



ENERGY FORUM

FORUM ORGANIZERS:

Dave Ginley

National Renewable Energy Laboratory

Claudio Estrada

UNAM

Paul Grant

Colorado School of Mines

The world's focus on climate change has heightened interest in a more sustainable way to generate and use energy in order to drive societal development. There is an ongoing reexamination of conventional energy systems based upon coal, gas, and nuclear fuels, as well as a new emphasis on renewable and green energy cycles. Besides these "supply-side" challenges, sustainable "demand-side" innovations are needed, including next-generation vehicles, efficient indoor lighting, energy-efficient buildings, and recycling.

This forum will explore the materials advancements that are pivotal to our success in developing more desirable energy systems. Discussion will focus on the need to develop materials, models to anticipate their impacts, and the materials science behind such technologies. Topics covered will encompass emerging materials science in the following areas:

Energy Generation

Renewable power generation – solar, wind, solar thermal, geothermal

Conventional power generation – nuclear, coal, gas, and oil

Materials needs and technologies for emerging generation concepts, fuels production, and CO₂ abatement

Energy Use and Storage

Next-generation vehicles – plug-in hybrids, electric, alternative fuel, fuel cell

Stationary power – fuel cells and materials for advanced buildings

Energy storage – batteries, CAES, hydro, flywheels, ultracapacitors, and thermal storage fluids

Green Processes and Sustainable Processing

Green process technologies

Recycling approaches

Lifecycle engineering

Energy-efficient buildings



**MONDAY, AUGUST 17
ROOM TULUM "E"
(JW MARRIOT)**

AFTERNOON SESSION

EF-1 16:00-16:30

FORUM INTRODUCTION AND THEME

David Ginley

National Renewable Energy Laboratory

EF-2 16:30-17:00

**GLOBAL CLIMATE CHANGE – ENERGY NEEDS IN A CHANGING
WORLD**

V. S. Arunachalam

Center for Study of Science, Technology & Policy, India

EF-3 17:00-17:30

ANALYSIS OF GLOBAL ENERGY AND CARBON FLOWS

Richard Sassoon

Stanford University, GCEP Program

EF-4 17:30-18:00

**FUTURE PATHS TO ELECTRICAL ENERGY PRODUCTION WITH NUC-
LEAR POWER**

Sara Scott

Los Alamos National Laboratory

EF-5 18:00-18:30

**CONVENTIONAL VS SUSTAINABLE TRANSPORTATION FUELS FOR
THE FUTURE**

Russel Chianelli

University of Texas El Paso

EF-6 18:30-19:00

RECYCLING THE IMPACT ON THE ENERGY EQUATION

Randolf Kirchain

Massachusetts Institute of Technology

18:30-20:30 POSTER SESSION & COFFEE BREAK

**TUESDAY, AUGUST 18
ROOM TULUM "F"
(JW MARRIOT)**

MORNING SESSION

EF-7 8:30-9:00

RENEWABLE ENERGY CHALLENGES FOR MEXICO

Sebastian Pathiyamattom Joseph

Centro de Investigacion Energia, UNAM, Mexico

EF-8 9:00-9:30

MATERIALS RESEARCH NEEDS FOR PHOTOVOLTAICS

David Cahen

Weizmann Institute, Israel

EF-9 9:30-10:00

**MATERIALS CHALLENGES IN PHOTOVOLTAIC SOLAR ENERGY
CONVERSION**

Rueben Collins

Colorado School of Mines, REMERSEC

EF-10 10:00-10:30

MATERIALS CHALLENGES TO ENERGY STORAGE

M. Stanley Whittingham

Institute for Materials Research, SUNY at Binghamton

EF-11 10:30-11:00

ENERGY STORAGE, NEW BATTERY MATERIALS

Anne Dillon

National Renewable Energy Laboratory

11:00-11:30

COFFEE BREAK

11:30-12:30

PLENARY 3

EF-12 12:30-13:00

FUEL CELLS FOR ENERGY CONVERSION

Ryan Ohayre

Colorado School of Mines, REMERSEC

EF-13 13:00-13:30

**IONIC CONDUCTION CRITICAL ASPECTS TO ENERGY CONVERSION
AND STORAGE**

Sossina Haile

California Institute of Technology

EF-14 13:30-14:00

**IMPORTANCE OF NANOMATERIALS TO ENERGY CONVERSION
AND STORAGE**

Sam Mao

University of California Berkeley

14:00-16:00

LUNCH

16:00-18:30

AFTERNOON SESSION

**16:00-18:00 PANEL DISCUSSION – VIABLE APPROACHES TO
ENERGY CONVERSION FOR THE WORLD**

Moderator: David Ginley, National Renewable Energy Laboratory

Panelists:

All Forum Presenters



18:30-20:30 POSTER SESSION & COFFEE BREAK

EF-P1

BIODIESEL PRODUCTION FROM JATROPHA CURCAS SEED OIL

¹G. Corro, ²A.L. Martinez Ayala, ²E. Ocaranza Sanchez, ²M. Morales-Rosas

¹Instituto de Ciencias, Benemerita Universidad Autonoma de Puebla, 4 sur 104, Puebla Puebla 72000, Mexico. E-mail: cs001380@siu.buap.mx

²Instituto Politecnico Nacional, Centro de Investigación en Biotecnología Aplicada, Tlaxcala, E-Mail: alayala@hotmail.com

EF-P2

BIOGAS PRODUCTION FROM COFFEE WASTE

G. Corro, C. Cano, R. Hernandez-Huesca, T. Jimenez-Salgado, A. Tapia-Hernandez, M. Rosas-Morales¹

Instituto de Ciencias, Benemerita Universidad Autonoma de Puebla, 4 sur 104, Puebla Puebla 72000, Mexico. E-mail: cs001380@siu.buap.mx

¹Instituto Politecnico Nacional, Centro de Investigación en Biotecnología Aplicada, Tlaxcala, e-mail: mormin@hotmail.com

EF-P3

RESEARCH & DEVELOPMENT ON HIGHLY EFFICIENT THERMOELECTRIC MATERIALS PROGRAM AT THE ALABAMA A&M UNIVERSITY

S. Budak¹, C. Smith², S. Guner³, C. Muntele², and D. ILA²

¹Department of Electrical Engineering, Alabama A&M University, Normal, AL USA ²Center for Irradiation of Materials, Alabama A&M University, Normal, AL USA ³ Department of Physics, Fatih University, Istanbul, TURKEY

Presenting author email: ila@cim.aamu.edu, Daryushila@aol.com

EF-P4

TOWARD ZERO ENERGY RENOVATION USING HIGH-PERFORMANCE TRANSPARENT MATERIALS

Emanuele Naboni¹, Elena Lucchi²

ratory, 1 Cyclotron Road, MS 90R3111, Berkeley, CA 94720, USA. E-mail: emanuele.naboni@gmail.com ² Politecnico of Milano, BEST Department, Via Bonardi 9, 20133 Milano. E-mail: elena.lucchi@polimi.it



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Materials Research Society
The Materials Gateway

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