

CE

May 15, 1995

Haroutiun Topsakalian  
USAID/IDEA  
Aygedzor 10  
Yerevan

Dear Mr. Topsakalian,

I have received final approval from the Dean of Engineering, Armen Der Kiureghian, for the course "Energy Systems, Technology, and Policy" to be included as a 2-unit elective course in the Department of Industrial Engineering at The American University of Armenia (see enclosed syllabus and course announcement).

This course will introduce engineering and business students to the issues and technology of energy generation in Armenia in a formal and meaningful manner, and I believe it will help stimulate the work and goals of the USAID offices, including a closer collaboration with researchers at AUA.

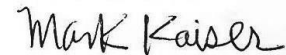
I am soliciting your support, and would hope to obtain funding for this experimental course, team taught with Artak Hambarian (physicist and research associate at the Engineering Research Center) and Newell Thomas (electrical engineer working with Ascension Technology, Inc.) in the amount of \$2000. I believe that this small investment will yield a large potential payoff both to the students at AUA, and to the infrastructure of Armenia.

I further anticipate establishing a close working relationship with your office, and appreciate any assistance and expertise you can provide in regard to this course and energy policy we hope to develop.

Thank you for your consideration, and I look forward to your response.

Sincerely,

Mark Kaiser



cc: Armen Der Kiureghian  
Michael Kouchakdjian

## IE 290 C- Special Topics: Energy Systems, Technology and Policy

*Prerequisites:* None

*Course Description:* An examination of the basic physics, engineering, and related policy of conventional and renewable energy production, storage and delivery systems. Forms of energy production to be discussed include conventional sources such as coal, oil, natural gas, and renewable systems such as hydroelectric, geothermal, solar, and wind power. World trends, policy of the transition period, and environmental and sociopolitical impacts will also be discussed.

*Course Goals:* Through lectures, field demonstrations and plant trips, students will be provided a comprehensive and practical overview of the fundamental issues involved in energy generation. Renewable resource assessment will be discussed with state-of-the-art techniques and equipment. The potential role of alternative energy sources in meeting present and near future energy policy based on a comparison of costs, benefits, and risks (political, as well as environmental) will be outlined. Aspects of modeling and data analysis will also be covered.

*Course Structure:* "Energy systems, technology, and policy" is designed as a 5-week course team taught by Dr. Mark Kaiser, Visiting Assistant Professor of IE at AUA; Newell Thomas, from Ascension Technology, Inc., electrical engineer with 12 years experience in the renewable energy field; and Artak Hambarian, semiconductor physicist with 9 years experience at Yerevan Microelectronics Institute and research associate at the Engineering Research Center at AUA. Dr. Kaiser will organize and oversee the course and teach basic modeling principles and policy issues. Mr. Thomas will teach wind power technology, renewable energy applications, resource data collection/analysis and policy. Mr. Hambarian will teach solar photovoltaic theory and renewable technology projects and prospects for Armenia.

Field trips are scheduled for the Hrazdan thermal power plant, Hrazdan hydroelectric plant, the 5 kW photovoltaic system at St. Sargis church in Yerevan, and the Aragast wind site. Dr. Panossian of State Engineering University has offered a tour of the photovoltaic panel manufacturing facility, and the Solar Institute is another option for a field trip.

American University is in the process of obtaining the most modern wind and solar monitoring equipment from State Engineering University and donated equipment from Ascension Technology, Inc. Students will learn the data logging equipment used to collect

and analyze real data for solar and wind assessment in Armenia. This is the first step to establish a national renewable energy monitoring network for the country.

*Course Textbook:* Lecture notes will be provided.

*General Outline:*

<b>Week</b>	<b>Lecture</b>	<b>Topic</b>
1	1	Overview of conventional and renewable energy sources.
	2	Solar analysis (modeling)
2	3	Theory of Photovoltaic effect.
	4	Technology of renewable energy: photovoltaic converters, energy storage systems.
3	5	Renewable technology applications in Armenia.
	6	Wind Analysis (modeling).
4	7	Resource monitoring and assessment.
	8	Wind power technology and applications.
5	9	Hydroelectric energy.
	10	Energy policy for Armenia.

## **Course Announcement:**

# **IE 290 C - Energy Systems, Technology, & Policy (2 units)**

<b><i>Prerequisites:</i></b>	None
<b><i>Audience:</i></b>	1 <sup>st</sup> /2 <sup>nd</sup> year Engineering & Business students (Business students should seek prior approval from Dr. Kaiser)
<b><i>Capacity:</i></b>	Enrollment on a FIRST-COME FIRST-SERVE basis (LIMITED TO 30 STUDENTS)
<b><i>Goals:</i></b>	Through lectures, field demonstrations, and plant trips, students will be provided a comprehensive and practical overview of the fundamental issues and policy involved in the energy sector of Armenia.
<b><i>Text:</i></b>	Lecture notes will be provided.

*For further information contact Dr. Kaiser (Room 30e), Artak Hambarian (Room 30b), or Newell Thomas (Room 30b).*