Appendix. 1. Brief Summary of Activities in the Smart Grid Area Reported by SGC Faculty for September 1, 2016 – August 31, 2017.

Large multidisciplinary collaborative efforts are marked by **C**.

Activity	Date	Funding Source, Amount	Collaborators	Description	Outcome
Growing of the Center					
New faculty members joined	Prior to August 2017	N/A	Change: Two new faculty members joined the SGC; one is leaving	New Collaborators: Kate Davis (ECE); Tom Overbye (ECE); Moving out of Texas: Yu Xiao (Arch)	83 collaborators in total
Completed Projects					
					(Number of papers, software, patents, attendees)
Year 1	2016	CNP Energy, $102,000	PI: M. Kezunovic (ECE TAMU)	"**Vegetation Management Risk Model**"	1 peer-reviewed paper
On-going Projects					
Year 2 **C**	2015-2018	NSF, $475,000 (TAMU portion: $475,000, IDC: $62,388)	PI: J. Silva-Martinez (ECE TAMU) Collaborator: A Karsilayan (ECE TAMU); D. Cheng Partner: R.L. Geiger (PI-IASTATE)	"**Design and Calibration Methodologies for Power-Efficient, High-Resolution Broadband Analog-to-Digital Converters**"	
Year 2	Apr. 2015 – Sep. 2016	Sandia National Laboratories, $88,313 (TAMU portion: $88,313, IDC: $23,776)	PI: J. Silva-Martinez (ECE TAMU) Collaborator: A Karsilayan (ECE TAMU);	"**SingleChip CMOS "Brain" for GaN/GaAs Power Amplifiers," "High-Sensitivity, Coherent Digitizer for Pulse-Doppler Radar Applications"**	

Year 2 **C**	Jul. 2015 – Aug 2018	NSF PSERC, $1.290,648 (TAMU portion: $321,750, IDC: YY), 3 years	PI: M. Kezunovic (ECE), Partners: S. Meliopoulos (GaTech), T. Overbye (Univ. of Illinois-Urbana Champaign), D. Bakken (Washington State Univ.), A. Srivastava (Washington State Univ.)	High Impact Project: **"Life-Cycle Management of Mission-Critical Systems through Certification, Commissioning, In-Service Maintenance, Remote Testing, and Risk-Management"**	
Year 4	Oct. 2013 - 2017	NSF Cyber SEES, $667K (IDC:), 4 years	PI: L. Xie (ECE TAMU), Collaborator: E. Nikolova (Comp. Science TAMU)	"**Coupon Incentive-based Risk Aware Demand Response in Smart Grid**"	
Year 4	Five years starting from October, 2013 – Oct. 2018	QNRF,$4,600,000.00	LPI: Haitham Abu-Rub	**1-MW PV Power RD&D Using SiC-based qZS Cascade Multilevel Inverter and Battery Energy Storage,**	
Year 3	Feb. 2015-Feb. 2018	QNRF,$865,281	Lead PI: Garng Huang, Co-Co- PI: Yushan Liu, PIs: Chanan Singh, Hoe Ooi	**Stability and Reliability Issues of Smart Grid with Network Topology and Flow Controls**	
Year 2	June 2015-June 2017	QNRF, $295,558.20, 2 years	Mentor : Haitham Abu Rub	**"High-Performance Drive with Permanent Magnet Synchronous Motor Based on Model Predictive Control"**	
Year 2	Dec. 2015-Dec. 2018	QNRF, $ 780,211 , 3 years	PI: Haitham Abu Rub	**"Integration of Solar Generation and Electrical Vehicles Into The Smart Grid"**	
Year 1	January 2017-January 2019	QNRF, $788,997, 3 years	**PI: Haitham Abu rub (ECE,TAMUQ)**	**"Microgrids Advanced Dynamic Control Architecture and Distributed Energy Optimization"**	
Year 1	2016-2019	QNRF, $714,997, 3 years	**PI: Mohamed Trabelsi (ECE,TAMUQ)**	**Enhanced Monitoring using Statistical Fault Detection Methods**	

			Supervisor: Haitham Abu Rub	**and Applications to Photovoltaic Systems and Genomic Data**	
Newly Awarded Projects					
C	Oct. 2016 – Sep. 2019	DOE, $2,999,501 (TAMU portion: XX, IDC: YY), 3 years	PI: M. Kezunovic (ECE TAMU), Co-PIs: A. Sprintson (ECE, TAMU), J.-C. (Steve) Liu (CSE, TAMU), J. Giri and M. Parashar (GE Grid Solutions), M. Papic (Idaho Power Company), C. Bonebrake, J. Dagle, M. Mylrea, M. Rice, and P. Skare (Pacific Northwest National Lab)	"**Timing Intrusion Management Ensuring Resiliency (TIMER)**"	Year 1
C	2016	NSF, SPOKE, $1,000,000 (TAMU portion: $649,999, IDC: $178,998), 3 years	PI: M. Kezunovic (ECE TAMU), Collaborator: D. Da Silva (CSE), P.R. Kumar (ECE), L. Xie (ECE), Z. Obradovic (Temple University), S. Grijalva (GaTech)	**"Smart Grids Big Data"**	Year 1
C	2017	QNRF, $850,997, 3 years	LPI: Haitham Abu-Rub, PI: Shady Khalil, PI: Santiago Bañales, PI: Le Xie, PI: Othmane Bouhali	"Smart Grid Dynamic Control and Management with Big Data Process Platform"	Year 0
C	2017	QNRF, $988,997, 3 years	LPI: Shady Khalil, PI: Haitham Abu-Rub, PI: Peter Tollkuehn, PI: Hamid Toliyat	On Line Continuous Monitoring, Detection, and Location of Partial Discharge and Dynamic Aging in Medium and High Voltage Electrical Insulation	Year 0

Proposal Submitted					
Client/Partner (Continuing & New)					
Donation by Company					
Student, Researcher Employed					
Yupeng Liu	2017	China Agricultural University (CAU)	Supervisor: Haitham Abu Rub	"Application of power electronics to energy router in energy internet"	
Amira Mohamed	2017	Researcher associate	Supervisor: Haitham Abu Rub / Sertac Bayhan	"Microgrids Advanced Dynamic Control Architecture and Distributed Energy Optimization"	
Amira Mohamed	September 2016 – to present		Supervisor: Haitham Abu Rub	"Microgrids Advanced Dynamic Control Architecture and Distributed Energy Optimization"	
Iresha Poonahela	January 2017 to present		Supervisor: Prof.Haitham Abu Rub / Sertac Bayhan	"Microgrids Advanced Dynamic Control Architecture and Distributed Energy Optimization"	
Mohamad Sleiman	August, 2017		Supervisor: Haitham Abu Rub	1-MW PV Power RD&D Using SiC-based qZS Cascade Multilevel Inverter and Battery Energy Storage,	
Mohamad Taif	July 2017-September 2017		Supervisor: Haitham Abu Rub	1-MW PV Power RD&D Using SiC-based qZS Cascade Multilevel Inverter and Battery Energy Storage,	
Continuing Education, Workforce Development Classes, Training (Direct & Indirect Revenue)					
Webinar	1/24/2017	Sponsored by PSERC	Presenter: M. Kezunovic (ECE TAMU)	**"PSERC High Impact (HI) Project: Life-cycle management of mission-critical systems through**	Participated: >300 attendees

				certification, commissioning, in-service maintenance, remote testing, and risk assessment"	
Webinar	3/7/2017	Sponsored by PSERC	Presenter: L. Xie (ECE TAMU)	**"Real-time synchrophasor analytics: Data quality monitoring and anomaly detection"**	Participated: >300 attendees
Webinar	1/13/2017	Sponsored by IEEE-PES	Presenter: M. Kezunovic (ECE TAMU)	"**Big Data Applications in Smart Grids: Benefits and Challenges**"	Participated: >1,000 attendees
Training	14-16 May 2017	Texas A&M University at Qatar/ SGC	Presenters: **Shady Khalil** and Haitham Abu-Rub	**"Power Quality and Management in Modernized Power Systems"**	7 attendees
Training	31-3 November 2016	Texas A&M University at Qatar/ SGC	Presenters: **Shady Khalil** and **Haitham Abu-Rub**	**"Design, Fault Analysis and Protection of Industrial Power Distribution Systems"**	6 attendees
Training	18-21 September 2016	Texas A&M University at Qatar/ SGC	Presenters: **Shady Khalil** and **Haitham Abu-Rub**	"**Electrical Transformers and Switchgears; Faults, Inspection, Testing, Maintenance and Trouble Shooting"**	11 attendees
Technology Commercialization (Patent, Disclosure, Licensing Agreement, Company Formed)					
Technology Adapted by Industry, Government (Direct & Indirect Revenue)					
Student Degree, Fellowship, Award, Recognition					
Payman Dehghanian, Ph.D. (ECE)	2016	CIRTL Teaching as Research Fellow 2016-2017 academic year	Supervisor: Mladen Kezunovic (ECE)	Teaching Fellow	

Benjamin Wiseman (ECE)	2017	College of Engineering	Supervisor: Le Xie (ECE)	Powell Fellowship	
Yushan Liu	2017	Texas A&M University at Qatar Research Fellow Excellence Award at ECEN DePartment	Supervisor: haitham Abu-Rub	Research Fellow Excellence Award	
Organizing Event					
Meeting **C**	4/18/2017	Sponsored by NSF, TEES, VPR, ECE, EPPEI, SGC, National Instruments	Event held at Texas A&M, College Station, TX	**Fifth Smart Grid Workshop**, Organized on the theme of Smart Grids Big Data, Workshop Chair: M. Kezunovic (ECE), A&M Panelists: M. Begovic (ECE TAMU), K. Butler-Purry (ECE TAMU), D. Da Silva (CSE TAMU), Mark Weichold (ECE TAMU), A&M Focus Group Session Chairs: K. Davis (ECE TAMU), Y. Ding (ISE TAMU), N. Duffield (ECE TAMU), M. Kezunovic (ECE TAMU), P.R. Kumar (ECE TAMU), L. Xie (ECE TAMU),	Participated: 132 attendees including 28 students, 28 representatives from industry and national labs; graduate students presented posters
Giving Distinguished Talk					
Giving Invited Talk					

Media					
Service on Advisory Boards, National/International Committees, Agency Mission/Program Planning					
Hosting Distinguished Speaker					
Hosting Invited Speakers					
Hosting Visitor					
Untapped SG Mission Areas, Markets					
Address Major Questions Raised in the Industry					

Appendix 2. List of Publications

Peer-reviewed journal papers

Author	Year	Journal	Title	Vol., Issue, Pages
S. Bayhan, M. Trabelsi, H. Abu-Rub, M. Malinowski	2017	IEEE Transactions on Industrial Electronics ,	"*Finite Control Set Model Predictive Control for a Quasi-Z-Source Four-Leg Inverter Under Unbalanced Load Condition*	vol.64, no.4, pp.2560-2569, April 2017.
Shady S. Refaat, Haitham Abu-Rub, Amira Mohamed	2017	IET Renewable Power Generation, 2017	"Dynamic Voltage Stability Impact of Grid-Tied Large-Scale Photovoltaic Power Generation System"	
H. Komurcugil, **S. Bayhan**, H. Abu-Rub,	2017	IEEE Transactions on Industrial Electronics,	"*Variable and Fixed Switching Frequency Based HCC Methods for Grid-Connected VSI with Active Damping and Zero Steady-State Error*",	
Y.Liu, W. Wang, Y. Liu, **S. Bayhan**	2017	International Journal of Hydrogen Energy,	"Real-time Implemantation of finite control set model predictive control for matrix converter based solid state transformer"	
M. Trabelsi, S. Bayhan, H. Abu-Rub, L. Ben-Brahim,	2017	nternational Journal of Hydrogen Energy,	"Performance Enhancement of Cascaded qZSI-HB Based Renewable Energy System Using Model Predictive Control",	May 2017, ISSN 0360-3199
M.Trabelsi, M. Ghanes, M. Mansouri, **S. Bayhan**, H. Abu-Rub	2017	International Journal of Hydrogen Energy,	*"An Original Observer Design for Reduced Sensor Control of Packed U Cells based Renewable Energy System"*	
P. Kakosimos and H. Abu-Rub	2017	*IEEE Trans. Power Electron.,*	**Predictive Speed Control with Short Prediction Horizon for Permanent Magnet Synchronous Motor Drives**	
M. Trabelsi, L. Ben-Brahim, A. Gastli, K.A. Ghazi, H. Abu-Rub	2017	*International Transactions on Electrical Energy Systems*	**Improved Low Voltage Ride Through Capability of a Flying Capacitors Inverter based PV System"**	
M. Trabelsi, L. Ben-Brahim, H. Abu-Rub,	2017	*International Journal of Industrial Electronics and Drives*	**"High Performance Deadbeat Control for Cascaded H-Bridge Inverter based Variable Frequency Drive"**	

Book, book chapter

Author	Year	Publisher	Title	Pages
Sertac Bayhan, Haitham Abu-Rub	**2017**	**Elsevier**	Predictive Control of Power Electronic Converters" / "Power Electronics Handbook"	

Standard

Peer-reviewed conference publications

Author	Year	Conference (Location)	Title	Pages
M. Trabelsi, H. Abu-Rub	**2017**	**Saudi Arabia Smart Grid Conference on Smart Grid and Renewable Energy**	**"An effective Control strategy for a Grid-Connected qZS based PV System"**	**7**
M. Trabelsi, H. Abu-Rub	**2017**	**The 43rd Annual Conference of the IEEE Industrial Ekectronics Society**	**"Deadbeat Current Control of qZS based Grid-Connected Multilevel Inverter"**	**7**
Shady S. Refaat, Haitham Abu-Rub, Amira Mohamed	2017	EPE'17-ECCE Europe 2017, International Conference on Power Electronics and Applications	**A Novel Smart Energy Efficient Air-Conditioning System**	**8**

Shady S. Refaat, Haitham Abu-Rub, Amira Mohamed	**2017**	Innovative Smart Grid Technologies (ISGT)	**Transient Stability Impact of Large-Scale Photovoltaic System on Electric Power Grids**	**7**
Shady S. Refaat, Haitham Abu-Rub, Amira Mohamed, Mohamed Trabelsi	**2017**	IEEE-ICIT, International Conference on Industrial Technology	**Investigation into the Effect of Unbalanced Supply Voltage on the Detection of Stator Winding Turn Fault in PMSM",**	**7**
Shady S. Refaat, Haitham Abu-Rub, Amira Mohamed	**Dec. 2016**	**IEEE Big Data 2016**	**Big Data, Better Energy Management and Control Decisions for Distribution Systems in Smart Grid**	**7**
S. Bayhan, H. Abu-Rub, J.I. Leon, S. Vazguez, L.G. Frenquelo	**2017**	**The 43rd Annual Conference of the IEEE Industrial Ekectronics Society**	***Power Electronic Converters and Control Techniques in AC Microgrid*", **	**7**
M. Rivera, L. Tariscotti, P. Wheeler, S. Bayhan	**2017**	**The 43rd Annual Conference of the IEEE Industrial Ekectronics Society**	***Indirect Predicitve Control Strategy with Fixed Switching Frequency for a Direct Matrix Converter*", **	**7**
P. Kakosimos, S. Bayhan, and H. Abu-Rub	**2017**	**The 43rd Annual Conference of the IEEE Industrial Ekectronics Society**	***Predictive Control of Electric Drives with 3L-NPC Inverters with Uniform Switching Transitions and Reduced Calculation Requirements*", **	**7**
P. Kakosimos, S. Bayhan, and H. Abu-Rub,	**2017**	**The 43rd Annual Conference of the IEEE Industrial Ekectronics Society**	***Predictive Torque Control and Linear Control with SV-PWM for Electric Drives with NPC Inverters: An Experimental Comparison***	**7**
S. Bayhan, M. Trabelsi, H. Abu-Rub	**2017**	**19th European Conference on Power Electronics and Applications**	***"Model Predictive Control Based Current Ripple Damping in Single-Phase quasi-Impedance-Source Inverter***	**7**
H. Komurcigil, S. Bayhan, H. Abu-Rub	**2017**	**19th European Conference on Power Electronics and Applications**	***Lyapunov-Function Based Control Method for Three-Phase Grid-Tied Quasi-Z-Source Inverter with LCL Filter*", **	**7**

M. Trabelsi, S. Bayhan, H. Abu-Rub, L. Brahim, M. Ghanes	2017	19th European Conference on Power Electronics and Applications	*"High Performance Voltage-Sensorless Model Predictive Control for Grid Integration of Packed U Cells based PV System",*	7
A. Marquez, S. Bayhan, L. Frenquelo, J. Leon, S. Vazguez, H. Abu-Rub,	2017	Annual Texas A&M University at Qatar Showcase, 20 April, 2017	*Power Electronics for Smart Grid Applications*	1
A. Muhammed, S. Bayhan, S. Refaet,	2017	Annual Texas A&M University at Qatar Showcase, 20 April, 2017	*Energy Trading and Management System for Microgrids",*	1
A. Karaki, S. Bayhan, M. Begovic	2017	Annual Texas A&M University at Qatar Showcase, 20 April, 2017	"*A Review of Frequency Control Mechanisms in AC Microgrids*",	1
S. Bayhan, H. Abu-Rub	2017	Annual Texas A&M University at Qatar Showcase, 20 April, 2017	*"A Novel Predictive Energy Management System For Islanded Microgrid",*	1
H. Komurcigil, S. Bayhan, H. Abu-Rub	2017	IEEE 11th International Conference on Compability, Power Electronics and Power Engineering	*"Lyapunov-Function Based Control Approach with Cascaded PR Controllers for Single-Phase Grid-Tied LCL-Filtered Quasi-Z-Source Inverters*	7
S. Bayhan, H. Abu-Rub	2017	IEEE 11th International Conference on Compability, Power Electronics and Power Engineering	*"Model Predictive Control of Distributed Generation Inverters in Islanded AC Microgrid",*	7
Y. Liu, B. Ge, Y. Wu, P. Kakosimos, and H. Abu-Rub	2017	32nd IEEE Applied Power Electronics	Pulse width amplitude modulation based single-phase quasi-Z-source photovoltaic inverter with energy storage battery	7

		Conference and Exposition		
P. Kakosimos, M. Beniakar, Y. Liu, and H. Abu-Rub,	2017	32nd IEEE Applied Power Electronics Conference and Exposition	"Model Predictive Control for Permanent Magnet Synchronous Motor Drives Considering Cross-Saturation Effects	7
Y. Liu, H. Abu-Rub, B. Ge, M. Trabelsi	2017	The 43rd Annual Conference of the IEEE Industrial Ekectronics Society	Overview of Double-Line-Frequency Power Decoupling Techniques for Single-Phase Z-Source/Quasi-Z-Source Inverter,"	7
Y. Li, Y. Liu, H. Abu-Rub,	2017	2017 International Symposium on Industrial Electronics (ISIE), 2017.	PWAM Controlled Quasi-Z Source Motor Drive	7
M. Li, Y. Liu, H. Abu-Rub	2017	2017 International Symposium on Industrial Electronics (ISIE), 2017.	"Optimizing Control Strategy of Quasi-Z Source Indirect Matrix Converter for Induction Motor Drives,"	7
M. Metry, Y. Liu, R. S. Balog, H. Abu-Rub	2017	2017 International Symposium on Industrial Electronics (ISIE), 2017.	"Model Predictive Control for Maximum Power Point Tracking of Quasi-Z-Source Inverter Based Grid-Tied Photovoltaic Power System	7
Y. Liu, B. Ge, H. Abu-Rub,	2017	*IEEE International Conference on Industrial Technology (ICIT),*	A Model Predictive Control for Low-Frequency Ripple Power Elimination of Active Power Filter Integrated Single-Phase Quasi-Z-Source Inverter,"	7

Non peer-reviewed article

Author	Year	Journal/Magazine	Title	Vol., Issue, Pages

Report

Author	Month, Year	Organization It is Submitted to	Title	Type of Report (Final, etc)
Haitham Abu-Rub	2017	QNRF	Interim 7 report of NPRP-EP	Interim 7 report of NPRP-EP
P. Kakosimos , Haitham Abu-Rub	2017	QNRF	PDRA2-1110-14066 / High-Performance Drive with Permanent Magnet Synchronous Motor Based on Model Predictive Control	Annual report