

Overview of Clean Tech

I. Background Information

A. *What is Clean Tech vs. Climate Tech?*

As per the Maryland Climate Tech Look Book produced by the Maryland Energy Innovation Accelerator (MEIA), **cleantech** includes any new business model or technology that increases production performance, productivity, and efficiency while minimizing negative environmental impacts. Ventures in this asset class include clean energy, clean air, water treatment, transportation, recycling and waste reduction, supply chain improvement, the built environment, and manufacturing.

The Maryland Look Book discusses that **climate tech** encompasses novel business models or technologies that enhance productivity and efficiency while minimizing environmental harm. This includes various sectors such as clean energy, air and water treatment, transportation, recycling, supply chain optimization, infrastructure, and manufacturing.

B. *Industry Overview*

The clean energy industry generates substantial economic value, offering significant opportunities for both the United States and Maryland. Maryland has demonstrated its commitment to addressing environmental challenges by implementing legislative actions to reduce carbon emissions, enhance energy efficiency, and promote electric transportation during FY2023.

The Federal government, the State of Maryland, Montgomery County, and the City of Rockville have embraced a proactive stance by implementing aggressive environmental regulations. These initiatives stimulate the market for emerging green businesses and furnish local companies with the necessary resources to innovate new products, services, and clientele. This public policy aligns with the private sector's growing inclination towards low-emission, green economy transitions, bolstering consumer and corporate consumption and investment decisions.

The S&P 2024 Top Ten Cleantech Trends Report highlights a projected surge in clean energy technology investments, reaching nearly \$800 billion in 2024, marking a 10% to 20% increase from 2023 levels. Solar energy is expected to dominate this investment, accounting for approximately 55% of the total, followed by onshore wind. However, the most rapid growth is anticipated in battery energy storage and electrolysis. According to the Office of Energy

Efficiency & Renewable Energy (OEERE), renewable energy sources now contribute around 20% of total U.S. electricity generation, while fossil fuels and nuclear energy make up the remainder.

II. Clean Tech Sector Business Landscape

A. Maryland Employment & Wages

According to the FY2023 Maryland Clean Energy Center report:

- Compared to 2021, total sector-wide employment decreased by 161 jobs.
- Total sector annual earnings increased by a collective \$222,924,700.
- The decline in 2022 was roughly \$222M USD.
- The collective annual earnings of all workers in the clean energy sector increased from \$11,354,785,392 in 2018 to \$12,791,339,324 in 2022.
- Compared to 2018, the estimated total earnings in the Maryland clean energy sector increased by \$1,436,553,932 through 2022.
- The sector-wide average weekly earnings increased from \$1,608.61 in 2018 to \$1,854.00 in 2022. This is a \$245.39 increase.
- Average weekly earnings decreased by \$5.00 from 2021.

B. Energy, Renewable Energy & Green Companies in Rockville (with links and website excerpts)

1. [X-energy | HTGR | Advanced Nuclear Reactors \(SMR\) & TRISO Fuel](#)

X-energy is a private American nuclear reactor and fuel design engineering company. It is developing a [Generation IV](#) high-temperature gas-cooled [pebble-bed nuclear reactor](#) design. It has received funding from private sources and various government grants and contracts, notably through the [Department of Energy's](#) (DOE) Advanced Reactor Concept Cooperative Agreement in 2016 and its Advanced Reactor Demonstration Program (ARDP) in 2020.

2. [NECENERGY.com \(nuclearenergyconsultants.com\)](#)

Nuclear Energy Consultants, Inc. (NEC) is an innovative environmentally friendly energy consulting and staffing firm creating award-winning client-focused solutions of the highest quality since 1983.

NEC's consulting and staffing services offered include new, small modular, research/test and advanced nuclear reactors.

Innovative nuclear technology benefits the global environment and climate with safe, clean, reliable, affordable, efficient baseload electrical and thermal energy nearly 24/7/365 which complements renewable energy when the sun doesn't shine or the wind doesn't blow.

3. [EXCEL Services Corporation](#)

EXCEL has evolved over the last three decades to meet the needs of the nuclear energy industry. Today, EXCEL is uniquely equipped to provide our clients with expertise in licensing, compliance, new reactors, critical infrastructure protection, O&M reduction and more.

4. [News Archive – Standard Solar](#)

With extensive experience working across industries, our integrated approach leverages our vast technical expertise as a trusted EPC, long-term asset owner-operator and funding source to deliver success for our partners with extensive experience working across industries.

5. [Pixces Energy Corporation](#)

Enabling the growth of energy companies through technology requires an experienced partner. PEC takes the time to understand your business goals and the challenges that may hinder your performance, and works with you to resolve those **Error! Hyperlink reference not valid.** challenges. We recognize that emerging technologies, regulations and security concerns are driving complexity in the industry. Our “in the seat”, C-level experience across multiple industries enables PEC to help tackle your challenges with a quiet confidence and deliver the practical solutions you seek to innovate and grow.

6. [Princeton Energy Resources International, LLC \(perihq.com\)](#)

Princeton Energy Resources International, LLC (PERI) established in 1980, is a multifaceted, small business technology management services consulting firm providing a broad array of energy and environmental expertise to domestic and international clientele in both the public and private sectors. PERI is an affiliated company of [Solidaris, LLC](#).

7. [Energy Savings | Electricity Discounts \(energydynamicsmd.com\)](#)

Energy Dynamics is a hands-on team with the mission to harnessing cutting-edge technology solutions to conserve energy, reduce pollution and improve your quality of life. Since being established in 2010, we have completed or 2,000 comprehensive

energy audits and LED lighting installations at of commercial building, faith-based facilities, schools, and multi-family facilities. Our installations utilize energy saving measures that qualify for extensive rebate programs from Federal, State, Local Governments and Utility companies.

We offer free energy audits and will submit detailed proposals to you of the project cost, energy savings, savings on maintenance, payback period, return on investment, amount of rebate, and \$ savings over a 10-year period.

8. [Clean Currents – Green Energy Solutions](#)

At Clean Currents, we believe that businesses have a responsibility to protect and hopefully improve our natural environment while conducting their operations. We endeavor to:

- use environmentally friendly vendors, if available;
- offset all of our electric, operational and travel related greenhouse gas emissions;
- purchase environmentally friendly paper and products;
- provide a green benefits package to employees;
- purchase energy efficient computers, lights and office equipment;
- recycle all material that is eligible to be recycled; and
- support sustainable business associations

Clean Currents is committed to promoting solutions to today's biggest environmental challenges – global warming and air pollution.

The technology exists today to dramatically cut the greenhouse gas emissions that cause global warming. Businesses should join together with citizens and elected leaders to promote a vision of a cleaner, better, future free from the threat of global warming.

9. [Home | pq-inc](#)

Power Quality Inc. is dedicated to providing quality products and experienced installation and service personnel on every job. Let us give you a quotation for upgrading your facility. Power Quality is an Electrical Contractor that specializes in Induction and LED lighting, saving energy costs for its customers. In addition, as a general electrical contractor, Power Quality can fulfill all your electrical requirements.

10. [Maryland Solar Co | Solar Companies in Maryland \(solar-maryland.com\)](#)

Our partners specialize in a variety of solar panel installation services, such as residential and commercial installations, off-grid systems, and energy storage solutions. We have the expertise and resources necessary to ensure the highest quality installation possible.

We are passionate about renewable energy and sustainable practices and strive to provide top-notch service and support from start to finish. Take advantage of the sun's power and save on your energy bills today.

11. [About | Energy Research, Inc. \(energyresearchinc.com\)](http://energyresearchinc.com)

Energy Research, Inc. (ERI) is a Maryland-based, international, scientific, engineering and technology company.

The company services include engineering analysis, management consulting, and scientific research in nuclear energy, conventional energy, space systems, risk management, probabilistic risk assessment and environmental systems.

- [Computational Fluid Dynamics](#)
- [New Reactors](#)
- [Nuclear Fuel Performance Assessment](#)
- [Operating Reactors](#)
- [Probabilistic Risk Assessment](#)
- [Research & Test Reactors](#)
- [Simulation Methods](#)
- [Small Modular Reactors](#)
- [Space Systems](#)
- [Thermal-Hydraulics](#)
- [Reactor Physics/Neutronics](#)

12. [energytools, llc \(energytoolsllc.com\)](http://energytoolsllc.com)

Welcome to energytools, your online source for analytical energy management tools. energytools, llc. is an international consulting firm specialized in providing economic consultancy services and turn-key IT solutions to regulated utility clients.

Over the past two decades during which we've worked with dozens of utilities, we always sought better, easier and affordable ways to provide services to our clients. With that experience in hand we have decided to use cutting edge technology to transform our experience into software services that can be tried and used over the internet.

C. Recent Market Activity

- In 2023, Rockville's X-Energy Reactor Co., LLC raised an additional \$80 million for its Series C round, which, at its second closing, now totals \$235 million.
- In August 2023, Excel Services Corporation ("Excel"), a unique provider of licensing and regulatory compliance for the nuclear industry, acquired IEPSON Consulting Enterprises, Inc. ("IEPSON"), creating a full-service offering of value-added engineering services to nuclear operators across the world.

D. Local Government Initiatives

1. Rockville's Climate Action Plan Progress (July 2022 Progress Update)

- a. Adopted Climate Action Plan and Clean Fleet resolution on January 10, 2022
- b. The FY2023 budget includes more than \$4.2 million for climate actions.
- c. Montgomery County adopted Building Energy Performance Standards.
- d. Opted into Montgomery County's point-of-sale home energy disclosure law.
- e. Supported 1,000 EV Co-op pledges and 337 Solar Co-op members.
- f. Distributed 300 native trees and 348 packets of wildflower seeds.
- g. Weed Warriors engaged 656 volunteers to remove non-native invasive plants from parks.
- h. Converted 325 City Hall lights to LED with support from the Maryland Energy Administration.
- i. Completed City Hall building energy tune-up.

2. Montgomery County Clean Energy Initiatives Completed in 2023

- a. The Montgomery County Green Bank has 13 contractors under agreements (and 5 more in the works) and 77 studies presently underway for its technical assistance program with a dedicated \$750,000 of funding to support commercial property owners to complete energy assessments to determine potential energy improvements for their properties. The assessments will also include reviews of electrification alternatives where appropriate.

- b. In March 2023, the Department of Environmental Protection (DEP) and the Department of Finance (DOF) submitted the 2023 Commercial Property Assessed Clean Energy (C-PACE) Annual Report to the County Council.
- c. The Montgomery County Green Bank closed on a 31.5 kilowatt (kW) solar PV project with Sandy Spring Monthly Meetings, a faith-based organization. This brings the Green Bank's total solar-supported efforts to 633.87 kW among 8 organizations, including nonprofits, affordable housing, and faith-based institutions.
- d. Montgomery County Public School (MCPS) continues work on designs for the installation of rooftop solar production sites at 8 MCPS sites, including a pilot parking lot canopy with EV charging station, a pilot of solar parking lot lighting, and purchasing of off-site ground-mounted solar in the PJM region.
- e. The Department of General Services (DGS) completed the 572 kW Animal Shelter Solar and Microgrid project.
- f. On March 28-29, 2023, the Department of Environmental Protection (DEP) hosted the 10th annual Montgomery County Energy Summit at the Silver Spring Civic Building.
 - Together with the Cities of Rockville and Gaithersburg, the County began to develop its approach for coordinated community spending of Energy Efficiency and Conservation Block Grant (EECBG) formula funding from the U.S. Department of Energy (DOE).
 - All three jurisdictions will be receiving formula grants from DOE in early 2024.
 - The County's FY2023-2028 Capital Improvement Program (CIP) includes \$1.29 billion in spending on projects that help address climate change, adding \$653 million in funding for new projects or expansions of existing projects that increase climate resilience.
 - In 2022, Montgomery County created the nation's first county-level Green Bank, unanimously passing the Montgomery County Green Buildings Now Act, Bill 44-21.

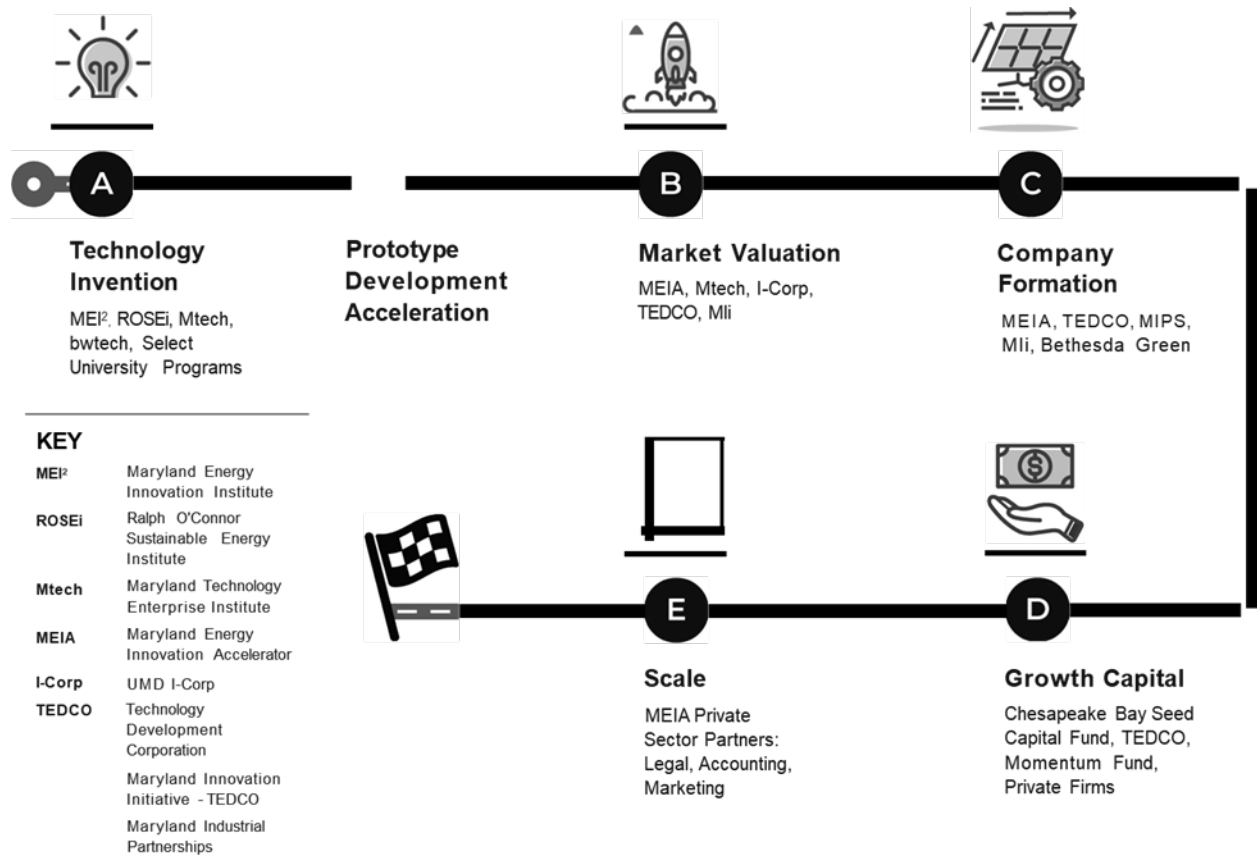
III. Maryland Climate Tech Entrepreneur Ecosystems Overview

A. Maryland Climate Tech Life Cycle

The Maryland Climate Tech ecosystem is small but growing. The ecosystem starts with Maryland Universities. The University of Maryland and John Hopkins have state-of-the-

art labs that leverage brilliant professors and researchers working to develop and commercialize novel inventions or technologies.

Entrepreneur Support Organizations (ESO) help commercialize university inventions to climate ventures by connecting them with markets, executive support, mentors, and investors. Here is a list of the organizations helping Maryland Climate Tech ventures grow.



- Maryland Energy Innovation Accelerator (MEIA) - <https://mdeia.org/>**
 - MEIA focuses on early-stage technology commercialization in partnership with Maryland-based Universities and labs to support Maryland's clean energy and climate goals.
 - MEIA supports companies working in the solar, wind, battery, energy efficiency, grid modernization, and carbon capture, utilization and storage (CCUS) fields and those working with any other technology that reduces greenhouse gas emissions

or provides negative emissions benefits in the electric, oil and gas, residential, commercial, or industrial sectors.

- **MEIA** has three major programs to support Maryland climate tech companies:
 - Pre- Accelerator Program
 - Launchpad
 - The Accelerator Program
- **The Maryland Energy Innovation Institute (MEI²)** <https://energy.umd.edu/>
 - Provides critical infrastructure to enable climate tech breakthroughs to become commercially viable companies,
 - **MEI²** awards \$600K annually in energy seed grant funding and has helped launch 20 companies in the state.
- **John Hopkins Ralph O'Connor Sustainable Energy Institute (ROSEi)**
<https://energyinstitute.jhu.edu/>
 - **ROSEi** creates a focal point for energy-related research and educational programs across John Hopkins University.
 - Aims to educate future energy leaders and support implementation, markets, and policies that promote an affordable and equitable green energy future for a more resilient world.
 - **ROSEi** offers grants to its research affiliates.
- **Bethesda Green** <https://bethesdagreen.org/>
 - **Bethesda Green's Innovation Center** is the leading entrepreneurship program in the Mid-Atlantic region that identifies and attracts leaders who are building for-profit business models around innovative and sustainable solutions to tackle environmental and social challenges.
 - As a B Local Mid-Atlantic partner, **Bethesda Green's B Corp Consulting** works with B Lab to offer consulting to assist businesses through the B Corp Certification process and help them improve their social and environmental impact.
- **Maryland Technology Enterprise Institute (Mtech)**
 - Mtech supports the University of System Maryland students and researchers and Maryland entrepreneurs.
 - Mtech programs provide knowledge of how to successfully launch companies and guide aspiring and existing entrepreneurs through the entire lifecycle of launching and maintaining technology-based ventures.
 - **Programs**
 - **ChesaP-eake Bay Seed CaP-ital Fund** invests \$100,000 to \$500,000 in innovative solutions in Batteries, Agritech, Renewable Energy, Electric vehicles, Stormwater Solutions, Air Emissions, and Natural Filters.

- **Mtech Ventures** is a **University of Maryland Incubator** for technology-based innovations commercialized at the university.
- **UMD 1-CorP-s** provides real-world training on incorporating innovations into commercially viable companies to solve societal problems.