

## 국 외 출 장 계 획 서

### 1. 출장개요

출장목적	“중개시스템 개발 및 BM 발굴” 연구과제 수행을 위한 해외사례 조사 (2017년도 CIGRE 더블린 심포지엄 참석)						
출장기간	2017.05.29.(월) - 2017.06.04.(일)						
출장국가	아일랜드(더블린)						
방문기관	CIGRE(Internatioanl Council on Large Electric Systems), EIRGRID(아일랜드 계통운영자)						
출 장 자	소 속	직 급	성 명	성 별	연 령	출 장 경 비	
						금액(천원)	부담기관
	전력경제 연구실	3	김진이	여	41	3,040 (숙박비제외)	정부출연금 (국책과제)

## 2. 출장일정

월 일 (요일)	출발지	도착지	방문기관	업무수행내용 (수집할 자료목록, 질의할 내용 등)	접촉예정인물 (직책포함)
5.29(월)	인천	더블린	-	출국 인천→더블린 (암스테르담 경유)	
5.30.(화)			CIGRE 학회장 (Trinity College)	· 분산자원확대에 따른 TSO와 DSO 간 네트워크 최적투자방안 등을 주제로 한 강연회 참석	학회참석자
5.31.(수)			CIGRE 학회장 (Trinity College)	· CIGRE 심포지엄 참석(1일차) - DSO와 TSO간 네트워크 및 계통운영의 최적 협조제어 방안 등	학회참석자
6.01.(목)			CIGRE 학회장 (Trinity College)	· CIGRE 심포지엄 참석(2일차) - 신재생자원 확대 등 전원믹스 변화에 따른 전력계통 영향검토 등	학회참석자
6.02.(금)			EIRGRID (아일랜드계통운영자)	· Technical Visit 참석 - EIRGRID 방문	EIRGRID 계통운영자
6.03.(토) ~6.04.(일)	더블린	인천(+1)	-	귀국 더블린→인천 (암스테르담 경유)	+ 1일 소요 (6.4.(일) 도착)

## 3. 출장경비

성 명	계	항공운임		체 재 비			준비금	교육비	기 타
		항공사	금액	일 비	식 비	숙박비			
김진이	3,040,1215	KLM	1,396,800	176,171	250,705	실비정산	0	0	155,850
성 명		업무 항공마일리지 활용 내역							
		보유 마일리지		활용 마일리지		미활용 사유			
김진이		0		0		마일리지 부족			

#### 4. 출장효과

- 분산자원 확대에 따른 TSO, DSO간 전력계통 협조운영 방법론 해외 기술동향 조사
  - 분산자원 확대를 고려한 새로운 방식의 TSO, DSO간 네트워크 투자계획 및 운영방안 토의
  - TSO와 DSO간 계통운영 협조제어 방안 및 데이터 교환, 운영자간 인식 및 훈련방안 토의
  - 해외 ISO의 TSO-DSO-End User 간 전력계통 협조운영 사례조사
  
- CIGRE 심포지엄을 통한 신재생 자원의 불확실성에 기인한 계통영향 연구 및 의견교환
  - 신재생 확대에 따른 유럽 전력계통 영향 분석 및 새로운 제어 기술 활용 현황 파악
  - 분산자원 및 새로운 BM 모델 등장에 따른 전력시장 규제, 설계, 정책 측면 해외동향 조사
  - 불확실성 해소를 위한 신기술 정보교류 및 협력방안 모색
  
- 중개시스템 개발 및 BM 발굴 국책과제의 분산자원 중개시장 기반 계통운영 협조운영 방법론 정립의 기초 연구로 활용

#### 5. 해외사무소 협조

- 해당사항 없음

첨부 : 공무 국외출장 계획서 1부.

## [붙임] 공무 국외출장 계획서

### 1. 출장목적

- 중개시스템 개발 및 BM 발굴 연구과제 수행을 위한 해외사례 벤치마킹  
\* 소규모 분산자원 전력거래 활성화를 위한 중개시스템 개발 및 BM 발굴('16.5~'18.12)
- 분산자원 확대에 따른 전력계통 협조운영 방법론 기술동향 조사
- 신재생 자원의 불확실성에 기인한 계통영향 연구 및 전문가 의견교환
- 2017년도 CIGRE 더블린 국제 심포지엄 참석

※ **CIGRE** (International Council on Large Electric System)

- 1921년 프랑스에서 설립된 비영리 국제협의회로 미국의 IEEE와 함께 전기분야의 대표적인 국제기술협회 중 하나임
- 전 세계 전력회사 및 제작사, 학계, 연구소들이 참여하여 최신 실무사례를 중심으로 논문발표, 워킹그룹 및 국가별 연구 활동실적 등을 발표 함
- 매 짝수년도에 파리에서 전 분야를 다루는 대규모 컨퍼런스가 진행되며, 홀수년도는 특별 토픽을 중심으로 행사가 개최 됨

### 2. 출장계획

- 출 장 자 : 전력경제연구실 차장 김진이
- 출장기간 : '17.5.29 ~ '17.6.4(5박7일)
- 출 장 지 : 아일랜드 더블린
- 소요예산 : 3,040,125원(세부내역 첨부1 참조)
  - 등록비 : 1,060,599원/연구활동비(학회 참가비)
  - 항공료 및 체재비 : 1,979,526원/연구활동비(국외여비)
- 예산과목 : 국책연구과제비(중개시스템 개발 및 BM 발굴)

○ 주요일정

일 자	내 용
5.29(월)	출국 및 현지 도착
5.30(화)	워킹그룹 강연회 참석
5.31(수)~6.1(목)	CIGRE 심포지엄 참석
6.2(금)	Technical Visit 참석
6.3(토)~6.4(일)	더블린 출발/인천공항 도착

### 3. 2017년도 CIGRE 심포지엄 주요 내용

- 개최장소 : 더블린 Trinity College
- 개최기간 : 5.30(화) ~ 6.2(금)
- 주요내용(세부내역 첨부4 참조)
  - 소규모 분산자원 확대에 따른 규칙(rule) 및 표준화(standards) 변화방향
  - ESS 등 신기술 및 수요측 참여를 촉진시키기 위한 전력시장 설계안
  - TSO와 DSO 사이 네트워크 구성 및 운영관련 협조 제어 방안
  - TSO와 DSO간 네트워크 계획 및 운영 개선을 위한 빅데이터 활용

- 첨부 1. 소요예산 산출명세서 1부
2. 항공료 인보이스 1부
  3. 학회 등록비 상세내역 1부
  4. 심포지엄 주요내용 1부
  5. 주최 측 숙소 지정 내역 1부

[첨부1]

**소요예산 산출명세서**

1. 총 소요예산 : 3,040,125원

2. 적용기준

가. 국외여비 적용 등급 : “다”급(아일랜드)

자격	일비	숙박비	식비
3직급이하	26\$	실비(상한액:90\$)	37\$

나. 예산편성 환율(17.5.11 고시환율 기준)

○ 1,227.83원/EUR 적용, 1,129.30원/USD 적용

3. 세부내역

가. 항공료 : 1,396,800원(TAX 및 유류할증료 포함)

나. 체재비 : 426,876원(숙박비 제외)

○ 일 비 :  $\$26 \times 6\text{일} \times 1\text{인} \times 1,129.3\text{원}/\$ = 176,171\text{원}$

○ 식 비 :  $\$37 \times 6\text{일} \times 1\text{인} \times 1,129.3\text{원}/\$ = 250,705\text{원}$

○ 숙박비 : 실비정산

※ 총무규정 제21조(국외출장 여비)  
 3. 숙박비는 업무형편 또는 기타 부득이한 경우에는 기준금액의 5할 범위 내에서 추가지급 할 수 있으며, 국제회의 참석시 주최측에서 숙소를 지정한 경우에는 실비를 지급한다.

다. 등록비 : 1,060,599원

○ 등록비 :  $830\text{EUR} \times 1\text{인} \times 1,227.83\text{원}/\text{EUR} = 1,060,599\text{원}$

라. 기타 : 155,850원

○ 해외여행자보험료 :  $34,250\text{원} \times 1\text{인} = 34,250\text{원}$

○ 인천공항↔나주 왕복 KTX 요금:  $60,800\text{원} \times 2(\text{왕복}) \times 1\text{명} = 121,600\text{원}$

※ 예산편성 적용환율

○ 2017.05.11. 기준 KEB하나은행 환율 기준

- 1EUR = 1,227.83원 적용
- 1USD = 1,129.30원 적용

해외정보



[첨부2]

# 항공료 INVOICE

(주)그린프로젝트투어

Green Project Tour Co.,Ltd

서울 종로구 삼봉로 81 두산위브빌딩은 838호 ■ Doosan We've Pavilion #838, 81, Sambong-ro, Jongno-Gu, Seoul, Korea  
Tel: 02- 776-1444 ■ Fax : 02-755-8668 ■ greenproject@hanmail.net ■ http://www.greenproject.co.kr

## INVOICE ( 請 求 書 )

TO : 한국전력거래소  
 FROM : (주) 그린프로젝트투어  
 이 현옥실장  
 |  
 NAME : 1. MS. KIMJINYI  
 DATE : 2017.05.15

ROUTING : 29,MAY 인천 - 암스텔담 KL 856 00:55 04:50  
 29,MAY 암스텔담 - 더블린 KL 933 07:40 08:20  
 03,JUN 더블린 - 암스텔담 KL 938 17:15 19:50  
 03,JUN 암스텔담 - 인천 KL 855 21:35 14:40+1DAY

AIR FARE : ₩1,396,800 ( TAX 및 유류할증료 포함 )  
 \*\* ECONOMY CLASS / 광공권 발급 후 출발변경이나 취소시 페널티가 있습니다. \*\*

해외여행자보험 : ₩34,250 ( 가입액 : 3억원 )

발권데드라인 : 예약후 24시간이내

**합 계 : ₩1,431,050**


사업자등록번호 : 104-81-53808

결제구좌 : 국민은행 815-01-0449-494 (주)그린프로젝트투어

This is to certify that the above fare is in accordance with tariffs and regulations.

Prepared by

서울-종로구수송동58(두산위브빌딩은838호)  
 (주)그린프로젝트투어  
 TEL: (02) 776-1444  
 대표이사 **운 승 원**





# (주)그린프로젝트투어

이현복  
leehyunokdk@hanmail.net /

## 여정표 (Itinerary)

발행일 : 2017년 05월 15일

승객 성명 : **KIM/JINYIMS** Booking No. : **2382-5950 (T57TPO)**

- \* 본 여정표의 내용이 예약한 내용과 일치하는 지 확인하시기 바랍니다.
- \* 본 여정표는 항공권 구매 확인 증서가 아니므로, 필요 시 항공권 지불 영수증(ITR) 을 수령하시기 바랍니다.

### 여정 Itinerary

편명 Flight **KL 856**(예약 번호 : **T57TPO**) **KLM ROYAL DUTCH AIRLINES** 

출발 Departure	서울(ICN) INCHEON INTL, KR	<b>29MAY17(월) 00:55</b>	Local Time	Terminal No. :	
도착 Arrival	암스테르담(AMS) SCHIPHOL AIRPORT, NL	<b>29MAY17(월) 04:50</b>	Local Time	Terminal No. :	
예상 비행 시간	Flight Time	10시간 55분	좌석 번호	Seat Number	미확정
예상 비행 거리	Est. Distance	8549 킬로, 5312 마일	기종	Aircraft Type	BOEING 747-400 (744)
예약 등급	Class	일반석(T)			
예약 상태	Status	확약(HK)			

편명 Flight **KL 933**(예약 번호 : **T57TPO**) **KLM ROYAL DUTCH AIRLINES** 

\* /KLM CITYHOPPER 항공기로 운항하는 공동 운항편 입니다. /KLM CITYHOPPER의 탑승수속 카운터를 이용하시기 바랍니다.

출발 Departure	암스테르담(AMS) SCHIPHOL AIRPORT, NL	<b>29MAY17(월) 07:40</b>	Local Time	Terminal No. :	
도착 Arrival	더블린(DUB) DUBLIN INTL, IE	<b>29MAY17(월) 08:20</b>	Local Time	Terminal No. : <b>1</b>	
예상 비행 시간	Flight Time	1시간 40분	좌석 번호	Seat Number	미확정
예상 비행 거리	Est. Distance	748 킬로, 465 마일	기종	Aircraft Type	EMBRAER 175(E75)
예약 등급	Class	일반석(L)			
예약 상태	Status	확약(HK)			

편명 Flight **KL 938**(예약 번호 : **T57TPO**) **KLM ROYAL DUTCH AIRLINES** 

\* /KLM CITYHOPPER 항공기로 운항하는 공동 운항편 입니다. /KLM CITYHOPPER의 탑승수속 카운터를 이용하시기 바랍니다.

출발 Departure	더블린(DUB) DUBLIN INTL, IE	<b>03JUN17(토) 17:15</b>	Local Time	Terminal No. : <b>1</b>	
도착 Arrival	암스테르담(AMS) SCHIPHOL AIRPORT, NL	<b>03JUN17(토) 19:50</b>	Local Time	Terminal No. :	
예상 비행 시간	Flight Time	1시간 35분	좌석 번호	Seat Number	미확정
예상 비행 거리	Est. Distance	748 킬로, 465 마일	기종	Aircraft Type	EMBRAER 175(E75)
예약 등급	Class	일반석(L)			
예약 상태	Status	확약(HK)			

편명 Flight **KL 855**(예약 번호 : **T57TPO**) **KLM ROYAL DUTCH AIRLINES** 

출발 Departure	암스테르담(AMS) SCHIPHOL AIRPORT, NL	<b>03JUN17(토) 21:35</b>	Local Time	Terminal No. :	
도착 Arrival	서울(ICN) INCHEON INTL, KR	<b>04JUN17(일) 14:40</b>	Local Time	Terminal No. :	
예상 비행 시간	Flight Time	10시간 5분	좌석 번호	Seat Number	미확정
예상 비행 거리	Est. Distance	8549 킬로, 5312 마일	기종	Aircraft Type	BOEING 747-400 (744)
예약 등급	Class	일반석(T)			
예약 상태	Status	확약(HK)			

[첨부3]

## 학회 등록비

- 학회 등록비 : 830유로\*1,227원=1,018,410원
  - 심포지엄 등록비 : 715유로
  - 강연회 참석비 : 75유로
  - Technical Visit : 40유로

Symposium*		
	Early Bird Registration Rate - available until 1 <sup>st</sup> March 2017	Late Registration Rate after 1 <sup>st</sup> March 2017
Member	€ 495.00	€ 595.00
Non-Member	€ 600.00	€ 715.00
Student Member	€ 395.00	€ 475.00
Non Member Student**	€ 480.00	€ 570.00

\* exempt from Value Added Tax (VAT)

\*\*Non Member Students must provide proof of student status to [cigredublin2017@abbey.ie](mailto:cigredublin2017@abbey.ie) after registration

Optional Extras	
Tutorials	€75.00 per delegate
Gala Dinner	€75.00 per delegate
Lunch on site	€20.00 per day
Technical Visit	€40.00 per delegate
Accompanying Person	€35.00 per person

[첨부4]

## 심포지엄 주요내용



Specialist Consultants  
to the Electricity Industry



INTERNATIONAL



ELECTRIC POWER  
RESEARCH INSTITUTE

○ 전체일정



## A Guide to Registration Options for the CIGRE Dublin 2017 Symposium

Dear Delegate,

We are delighted that you are planning to register for the CIGRE Dublin 2017 Symposium. Registration can be completed on line at the following link: <https://abbey.eventsair.com/cigre-dublin-2017/registration>

We have prepared this guide to help make the registration process as smooth as possible. We strongly recommend you read it prior to commencing the registration process.

Section 1 – High Level Programme

Section 2 – Options you will be given as you step through the registration process

Section 3 – Summary of Fees

Section 4 - Cancellation and substitution, Invoicing, Payment and Taxes

If you need assistance during the registration process please contact us: [cigredublin2017@abbey.ie](mailto:cigredublin2017@abbey.ie)

### Section 1 High Level Programme

Date / Time (approximate)	Event	Location
Tuesday 30/5	14:00 – 18:00 Tutorials	Trinity College Dublin
	18:30- 20:00 Welcome Drinks Reception	Trinity College Dublin
Wednesday 31/5	08:30-18:00 Symposium Day 1	Trinity College Dublin
	10:00 – 14:00 Partners Half Day Tour	Dublin City
	19.30-23.00 Gala Dinner (The Mansion House)	The Mansion House, Dawson Street, Dublin
Thursday 1/6	08:30-18:00 Symposium Day 2	Trinity College Dublin
	09:00-17:00 Partners Full Day Tour	Dublin & Wicklow
Friday 2/6	09:00-11:30 Technical Visit	Ballsbridge, Dublin
Thursday 25/5 – Tuesday 30/5	Study Committee and Working Group Meetings. These are not covered by the registration process	Camden Court Hotel & Trinity College Dublin



## ○ 워킹그룹 Tutorial 일정(5/30)



### **Tutorial Room 1: Study Committees C4 and C2**

#### **Power Quality Analysis, Design and Management**

This tutorial looks at increasing challenges of analysing and managing power quality due to the changing nature of grid connected devices and the technology changes employed in the building of new grid infrastructure. Changes are being driven by the connection of generation with power-electronic interfaces, the use of power electronic consumer equipment and the increased use of HV and MV cables causing low order harmonic resonances. Based on the research of working groups from Study Committees C4 and C2 this tutorial will be broken into 3 sessions as shown below. The technical organising committee feel these topics will of great interest to delegates. A significant number of papers have been received on the topic of power quality and this tutorial gives delegates an opportunity to understand the subject matter in more depth prior to the papers being presented and discussed during the symposium.

#### **SC C4 - Changes in the power system impacting on power quality (Francisc Zavoda)**

- Moving from large conventional synchronous machines to generation sources utilising power-electronic interfaces.
- Changes in consumption: replacement of existing types of equipment with more energy-efficient alternatives, the proliferation of small devices and the almost complete shift to active power-electronic interfaces.
- Changes in the power system networks: Increased use of underground cables, power-electronic equipment and power line communication.

#### **SC C4 - Demand Side Management (Francisc Zavoda)**

- Volt & VAR control.
- Feeder reconfiguration.
- The complexity of smart grid and requirements for new measurement techniques that will comply with national and international standards.

#### **SC C4/C2 - Recommendations for Systematic Framework Design of Power System Stability Control (Yongjie Fang – based on the output of Joint Working Group C2/C4.37)**

- Classification of power system stability control
- Role features, functional orientation and interrelations of various types of control
- Functional structure and essential techniques of a systematic framework for enhancing control adaptability and coordination

## Tutorial Room 2: Study Committees C1, B2 and C6

### Building for the Future:

This topic investigates how TSOs and DSOs are contemplating the future with a view to investing in appropriate networks. This is especially important in the context of societal concerns about new infrastructure. The topic will be examined from three different perspectives and presented by internationally acclaimed experts from Study Committees C1, B2 and C6:

1. Understanding what is possible in terms of optimising the use of existing overhead line assets;
2. Examining the basis for investment decisions in a changing and uncertain environment;
3. Assessing the impact of battery storage on distribution networks; many papers have been received on these topics and this tutorial aims to give delegates a deeper understanding of them prior to the symposium sessions.



**SC C1 - Investment decisions in a changing and uncertain environment (speaker to be confirmed)**  
WG C1.22 has reviewed current and emerging practices that identify the need for new system facilities, the factors that influence the choice of appropriate investments and the ways in which TSOs are able to make progress. Building on the work of WG C1.22, the tutorial addresses:

- New drivers for network investment and new options
- Organisational and institutional issues
- Market issues
- Economic issues

**SC B2 – Quo Vadis Overhead Lines (Konstantin Papailiou)**

SC B2 will present on issues associated with “The Overhead Line dilemma”

- Public acceptance issues
- Upgrading & uprating techniques
- Dynamic line rating & monitoring
- Multi-circuit lines & AC to DC conversion

**SC C6 - Impact of Battery Energy Storage Systems (BESS) on Distribution Networks (Geza Joos)**

The tutorial will present the main findings of WG C6.30 'Impact of Battery Energy Storage Systems (BESS) on Distribution Networks'. It covers different aspects such as:

- Battery energy storage systems in operation, planning and design of distribution systems
  - Use cases and business cases
  - Standardization issues and grid codes
  - International experiences with practical installations (pilots, projects, and studies) and provides some best practice recommendations for the installation of battery systems.
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○ 심포지엄 세부일정(5/31~6/1)

Wednesday 10:30:-12:15	
Session 1	Session 2
Room 1	Room 2
Adaptable market designs that attract technology innovations and demand side participation	Power system technical performance in light of the changing mix of resources and technologies: Focus on Frequency Stability
012 Demonstration for estimation of nega-watt potential in Japan J. YOSHINAGA	021 Decentralized intelligent electric water heater as resource to improve frequency response F. LAURENCELLE, A. MOREAU, F. MONETTE, S. JASMIN
013 Power Off and Save - A System Operator-led Residential DSM project D. BARRY, C EGAN	022 Proving Primary Frequency Response from Photovoltaic Power Plants P. POURBEIK, S. SONI, A. GAIKWAD, V. CHADLIEV
014 Smart Control of Heat Pumps and Thermal Storage Systems: An Approach to Support Future Distribution Grids A. BENZARTI, S. ROEHRENBECK, W.H. WELLSOW, M. PAHN, A. TERSLUISEN, P. HAUFFE, K. MAAR, J. MAUL, S. JAEGER	023 Frequency Regulation in Transmission Grids Using Virtually Interconnected Battery Storage Systems K. VEERASHEKAR
015 The Evaluation of Customer Characteristics and the Aggregation Result in Experiences of Demand Response K. HONDA	024 Missing Inertia in Future Power Systems and Frequency Stabilizer as a Solution E. SPAHIC, R. MORGENSTERN, G. BECK, V. HILD
016 Energy Management in Smart Home Based on Active Distribution Network D. LIU, LX. YAN	025 Impacts of Reduced Rotational Inertia on Frequency Stability in the European Transmission System D. HEWES, I. BOIARCHUK, R. WITZMANN, S. ALTSCHAEFFL
	026 Synthetic Inertia Requirements for Optimal Participation in Under Frequency Transients and System Recovery P. BROGAN

Wednesday 13:30-15:15	
Session 3	Session 4
Room 1	Room 2
Coordination between DSOs and TSOs to optimise networks and power system control	Transmission and Distribution overhead lines; design, materials and standards
031 Reactive Power - Voltage Nodal Controller for Integration of Windfarm Clusters Connected to the Distribution Grid T. HEARNE, P. O'HALLORAN, A. STEFANOV	041 Alternatives for the conversion of HVAC overhead lines to HVDC operation J. IGLESIAS
032 Potential of Local Virtual Power Plants for Reactive Power Control in a HV Grid Area N. THIE	042 Managing big data to improve the planning of overhead electric lines: Referencing and project information database (RaPID) T. WATERFIELD, M BRODERICK, J BARTER, T LANGTON
033 Cross-grid level interface using P-U-capability range for flexibility determination and operating point shifting A.K. MARTEN	043 Alternative design experience in remote African areas - electrification with 330 kV overhead line M. MIKKELSEN, HENRI SKOUBOE, S. GALANTINO, AARON NYIRENDA
034 Control and Automation Systems at the TSO/DSO interface: a survey on the actual functionalities and DSO requirements F. SILVESTRO, F. PILO, G. MAURI, J. TAYLOR, B. BAK-JENSEN, E. KAMPF	044 Field trial of carbon composite core covered conductor system M. LEE, P. PEARL
036 Coordinated flexibility for distribution grids and balancing markets: Regulatory aspects and the configuration of the hybrid VPP concept C. GUTSCHI, T. ESTERL	045 Wind and Ice Loading Assessment of Transmission Line Network in Ireland P. PORTER, O. ARMSTRONG
037 Participation of RES in operational reserves and market-based limitations in Spain M. SANCHEZ LLORENTE, J. BOLA MERINO, M. DE LA TORRE RODRIGUEZ, R. FERNANDEZ-ALONSO	046 Lightning Performance Comparison of a Conventional and a Low Profile Compact DC Transmission Line M. SALIMI

Wednesday 15:45-17:30	
Session 5	Session 6
Room 1	Room 2
<b>Challenges in transmission and distribution networks: Analysing and assessing power system dynamic stability</b>	<b>Improvements in Power System Operation brought about through innovative use of data, monitoring, automation and testing</b>
051 Experiences of analysing seasonal oscillatory properties of the Nordic power system using large data sets A.-J. NIKKILÄ, J. TURUNEN, J. SEPPÄNEN, L.C. HAARLA	061 Flexible operation of VSC-HVDC and Phase Shifting Transformers for next generation of Transmission System Control Centres F. SASS
052 A Dynamic Network Security Assessment Model for the Interconnected Power System of Continental Europe R. DIMITROVSKI	062 Transformer Tap Optimisation exercise in Indian Power System A. SINGH
053 Investigation of Voltage Dip Induced Frequency Dips in Ireland L. MCMULLAN	063 Four years of successful experience and optimizations of thermal rating operation in Austria's Transmission Grid and options for further developments R. PUFFER, K. REICH, G. MIKA
054 Analysis of dynamic aspects of the Continental European power system E. HILLBERG, G. LINDAHL, G. PINARES, F.R. SEGUNDO SEVILLA, P. KORBA, K. UHLEN, W. SATTINGER	064 Online power system state monitoring and automatic disturbance reporting using WAMS-data M. KUIVANIEMI, A.-J. NIKKILÄ
055 Assessment of transient stability of cable based transmission grids with reactive power compensation Y.W. FOO, L. DALL, F. FARIA DA SILVA	065 Evolution of Supervision in a variable electrical environment G. EVEN
056 Power System Dynamic Model Validation M. EAGER	

Thursday 08:15-10:00	
Session 7	Session 8
Room 1	Room 2
<b>Improving reliability and security of supply for customers: Focus on microgrids and on asset protection</b>	<b>Adaptable market designs: Innovative market regulation, design and policies</b>
071 Reliable and affordable power supply for industrial sites with renewable energy –Lessons learned from operating the grid connected PV-diesel-battery microgrid in Johannesburg, South Africa B. BUCHHOLZ	081 Evidence of the techno-economic impact of energy policy, market and incentive design, and European Network Codes on distribution system management E. DISKIN
072 Microgrid Deployment Enablers – Guidelines, Grid Codes and Standards G. JOOS	082 International Perspectives on Alignment between Electric Service Costs and Rate Structures A. CHUANG
073 Highlights of Intelligent Controls in Off-Grid Systems – Cigre C6.28 WG Case Studies P. CHUSOVITIN, R. SEETHAPATHY, H. FARAG	083 Integration of HVDC-Links into Flow-Based Market Coupling: Standard Hybrid Market Coupling versus Advanced Hybrid Market Coupling C. MÜLLER, A. HOFFRICHTER, H. BARRIOS BÜCHEL, A. SCHWARZ
074 Climate change and more demanding consumers, increase the need for new investments in the power grid E.F. LIVGARD	084 Toward the policy and development of renewable power generation in Thailand P. WATTANACHANYA
075 Evaluation of Fault Detection by Sensor Equipped Sectionalises in Distribution System S. OE	086 Cross-border Transmission Capacity Management for Regional Electricity Market Development G. ONICHIMOWSKI
076 Demonstration Project Utilizing Hybrid Battery Energy Storage System with High Penetration of Renewable Energy Sources in the Oki-Islands M. MIKAWA	087 Regulatory frameworks for innovating transmission investments fostering market integration and green generation F. REGAIRAZ, A. BALKWILL, F.P. HANSEN



Thursday - 13:15-15:00	
Session 9	Session 10
Room 1	Room 2
<b>Power system technical performance in light of the changing mix of resources and technologies: Focus on Power System Harmonics</b>	<b>Integration public concerns into development of infrastructure projects</b>
092 CIGRE JWG C4/B4.38. Network modelling for harmonic studies – status report M. VAL ESCUDERO	101 Overhead lines and underground cables: acceptability issues and strategies, methodologies and techniques for stakeholder engagement – Two UK Case studies. M. BRODERICK
093 Proposed Method for Evaluating Temporary Overvoltages in Transmission Systems due to Low Harmonic Order Resonances K. VELITSIKAKIS	102 Gaining public acceptance with new design power pylons - a real life case from Denmark M. MIKKELSEN, HENRI SKOUBOE
095 Use of a Sub Harmonic Protection Relay to Detect SSO Conditions Associated with Type-III Windfarms and Series Compensated Transmission Systems N. PERERA, K. NARENDRA	103 Feasibility Study on the Building Superconducting Smart Platform using Co-axial HTS Power Cables Y. KWAK
096 Harmonic specification for Offshore Wind Farm connections – determination, issues and recommendations K. KOO	104 A New Transformational Approach to Grid Development S. O'MALLEY
098 Development of Wind Farm Power Station (WFPS) Grid Code Compliance Testing Standards, Ireland. K. O'KEEFE	105 Visual Impact Provision: a new approach to dealing with visual impact of existing high voltage transmission lines in protected areas H. PEARSON
099 Protecting Submarine Electricity Cables and the Impact on the Island Communities of Scotland and the Surrounding Environment I. HENDERSON, G. CLARKE	

Thursday 15:30 - 17:15	
Session 13	Session 14
Room 1	Room 2
<b>Coordination between DSOs and TSOs: Information exchange, operator awareness and training</b>	<b>Power system technical performance in light of the changing mix of resources and technologies: Focus on the impact of variable generation on power system operation</b>
131 Austrian Awareness System – improving information exchange and communication between TSO and DSOs J. KREIENKAMP, M. MARKOVIC	141 Frequent Unit Commitment of Dispatchable Thermal Generators by the Integration of Variable Renewable Energy Sources in the Future Power System J. TOYODA, T. CHIDA, M. MATSUMOTO, K. SHINADA
132 Interaction between Distribution Automation System & Load Dispatching Control System M. MURATA	143 Assessment of Energy Storage Systems for Contribution to Flexibility in Electrical Power System with High Level Intermittent Renewables Energy J. AVALOS
134 Operator Training Aspects in Systems with High DG/RES Generation Levels: Current situation and Recommendations for Improvement N. CUKALEVSKI	145 Quantitative Measures for Evaluating Grid Variability Reduction Due to Diversity, Storage or DSM H. MING
135 Extending the operational capacity for HVDC exports on the power system of Ireland and Northern Ireland D. CASHMAN, D. GILLESPIE, M. EAGER, E. SWEENEY, S. POWER, J. O' SULLIVAN	146 Estimation Method of Green House Gas Reduction for EES systems Based on Use case D. RHO
136 Impact of Distributed Generation on Power System Restoration and Defence M. POWER	147 Risk Assessment in Predictive Outage and Asset Management Using Big Data M. KEZUNOVIC
137 Recent challenges of operating a secure transmission system with high levels of non-synchronous generation A. ROGERS, P. RYAN	

## ○ Technical Visit 일정(6/2)

### **Technical Visit – EirGrid National Control Centre**

*Cost of attendance €40.00.*

In the world of electric power systems Ireland is probably best known for the work it has done to integrate high levels of renewable non-synchronous generation into its power system. As a small island power system with no AC interconnection to Great Britain or Continental Europe, integrating large amounts of non-synchronous generation poses a number of technical challenges in areas such as voltage, frequency and transient stability. As of October 2016 Ireland is trialling operating the power system with up to 60% of the generation coming from non-synchronous sources at any point in time.

The technical visit takes us to the offices of EirGrid, the Transmission System Operator in Ireland and Northern Ireland. During the visit delegates will meet the engineers behind the transformation of the power system and will visit the National Control Centre. EirGrid staff will provide detailed presentations on the technical challenges posed by high levels of non-synchronous generation and the solutions identified to manage these challenges. This will include a presentation on the performance of the power system during Storm Darwin in 2014. The presentations will be followed by a 30 minute guided visit to the National Control Centre to see the operation of the power system



in real time and witness first-hand the tools, processes and systems used by the control centre engineers.

## 주최측 숙박 지정 내역

### Accommodation

We have reserved rooms in a number of 3, 4 and 5 star hotels around Dublin in close proximity to Trinity College. You will have the option to book these rooms as part of your registration process and will be required to pay a deposit equivalent to one night's stay. The prices below are per night for a single room bed and breakfast, additional options for double / twin rooms are available during the registration process.

Please note that for most of these hotels you can only book nights between Sunday 28<sup>th</sup> May and Friday 2<sup>nd</sup> June. The Camden Court hotel can be booked from Thursday 25<sup>th</sup> May. If you wish to reserve accommodation for nights outside of this range please email the conference organiser directly with your dates at [cigredublin2017@abbey.ie](mailto:cigredublin2017@abbey.ie)

#### 5 Star Hotels

The Westin Hotel - €335

The Westbury Hotel - €390

#### 4 Star Hotels

Camden Court Hotel - €185

#### 3 Star Hotels

Jury's Inn Parnell Street - €180

Jury's Inn Christchurch - €185

Fleet Street Hotel - €169

Buswells Hotel - €155

Trinity College Apartments - €78.50