

MITEI has two postdoctoral positions available to support analysis of energy transition topics. Applicants should clearly designate which of the two positions they are applying for.

### **Methane pyrolysis project**

The methane pyrolysis project will develop detailed lifecycle assessments and technoeconomic analyses of the pyrolysis process that produces turquoise hydrogen and solid carbon. The project will evaluate the market potential for turquoise hydrogen and solid carbon co-products subject to different local conditions, policy frameworks, and energy market dynamics and produce a comprehensive understanding of the impact of solid carbon on the levelized cost and GHG emissions of turquoise hydrogen production. The project will also consider GHG reductions in materials industries based on incorporation of solid carbon as an additive or as a primary construction material and develop guidelines to prioritize the optimal markets and pathways for utilizing solid carbon in various sectors (e.g., construction, steel, etc.). The project will address such questions as the solid carbon price at which turquoise hydrogen may be profitable; how electricity and natural gas supply costs and carbon intensity affect calculated costs and emissions for turquoise hydrogen; and how costs and emissions should be allocated between turquoise hydrogen and solid carbon in analysis of methane pyrolysis.

### **Geologic hydrogen project**

This project is developing detailed cost and emission analyses regarding production and processing of geologic hydrogen over a range of possible scales, depths, and concentrations. Building on a foundation of in-progress work, the project will consider how conventional natural gas production technologies could be adapted to geologic hydrogen production, whether a basic process model could be developed for geologic hydrogen, and which technologies could be viable for hydrogen gas processing and purification. The project will also evaluate the economic viability and emissions of geologic hydrogen relative to blue and green hydrogen. While much of the project is focused on natural (conventional) geologic hydrogen, stimulated production of geologic hydrogen in the subsurface will also be considered. In the final stages, the project will examine the compositional differences between the two types of geologic hydrogen and the implications for costs and emissions.

### **Core Duties**

In addition to conducting technical work and meeting at regular intervals with MITEI Research Scientists and other staff, the postdoctoral associates will be expected to present research at professional meetings, MITEI workshops, and sponsor meetings; prepare progress reports for sponsors; publish papers in peer-reviewed journals and at international conferences; participate in the activities of MITEI and MITEI's [Future Energy Systems Center](#), including interacting with member companies; and possibly assist with preparation of proposals for future funding.

*REQUIRED:* Ph.D. in chemical engineering or other related engineering field; expertise in lifecycle assessment, technoeconomic analysis, and process modeling; excellent communication skills; ability to work with minimal supervision and prioritize work to meet deadlines; and fluency in spoken and written English.

*PREFERRED:* Experience with process modeling software such as Aspen Plus and LCA software such as GREET. For additional information, please contact Randall Field (<mailto:rpfield@mit.edu>), MITEI's Director of Research.

The position will be located on the MIT campus in Cambridge, MA. This is a one-year position with the possibility of renewal depending on satisfactory performance and continued funding.

These positions will remain open until qualified candidates are hired. Candidates interested in these positions should send 1) a cover letter that states which project you are interested, your suitability for that specific project, and the date of your availability; 2) a CV that includes a complete list of publications; and 3) the names and contact information of three references to Randall Field (<mailto:rpfield@mit.edu>).