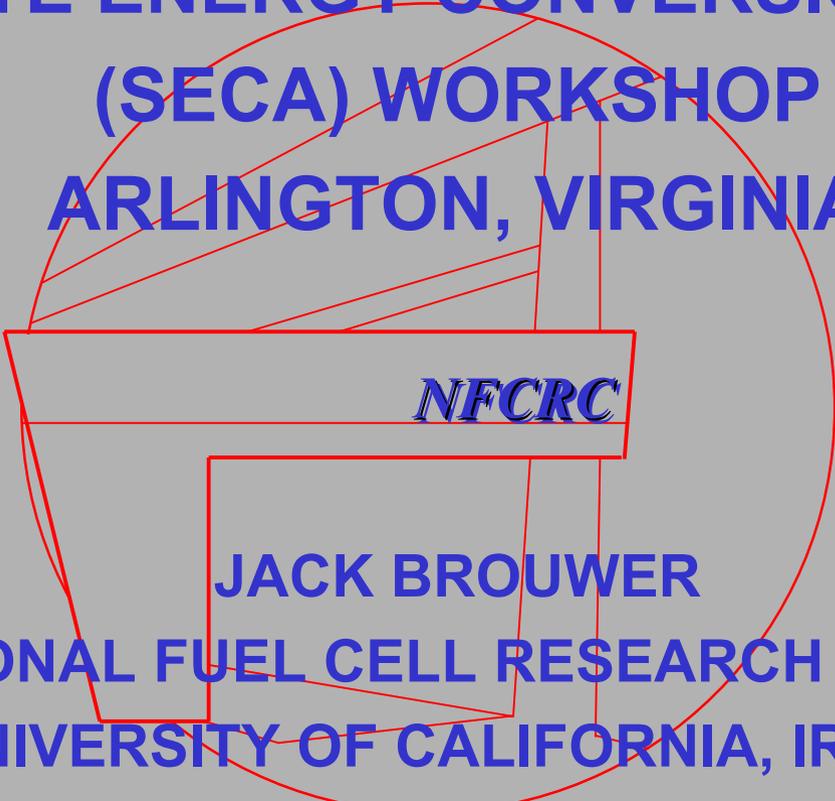


# UNIVERSITIES FOR FUEL CELLS

## SOLID STATE ENERGY CONVERSION ALLIANCE (SECA) WORKSHOP ARLINGTON, VIRGINIA

A large red outline of the NFCRC logo, which is a stylized building with a flat roof and a central vertical element. The text 'NFCRC' is written in blue, italicized font across the top horizontal bar of the building.

*NFCRC*

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MARCH 29, 2001



# UNIVERSITIES FOR FUEL CELLS

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## OUTLINE

- INTRODUCTION TO UfFC CONCEPT
- BACKGROUND
  - DESCRIPTION OF CURRENT/PAST ACTIVITIES
- GOALS AND OBJECTIVES OF UfFC
- RELATIONSHIP TO SECA PROGRAM
- NEXT STEPS



# INTRODUCTION

- FUEL CELLS ARE AN “EMERGING” TECHNOLOGY
- RESEARCH AND DEVELOPMENT OF FUEL CELLS IS ALSO “EMERGING”
- FUEL CELL EDUCATION IS NOT WIDESPREAD
- PUBLIC DOESN'T HAVE BASIC UNDERSTANDING OF FUEL CELLS
- ENGINEERS OFTEN HAVE NO BASIC UNDERSTANDING OR BACKGROUND IN FUEL CELLS
- BROAD RANGE OF MULTI-DISCIPLINARY TALENT IS REQUIRED:
  - PHYSICS
  - CHEMISTRY
  - MATERIALS SCIENCE
  - HEAT TRANSFER
  - FLUIDS
  - ELECTROCHEMISTRY

**emerging** (i mûrj' ing), *v.i.*, to come forth into view, as from concealment, or, to rise, as from an inferior state



# INTRODUCTION

- **BRING OPPORTUNITIES INTO VIEW**
  - JOINT RESEARCH AND DEVELOPMENT PROJECTS
  - R&D PROGRAMS
  - INDUSTRY, UNIVERSITY, NATIONAL LAB COLLABORATIVES
- **RAISE FUEL CELL EDUCATION LEVELS (FROM THEIR INFERIOR STATE)**
- **BRING FORTH INTO VIEW CONCEPTS AND BREAKTHROUGHS THAT COULD IMPACT FUEL CELLS**
- **IDENTIFY NEEDED RESEARCH AND DEVELOPMENT ACTIVITIES**
- **IDENTIFY SCIENTIFIC EXPERTISE AND TALENT AT VARIOUS INSTITUTIONS THROUGHOUT U.S. (WORLDWIDE)**
  - ADDRESS REQUIRED R&D
  - ADDRESS FUEL CELL PROGRAM NEEDS
- **RAISE GENERAL AWARENESS OF FUEL CELLS**



# BACKGROUND

- U.S. DEPARTMENT OF ENERGY WORKSHOP, MORGANTOWN, WV, AUGUST, 1998
- EVENING BREAKOUT GROUPS (UNIVERSITIES GROUP FORMED)
- PROFESSOR J. ROBERT SELMAN LEADING EFFORTS TO-DATE
- SEVERAL INFORMAL MEETINGS
  - AT MAJOR ELECTROCHEMICAL SOCIETY MEETINGS
  - AT JOINT U.S. DOE/EPRI/GRI MEETINGS
  - AT ILLINOIS INSTITUTE OF TECHNOLOGY
- NFCRC JOINED IN LEADERSHIP
- VOLUNTARY AND SELF-SUPPORTED PARTICIPATION



# GOALS AND OBJECTIVES

- **SUPPORT UNIVERSITY-BASED FUEL CELL ADVANCEMENT**
- **SUPPORT MAJOR U.S. DOE PROGRAMS THAT ARE ADVANCING SOLID STATE FUEL CELLS**
- **PROVIDE AN INFORMATION CONDUIT BETWEEN AND AMONGST UNIVERSITIES, NATIONAL LABS, AGENCIES, INDUSTRY**
- **EDUCATE PUBLIC ON FUEL CELLS IN GENERAL AND SOLID STATE FUEL CELLS IN PARTICULAR**
- **PROVIDE A FORUM FOR INFORMATION DISSEMINATION AND THE DEVELOPMENT OF EDUCATIONAL MATERIALS**
- **FOSTER INCREASED PARTICIPATION OF SCIENTISTS AND RESEARCHERS IN THE EMERGING FIELDS REQUIRED**



# RELATIONSHIP TO SECA

- **SECA PROGRAM NEEDS A STRONG CONTINGENT OF UNIVERSITY RESEARCHERS**
  - CRITICAL EXPERTISE
  - REQUIRED RESEARCH AND DEVELOPMENT CAPABILITIES
- **SECA PROGRAM (AND OTHERS) ARE VERY BROAD**
  - FUEL CELLS AND FUEL CELL MATERIALS
  - FUEL PROCESSORS
  - INVERTERS AND POWER ELECTRONICS
  - WATER AND THERMAL MANAGEMENT
  - SYSTEMS MODELING AND SYSTEM INTEGRATION
  - MANUFACTURING
- **SECA PROGRAM HAS AMBITIOUS COST TARGETS**
  - BREAKTHROUGHS AND DISCOVERIES



# NEXT STEPS

- **DESIRE IS FOR VERY LOW OVERHEAD OPERATION**
- **NO COMPLEX STRUCTURE, NO LARGE TIME COMMITMENT (VOLUNTARY PARTICIPATION)**
- **FOCUSED EFFORTS (JOINT WORKSHOPS, BROCHURE, WEB-SITE, WHITE PAPERS)**
- **SUPPORT ALLIANCE BUILDING**
- **ATTRACT A MORE BROAD CROSS-SECTION OF UNIVERSITY PARTICIPANTS**
  - **E.G., UNIV. OF WISCONSIN, VIRGINIA TECH, OTHERS EXPERTISE IN POWER ELECTRONICS**
- **SERVE AS INFORMATION CONDUIT**
  - **INDUSTRY INTEGRATION TEAMS**
  - **CORE TECHNOLOGY PROGRAM**



# NEXT STEPS

## RESEARCH AREA WORKSHOPS

- **EXCHANGE OF INFORMATION**
  - STATUS AND CURRENT RESEARCH ACTIVITIES
  - FUNDING OPPORTUNITIES ARE REVIEWED,
  - JOINT EFFORTS ARE ESTABLISHED FOR FUNDING.
- **DEVELOP TECHNOLOGY TRANSFER MATERIALS**
- **SUPPORT DOE PROGRAMS**
- **SUPPORT INDIVIDUAL AND JOINT UNIVERSITIES' PROGRAMS**



# NEXT STEPS

## INFORMATION DEVELOPMENT/DISSEMINATION

- ESTABLISH A WEB-SITE
- GENERATE/IDENTIFY RESEARCH AREA NEEDS
- GENERATE BROCHURE
  - LAY AUDIENCE
- GENERATE WHITE PAPER(S)
  - OBJECTIVE INFORMATION
  - PERSUASIVE SCIENTIFIC INFORMATION



# NEXT STEPS

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## REQUEST TO YOU:

- **HELP US IDENTIFY INTERESTED PARTIES**
  - YOU AND YOUR UNIVERSITY ORGANIZATION
  - COLLEAGUES, ACQUAINTANCES
  - GROUPS OR INDIVIDUALS YOU KNOW ABOUT
- **SEND TO:**
  - JACK BROUWER, [JB@NFCRC.UCI.EDU](mailto:JB@NFCRC.UCI.EDU)

