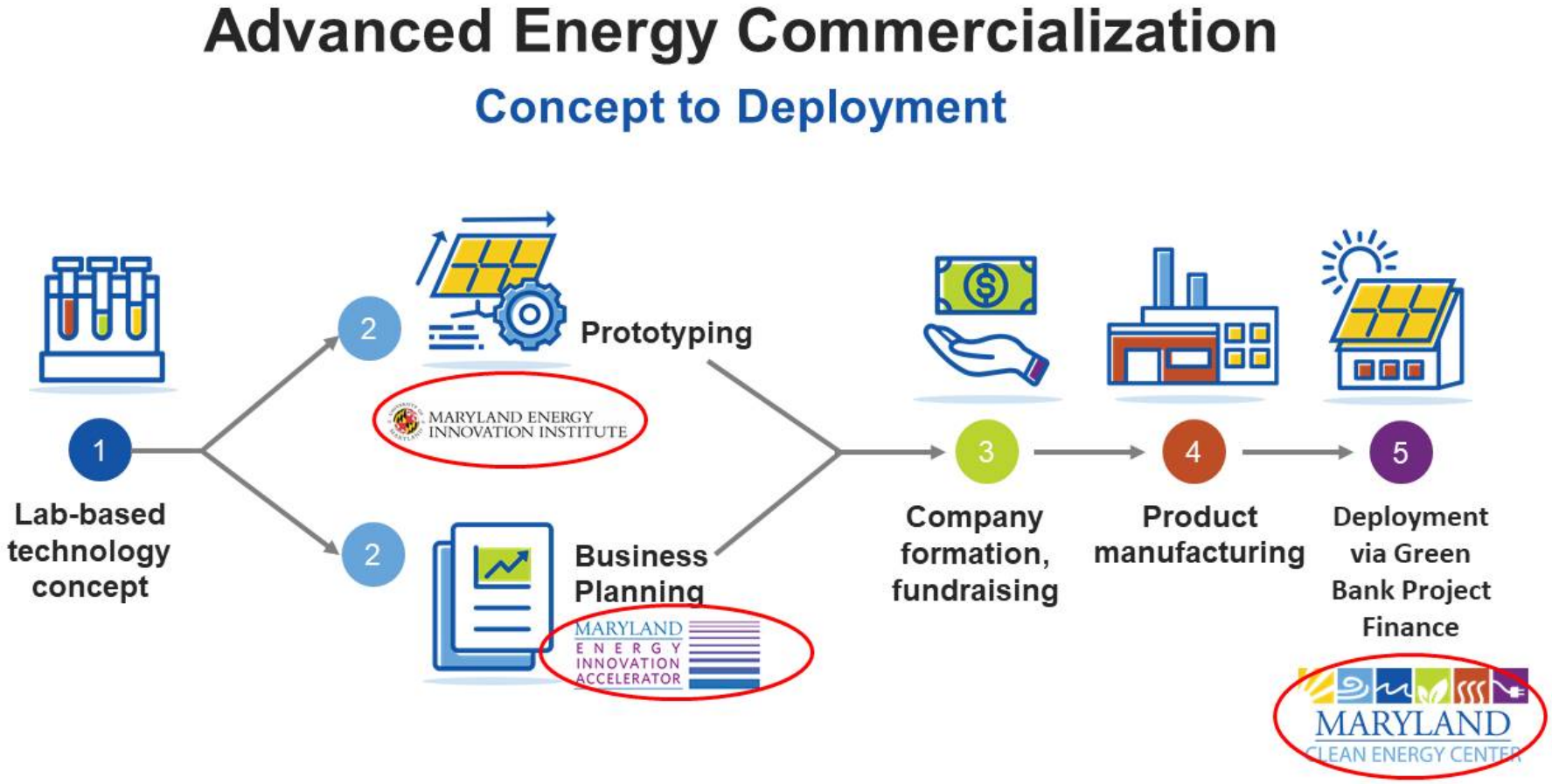
Maryland Energy Innovation Institute

Eric D. Wachsman, Director MEI[2]

www.energy.umd.edu

House Economic Matters Committee Testimony for HB419 / SB460



MEI² Energy Research

Maryland an academic powerhouse in energy research:

DOE BES Energy Frontier Research Center, $29M

Bi-National Center on Solid State Batteries, $18.4M

Transformational Army Batteries, $7.2M + $10M (FY21)

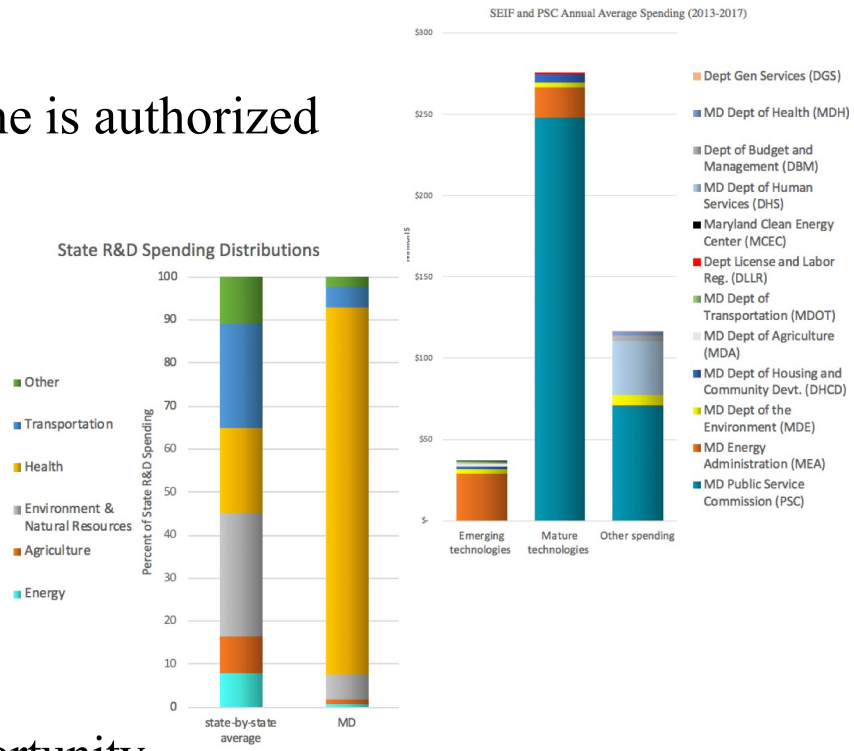
- UMD leads the nation in DOE ARPA-E Awards (*2nd only to MIT*), leading or participating in 28 awards for $64M in research funding since 2009 *ARPA-E is the only DOE agency focused on energy innovation and economic development*
- Since its creation in 2017 MEI² has helped obtain $55M in federal funding for the State of Maryland economy
- **MEI² has provided a 23X rate of return on Maryland's investment** based on its share of the SEIF ($2.4M to date)

Transforming MEI^2 Research to Innovation

MEI^2 legislation (HB410/SB313) mandated report to Governor and General Assembly on development, deployment, and commercialization of clean energy technology from SEIF and other forms of financing and any need for additional funding for these purposes.

Report Findings include:

- With Maryland's energy research leadership and appropriate innovation infrastructure this could be major growth area for the Maryland economy.
- Maryland spends over $400M/yr on energy-related programs. However, none is authorized to support in-state development of clean energy firms.
- Maryland is last (#50) among all states in diversity of technology support for economic development
- Health-related R&D accounts for on average 85% of Maryland's total investment
- <u>There was no Maryland focused early stage energy investment in Maryland until MEI^2</u>



Report Recommendations include:

- Designate clean energy an economic development opportunity
- Expand seed funding and developmental support for clean energy innovation (**HB419 / SB460**)

Transforming MEI^2 Research to Innovation

MEI^2 Innovation Seed Grants

- Bridge the gap between transformative academic research and VC-Ready Proof-of-Concept
- Advance energy technology and economic growth of Maryland university spin-off company. Must have appropriate IP protection and commercialization plan.
- In first three years 14 seed grants were awarded to University of Maryland College Park (UMCP), University of Maryland Baltimore County (UMBC), University of Maryland Eastern Shore (UMES), Johns Hopkins University (JHU), and Morgan State University (MSU).
- Demand for these seed grants has grown rapidly far exceeding current budget to support.
- Several have resulted in follow on private investment.

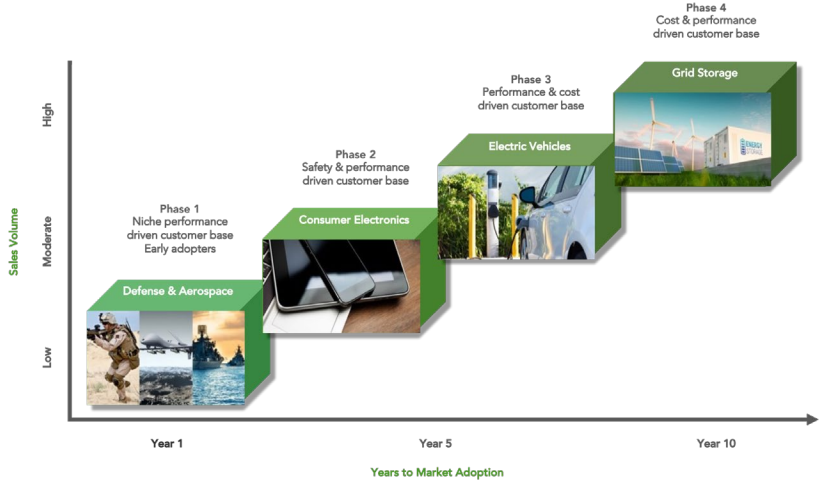
MEI^2 Investment Committee

Ellen Williams, *UMD Distinguished University Professor, Former Director ARPA-E (DOE)*
Julie Lenzer, Assoc.Vice-President for Economic Development, UM Ventures
Eric Chapman, Asst.Vice-President of Research, UMD
Rob Briber, Interim Dean, A. James Clark School of Engineering
Arti Santhanam, Exec. Director Innovation Initiative, TEDCO

Transforming MEI^2 Innovation to Jobs

ion Storage Systems

- Commercializing next generation batteries developed at UMD
- Over $20M in R&D funding
- $8M investment lead by Alsop Louie Partners
- 17 Employees and growing
- CEO, *former Exec Director Battery Operations - Apple*
- Moving into 20,000 ft^2 facility
- Scaling to 10 MWh/yr production
- Commercial prototypes available Q1 2021
- First product in defense market due to higher margin at lower volume
- Moving to higher volume markets as scale production
- Selected as "*Maryland Future 20*" company



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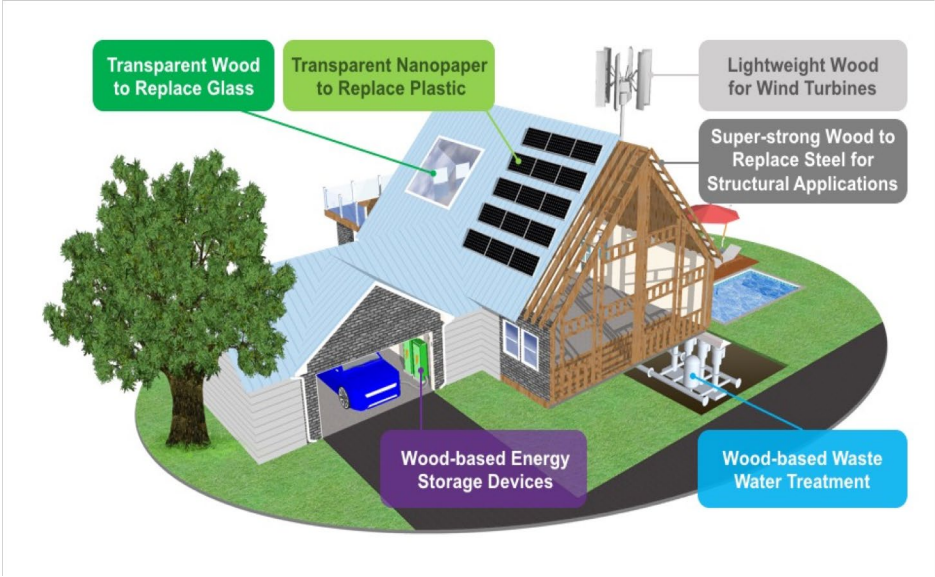
Disclaimer: *Ion Storage Systems founded by Wachsman and this is meant as only an example of potential spinoffs and not an endorsement of this company or request for any support on its behalf*

Transforming MEI² Innovation to Jobs

InventWood™
From Nature | For the Future



Revolutionary Technology, Millions of Years Old

InventWood is transforming the world by developing cellulose-based materials that are high-quality, cost-effective, and environmentally-sustainable. Our proprietary technologies offer superior alternatives to the most commonly-used materials today while providing solutions to some of the world's most intractable environmental challenges.

Revolutionizing Sustainable Building Materials

MettleWood™

An extremely strong and tough material that is stronger, lighter, and cheaper than titanium and carbon fiber. It also offers numerous safety benefits over alternatives, and it is responsibly created and biodegradable.

Potential uses:

Vehicles · Buildings & Houses · Aerospace · Furniture · Electronics

Insulating Wood

A bright-white material that is stronger than natural wood and insulates against both heat loss and impacts better than commercially available alternatives. It is also biodegradable and eco-friendly.

Potential uses:

Residential Insulation · Packaging · Furniture · Electronics · Musical Instructments

Transparent Wood

A clear wood material that is lighter and tougher than glass, with up to 3x better thermal insulation. It also offers benefits in terms of both light channeling (to reduce glare) and far more environmental sustainable.

Potential uses:

Windows & Doors · Electronics · Glassware · Solar Panels · Vehicles

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• Selected as "*Maryland Future 20*" company

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CLEAN ENERGY CENTER

Katherine Magruder, Executive Director

Testimony for HB 419/ SB460

February 4, 2021

created with an economic development mission

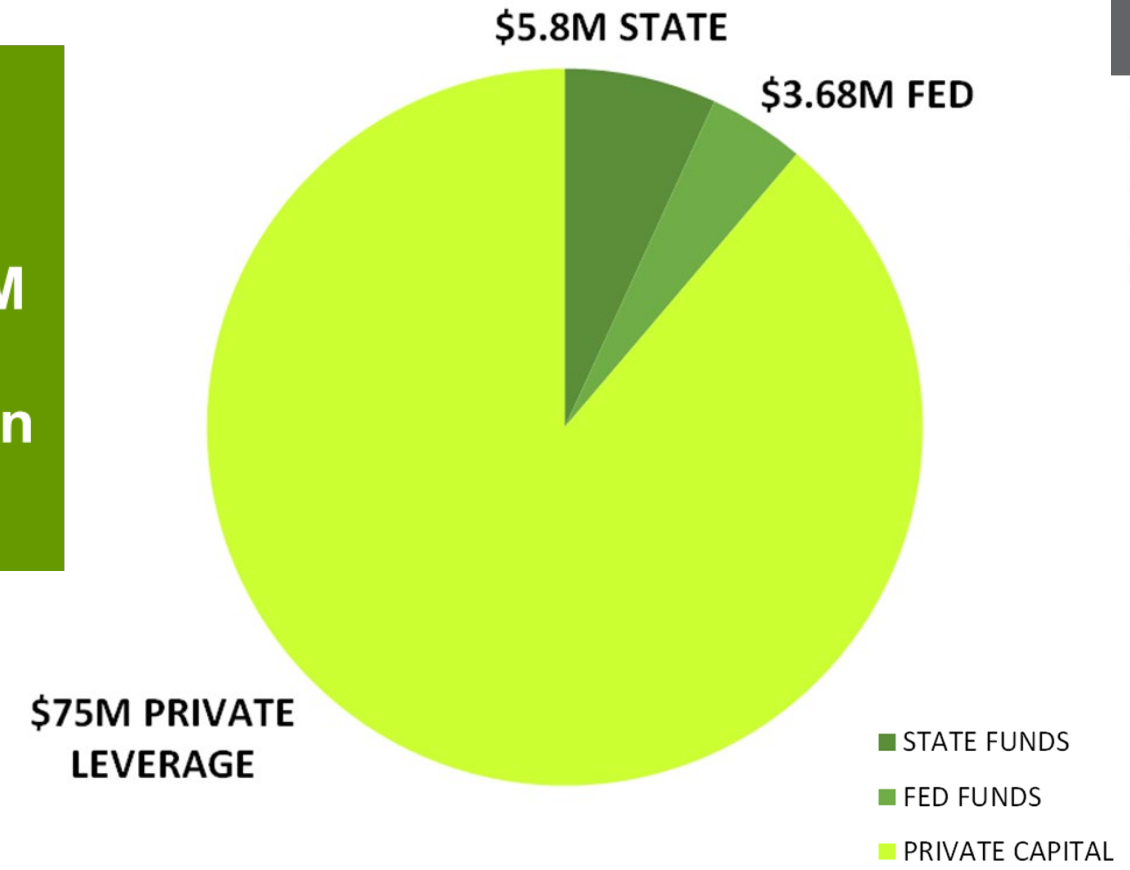
MARYLAND
CLEAN ENERGY CENTER

"MCEC bridges the gap between what the public sector can't do and what the private sector doesn't do."

Geoff Oxnam
Founder & CEO American Microgrid Solutions
MCEC Board Chair

Financing Programs Crowd in Private Capital

$9.48M investment of public funds generated approximately $75M in private capital investment for clean energy solutions.



MARYLAND CLEAN ENERGY CAPITAL
providing financial solutions

MARYLAND COMMERCIAL PACE
property assessed clean energy loans

MARYLAND HOME ENERGY LOAN PROGRAM
advancing energy efficiency

CLEAN ENERGY Advantage
FINANCING PROGRAM FOR ENERGY EFFICIENCY & RENEWABLES

MARYLAND CLEAN ENERGY CENTER

a program of MCEC launched in 2019

MARYLAND ENERGY INNOVATION ACCELERATOR

MEIA is building new industry and enhancing the energy innovation eco-system in the state.

MEIA facilitates translation of emerging energy technologies from research to market by wrapping business expertise around licensable discoveries to pull them toward commercialization.

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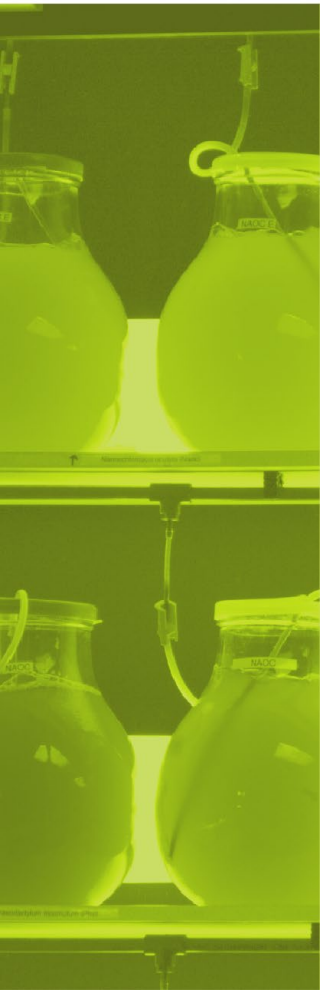
Maryland has aggressive energy and greenhouse gas reduction goals, and municipalities are concerned about resilience and environmental justice.



It will take more financial resources than public funds available to achieve state climate goals and grow the innovation economy in Maryland.

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FY20 Strategic Energy Investment Fund Actual Expenditures

APPENDIX A: SEIF Funding Details

Table 13

SEIF Expenditures and Appropriations		
	FY2020 Actual	FY2021 Appropriation
Maryland Department of the Environment - RGGI Inc. Dues	353,585	550,000
Maryland Department of the Environment - Energy-Water Infrastructure Program	3,105,033	
Maryland Department of the Environment - Climate Change	2,850,000	2,550,000
University of Maryland (Maryland Energy Innovation Fund)	1,500,000	1,500,000
Department of Human Services - Energy Bill Assistance	19,942,924	19,850,329
Department of General Services	500,000	500,000
Department of Health - Energy Performance Contracting Repayments	2,039,087	2,037,973
Maryland Energy Administration - Energy Efficiency - Low-to-Moderate Income	6,000,000	6,700,000
Maryland Energy Administration - Energy Efficiency - Other	3,865,110	5,000,000
Maryland Energy Administration - Renewable Energy, Transportation, and Resiliency	14,722,565	22,369,721
Maryland Energy Administration - Admin	4,427,658	4,683,187
Maryland Energy Administration - Offshore Wind Development	1,051,832	1,500,000
Department of Commerce		200,000
Maryland Department of Labor	542,832	450,000
Department of Natural Resources		500,000
Dept. Housing and Community Development	574,776	
Maryland General Fund - State agency electric vehicles	2,366,956	2,250,000
Maryland Department of Agriculture	1,381,668	
Motor Vehicle Administration - Electric Vehicle Tax Credit reimbursement	5,993,583	0
TOTAL	**$71,217,609**	**$70,641,210**

Source: MEA Strategic Investment Fund Activities for FY2020

$1.5 M was included in the SEIF appropriation for MEIF sub-grantees.

Bill calls for an increase of $600,000 in the future.

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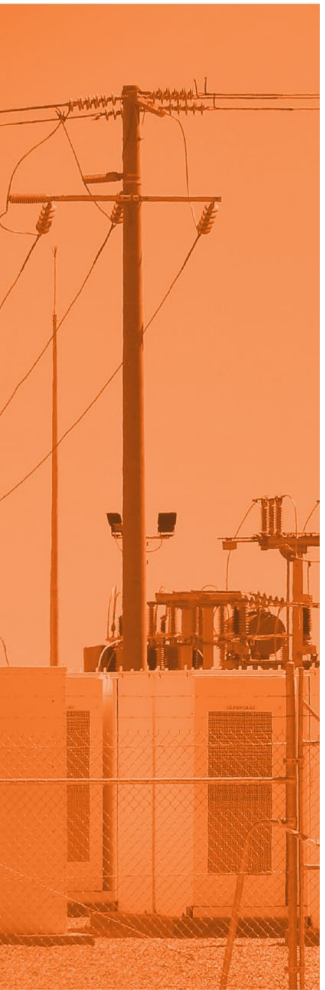
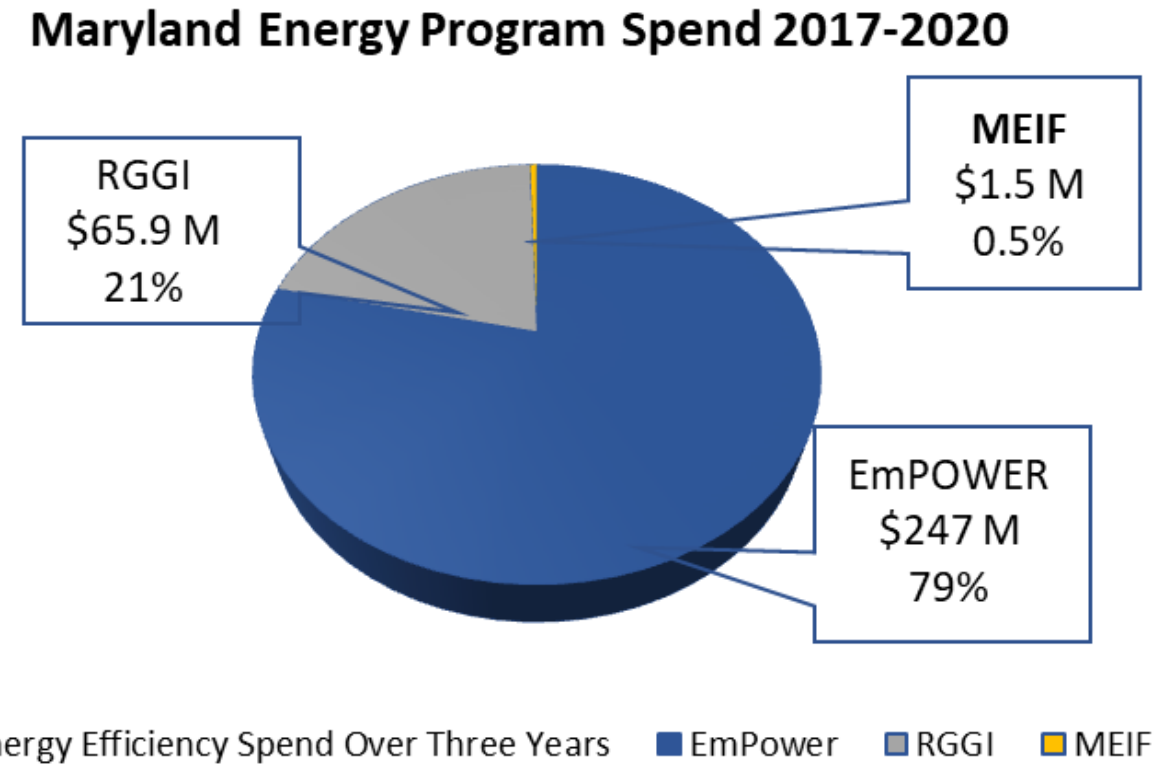
How funding requested may impact State programs and investments?



EmPOWER surcharge and RGGI proceeds combined expenditures averaged approximately $314M/ yr.

MEIF state funding for the last three years has been less than 0.5% of that total

It will only be 0.6% with added funding.



*RGGI for FY18,19 &20 EmPOWER for Calendar 2017, 2018 & 2019

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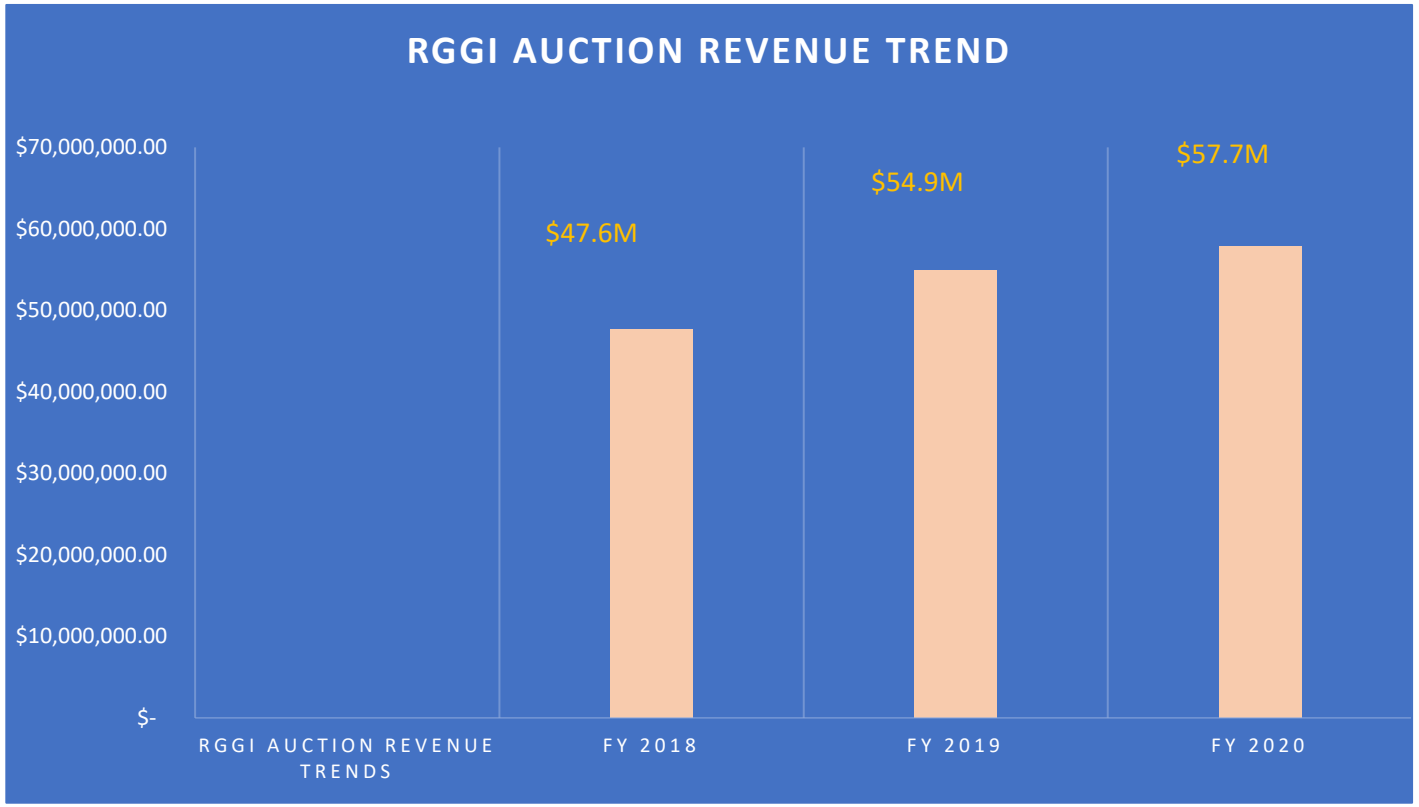
RGGI Revenue Trending Upward from FY18-20

RGGI REVENUE avg. $50M/yr.



Sources: SEIF Report & Maryland Budget Highlights FY2022

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Sidney H. Evans, Jr., M.B.A.

Vice President for Finance and Management/CFO

Pranay Kohli

CEO

ACTIVEcharge