



# IGEN-GEC: Background and Status

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**IGEF sub group meeting**  
**11<sup>th</sup> February 2015, New Delhi, India**



## INDO – GERMAN COLLABORATION ON GEC



- Joint declaration of Intent between Germany and India on Indo-German Development Cooperation regarding the Establishment of **Green Energy Corridors** was signed on 11<sup>th</sup> April 2013.
- The declaration was signed in the presence of H.E. Dr. Manmohan Singh, Prime minister of the Republic of India, and H.E. Dr. Angela Merkel, Federal Chancellor of the of the Federal Republic of Germany.





## INDO – GERMAN COLLABORATION ON GEC Contd..

- In this regard the German Side expressed its willingness to consider providing concessional loans of up to **one billion EUR** over the next six years through KfW.
- “Technical assistance for forecasting, balancing, market design and network management in connection with grid integration of renewable power should be considered under Indo- German Technical Cooperation and realized through GIZ”.
- During the negotiations on Development cooperation between Government of India and Government of Germany, held in New Delhi on 22 – 23 July 2013, Germany committed **EUR 2 million** for the technical assistance as new component of the Indo – German Energy Programme (IGEN –GEC)



# INDO GERMAN ENERGY PROGRAMME (IGEN)

## Energy Efficiency Ministry of Power (BEE/CEA)

EE in Thermal Power Plants

Implementation of Energy Conservation Act

Clean Development Mechanism

Excellence Enhancement Centre

Trigeneration (TRIGEN)

Support Office to IGEF

Indo-German Energy Symposium

## Renewable Energy

## Ministry of New and Renewable Energy (MNRE)

Rural/ Poverty Focused

IGEN – Renewable Energy Component (IGEN-RE)

Renewable Energy Supply for Rural Areas (RESRA)

Industrial/ Urban Focused

Commercialisation of Solar Energy in Urban and Industrial Areas (ComSolar) / (KI-RE)

Solar Mapping and Monitoring (SolMap)

Green Energy Corridors (IGEN – GEC)

BMUB

BMZ

support

support

**Indo-German Energy-Forum (IGEF)**  
MoP (CEA, BEE), MNRE  
BMW, BMZ, BMU, (BMBF, AA, BMVBS)

Sub-Group 1: "Efficiency enhancement in fossil fuel based power plants"

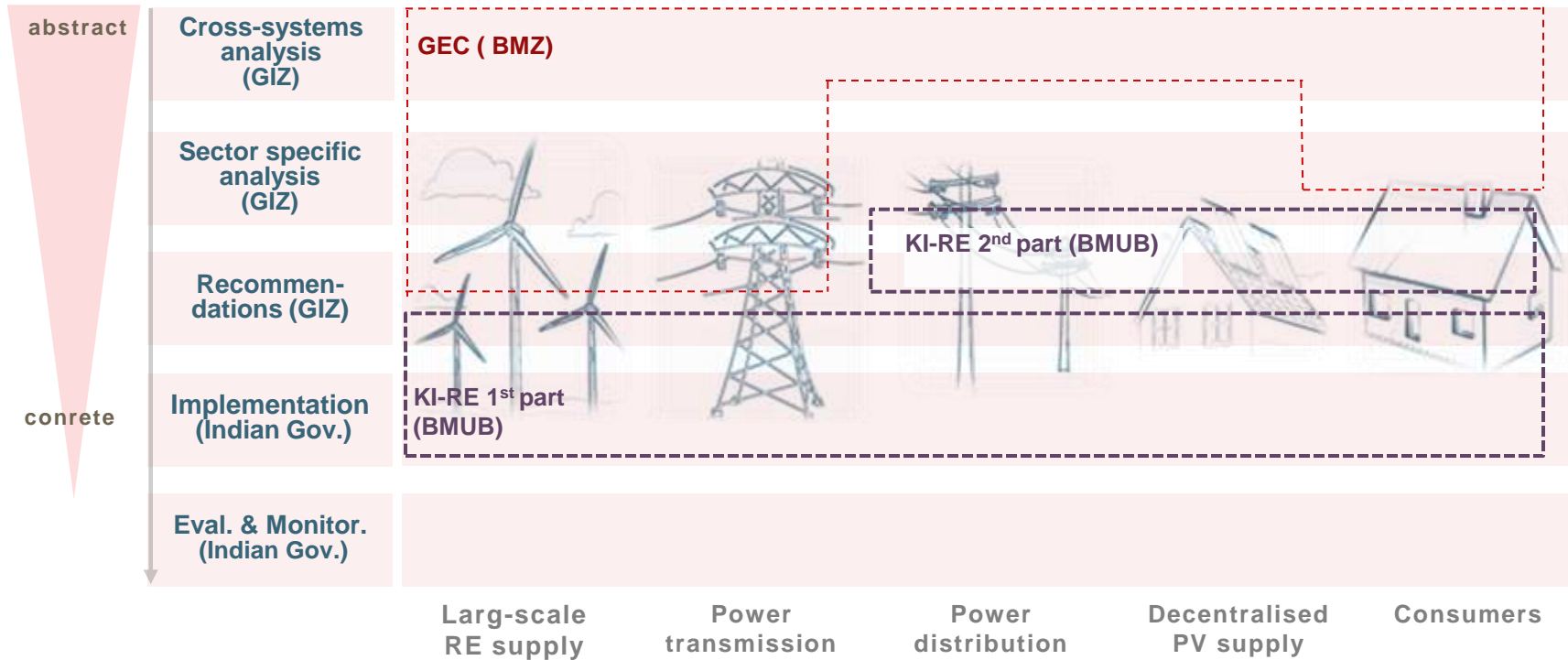
Sub-Group 2: "Renewable Energy"

Sub-Group 3: "Demand side energy efficiency and low carbon growth strategies"

Sub-Group 4: "Green Energy Corridors"



# KI-RE & GEC: DEMARCATIION OF CONTENT



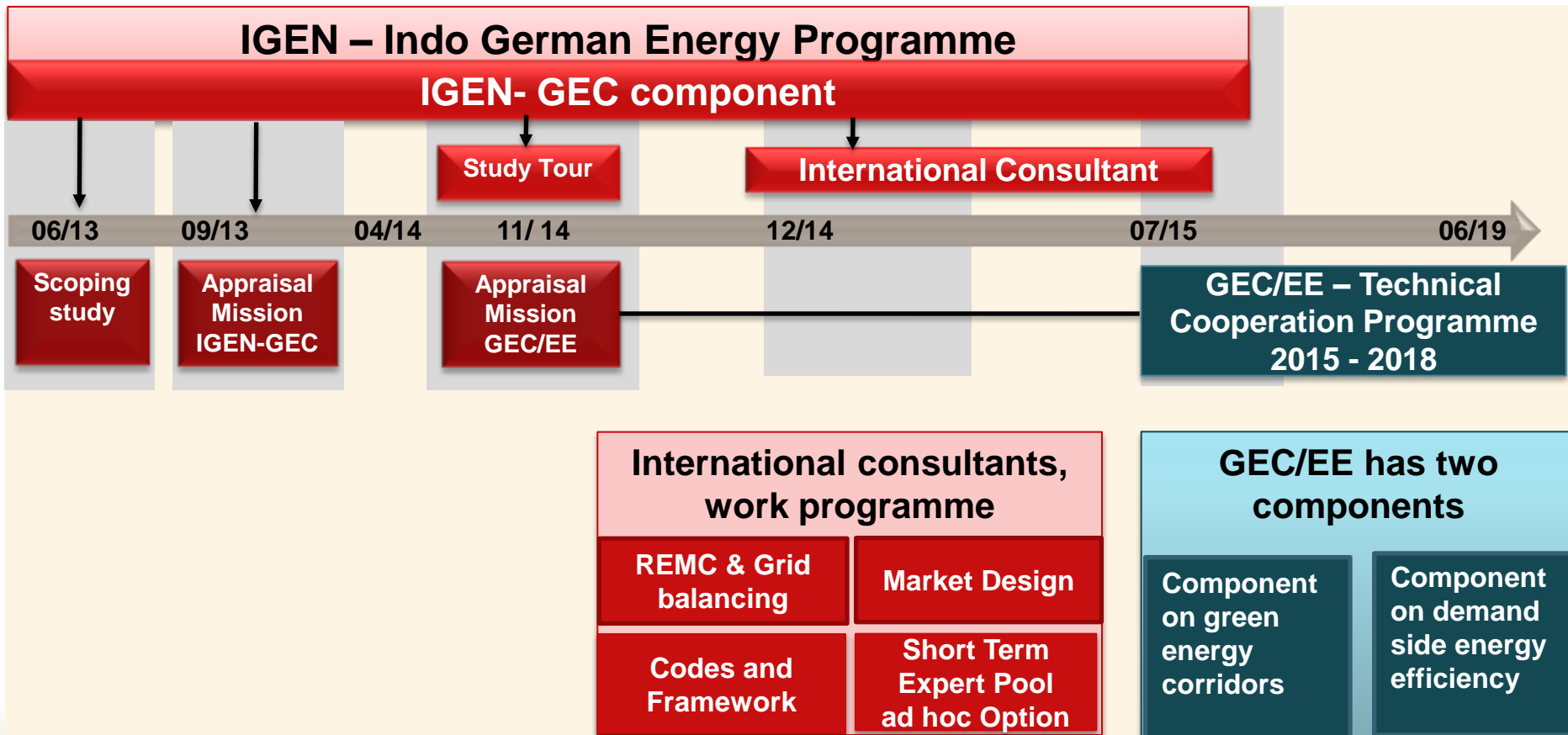


## TECHNICAL ASSISTANCE: IGEN - GEC

- Technical Cooperation component of Green energy corridors is being implemented by GIZ under Indo German Energy Programme (IGEN – GEC).
- The key objective of the IGEN-GEC component is that “Indian organisations/institutions on national and State levels are in possession of a concise set of decision making recommendations for extension and operation of the electricity transmission grid in the light of increased shares of renewable energy in the grid”.
- The target group of the technical assistance work consists of the relevant staff members of MNRE, CEA, CERC, POSOCO (NLDC, RLDCs), SLDCs, Central Transmission Utility (PGCIL), the State Transmission Utilities and distribution companies.
- Project developers and investors along with the Forum of Regulators are also part of the target group



## TIMELINE FOR GIZ's ACTIVITIES on GEC





## STUDY TOUR TO GERMANY (22.11.14 to 29.11.14)







## STUDY TOUR TO GERMANY Contd..

- Study tour on **‘Transmission grid management, challenges and solutions – large scale integration of renewable energy’** was organized from 22.11.14 to 29.11.14
- Representatives from State load Dispatch Centres (Tamil Nadu, Gujarat, Rajasthan, Karnataka and Andhra Pradesh), MNRE, CEA, CERC, PGCIL and POSOCO participated in the study tour.



## STUDY TOUR TO GERMANY: ORGANIZATIONS VISITED

- **Senvion** : Offshore Wind Energy
- **Oldenburg University**: Solar and Wind forecasting
- **ForWind Center for Wind Energy Research**: Short term Wind power forecasting
- **Overspeed GmbH**: Solar and Wind forecasting
- **EWE NETZ**: Distribution Utility
- **NEXT Energy**: Research about Solar PV material and Energy Storage
- **OFFIS Institute**: Intelligent control of electricity supply systems
- **Deutsche Windguard GmbH**: Certification of wind turbines



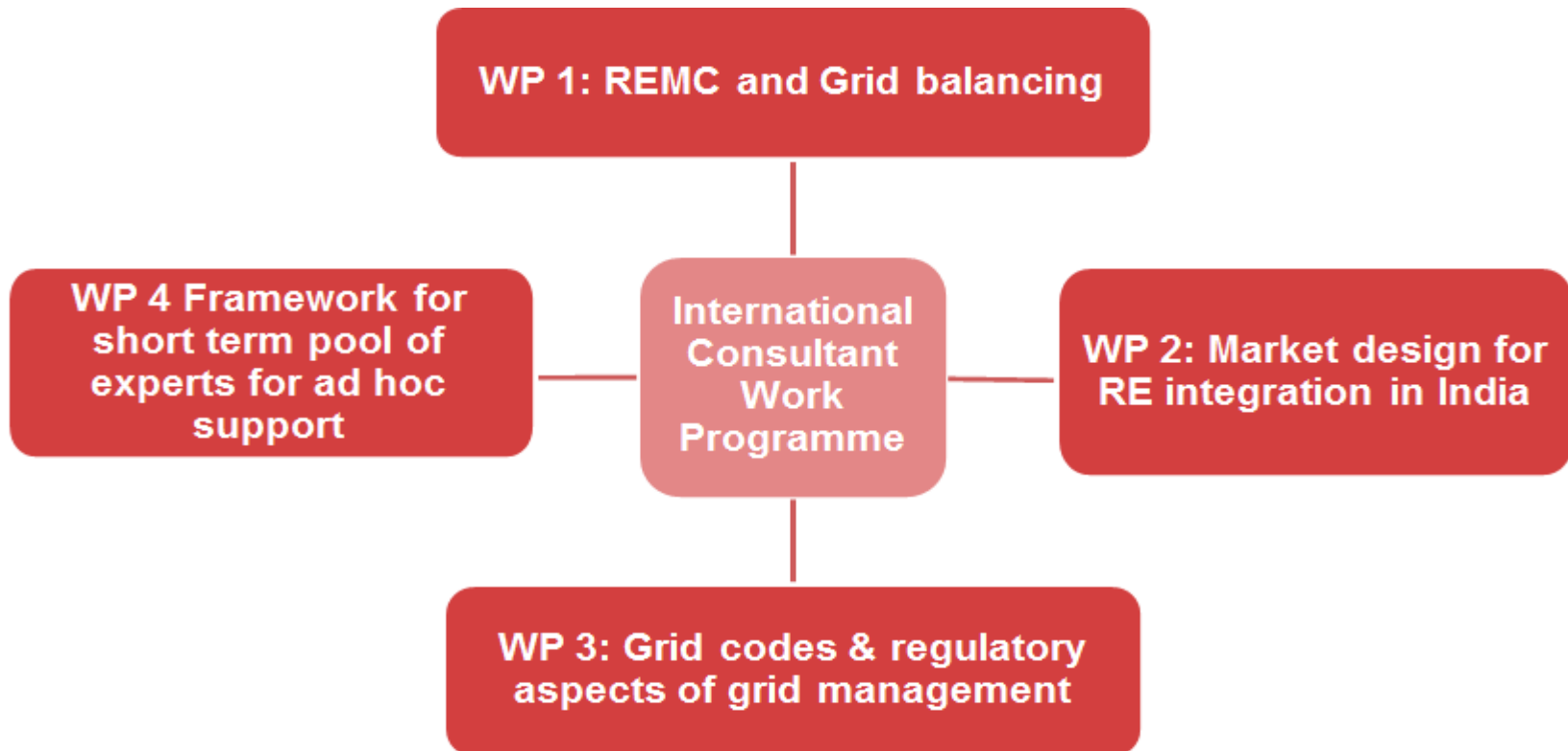
## STUDY TOUR TO GERMANY: ORGANIZATIONS VISITED Contd..

- **50 hertz:** Transmission system operator
- **Airport Neuhardenberg:** Solar park with 145 MW<sub>p</sub> installed capacity
- **Fraunhofer Institute IWES:** Virtual power plant: Kombikraftwerk project
- **Outdoor laboratory of IWES:** Ancillary services testing facility





# IGEN – GEC : INTERNATIONAL CONSULTANTS TERMS OF REFERENCE





## WP 1: REMC and GRID BALANCING

### Task 1

- Analysis of wind and solar power forecasting infrastructure and requirements

### Task 2

- Proposal for the establishment of Renewable Energy Management Centres (REMC)

### Task 3

- Balancing capability enhancement

### Task 4

- Overall strategy and roadmap



## WP 2: MARKET DESIGN FOR RE INTEGRATION IN INDIA

- Task 1** • Analysis of existing framework for renewables & RE-policy within different states in combination with the national level
- Task 2** • Instruments & measures to foster variable RES in Germany & Europe
- Task 3** • Market design for an electricity system with higher share of RES
- Task 4** • Market design of possible capacity markets
- Task 5** • Overall strategy & roadmap, recommendation on work programme of GIZ



## WP 3: GRID CODES AND REGULATORY ASPECTS OF GRID MANAGEMENT

- Task 1** • Review Indian Electricity Grid Code & relevant technical standards
- Task 2** • Suggest roadmap for implementing Automatic Generation control (AGC)
- Task 3** • Document best practices relevant to India on large scale integration of RE
- Task 4** • Advice on policy & regulatory initiatives in India for large scale integration of RES
- Task 5** • Methodology for selection & placement of control equipments
- Task 6** • Overall strategy & roadmap on regulatory aspects for large scale grid integration of RE



## WP 4: FRAMEWORK FOR SHORT TERM POOL OF EXPERTS FOR AD HOC SUPPORT

Work package 4 is not divided into pre-defined tasks. The Contractor will give support on ad –hoc short term basis in the following fields of expertise

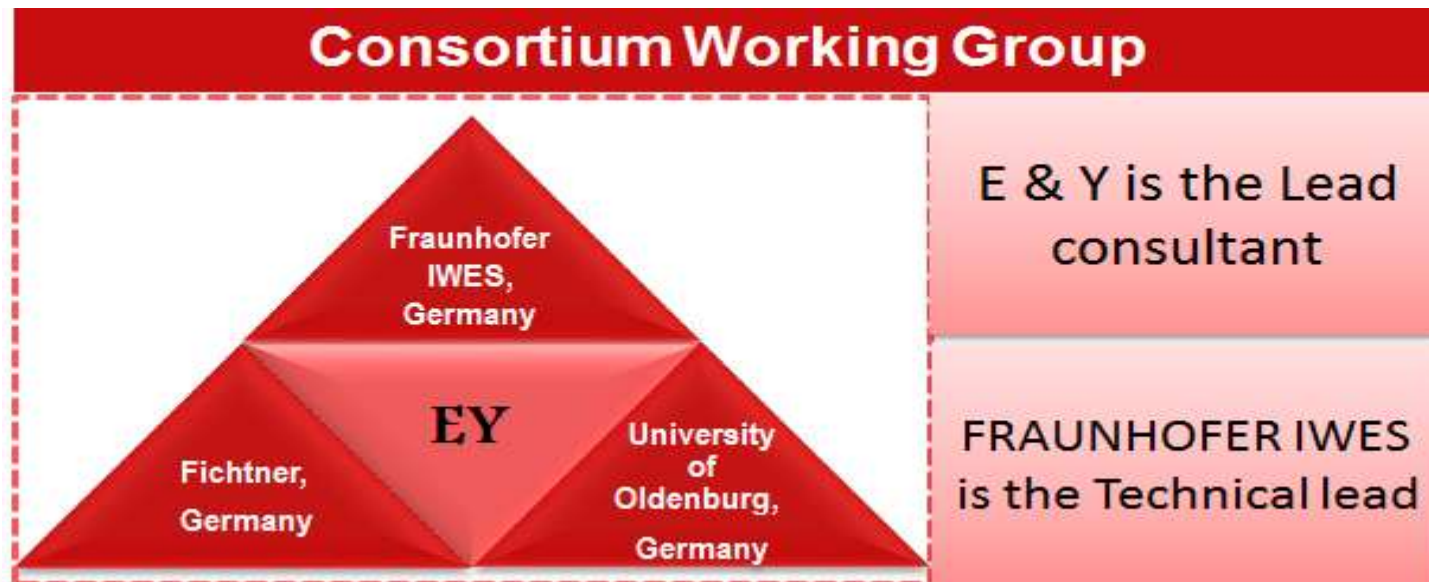
- Forecasting, scheduling and balancing of renewable energies in Indian electricity grids
- Energy Systems Technologies and Engineering
- Electrical Grids, e.g. calculation of grid losses
- Energy Management
- Energy Economics, macro-economic issues of grids
- Energy Scenarios
- International industry landscape in the grid integration sector





## IGEN GEC : GLOBAL CONSULTING WORK

- Global Consultant contract was awarded to consortium lead by E & Y.
- Consulting started from 1.12.2014 and will be completed by 31.07.2015.
- WP4 is active: some answers on Forecasting and balancing were delivered to Indian stakeholders' this week





# IGEN-GEC PROJECT WORKPLAN

			Time Schedule									
			Dec 14	Jan-15	Feb-15	Mar 15	Apr-15	May 15	Jun-15	Jul-15	Aug-15	
T no	Description of Tasks	by	Months	1	2	3	4	5	6	7	8	9
1	Work Package 1- Renewable Energy Management centres and Grid balancing			Work Activities	Work Activities	Work Activities	Work Activities	Work Activities	Work Activities	Work Activities	Work Activities	Work Activities
2	Workpackage 2- Market Design for Renewable Energy integration in India			Work Activities	Work Activities	Work Activities	Work Activities	Work Activities	Work Activities	Work Activities	Work Activities	Work Activities
3	Work Package 3 Grid Codes and Regulatory Aspects of Grid management			Work Activities	Work Activities	Work Activities	Work Activities	Work Activities	Work Activities	Work Activities	Work Activities	Work Activities
4	Framework for Short Term Pool of Experts for Ad Hoc Support			Adhoc support	Adhoc support	Adhoc support	Adhoc support	Adhoc support	Adhoc support	Adhoc support	Adhoc support	Adhoc support
<b>Legend:</b>				Work Activities	GIZ Review Meetings	Adhoc support						



## NEW TECHNICAL COOPERATION PROGRAMME : IGEN – GEC/EE (Proposed)

- The new Technical Cooperation Programme: “Indo German Energy Programme – Green Energy Corridors, Energy Efficiency (IGEN–GEC/EE)” is **tentatively** scheduled for four years starting 07/2015 and ending 06/2019.
- An amount of up to 10 Million EURO is earmarked by the German side for IGEN–GEC/EE.
- IGEN – GEC/EE has two components.





# COMPONENT ON GRID INTEGRATION OF RENEWABLE ENERGIES (GEC)

## Proposed Activities under expected outputs of GEC

### Output A

*Improved market  
mechanisms and  
regulations*

- Support on updating grid codes and technical standards
- Advise on policy & regulatory issues
- Recommendations on market design
- Propose or demonstrate (pilot) on capacity market

### Output B

*Technical and  
institutional  
conditions for the  
integration of RE*

- Propose regulatory basis for REMC
- Support selection of appropriate structure for forecasting and IT infrastructure
- Assist physical & operational establishment of REMC.
- Evaluate operational performance of REMC & suggest measures for adjustment

### Output C

*Human capacities  
to handle  
systematic  
RE integration*

- Develop Human Capacity Development (HCD) concept.
- Design and implement training program on RE grid integration
- Initiate short-term studies and study tours on various specific topics of broader interest



***THANK YOU***