49th Annual Frontiers of Power Conference 2016

Stillwater, Oklahoma, USA 31 October – 1 November 2016

ISBN: 978-1-5108-3289-3

Printed from e-media with permission by:

Curran Associates, Inc. 57 Morehouse Lane Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2016) by Oklahoma State University – Engineering Energy Laboratory All rights reserved.

Printed by Curran Associates, Inc. (2017)

For permission requests, please contact Oklahoma State University – Engineering Energy Laboratory at the address below.

Oklahoma State University – Engineering Energy Laboratory 216 Engineering South Stillwater, OK 74078-5034 USA

Phone: (405) 744-9912

www.okstate.edu

Additional copies of this publication are available from:

Curran Associates, Inc. 57 Morehouse Lane Red Hook, NY 12571 USA Phone: 845-758-0400

Fax: 845-758-2633

Email: curran@proceedings.com Web: www.proceedings.com

TABLE OF CONTENTS

	Page Numb
KEYNOTE ADDRESS Economics of Grid Connection Tom Key Senior Technical Executive Electric Power Research Institute Knoxville, Tennessee	1
KEYNOTE ADDRESS Systems & Control Science for the Future of Humanity: Role of Controls in Energy and Environment Kwang Lee	25
Professor and Chair Department of Electrical & Computer Engineering Baylor University Waco, Texas	

TECHNICAL PAPERS

An Ill Wind Blows in Oklahoma

Steve Stadler

Professor and State Geographer of Oklahoma

Department of Geography

Oklahoma State University

Stillwater, Oklahoma

J. Scott Greene

Professor and Associate Chair

Geography and Environmental Sustainability

Director, Oklahoma Wind Power Institute

The University of Oklahoma

Norman, Oklahoma

Paper Withdrawn

Capturing the Multi-Faceted Value of Energy Storage

Don Dumich

Application Director-Microgrids

S&C Electric Company

Chicago, Illinois

Utilizing SIRES to Promote the Two Superpowers-"Energy" and "Time" As Expressed by the Gates Foundation

Zeel Maheshwari

Ph.D. Candidate

R. Ramakumar

Regents Professor and PSO/Naeter Professor

Director, Engineering Energy Laboratory

Electrical & Computer Engineering

Oklahoma State University

Stillwater, Oklahoma

Innovation Pointe PREP Microgrid

Todd Hiemer

Executive Vice President of Engineering

Yuvaraj Kondaswamy

System Planning Engineer Central Electric Cooperative

Stillwater, Oklahoma

Utility Electric Power Challenges Related to a Level 3 Trauma Hospital's Electrical Vault Failure, Its Recovery Operations, Regulatory Challenges and The Evolving Challenges of Temporary Generation OR The Hospital, The Utility, The Explosion and The Aftermath

Michael Moore

Walker Engineering

Irving, Texas

SIFT Algorithm Applied to Real-Time Inspection System for Overhead Power Lines Using Unmanned Aerial Vehicles

Fujian Yan

Graduate Student

Qilin Wang

Graduate Student

Chengzong Pang

Assistant Professor

Department of Electrical and Computer Science

Wichita State University

Wichita, Kansas

Steam Turbine Solutions to Maintain Reliable Operation:

Repairs, Retrofits and Component Exchange

Michael W. Smiarowski

Manager, Steam Product Line

Rob Bursch

Marketing Representative

Siemens Energy, Inc.

Orlando, Florida

Incorporation of Electromagnetic Transients Analysis into Power System Planning and Operation Support

John N Jiang

OG&E Associate Professor

Electrical and Computer Engineering

The University of Oklahoma

Norman, Oklahoma

Statistical Analysis of Insolation Data

Abdulmunim Guwaeder

Ph.D. Candidate

R. Ramakumar

Regents Professor and PSO/Naeter Professor

Director, Engineering Energy Laboratory

Electrical & Computer Engineering

Oklahoma State University

Stillwater, Oklahoma

Review of Grid-Connected AC Microgrid Control

Kishor Gaire

Ph.D. Candidate

Nishantha C. Ekneligoda

Assistant Professor

Electrical & Computer Engineering

Oklahoma State University

Stillwater, Oklahoma

Voltage Regulation and Loss Minimization in Distribution Network with Renewable Generation using Smart Inverters

Dattatreya Poosarla

Graduate Student

Yuanxiong Guo

Assistant Professor

Electrical & Computer Engineering

Oklahoma State University

Stillwater, Oklahoma

Neural Network Based Load Frequency Controller Design

Abdulhamid Zaidi

Ph.D. Candidate

Qi Cheng

Associate Professor

Electrical & Computer Engineering

Oklahoma State University

Stillwater, Oklahoma

Impact of the Different Types of Load Models Toward the Power Flow Solution

Anushka M. Dissanayake

Ph.D. Candidate

Nishantha C. Ekneligoda

Oklahoma State University

Optimal Location Determination of DG with Vulnerability Index Weighting Factor

Koushik Sarkar

Graduate Student

Chengzong Pang

Wichita State University

Wichita, Kansas

Backstepping Control of Ćuk Converters for Solar PV and Battery Energy Storage Systems

Khalid S. Alharbi

Ph.D. Candidate

Roy McCann

Professor

Electrical and Computer Engineering

University of Arkansas

Fayetteville, Arkansas

The Methodologies for the Analysis of Condition Based and Predictive Maintenance Technologies and Their Implemented Practices and Impacts to the Utility Scale Infrastructure

Michael Moore

Walker Engineering

Irving, Texas

Radical Pumping System for Stripper Wells-A PVC Pump,

Wireline, and Raspberry PI

Marcus O. Durham

Principal

Jason A. Coffin

Senior Analyst

Robert A. Durham

Principal

THEWAY Labs

Tulsa, Oklahoma

Sliding Mode Control for Improved Stability and Disturbance Rejection in Ring Bus Configured Microgrids

Rasheed Abdulkader

Graduate Student

Amlam Niragire

Graduate Student

Roy McCann

Professor

University of Arkansas

Fayetteville, Arkansas

Look-ahead Dispatch Coordinated Control of Wind Power and Aggregated PHEVs

Qilin Wang

Graduate Student

Fujian Yan

Graduate Student

Chengzong Pang

Assistant Professor

Electrical Engineering and Computer Science

Wichita State University

Wichita, Kansas

Combined Heat and Power (CHP) Plants Offering Reliable and Environmentally Friendly Solutions for Industrial and Commercial Applications Dalia El Tawy

Senior Marketing Manager Power and Gas Division Siemens Energy, Inc. Orlando, Florida