



2014: A Year in Review

1. Overview: One of my primary goals in establishing and maintaining our CERES group is to strengthen our research and graduate education by promoting a shared vision and fostering a cohesive and collaborative environment. To support these goals, I want to share a few of our 2014 accomplishments and set a common objective of being even better in 2015.

1.1 Mission: Many of today's global challenges are intimately tied to energy such as socio-economic development, climate change, national security, resource depletion, and pollution. These challenges represent an opportunity for engineers to create innovative solutions and make a meaningful contribution to society. Through Research, Education, and Service, CERES members are working to develop solutions to these global challenges that are economically viable, and socially, environmentally, and globally responsible.

1.2 Goals: Our goals are excellence in research, education, and service in the area of clean thermal energy conversion systems. The simplest measure for success in reaching these goals is opportunities. Specifically, if we are successful, members will have opportunities to achieve their professional goals both within our group and by moving to other groups within Turkey and internationally. Additionally, high quality new members will want to join our group due to the opportunities we offer.

1.3 Research: Most of our current research fits under the broad umbrella of clean processes that can be driven using or supports Concentrating Solar Thermal (CST) technologies, with a specific emphasis on Solar Thermal Electric (STE) (also called Concentrating Solar Power/CSP) and thermal powered air conditioning systems (e.g., adsorption, absorption, and desiccant). Our research extends into geothermal energy, thermal energy storage, building energy systems, and distributed energy networks and micro-grids.

1.4 Research Objective: Our Research Objective is for all members to demonstrate the ability to do research of publishable quality and to disseminate this work through publications.

2. 2014 Graduates

Tufan AKBA



Degree: METU ME MSc, 2014

Thesis Title: Modelling, transient simulation and parametric study of parabolic trough collector with thermal energy storage.

Supervisor: Assoc. Prof. Dr. Almıla Güvenç YAZICIOĞLU

Co-Supervisor: Assoc. Prof. Dr. Derek BAKER

Nima BONYADI



Degree: METU ME MSc, 2014

Thesis Title: Theoretical and experimental investigation on characteristics of adsorption cooling systems using advanced porous materials.

Supervisor: Assoc. Prof. Dr. Cemil YAMALI

Co-Supervisor: Assoc. Prof. Dr. Derek BAKER

Arash KARSHENASS**Degree:** METU ME MSc, 2014**Thesis Title:** Modelling and transient analysis of a hybrid liquid desiccant cooling system.**Supervisor:** Assoc. Prof. Dr. Cemil YAMALI**Co-Supervisor:** Assoc. Prof. Dr. Derek BAKER**Arsalan TARIQ****Degree:** METU NCC SEES MSc, 2014**Thesis Title:** Methodology to size large scale solar PV installations for institutions with unidirectional metering.**Supervisor:** Assoc. Prof. Dr. Derek BAKER**Koray TAŞTANKAYA****Degree:** METU ME MSc, 2014**Thesis Title:** Development of a methodology for sizing and assessment of wind integrated advanced adiabatic compressed air energy storage system.**Supervisor:** Assoc. Prof. Dr. İker TARI**Co-Supervisor:** Assoc. Prof. Dr. Derek BAKER

3. Publications: The ability to communicate and publish your research is a core skill critical for success in academic and research intensive careers; therefore I increasingly see this as a skill that I can be expected to strengthen among my students. I also think communicating your research through publications has several positive feedback mechanisms that improve not only your actual research but also your fundamental research skills, and also creates research opportunities. To communicate and assess our success in strengthening scientific communication and publishing skills, our 2014 publishing information is presented below as a Student Author Index and List of Publications. In the Author Index the number of students who gained experience in scientific communication and publishing in 2014 is quantified, where I classify a co-author as a student if the publication is based on their work as a student, even though in some cases the paper was written after they graduated. In the List of Publications the number and type of publications is quantified. I am aware that some students published without me as a co-author, and to simplify my life in preparing this document I am only including publications in which I am a co-author. Additionally, several papers presented at conferences were invited to be submitted to books and journals, and to avoid double counting, these are only listed once under Book Chapters and Journal Articles.

3.1 Student Author Index: While a List of Publications is a common way to communicate publishing activity, I am not happy with it as a method to communicate the number of students involved in publishing, which I see as an equally important metric. Therefore after much thought of how to communicate and assess student involvement in publishing, I decided a Student Author Index would

be more effective. As a side note, as you work to communicate your own research, remember the way you present your information impacts the ease with which and how the reader interprets this information.

	Journal Articles		Accepted	Published
	Published	Submitted	Book Chapters	Conference Paper
1. Ali, S. M. H.		1		
2. Altinoz , M.				1
3. Bilyaz, S.			1	
4. Karshenass, A.			2	
5. Özalevli, C. C.			1	1
6. Özkan, O.	1			
7. Pehlivan Türk, C.	1			
8. Qureshi, F. U.		1		
9. Sadati, S. M. S.		1		
10, Singh, R.			2	
11. Sömek, S. K.			1	1
12. Tariq, M. A.		2		1
13. Zuberi, M. J. S.		1		1

3.2 List of Publications: To emphasize student involvement in publishing, I initially just tried underlining co-authors who were students in this List of Publications. However, I was not happy with this method to quantify and communicate the number of students involved in publishing, and subsequently decided to create the Student Author Index. I have retained the underlining of co-authors who were students to further communicate student involvement in these publications.

3.2.1 Journal Articles

Published

Pehlivan Türk, C., Özkan, O., Baker, D. K. (2014). *Modeling and Simulations of a Micro Solar Power System*. International Journal of Energy Research. 38. 1129-1144. doi: [10.1002/er.3119](https://doi.org/10.1002/er.3119).

Submitted

Ali, S. M. H., M. J. S. Zuberi, M. A. Tariq, D. Baker, A. Mohiuddin (In-Review). *A study to incorporate renewable energy technologies into the power portfolio of Karachi, Pakistan*. Renewable & Sustainable Energy Reviews.

Sadati, S. M. S., F. U. Qureshi, D. Baker (In-Review). *Energetic and Economic Performance Analyses of Photovoltaic, Parabolic Trough Collector and Wind Energy Systems for Multan, Pakistan*. Renewable & Sustainable Energy Reviews.

Tariq, A., D. Baker (In-Review). *Technical and economic analysis of a Solar PV Power Plant for Middle East Technical University Northern Cyprus Campus*. International Journal of Exergy.

3.2.2 Book Chapters (All Accepted and In-Press)

Baker, D., Özalevli, C. C., Sömek, S. K. (In Press, Accepted 13 Nov. 2014). "Technical Study of a Hybrid Solar-Geothermal Power Plant and its Application to a Thermal Design Course," *Progress in Clean Energy - Volume 2 Novel Systems and Applications*. Springer.

Bilyaz, S., Singh, R., Karshenass, A., D. Baker (In Press, Accepted 13 Nov. 2014). "Modeling and Transient Simulations of 30 MW Solar Thermal Electric Power Plants in the Northeast Mediterranean Region," *Progress in Clean Energy - Volume 2 Novel Systems and Applications*. Springer.

Karshenass, A., Baker, D., Yamali, C., Singh, R. (In Press, Accepted 13 Nov. 2014). "Technical Analysis of Hybrid Desiccant Cooling in a Mediterranean Climate," *Progress in Clean Energy - Volume 2 Novel Systems and Applications*. Springer.

Sankir, M., Semiz, L., Serin, R. B., Sankir, N. D., Baker, D. (In Press, Accepted 04 Nov. 2014) "Hydrogen Generation from Chemical Hydrides, Advanced Catalytic Materials" *Advanced Materials Book Series*. Eds: A. Tiwari and S. Titinchi. Wiley-Scrivener Publishing, USA.

3.2.3 Conference Papers

Altinoz, M., A. Guvenc Yazicioglu, D. Baker (2014). "Experimental Investigation of Single-Phase Liquid Flow and Heat Transfer in Multiport Minichannels," ASME 2014 4th Joint US-European Fluids Engineering Division Summer Meeting and 11th International Conference on Nanochannels, Microchannels, and Minichannels, FEDSM2014, August 3-7, 2014, Chicago, Illinois, USA.

Kuyumcu, Ö. Ç., O. Serin, C. C. Özalevli, D. K. Baker, S. K. Sömek (2014). "Design and Implementation of the Gümüşköy Hybrid Geothermal and Solar Thermal Power System," 38th GRC (Geothermal Research Council) Annual Meeting & GEA (Geothermal Energy Association) Geothermal Energy Expo, Sept. 28-Oct. 1, 2014, Portland, Oregon, USA.

Tariq, M. A., M. J. S. Zuberi, D. Baker (2014). "Ethanol production and fuel substitution in Pakistan promoting sustainable transportation and mitigating climate change," International Conference on Clean Energy 2014 (ICCE-2014), June 8-12, Istanbul, Turkey.

4. Innovation: Research is increasingly not only expected to create new knowledge but is also expected to lead to innovation, which includes but is not limited to stimulating economic growth through the commercialization of new technologies. One of the primary metrics to measure creation of new knowledge is quantity and quality of publications. Primary metrics to measure innovation include patents, companies started, and technologies licensed. I have thought about renaming our group *CERES: Clean Energy Research, Innovation, Education, and Service* or similar to reflect that increasingly our success is not only dependent on research, education, and service, but also on innovation. While in recent years I have spent considerable time and effort to develop methods to strengthen scientific communication and publication skills, I have only recently started to develop methods to package and teach innovation skills, and I still consider these methods very immature. Therefore I am happy that Cihan and Kazim are taking the initiative to be innovative and I want to share their successes with you.

Cihan Özalevli, One of 10 *Innovators Under 35-Turkey* named by *MIT Technology Review*.

Süleyman Kazım Sömek, 2nd Place, *GE Turkey Innovation Competition*.



Best wishes for a happy, safe and successful 2015 full of Research, (innovation), Education, and Service!

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