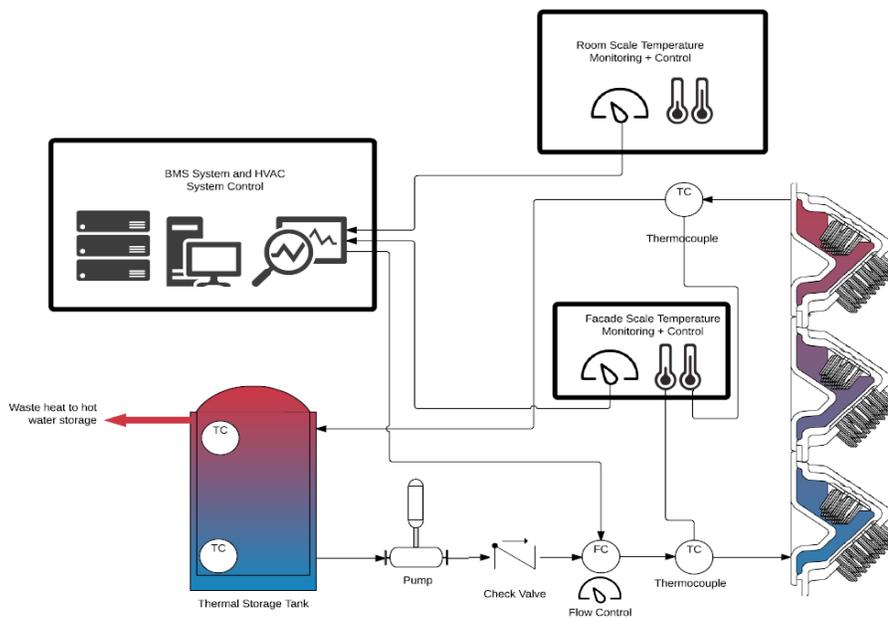


## NYSP21 Conducts Performance Evaluation of EcoCeramics Active Thermal Building Envelope

EcoCeramics, Inc. (EcoCeramics) located in Rensselaer, New York is developing a high-performance masonry active building product: EcoCeramics Envelope System (EES). The EES building fascia is an alumina and glass ceramic tile facade with internal fluid channels and heat transfer surfaces. The EES is designed to gain or lose energy as needed to maintain building comfort and store thermal energy as part of a building automation system.



**EcoCeramics Envelope System**

### CHALLENGE

EcoCeramics requested assistance from New York State Pollution Prevention Institute (NYSP21) and Rensselaer Polytechnic Institute (RPI) to evaluate the performance of their EES as compared to an existing building envelope and an ASHARE Curtain Wall, using analytical models and experimental testing for validation.

### SOLUTION

NYSP21 in partnership with RPI calculated the performance of the EES as compared to an existing conventional building system and the ASHARE Curtain Wall. RPI and NYSP21 performed work in the following key areas in support of the project:

- Analytical modeling of the EcoCeramics EES, ASHRAE Curtain Wall, and a Conventional building system (Howe Center in Hoboken, NJ)

### CHALLENGE

- EcoCeramics requested NYSP21 and RPI to evaluate the performance of their EcoCeramics Envelope System (EES) as compared to a baseline building envelope system

### SOLUTION

- NYSP21 and RPI evaluated the performance of the EES as compared to a conventional building system and an ASHRAE curtain wall

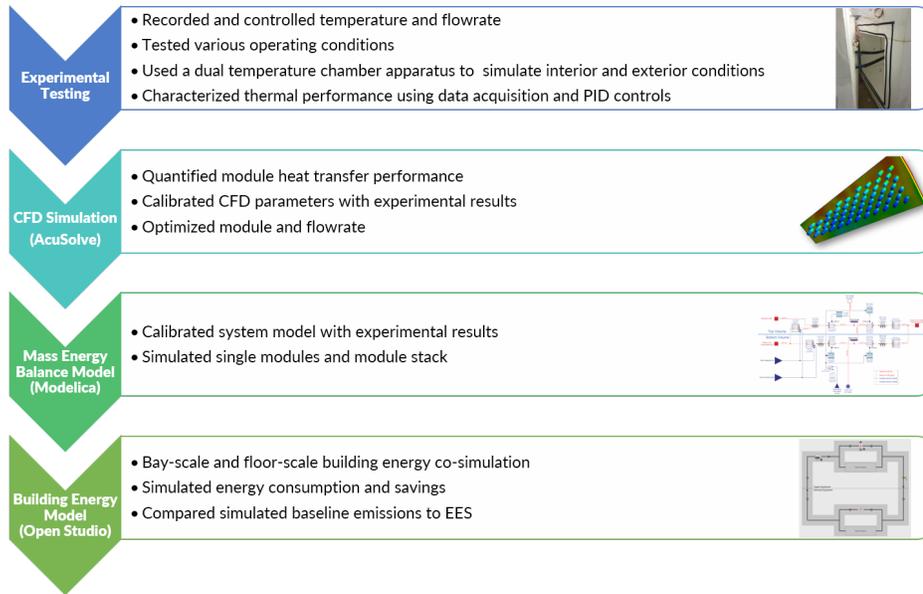
### RESULTS

- EcoCeramics EES enabled significant energy and greenhouse gas reduction as compared to the existing conventional building envelope system
- NYSP21 and RPI estimates the following benefits using EcoCeramics Envelope system:
  - 46.9% annual energy savings for the conventional building considered compared to 43.8% savings with the ASHRAE curtain wall
  - 453 Metric Tons CO<sub>2</sub> (38%) annual reduction from the conventional building envelope
  - 21 Metric Tons CO<sub>2</sub> (2.8%) annual reduction as compared to the ASHRAE curtain wall



- Experimental testing of EcoCeramics modules
- Determination of environmental and energy impact of the EES as compared to existing systems

## EES Performance Evaluation Methodology



## RESULTS

RPI analyzed the building envelopes through experimentally calibrated Computational Fluid Dynamics (CFD) and system models. The analysis confirmed key performance characteristics of the EES, which NYSP2I used to estimate the environmental impact.

### Environmental Impacts with EES:

#### *Building Energy Reduction:*

- 46.9% annual energy savings for the EES over the conventional building envelope compared to 43.8% savings with an ASHRAE 90.1-2013 CZ 4 Curtain Wall

#### *Greenhouse Gas Emissions:*

- Annual reduction of 453 Metric Tons CO<sub>2</sub> (38%) for the existing building envelope based on US average emissions for electricity and natural gas
- 21 Metric Tons CO<sub>2</sub> (2.8%) reduction as compared to the ASHRAE curtain wall

### Economic Impact of EES:

The results of this project will assist EcoCeramics with accelerating commercialization of the EES, expanding business in New York State. EcoCeramics estimates that implementation of EES will create up to 44 jobs over 3 years upon commercialization.

“NYSP2I provided an extremely valuable opportunity for EcoCeramics to take the next steps to commercialization of its EES façade system. EcoCeramics needed a bridge from the initial heat transfer and design modeling and prototype experimental testing of the EES concept to a more fully developed and robust economic and engineering case to bring to potential first adopters in the building construction and design industry. The GTAC-sponsored collaboration between EcoCeramics, NYSP2I, and RPI produced significant modeling and experimental results that confirm the energy and pollution reduction advantages of EES as well as providing important guidance on component design for the façade tile system. The data generated in this project will contribute a great deal to EcoCeramics' progression to a fully commercialized enterprise.”

– Shay Harrison, President  
EcoCeramics, Inc.

## NYSP2I PARTNERS



New York Manufacturing Extension Partnership

Funding provided by the Environmental Protection Fund as administered by the New York State Department of Environmental Conservation. © 2017 Rochester Institute of Technology Any opinions, results, findings, and/or interpretations of data contained herein are the responsibility of Rochester Institute of Technology and its NYS Pollution Prevention Institute and do not represent the opinions, interpretation or policy of the State.

### For more information please contact us:

111 Lomb Memorial Drive, Bldg. 78  
Rochester, NY 14623

Tel: 585-475-2512  
Web: nysp2i.rit.edu  
E-mail: nysp2i@rit.edu