
The Emerging Smart Grid Could it Affect the Solar Market?

SDREO Solar Conference

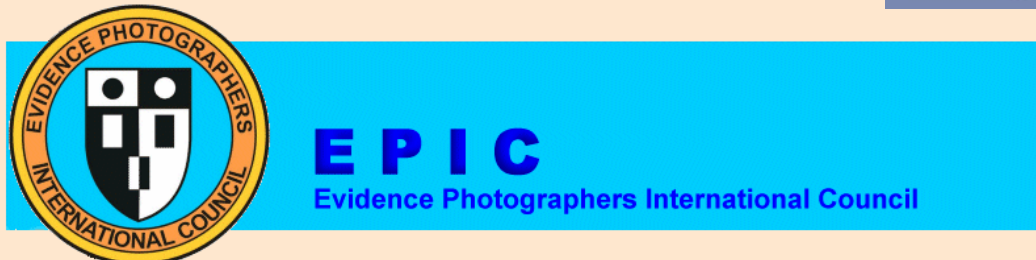
Scott J. Anders, Director
September 27, 2006



Presentation Overview

- About EPIC
- EPIC Project Review
- Policy Update
 - Legislative
 - Regulatory

What's in a Name?



About EPIC

- Academic and Research Center
 - University of San Diego School of Law
- Funded with settlement monies from a lawsuit against Duke Energy
- Agreement between San Diego District Attorneys Office and USD

About EPIC

■ EPIC's Mission

- ❑ Educate the public and public officials concerning energy issues and policies;
- ❑ Educate law school students about energy law and policy;
- ❑ Conduct research and analysis on energy trends, policy options and their implications; and,
- ❑ Encourage the use and development of less costly and more environmentally-friendly energy resources.

About EPIC

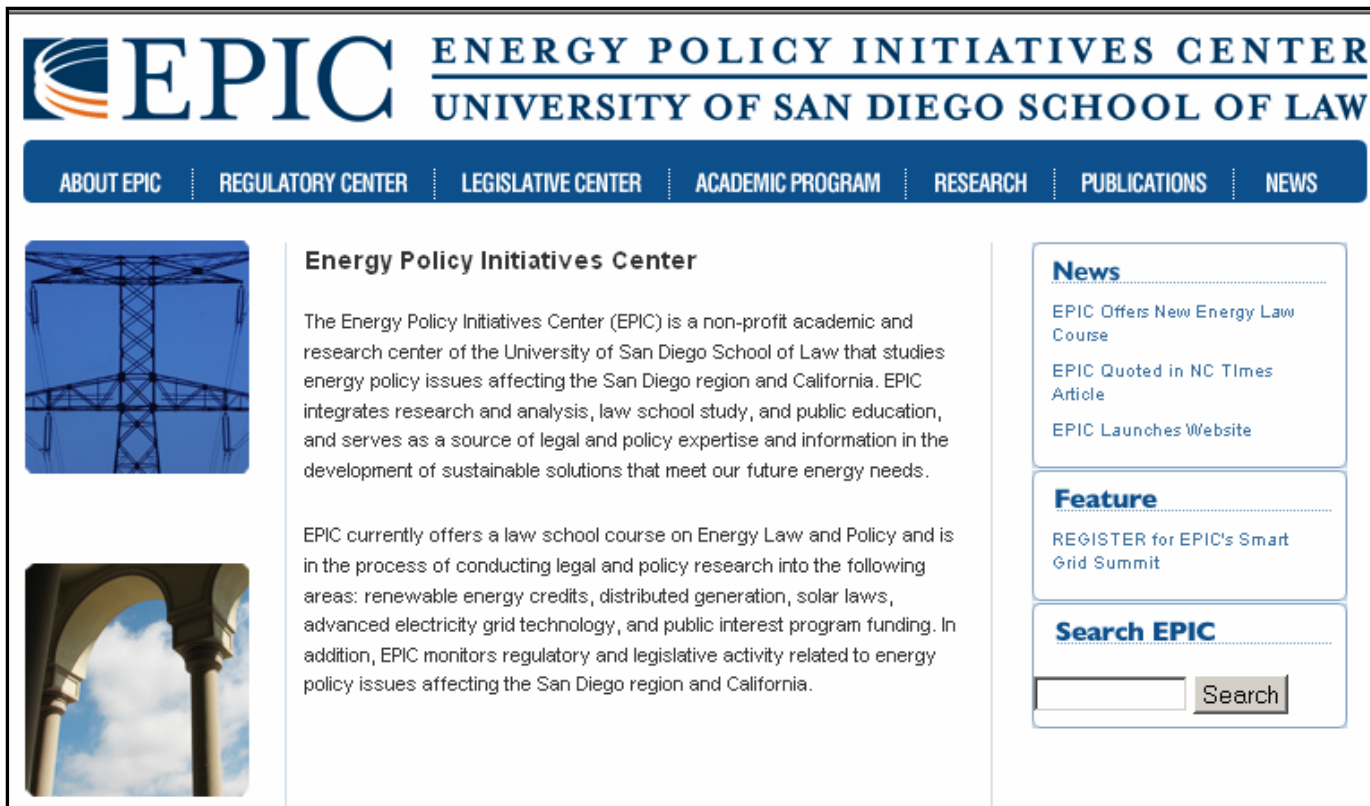
- Research and Analysis
 - Smart Grid
 - Public Goods Charge Fund
 - Renewable Energy Certificates (RECs)
 - Solar Laws
 - AB 1X Rate Caps
 - Solar Financing
 - Energy Legislation
 - Energy Regulation

About EPIC

- Academic Program
 - Energy Law and Policy Course
 - Fall 2006
 - Taught by two local energy attorneys
 - Focus: Electricity and Natural Gas
 - Energy Law and Policy Clinic (*in development*)
 - Work with energy agencies to conduct legal and policy research

About EPIC

- EPIC Website: www.sandiego.edu/epic



The screenshot shows the EPIC website homepage. At the top is the EPIC logo, which consists of a stylized 'E' with three curved lines in blue and orange, followed by the text 'EPIC ENERGY POLICY INITIATIVES CENTER UNIVERSITY OF SAN DIEGO SCHOOL OF LAW'. Below the logo is a dark blue navigation bar with white text for 'ABOUT EPIC', 'REGULATORY CENTER', 'LEGISLATIVE CENTER', 'ACADEMIC PROGRAM', 'RESEARCH', 'PUBLICATIONS', and 'NEWS'. The main content area is divided into three columns. The left column features two images: a blue-tinted image of a power transmission tower and a photograph of a classical building with arches. The middle column has a heading 'Energy Policy Initiatives Center' followed by a paragraph describing EPIC as a non-profit academic and research center. Below this is another paragraph detailing the center's current offerings and research areas. The right column contains three sections: 'News' with three links, 'Feature' with one link, and 'Search EPIC' with a search input field and a 'Search' button.

EPIC ENERGY POLICY INITIATIVES CENTER
UNIVERSITY OF SAN DIEGO SCHOOL OF LAW

ABOUT EPIC | REGULATORY CENTER | LEGISLATIVE CENTER | ACADEMIC PROGRAM | RESEARCH | PUBLICATIONS | NEWS

Energy Policy Initiatives Center

The Energy Policy Initiatives Center (EPIC) is a non-profit academic and research center of the University of San Diego School of Law that studies energy policy issues affecting the San Diego region and California. EPIC integrates research and analysis, law school study, and public education, and serves as a source of legal and policy expertise and information in the development of sustainable solutions that meet our future energy needs.

EPIC currently offers a law school course on Energy Law and Policy and is in the process of conducting legal and policy research into the following areas: renewable energy credits, distributed generation, solar laws, advanced electricity grid technology, and public interest program funding. In addition, EPIC monitors regulatory and legislative activity related to energy policy issues affecting the San Diego region and California.

News

- EPIC Offers New Energy Law Course
- EPIC Quoted in NC Times Article
- EPIC Launches Website

Feature

- REGISTER for EPIC's Smart Grid Summit

Search EPIC

Smart Grid - Background

- What is a Smart Grid?
 - Grid-wide integrated communications
 - Internet for the power grid
 - Sensing, metering, measurement
 - Digital two-way communication devices
 - Enable connection and disconnection of generators
 - Enhance operator information
 - Advanced control capabilities
 - Computer based monitoring of grid
 - Enables dispatch of distributed resource

Source: U.S. DOE Modern Grid Initiative

Smart Grid - Background

- What is a Smart Grid?
 - Advance grid components
 - Energy storage
 - Distributed generation
 - T&D infrastructure improvements (e.g., FACTS)
 - Decision Support
 - Artificial intelligence to guide grid operators
 - Semi-autonomous agent software

Smart Grid - Background

- Characteristics of a Smart Grid
 - ❑ Self Healing
 - ❑ Empowers and incorporates the consumer
 - ❑ Tolerated security attacks
 - ❑ 21st Century power quality
 - ❑ Accommodates a wide variety of generators
 - ❑ Fully enables electric markets
 - ❑ Optimizes asset utilization
 - ❑ Minimized operation and maintenance costs

Source: U.S. DOE Modern Grid Initiative

Smart Grid - Background

- Why Consider a Smart Grid?
 - Aging Infrastructure
 - Significant investment in T&D system likely in coming years
 - Help Achieve / Integrate policy goals
 - Regional Energy Strategy 2030
 - In-region renewables
 - Energy Efficiency/Demand Response
 - CA Loading Order
 - Efficiency/Demand Response
 - Renewables & distributed generation
 - Generation
 - Transmission

Smart Grid - Background

- Why Consider a Smart Grid?
 - Potential benefits
 - Peak demand reduction
 - Environmental quality
 - Increased reliability and power quality
 - Reduced outage; increased restoration time
 - Increased integration of renewables and distributed generation

Smart Grid - Background

- Potential Challenges
 - Regulatory Changes
 - Rates
 - Data and communication standards
 - Interconnection protocols
 - Cost
 - Complexity
 - Technology Advances

Smart Grid - Background

- Smart Grid Study
 - Topic: Assess feasibility of intelligent grid in San Diego region
 - Release Date: Early October 2006
 - Project Team:
 - EPIC – Prime Contractor
 - SAIC – Technical Subcontractor
 - SDG&E – Funding partner
 - UCAN – Funding partner

Smart Grid - Background

- Smart Grid Study Components
 - Smart Grid Definition
 - Scenario Development
 - Gap Analysis between Current and Future State
 - Cost Benefit Analysis (Business Case)
 - Implementation Plan
 - Recommended RD&D Projects

Smart Grid and PV

- How does PV fit in?
 - More easily integrated into the grid
 - Better info for utility operations
 - Real-time data about PV production
 - Potentially dispatchable
 - Advanced energy storage devices
 - Plug-in Hybrid Electric Vehicles (PHEV)
 - Vehicle to Grid (V2G)
 - Dynamic Rates
 - Paid variable rates for PV output



Smart Grid and PV

- How does PV fit in?
 - Distributed Energy
 - Part of Micro-grid power mix
 - Power source for Zero Energy Homes

San Diego Smart Grid Summit

- Date: October 25-26, 2006
- Location: Joan Kroc IPJ (USD Campus)
- Focus: Implications of a Smart Grid in San Diego Region
 - EPIC Smart Grid Report
 - Policy and regulatory issues related to Smart Grid
 - Technological advances in the Smart Grid
 - Regional planning considerations

San Diego Smart Grid Summit

- Confirmed Speakers:
 - **Kevin Kolevar**, Director of the U.S. Department of Energy's Office of Electricity Delivery and Energy Reliability
 - **Senator Christine Kehoe**, Chair, CA Senate Energy, Utilities, and Communications Committee
 - **Commissioner Dian Grueneich**, California Public Utilities Commission
 - **Jim Detmers**, Vice President of Operations, California ISO
 - **Kurt Yeager**, Founder of the Galvin Electricity Initiative and President Emeritus, Electricity Power Research Institute

Thank You

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