Note: This is a research group we are in the process of creating. We are planning to launch a formal website in late February. We have fixed most of the website content and are working on developing the website structure. This is the planned website content and serves as a placeholder until we get our formal website working.

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**SEG: Sustainable Energy Group**  
*Advancing the State-of-the-Art in Sustainable Thermal Energy Conversion Technologies through Research, Technology Development, and Innovation*

**Mission:** To develop human resources and advance the state-of-the-art in thermal energy conversion technologies through excellence in research, technology development, and innovation based on synergistic collaborations with other research institutions, industry, and funding agencies at national and international levels.

**Objectives:**

1. **Research and Technology Development:** To have an impact at the global level through our research and technology development. We seek out and foster synergistic collaborations with international research institutions and always add significant scientific value to these collaborations. We disseminate our work globally through international peer-reviewed Gold Standard Open Access publications.

2. **Industrial Collaboration and Innovation:** To develop and exploit innovative technologies at the national and international levels through synergistic collaborations with industry, technology transfer offices, technology incubators and similar vehicles to foster innovation.

3. **Human Resource Development:** To develop the next generation of researchers as demonstrated by our research group being a destination for bright young researchers due to the opportunities we offer and our current members being sought-after by other groups both nationally and internationally due to the knowledge, skills and expertise they possess.
<table>
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<tr>
<th>Faculty Members</th>
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| **Derek BAKER** | **Research Interests:** Concentrating Solar Thermal (CST); Solar Thermal Electricity (STE) & Concentrating Solar Power (CSP); Renewable Energy Supported Smart Micro-Grids; Nearly Zero Energy Buildings and Districts; Geothermal energy.  
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| **F. Nazlı DÖNMEZER AKGÜN** | **Research Interests:** Micro and nanoscale heat transfer; multiscale thermal modeling; electrothermal modeling; thermal characterization; thermophysical properties; plasmonics.  
**Webpage:** http://www.metu.edu.tr/~donmezer/  
**Email:** donmezer@metu.edu.tr |
| **Feyza KAZANÇ** | **Research Interests:** Combustion; Solid fuels; Alternative fuels; Biomass; Coal; Clean Coal Combustion Technology; Gasification; Oxy-Fuel Combustion; Chemical Looping; Emission Characterization; Fluidized Beds; Drop Tube Furnace.  
**Webpage:** http://www.metu.edu.tr/~fkazanc/  
**Email:** fkazanc@metu.edu.tr |
| **İlker TARI** | **Research Interests:** Fuel Cells; Thermal Energy Storage; Radiative Transfer; Solid Particle Solar Absorption; Fluidized Beds; Numerical Modelling of Thermofluids Systems; Thermal Management of Electronics.  
**Webpage:** http://www.metu.edu.tr/~itari/  
**Email:** itari@metu.edu.tr |
| **Onur TAYLAN** | **Research Interests:** Alternative Energy Conversion Systems; Thermal and Chemical Energy Storage; Non-Thermal Plasma Applications; Radiative Transfer; Biomass; Concentrating Solar Energy; Renewable Energy Supported Micro-Grids.  
**Webpage:** http://onurtaylan.com  
**Email:** ontaylan@metu.edu.tr |
| **Almila Güvenç YAZICIÖGLU** | **Research Interests:** Microscale Heat Transfer and Fluid Dynamics; Microchannel Cooling; Heat Transfer Enhancement using Nanofluids.  
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**Email:** yalmila@metu.edu.tr |
International Research Collaborations: We are currently or have recently collaborated with the following international institutions.

- Advanced Technology Centre for Renewable Energies (CTAER), Spain, www.ctaer.com
- Agenzia Nazionale per le Nuove Tecnologie, L'energia e lo Sviluppo Economico Sostenibile (ENEA), Italy, www.enea.it
- Carnegie Mellon University, USA, www.cmu.edu
- Centre for Renewable Energy Sources and Saving (CRES), Greece, www.cres.gr
- Centre for Research and Technology Hellas (APTL-CERTH), Greece, www.certh.gr
- Centro de Investigaciones Energeticas, Ambientales y Tecnologicas-Ciemat (CIEMAT-PSA), Spain, www. PSA.es
- Deutsches Zentrum Fuer Luft - Und Raumfahrt (DLR), Germany, www.dlr.de/sf
- EU-SOLARIS, European, www.eusolaris.eu
- European Solar Thermal Electricity Association (ESTELA), , www.estelasolar.eu
- System Analysis and Renewable Energies (SEE), University of Stuttgart, Germany, www.ier.uni-stuttgart.de/abteilungen/see.en.html
- The Cyprus Research and Educational Foundation (CYI), Cyprus, www.cyi.ac.cy
- Technische Universität München, Germany, www.tum.de
- The University of Texas at Austin, USA, www.utexas.edu
- Universidade de Evora (U.EVORA), Portugal, www.uevora.pt
- Weizmann Institute of Science (WEIZMANN), Israel, www.weizmann.ac.il
- Georgia Institute of Technology, Atlanta, GA, www.gatech.edu

Funding Agencies: The following agencies are currently or have recently funded our research.

- 7th Framework Programme of the European Union, ec.europa.eu/research/fp7/index_en.cfm
- DAAD German Academic Exchange Service, www.daad.de
- METU Scientific Research Fund, www.bap.metu.edu.tr
- Ministry of Science, Industry and Technology of Turkey, biltek.sanayi.gov.tr
- The Scientific and Technological Research Council of Turkey (TÜBİTAK), www.tubitak.gov.tr
- Solar Facilities for the European Research Area (SFERA), sfera2.sollab.eu
- US National Science Foundation (NSF), www.nsf.gov

Prospective Students: Students working with faculty members from our group have gone on to the following international institutions.

- Case Western Reserve University, Cleveland, Ohio, www.case.edu
- Drexel University, Philadelphia, Pennsylvania, drexel.edu
- Loughborough University, UK, www.lboro.ac.uk
- Old Dominion University. www.odu.edu
- Pennsylvania State University, www.psu.edu
- University of Cambridge, www.cam.ac.uk
- University of Illinois at Urbana-Champaign, www.uiuc.edu
- University of Michigan, www.umich.edu
- University of Nevada, Reno, www.unr.edu
- University of South Florida, www.usf.edu
- The University of Texas at Austin, www.utexas.edu

Research and Innovation:
Research: Ongoing and Recent Research Projects

An Observation on Pulverized Combustion Behavior of Co-firing Turkish Lignite with Various Biomasses and Waste Magnesite Dust in a Drop Tube Furnace (2015-2018). TÜBİTAK (Scientific and Technological Research Council of Turkey) Grant 214M332. PI: Feyza Kazanç; Supported Students: Çağatay Koyuncuoğlu (METU MSc); Researcher: Mert Değerli (METU MSc).

Determining the thermal conductivity of nano-sized Zeolites (2015-2016). METU Scientific Research Fund Project BAP 03.02.2015-001. The objective is to construct a setup and measure the thermal conductivity of different types of zeolites, specifically nano-sized and silver-doped zeolite Beta, which have potential to be used in various thermal applications, such as thermal energy storage. PI: Almıla Güvenç Yazıcıoğlu; Researchers: Burcu Akata Kurç, Yeganeh Baghi (METU PhD)

The Effects of Co-Firing Turkish Lignite with Various Biomasses and Waste Magnesite Dust on Combustion Characteristics (2015-2016). METU Scientific Research Fund Project BAP 08.11.2015-022. PI: Feyza Kazanç; Researcher: Oğuzhan Solak (METU MSc); İmge Koca (METU BSc).

EU-SOLARIS (2012-2016): The European Research Infrastructure for Concentrated Solar Power (CSP); European Union FP7 Grant 312833, CP-CSA_FP7-INFRASTRUCTURES-2012-1. The Objective is to create the legal, financial and management structure for the transnational European Concentrating Solar Thermal (CST) research entity Solaris. The project team consists of 15 research and non-profit entities across 10 different countries. PI: Raşit Turan; Co-Pls: Derek Baker, Tuba Okutucu. eusolaris.eu

Numerical investigation of solid particle fluidized bed concentrated solar energy systems (2015-2016). METU Scientific Research Fund Project BAP 03.02.2015-007. The objective is to numerically model solid particle solar absorption, solid-fluid flow and heat transfer in a solid particle fluidized bed concentrated solar system riser. PI: Ilker Tari; Researcher: Serhat Bilyaz (METU MSc).

EAGER (2014-2015). Energy Harvesting and Storage for Sustainable and Energy Efficient Buildings of the Future. The objective is to seed collaboration between METU GÜNAM and The University of Texas-Austin on photovoltaic research. The project is co-funded by the TÜBİTAK and the US National Science Foundation (NSF). PI: Raşit Turan; Co-Pls: Derek Baker; Mehmet Parlak; Hüsnü Emrah Ünal.

Solar Geothermal Hybrid (SGH) Power Plants (2013-2014): TÜBİTAK (Scientific and Technological Research Council of Turkey) Grant 7120763. The Objective is to install and monitor the performance of parabolic trough collectors at a geothermal power plant in Turkey, and develop software for feasibility and design studies of solar-geothermal hybrid power plants. Consultant: Derek Baker.

EU-SFERA User at CIEMAT-PSA (Centro de Investigaciones Energéticas Medioambientales y Tecnológicas-Plataforma Solar de Almeria) (2013): Grant 228296. 9-13 September 2013. The Objective was to visit PSA’s Heat Transfer Fluid (HTF) testing facility for Parabolic Trough Collector’s (PTC) to support the installation and testing of PTC’s for the Solar Geothermal Hybrid Power Plant project listed above and to support the development of a central CST research facility for Turkey. PI: Derek Baker; Supported students: Cemil Cihan Özalevim (METU MSc); Süleyman Kazim Sömek (METU BSc); Hakan Kocaman (METU BSc). sfera.sollab.eu


Innovation Awards: Students from our group have recently received the innovation awards from the following competitions.

- Cihan ÖZALEVLİ (MSc Student), MITReview Innovators Under 30 – Turkey (2014)
- Süleyman Kazim SÖMEK, 2nd Place, GE Innovation Challenge (2014)