

# Economy, Energy & Environment (E3) Pilot Project – St. Marys Carbon Company

## The Need:

St. Marys Carbon Company, a privately held corporation founded in 1939, is a quality integrated manufacturer of carbon graphite, electro-graphite, resin bonded graphite, and metal graphite products. These materials are used in the manufacturing of automotive and industrial brushes, electrical contacts, current collector shoes, and a wide range of mechanical products. St. Marys Carbon wanted to improve the energy efficiency and reduce the carbon footprint of their production operations.



## The PennTAP Connection:

PennTAP received a grant from the US EPA and the PADEP for the delivery of an Economy, Energy and Environment (E3) pilot project in Pennsylvania. PennTAP partnered with The NWIRC, a regional service provider of the PA MEP IRC network, to recruit local manufacturers that wish to implement strategies designed to improve energy, environmental and economic efficiencies. PennTAP and NWIRC experts in lean, environmental and energy practices performed E3 activities to identify strategies for better efficiencies in energy usage and pollution prevention within the selected organization.

## The Project:

The PennTAP-NWIRC-St. Marys Carbon Senior Management team decided that the E3 pilot project would proceed according to the following two distinct sub-projects:

1. A cross-functional assessment team established to identify and implement process changes to reduce waste and reduce energy consumption during the baking process.
2. A three-day assessment event using the Lean Manufacturing technique of Value Stream Mapping applied to a production process.

*"I was very pleased with the vision project to better inform us of the opportunities we have available to process orders. I also was happy with the assistance in the "Fast Bake" project to help us see the value of these cycles. E3 was a Pilot for a MUCH larger objective for St. Marys Carbon .....Throughput!"*

*James Slay  
Chief Operating Officer  
St. Marys Carbon*

### E3 Assessment Results

*14.6% natural gas reduction  
\$50,000/year cost savings  
\$4,500,000/year economic benefit potential  
\$2,000,000 one-time reduction of working capital & avoided unnecessary investments*

## About the Company

St. Marys Carbon Company  
259 Eberl Street  
St. Marys, PA 15857  
814-781-7333  
www.stmaryscarbon.com  
James Slay, Chief Operating Officer  
Bob Cotter, Director of Operations

County: Elk  
Employees: 100  
Industry: Graphite Products

## The Outcome:

### Baking Process

The baking process was identified as a very significant source of waste, emissions and energy consumption with a perceived substantial opportunity for improvement. Baking temperature is currently ramped up to 1850 degrees-F over 20 days, followed by two days of baking and then cool down, up to six days. The total cycle time is 28 days. The objective of this project is to reduce the bake cycle time down to 6-10 days in the 1640 Car kiln oven. Initial tests during this assessment resulted in reducing the bake cycle time by 16.4 days, from 28 days down to 11.6 days. Natural gas consumption is reduced by 14.6% for a savings of \$5,000 per year. Other benefits include an improved and more consistent product, increased throughput, improved energy intensity, increased production capacity, reduce lead times, reduced inventory, and greenhouse gas emissions reductions

### Value Stream Mapping Event

The primary objective of this effort was to apply the lean manufacturing value stream mapping tool to the rotor and vein product family within the company in order to teach the project team the methodology and the benefits than can be achieved. Information collected during the event was then analyzed to develop a possible future state. A summary of the results is summarized in the following table.

	Rotors			Vaness		
	Current State	Future State	% Change	Current State	Future State	% Change
Queue Time (Days)	53	37	30%	23	16	30%
Total Cycle Time (Days)	54	30	44%	34	20	41%
Touch Time (Days)	2.6	2.5	3%	5.8	5	12%
Set Up Time (hrs.)	6	5.5	8%	12.8	9.8	23%

As a result of the E3 project, \$247,000 was invested for implementation of the following recommendations: rebuild vane radius grinder, upgrade edge grinder, change bake patterns and purchase of smaller saggors and thermocouples, retained a consulting firm and purchased a scheduling software package to more efficiently schedule product flow. The Company also reported an additional \$200,000 in avoided unnecessary investments, more than \$50,000 in other cost savings, and increased sales of more than \$30,000.

The E3 project was a pilot for a **MUCH** larger objective for St Marys Carbon, namely **throughput!** A very conservative estimate of the anticipated benefit is **\$1,500,000** per year. The Company further expects that the real value will be in shorter lead times and expedited orders priced at premiums for this level of service, with a targeted additional benefit of **\$3,000,000** per year.

Finally, the reduction of queue time from the current status of 2.2 inventory turns to the improved state of 4 with a target of 6 inventory turns will result in a one-time reduction of working capital of **\$1,850,000**.



#### **Roger L. Price, P.E.**

Sr. Technical Specialist  
Penn State Greater Allegheny  
4000 University Drive  
McKeesport, PA 15132  
P: 412-889-5821  
E: [rogerprice@psu.edu](mailto:rogerprice@psu.edu)