PENNSYLVANIA TURNPIKE COMMISSION

Bradley Heigel, P.E. – Chief Engineer
Matthew Burd, P.E. – Assistant Chief Engineer – Construction

ACEC/PA

September 8, 2025

PENNA TURN PIKE

STRATEGIC PLAN 2025-2029 FRAMEWORK

VISION

To be a leader in mobility services at the forefront of innovation in transportation, safety and customer experience.

MISSION

To operate a safe, reliable, customer-valued toll road system that supports national mobility and commerce.

VALUES

SAFETY ALWAYS

COMMUNICATE OPENLY

CUSTOMER DRIVEN

RESPONSIBILITY MATTERS

TEAMWORK DELIVERS

ADVANCING EXCELLENCE

GOALS

CONNECTION

CULTURE

GROWTH

SAFETY

STEWARDSHIP

Continuous Improvement: Focus on enhancing processes for the benefit of the workforce, customers and business partners

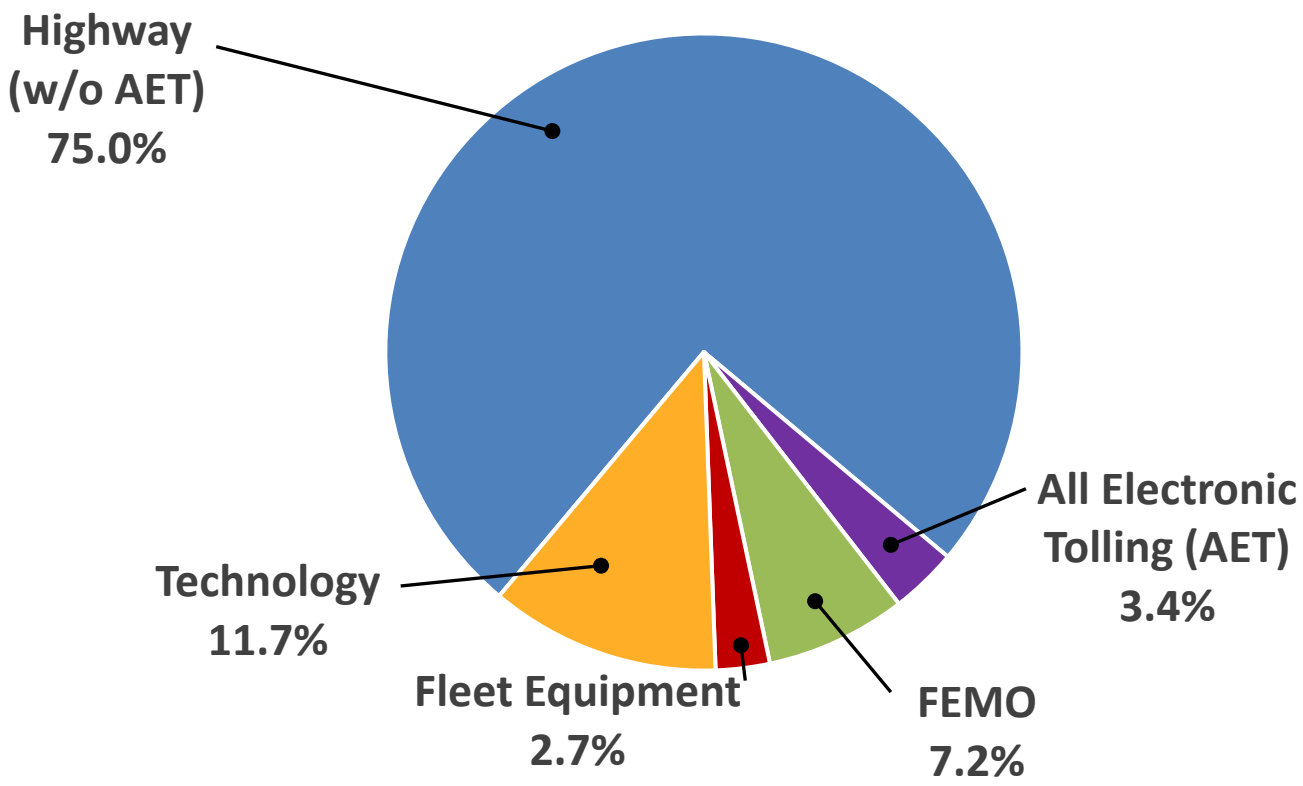
Best-in-Class: Embodies a commitment to being best-in-class and encourages self-reflection and evaluation at all levels.

Evaluation Over Routine: Encourages employees to assess if tasks and processes can be improved, avoiding the mindset of "we've always done it this way."

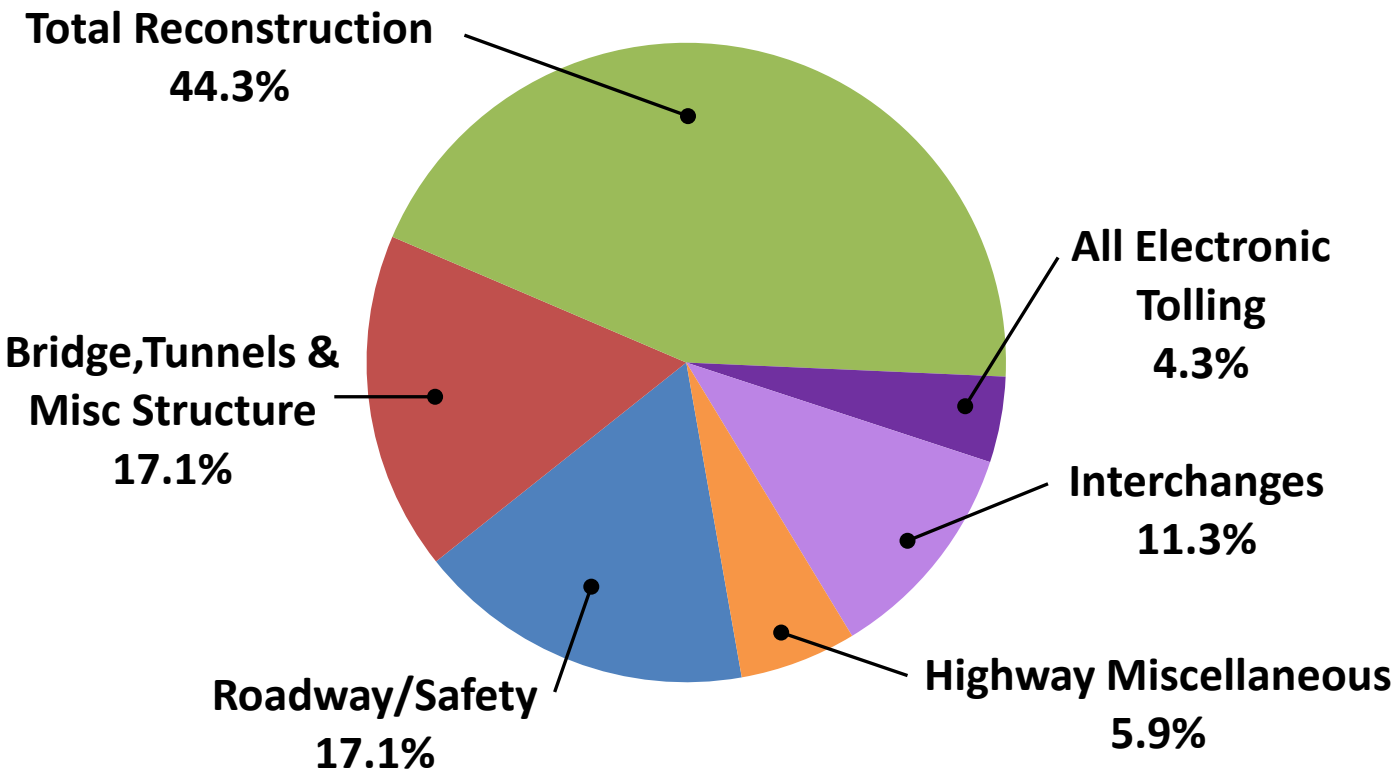
Innovation Without Disruption: Supports everyday improvements and evaluation without necessarily requiring large-scale changes.

Mindset of Excellence: Exemplifies asking, "Could this be done better?" in all work areas.

FY 2026 Capital Plan 10 Year Program

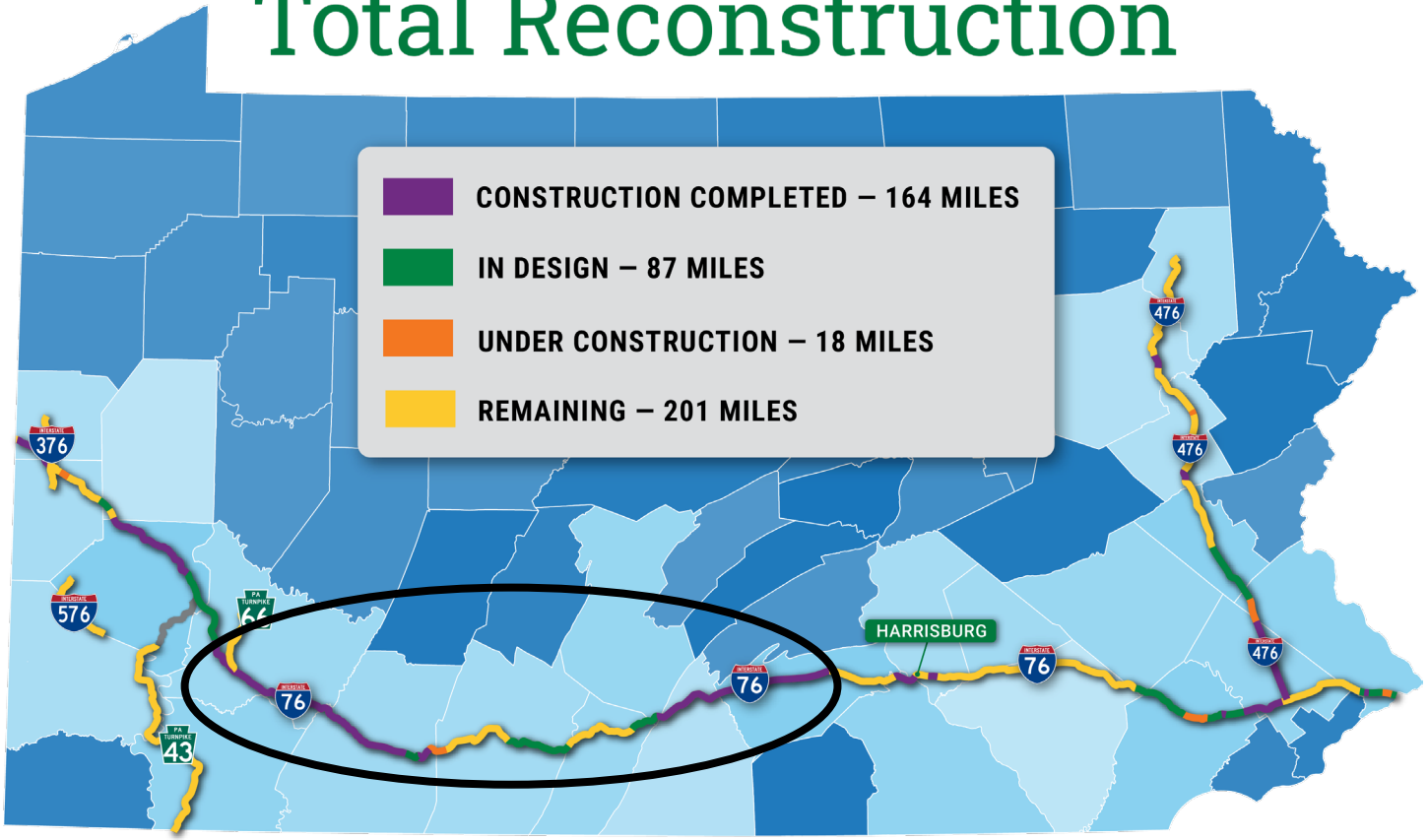


FY 2026 Capital Plan - Highway Program




BUILD
Total System Reconstruction
INNOVATE
All-Electronic and Open Road Tolling Operations
CONNECT
Fiber Optic Network and Alternative Energy

Total Reconstruction



“When we opened as America’s first superhighway, we set the national standards for interstate highway design and engineering. Open road tolling continues that legacy”

Meets customer expectation

- Clear preference for electronic tolling methods; 85%+ adoption of E-Z Pass
- National standard

Increases access

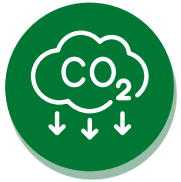
- Built at a fraction of the cost of an interchange
- Increases ability to fulfill the access requests we receive from communities across the Commonwealth
- $25 million in savings per year on operations and maintenance

Safer

- Eliminates confusion and lane switching at exit/entry

Increases mobility

- Eliminates travel-time impacts of traditional tolling



Better for the environment

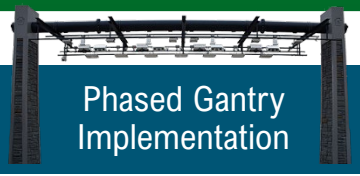
- Continuous travel results in lower carbon emissions
- Smaller physical footprint

OPEN ROAD TOLLING CONVERSION

2024 2025 2026 2027 2028

Phased Gantry Implementation

East of Reading and Northeast Extension (January 2025)



Phased Gantry Implementation

West of Reading (January 2027)

Phased Interchange Building Demolition

East of Reading and Northeast Extension (2025-2028)

Phased Interchange Building Demolition

West of Reading (2027-2030)

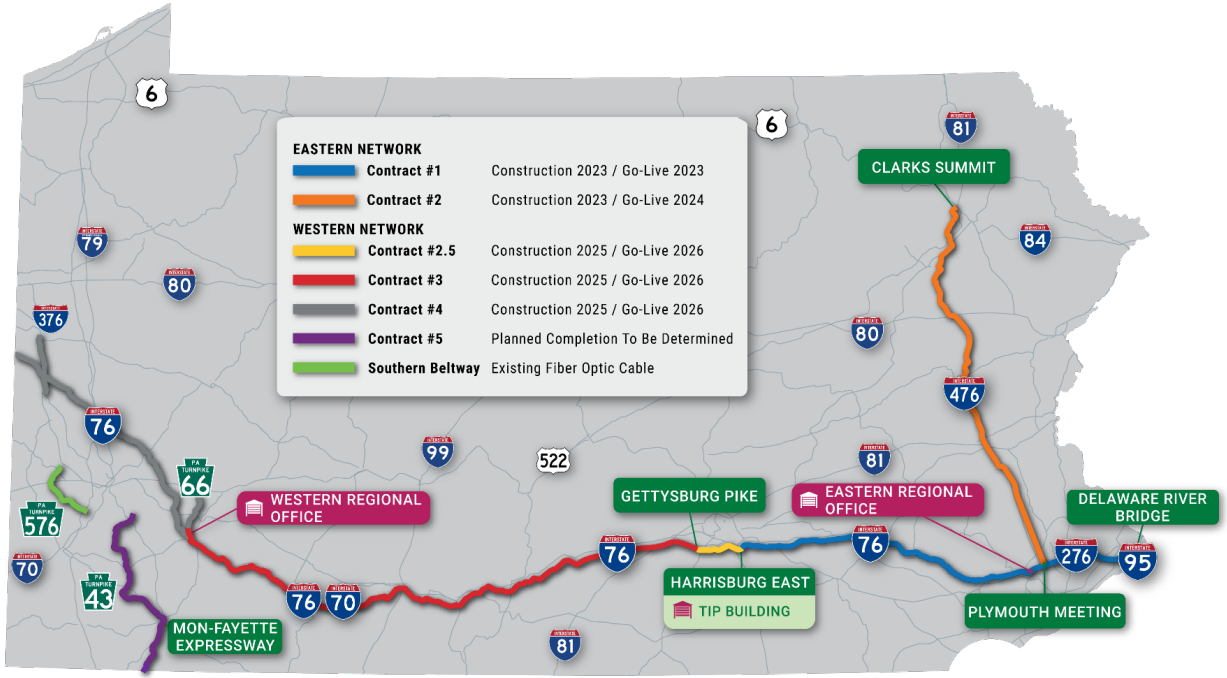
Prior Efforts

- Total Reconstruction – Early 2000s
- Public-Private-Partnership(P3) – 2016 to 2018

Design Build

- Sections 1, 2 & 2.5– Operational
- Section 3 & 4 by end of 2026

Operations, Maintenance and Commercialization



EXPANDED SYSTEM ACCESS

Constructing a trailhead to provide better access to this popular outdoor recreation area for our customers, truckers, and those in the local community.

- Expanded parking areas
- A pavilion with seating
- Expanded green space
- Bike repair stations
- Bike wash station
- Bike racks
- EV Bike Charging Stations
- Wayfinding signage
- Landscaping/planters

NEW DRIVER
WORK ZONE SAFETY PROGRAM

PENNA TURN PIKE

Pennsylvania
Department of Transportation

What's in the course?

- ✓ Powerful testimonials from workers & drivers
- ✓ Safe driving behaviors
- ✓ Real-world driving scenarios
- ✓ PA work zone laws and regulations
- ✓ Interactive elements teaching work zone components and features
- ✓ Videos, quizzes, and more!

Available in English and Spanish!

Visit:
PennDOT.pa.gov/WorkZoneSafety

- Text messaging service to communicate about unexpected traffic backlogs
- Not for daily commuter traffic or construction
- Provides real-time, automated alerts about clearance times
- First for any transportation agency and is designed only for PA Turnpike customers.

Innovation Month

Commission has a major focus on Innovation

One of the PTC's core values

PTC Shark Tank highlights Innovation Month

Intern Projects

CEO Interns – wide variety of backgrounds, come in each summer and are assigned a project

Engineering Interns – Work across the state in the Construction Engineering Department

Goal is to give them a positive, engaging varied experience

Summer Intern Presentation

Samantha McHugh – Engineering Intern (2nd Summer)

Joey Richmond – CEO Intern

Matthew Siletta – Drexel University Co-op

Proposed Solutions to Power Blue & Kittatinny Mountain Tunnels Microgrid

Summer 2025 Engineering Interns

Samantha McHugh

Joey Richmond

Matthew Siletta

Proposed System Expected Annual Energy Output

Annual load of tunnels is assumed to be 6.6 GWh/year

	ENERGY GENERATION	LOAD COVERAGE
3 MW Solar (fixed-tilt)	3.6 – 3.8 GWh	55 – 57%
5 MW Solar (fixed-tilt)	6.0 – 6.3 GWh	91 – 95%
3 MW Wind	7.9 – 10.5 GWh	120 – 159%
5 MW Wind	13.1 – 17.5 GWh	198 – 265%
1 MW Solar + 3 MW Wind	9.5 – 12.3 GWh	144 – 185%

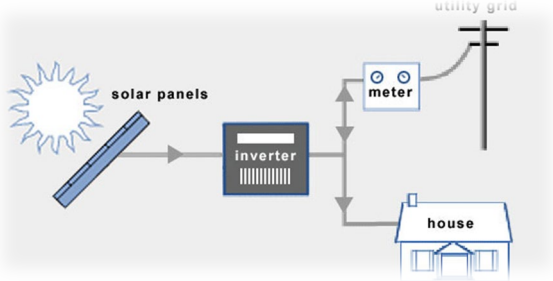
Solar Investment Comparison

3 MW | 5 MW

3 MW Systems	Fixed Tilt	Single Axis	Dual Axis
Total Solar Cost	$1.23M - $1.69M	$1.66M - $2.21M	$2.07M - $2.84M
Annual Expenses	$36k - $54k	$45k - $75k	$60k – 90k
Annual Electric Saved	$478k - $482k	$466k - $589k	$449k - $628k
Payback Years	2.8 – 3.9 years	3.9 – 4.3 years	5.3 years
Lifespan	25 – 30 years	20 – 25 years	15 – 20 years
Total Expected Payback	$9.82M – $11.16M	$6.76M - $10.64M	$3.76M – 7.92M
Annual Energy Output	3.6 - 3.8 GWh/year	3.5 - 3.7 GWh/year	3.4 - 3.6 GWh/year

These calculations only include solar components and excludes a backup power source. The payback time remains the same for each mounting type if the system is modified to 5 MW, but fixed tilt saves significantly more power and cost. The engineering interns recommend a 5 MW fixed tilt solar field unless 3 MW is the maximum power allowed.

3 MW vs 5 MW Fixed Tilt Solar & **2 MW Diesel Gen**



Grid-tied solar microgrid with emergency diesel backup expected to run 12-20 hours per year during grid outages

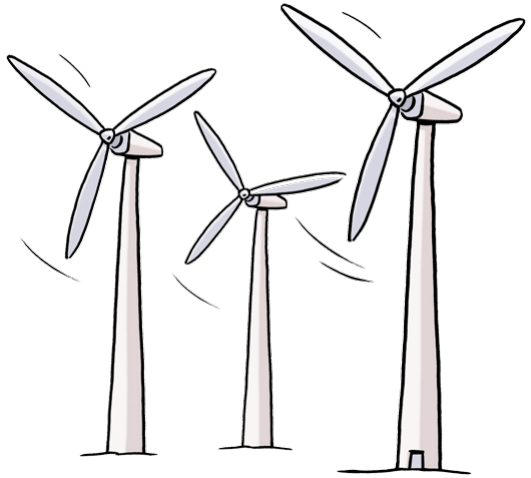
	3 MW	5 MW
Total Cost	**$1.79M - $2.78M**	**$2.61M - $3.9M**
Annual Expenses	$61k - $114k	$85k - $150k
Annual Savings	$478k – 482k	$796k - $804k
Payback Years	4.3 – 7.5 years	3.7 – 6.0 years
25 Year Payback	**$8.63M – $6.43M**	**$12.44M-$15.18M**

Grid-Tied Solar with Emergency Backup

	3 MW Solar + Diesel	5 MW Solar + Diesel	3 MW Solar + BESS	5 MW Solar + BESS
Total Cost	$1.79M – $2.78M	$2.61M – $3.9M	$4.2M - $6.9M	$5.02M - $8.03M
Annual Expenses	$61k – $114k	$85k – $150k	$69k - $120k	$93k - $156k
Annual Savings	$478k – 482k	$796k – $804k	$478k – 482k	$796k - $804k
Payback Years	4.3 – 7.5 years	3.7 – 6.0 years	10.3 – 19.1 years	7.1 – 12.4 years
25 Year Payback	$8.63M – $6.43M	$12.44M – $15.18M	$2.16M – $6.02M	$8.17M-$12.57M

These calculations assume a 2 MW diesel generator will run 12-20 hours per year during grid outages and a 2 MW/6.6MWh BESS with a full power capacity of 4 hours to the tunnels. The interns recommend installing a 5 MW solar field to supply power to the tunnels, paired with a 2 MW diesel generator for use during grid outages. If a 5 MW system is not feasible due to budget and permitting constraints, they suggest a 3 MW solar field with the same 2 MW diesel generator backup.

5 MW Wind Turbine & Diesel Generator



- **5 MW Wind Turbine System backup by a 2 MW Diesel Generator**
- Predicted to generate 13.14 – 17.52 GWh/year
- Cost for diesel to run generator $442/hour - $510/hour
- 12-20 hours per year expected runtime of diesel generator
- 5 MW Wind Turbine Cost: $3.30M - $5.35M
- 2 MW Diesel Generator Cost: $500k - $1.1M

Total Cost	**$3.87M**	**$6.44M**
Yearly Expenses	$105,000	$140,000
Yearly Revenue	$790,000	$1.32M
Payback Years	2.6 years	3.3 years
20 Year Payback	**$25.76M**	**$33.09M**

Wind Turbine + Solar & Diesel Generator

- **3 MW Wind Turbine System to primarily power tunnels with a 1 MW solar field to charge 2 MW Diesel Generator and sell all excess energy back to grid**
- If wind is down, system would run off solar and diesel
- 50-200 hours/year expected runtime of diesel generator
- Entire system predicted to generate 9.45-12.25 GWh/year
- Approximately 1,800 solar panels
- 2 MW Wind Turbine Cost: $2.5M - $3.65M
- 1 MW Solar Cost: $5M – $5.4M for approximately 1,800 solar panels
- 2 MW Diesel Generator Cost: $550k - $1.1M

Total Cost	**$8.16M**	**$10.15M**
Yearly Expenses	$108,000	$130,000
Yearly Revenue	$409,000	$430,000
Payback Years	7.4 years	9.3 years
20 Years Payback	**$11.76M**	**$13.77M**

Investment Comparison

4-5 MW Systems	Wind & Diesel	Wind & BESS	Wind + Solar & Diesel	Wind + Solar & BESS
Total Cost	$3.87M - $6.44M	$6.36M - $10.65M	$8.16M - $10.15M	$9.6M - $12.26M
Annual Expenses	$105k - $140k	$105k - $130k	$108k – 130k	$113k - $142k
Annual Revenue	$790k - $1.32M	$790k - $1.32M	$409k - $430k	$345k - $685k
Payback Years	2.6 – 3.3 years	4.3 - 5.4 years	7.4 – 9.3 years	9.2 – 9.3 years
20 Years Payback	$25.76M – $33.09M	$27.3M - $29.1M	$11.76M – 13.77M	$11M - $14.5 M

These calculations assume a 2 MW diesel generator will run 12-20 hours per year during grid outages or a 2 MW/6.6MWh BESS with a full power capacity of 4 hours at a time to the tunnels. The engineering interns propose a 5 MW wind turbine with a 2 MW diesel generator as backup unless 3 MW is the maximum power allowed, then a 3 MW wind turbine system with a 2 MW diesel generator is recommended.

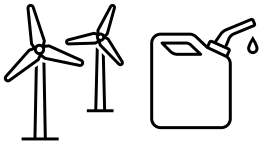
Batricity

- Proposed deal with Batricity for **1 MWh for $300,000** which may allow for BESS to enter back into the equation

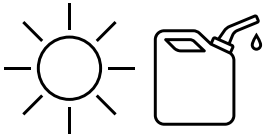
Solutions

2 MW Diesel vs 2 MW Biodiesel

	DIESEL GENERATOR	BIODIESEL GENERATOR
Total Cost	$565k - $1.09 M	**$610,000 - $1.39M**
Hourly Cost for Fuel	$442 - 510$	$416 - $479
Expected Runtime	50 hours/year - 300 hours/year	50 hours/year - 300 hours/year
Expected Yearly Fuel Cost	$22,100 - $153,000	$20,800 - $143,700



Proposed Solutions



5 MW Grid-Tied Wind Turbine + 2 MW Emergency Diesel Generator	5 MW Grid-Tied Solar Fixed Tilt Solar Field + 2 MW Emergency Diesel Generator
Purpose: • Self-Sustainability: Designed to make the tunnels as self-sustainable as possible. • Profit Generation: Potential to generate profit through excess energy production.	**Purpose:** • Cost Reduction: Aims to reduce the operational costs of the tunnels quickly and easily.
Advantages: • Renewable Energy: Utilizes wind, a reliable renewable resource. • High Energy Output: Consistent energy production in windy conditions. • Environmental Impact: Lower carbon footprint compared to fossil fuels.	**Advantages:** • Renewable Energy: Utilizes solar power, a renewable resource. • Lower Initial Cost: Generally lower upfront investment compared to wind turbines. • Predictable Output: More predictable energy production based on sunlight availability.
Challenges: • Initial Cost: Higher upfront investment. • Variable Output: Dependent on wind availability. • Space Requirement: Requires a large area for installation. • Net Metering Policies: need special approval up to 5	**Challenges:** • Efficiency: Lower efficiency in cloudy or rainy conditions, no energy production at night. • Net Metering Policies: Need special approval up to 5 MW for microgrids or emergency systems. • Smaller Investment: Longer and less payback.

Takeaways from Presentation

Allowed freedom to explore alternatives, under direction of Keith Jack, Director of Facilities Operations

Three of them worked well in a team environment

When talking with them, they were excited about what they were doing. Felt they were doing something worthwhile

PTC looking at possibility of working this into the Tunnel rehab job, may see their work come to fruition

CEO Interns Project

Solar Power Integrated Marketing Compaign

Faith Daniels
Keyur Nallani
Joey Richmond
Omar Rodriguez
Carley Strohecker

CEO Interns Project

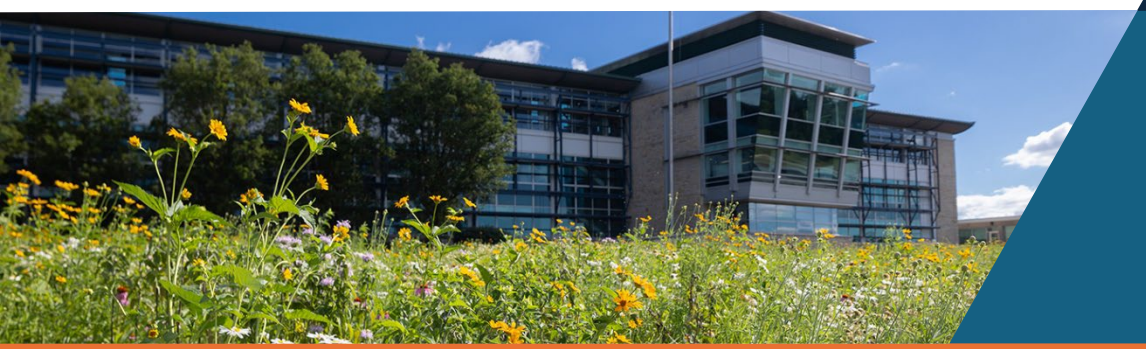
Project is done with guidance from PTC

PTC Communications lead the project this year

Present their project to PTC Executive staff and Commissioners at the end of the summer

Solar Powered Integrated Marketing Campaign

Faith Daniels, Keyur Nallani, Joey Richmond,
Omar Rodriguez, & Carley Strohecker



August 5, 2025

SCOPE STATEMENT

The purpose of the 2025 CEO Intern project is to research, analyze, and recommend an integrated marketing campaign to promote the PA Turnpike's integration of solar energy.

RESEARCH

BRAND STRATEGY

INTERNAL & EXTERNAL MARKETING

GAME CHANGING IDEAS

WHAT EXCITES US

Research Phase

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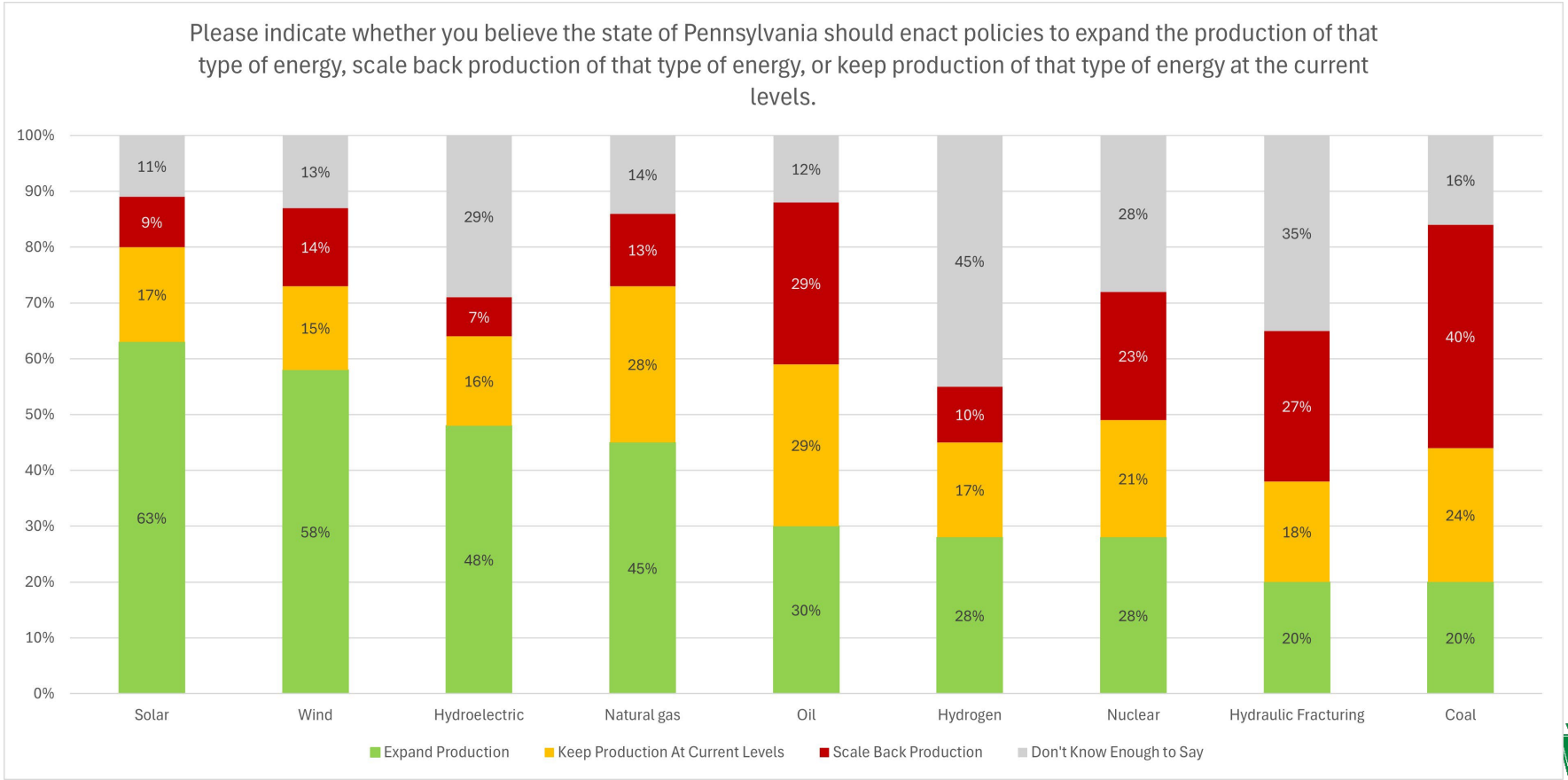
PUBLIC PERCEPTION



Brand Strategy

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Internal Communications

External Marketing

Instagram and Facebook

(Earned, Owned and Paid)

- Target audience
- ✓ Posts educating the public of solar energy
- ✓ Feature stories or testimonials
- ✓ Quizzes and polls

Spotify and YouTube

(Earned, Owned and Paid)

- Balanced audience
- Location based advertising
- Video and audio
- ✓ Using time as an advantage

Snapchat (Paid)

- Largest performing platform

Reddit (Earned)

Landing Page (Owned)

- ✓ Understanding our goals and future
- ✓ Supporting solar energy

Billboard (Paid)

- Types of billboards
- Reaching the public

Game Changing Ideas

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Forza Platform & Gaming Technology

PA Turnpike E-Racing Platform

- Digital Turnpike Fleet
  - Branded EV Fleet (F-150, Mach-E, Rivian)
  - Branded Sports EVs (2024 Corvette E-Ray)
  - Branded Supercars (PA Turnpike Lamborghini)
  - Description metatags with QR Code and Links to PA Turnpike sustainability projects

- **Custom PA Turnpike Commission Racetracks**
  - Solar Field/Microgrid and Inductive Test Track
  - In-Game Billboards Showcasing Initiative
- **Time Trials with Turnpike-Based Rewards System**
  - Quarterly
  - Apparel, Food Vouchers, E-ZPass Bonuses

Educational Outreach

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- Cumberland Valley (**Carley is a proud alum**) installed alpacas, emu, sheep to keep grass down around its solar arrays
  - ✓ 6 Alpacas, 6 Sheep, 1 Emu
  - ✓ 2-acre plot

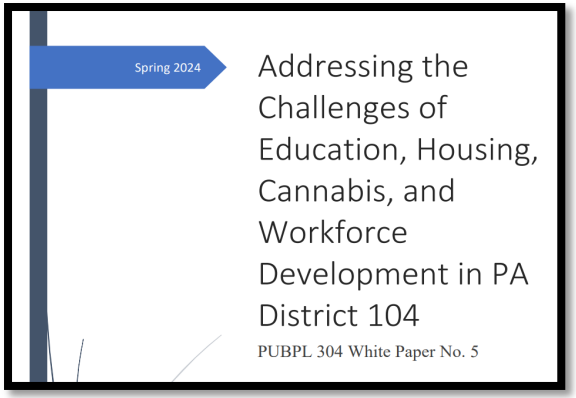
- Could be installed along the turnpike as an education tool **(Harrison City)** for schools and universities

- Would be installed alongside solar microgrids placed along the Turnpike

- Being implemented at Somerset

University of Pittsburgh

- GEOL 1333 and Pitt Green Fund
- Solar Picnic Tables
- Need for additional Capstone Sites



Penn State University – Harrisburg Campus

- PUBPL 304 – Public Policy and Analysis
- 4 Groups: Education Funding, Housing, Cannabis, and Workforce Development
- Final Presentation and Report – State Rep. Dave Madsen

Other PTC Innovations

Mobile Lane Signaling (MLS) System

- Subcommittee on Work Zone Safety

The Mobile Lane Signaling system can be set up at any work zone and near any event to help regulate traffic on the PA Turnpike.

MLS Device

Other PTC Innovations

Other PTC Innovations

Installing SNAPs

- Invented at the Pa Turnpike
- Neal Wood, P.E.
- First installed in 1987 on a downgrade with a history of drift off accidents
- After 18 months, only 1 accident occurred, prompting installation systemwide and then nationwide

Safety Reminder

End of Construction Season Rush to Complete Projects

- See increased Safety Incidents

Consultants that do work on our construction projects

- Safety needs to be their top priority
- If there is something unsafe, say something
- If ignored, move it up the escalation ladder

Access Gate Reminder

Consultants doing CM/CI please keep an eye out for abuse and report it if found

Remember to follow the policy

It is NOT permitted to open the gates for contractors or anyone else, aside from Emergency Responders and PSP

Reminders from Kevin!

Younger Staff – Work into your training time, reduce Errors and Omissions.

Submission Quality – Need to continually work at providing quality submissions

Quality is EVERYONE's responsibility

Thank You ACEC/PA

Michael Girman – President
Rosanna Smithnosky – President Elect
Eric Meyer – Vice President
Casey Moore – Treasurer
Anthony Dougherty – Secretary
Mark Markosky – Immediate Past President
Brent Sailhammer – Executive Director
Sarah Babski – Director Member Engagement/Meeting Planner

Questions

“One Man Can Be A Crucial Ingredient on a Team but One Man Cannot Make a Team”

- Kareem Abdul-Jabbar