.2 Mn over a 3-year period
  - NAICS: 332999 (Aluminum freezer foil not made in rolling mills)
- Total (Direct, Indirect and Induced) R&D funding related jobs: 1.26 FTE
- Total R&D funding related Value Added : \$ 106,625 (2024\$)



## Cumulative Impacts: 2002-2023

- Total # of jobs created:
  - From R&D Related Funding: 113.79 FTE
  - From Commercialization: 102.2 FTE
- Value Added from R&D & Commercialization: 24,509,896.31 (2024\$)
- ROI: 83.36%

- Economic Impact of DOE's SBIR Program over 2 decades (2002-2023) for technologies that were commercialized
- Assumptions
  - Data Limitations
    - Tracked technologies that dropped off (limiting the size of the original data set)
    - Sales figures
      - Use of conservative proxies
      - Difficulty in obtaining data as Small Businesses are not publicly traded
- DAC Analysis (work-in-progress)