

This 1-year Stage-2 Concept Definition Study will assess microwave activation to enable use of nanoscale catalysts for energy reduction in process industries

Energy-Intensive Reactions



- Petroleum catalytic processes = 1.3 Quads
 - (44% of total US refinery energy)
- Widespread use in other chemical, biorefinery, and petrochemical processes
- Nanostructured catalysts offer higher surface area, increasing effectiveness



Mach I, Inc. - Nanoscale catalyst developer and producer



Materials Technology Institute petrochemical manufacturers interested in improving technology

This project – Stage 2 enabling study



ORNL – Chemical catalysis, microwave and directed-beam technologies

- Life-Cycle Analysis on at least two industrial process applications
- Research plan for Stage-3 development with additional operating industrial partners



Potential Energy Savings
Microwave activation enables lower temperature of bulk streams
80-200 TBtu/yr – refinery catalysis
280-600 TBtu/yr – cross-cutting industrial reactions