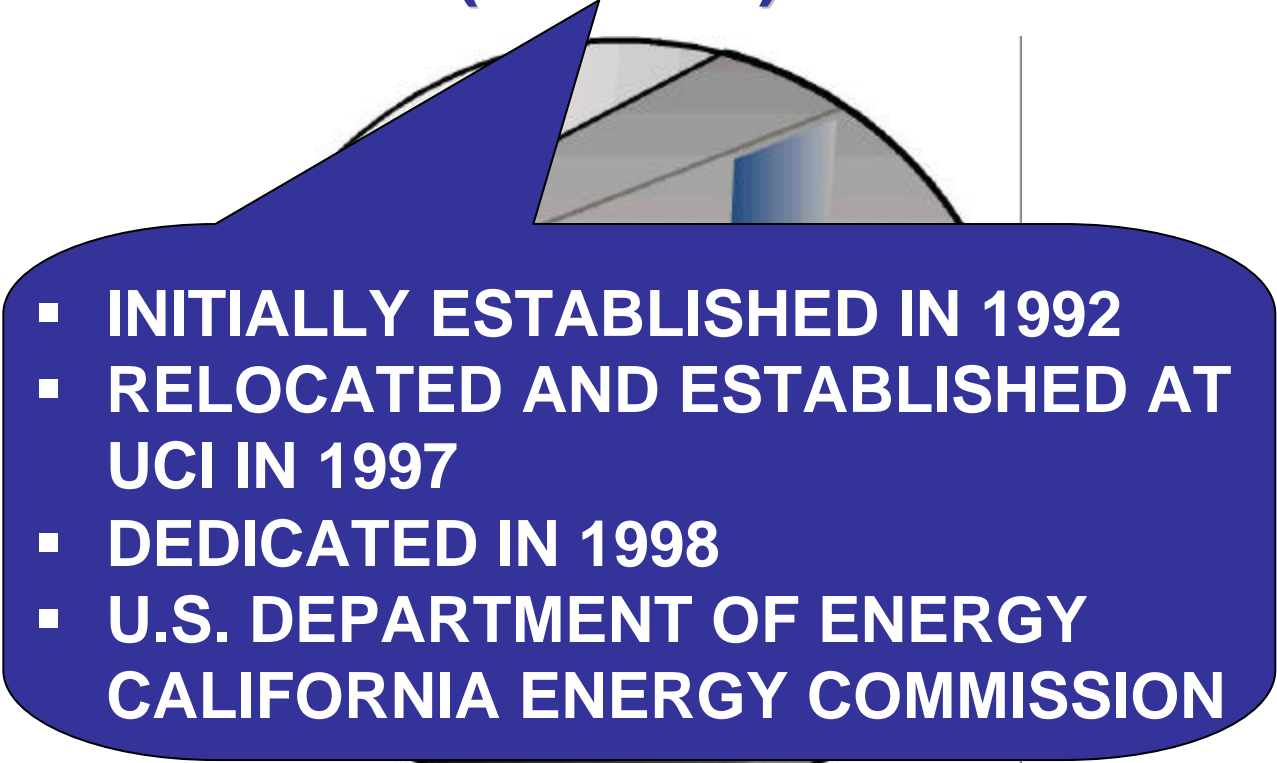


NATIONAL FUEL CELL RESEARCH CENTER (NFCRC)

- 
- **INITIALLY ESTABLISHED IN 1992**
 - **RELOCATED AND ESTABLISHED AT UCI IN 1997**
 - **DEDICATED IN 1998**
 - **U.S. DEPARTMENT OF ENERGY CALIFORNIA ENERGY COMMISSION**

August, 2002

NATIONAL FUEL CELL RESEARCH CENTER

- **MISSION**

~~TO FACILITATE AND ACCELERATE THE~~ **DEVELOPMENT** ~~AND~~
~~DEPLOYMENT OF FUEL CELL TECHNOLOGY AND FUEL CELL~~
~~SYSTEMS, AND PROMOTE STRATEGIC~~ **ALLIANCES**
~~ADDRESS THE MARKET CHALLENGES ASSOCIATED WITH THE~~
~~INSTALLATION AND INTEGRATION OF FUEL CELL SYSTEMS~~
~~INTO THE BUILT ENVIRONMENT~~

- **APPROACH**

RESEARCH
EDUCATION
BETA TESTING
MARKET DYNAMICS



APPROACH

UNIVERSITY ROLE

TRADITIONAL

NON-TRADITIONAL

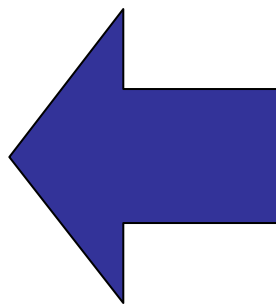
EDUCATION	RESEARCH & DEVELOPMENT	BETA TESTING	DEMO	FACILITATE POLICY / MARKET
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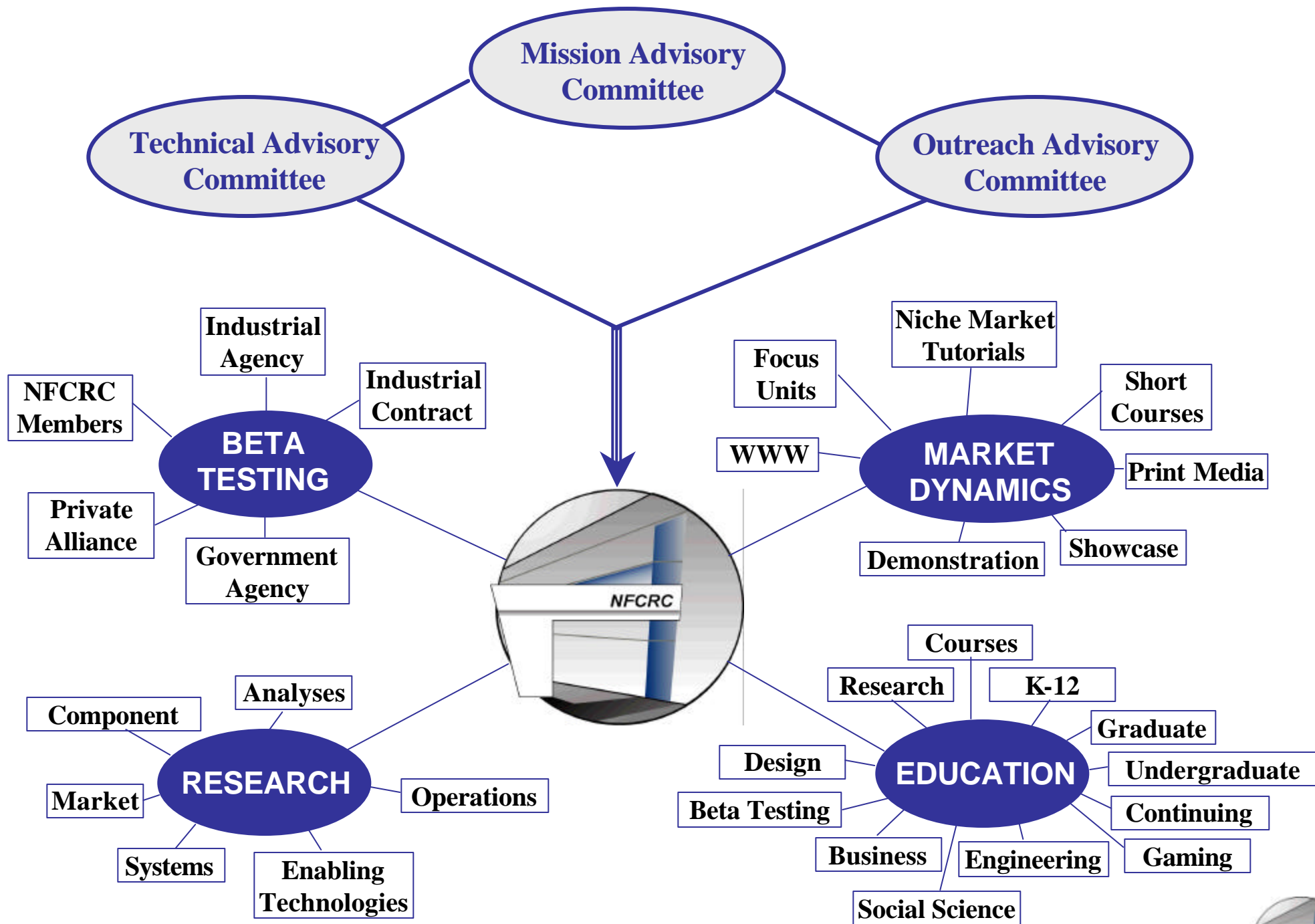
INPUTS

- R&D needs
- Education
- Stakeholders
 - Industry
 - Agencies
 - Market
 - Regulators
 - Codes

OUTPUTS

- Trained personnel
- Information
- Tools
- Accelerated development
- Market connectiveness
- Public benefit
- Experiential data

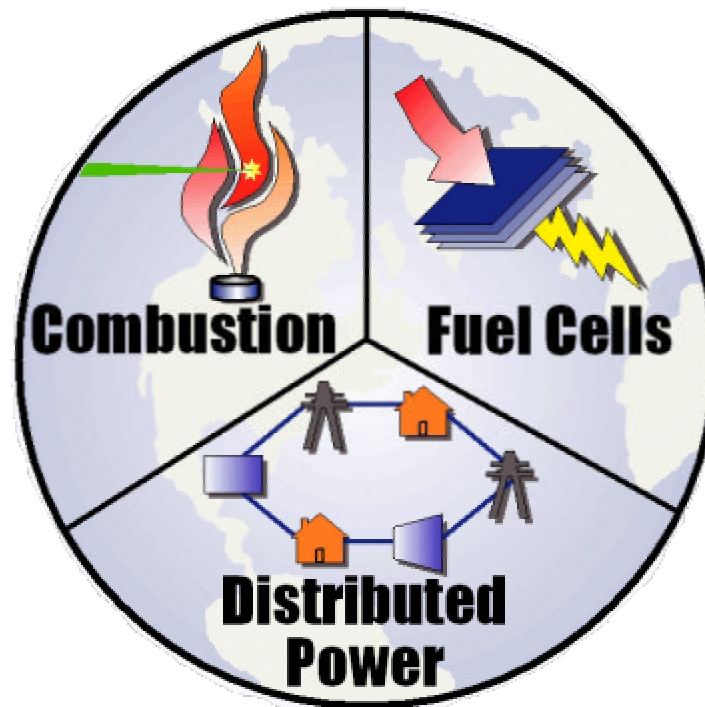




APPROACH

Advanced Power & Energy Program (APEP) context APEP the official umbrella organization since 2000

- National Fuel Cell Research Center (NFCRC)
- UCI Combustion Laboratory (UCICL)
- Pacific Rim Consortium on Energy Combustion and Environment (PARCON)



NATIONAL BASED MEMBERSHIP

Agencies

Air Resources Board

CA Institute of Energy Efficiency

Department of Energy

**South Coast Air Quality
Management District**

CA Energy Commission

Department of Defense

Electric Power Research Institute

Industry

Capstone Turbines

FuelCell Energy Corp.

Horiba Limited

Parker Hannifin

Siemens-Westinghouse Power

Southern California Gas

ChevronTexaco

Marine Fuel Cells

Plug Power

Southern California Edison

Toyota



APPROACH

COLLABORATIVE INTERACTION WITH INDUSTRY

- **CONTRACTS, GRANTS, TEAMING**

SCIENCE COUPLED TO PRACTICAL APPLICATION

- **ENERGY SYSTEMS: FUEL CELLS, GAS TURBINES, MICROTURBINE GENERATORS, HYBRIDS, INVERTERS, IT, BOILERS AND FURNACES**
- **PROPULSION SYSTEMS: GAS TURBINES, ROCKETS**

PERSONNEL

- **PROFESSIONAL STAFF**
- **GRADUATE STUDENTS**
- **UNDERGRADUATE STUDENTS**
- **RESEARCH ASSOCIATES**



RESEARCH STRATEGY / FOCUS

NFCRC Focus is on Stationary Power (Distributed Power)

NFCRC Focus is on Systems Research

- Fuel cell systems
- Gas turbine systems
- Fossil-fueled Hybrids
- Renewable Hybrids
- Fuel Processing (reformation)

Work with other Faculty, Staff, Universities and Partners in Key Research Areas

- Materials
- Systems and Simulation
- Fuel Processing
- Power Electronics
- Controls
- Manufacturing



RESEARCH STRATEGY / FOCUS

Controls

- Professor Faryar Jabbari

Materials

- Professors Martha McCartney, Arthur Nowick

Fuel Processing

- Professor Scott Samuelsen

Seismic

- Professors Gerry Pardoen, Jan Yang

Power Electronics

- Professor Keyue Smedley

Manufacturing

- Professor Enrique Lavernia

Information Technology

- Professors John King, Richard Taylor

Micro Fuel Cell Systems

- Professor Cill Richards



BETA TESTING / DEMONSTRATION

FUEL CELLS:

25 kW Siemens Westinghouse SOFC

220 kW SCE / SWPC Hybrid

- 180 kW Siemens Westinghouse SOFC
- 40 kW Ingersol Rand MTG

Reversible, Regenerative Fuel Cell Kit

Residential Plug Power PEMFC Unit

DCH Enable Portable PEMFC Unit

Residential FCTL SOFC Unit (On Order)

FUEL PROCESSOR:

Cyclic Autothermal Fuel Processor (GE-EER)

