

TA 9365
**Regional Cooperation
on Renewable Energy integration
to the Grid**



TA 9365 Regional Cooperation on Renewable Energy integration to the Grid

Overview

Financed by the Asian Development Bank

Amount : 1.2 millions of US\$

Beneficiary : 7 countries of Central Asia : Afghanistan, Kazakhstan, the Kyrgyz Republic, Pakistan, Tajikistan, Turkmenistan, and Uzbekistan

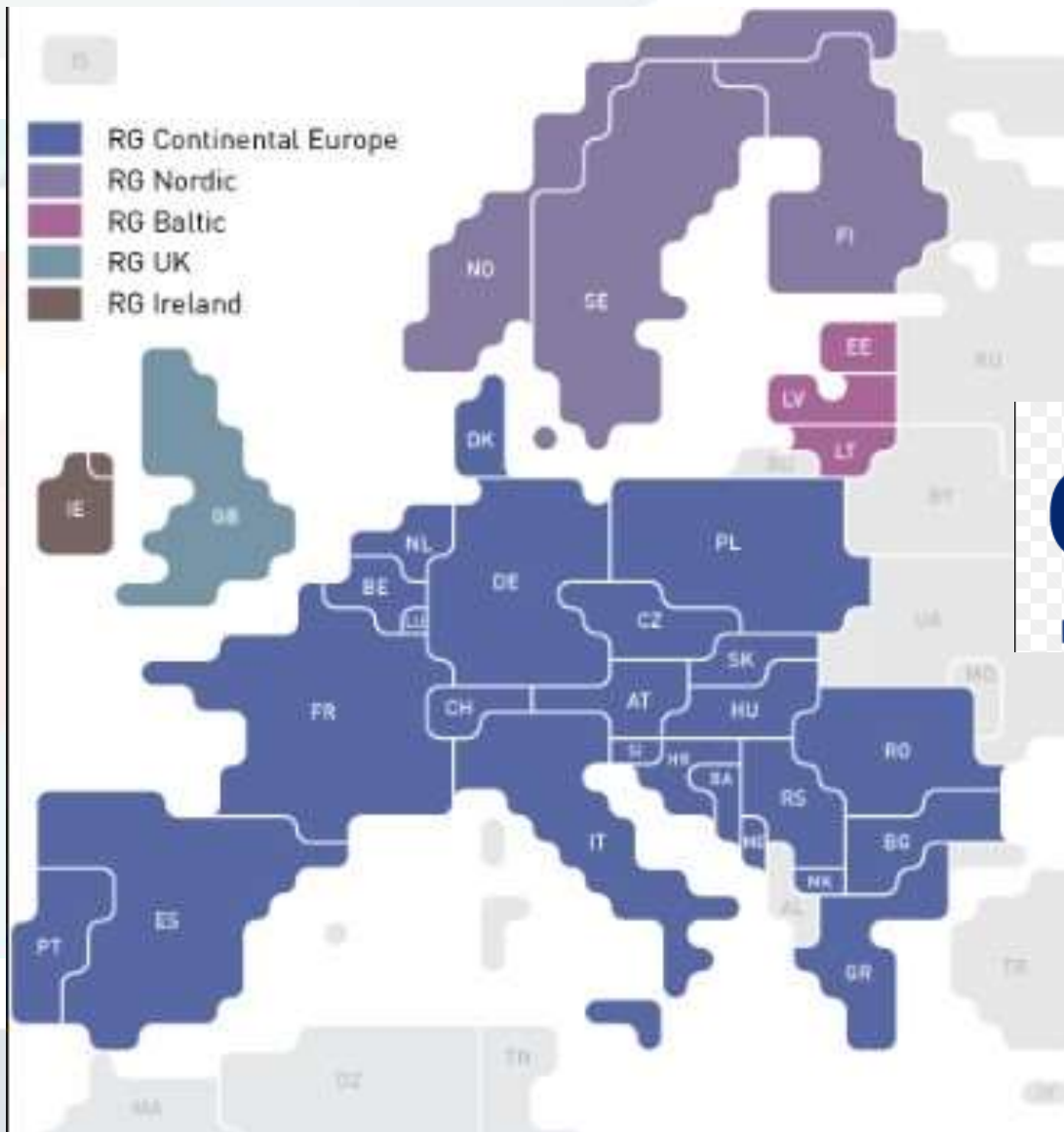
20 month Technical Assistance (commencement Date : January 2018)

Assistance provided by a French consortium between RTE-International and EDF, led by RTE-International, with the participation of CORESO

- Paris Agreement: greenhouse gas emissions reduction
- Important solar & wind generation potential
- Increasing needs in reserve exchange
- Central Asian countries are already almost interconnected

- **Output 1: Grid reinforcement plan, to accept intermittent renewable energy**
 - Task a - Balancing capacity reserve assessment
 - Task b - Dispatching operation practice assessment
 - Task c – Policy and sector review
- **Output 2: Regional cooperation to share balancing capacity reserve**
- **Output 3 : Dispatching operation support tool**
 - Including implementation of a generation forecasting service for RE in Kazakhstan
- **Output 4 : Capacity building**

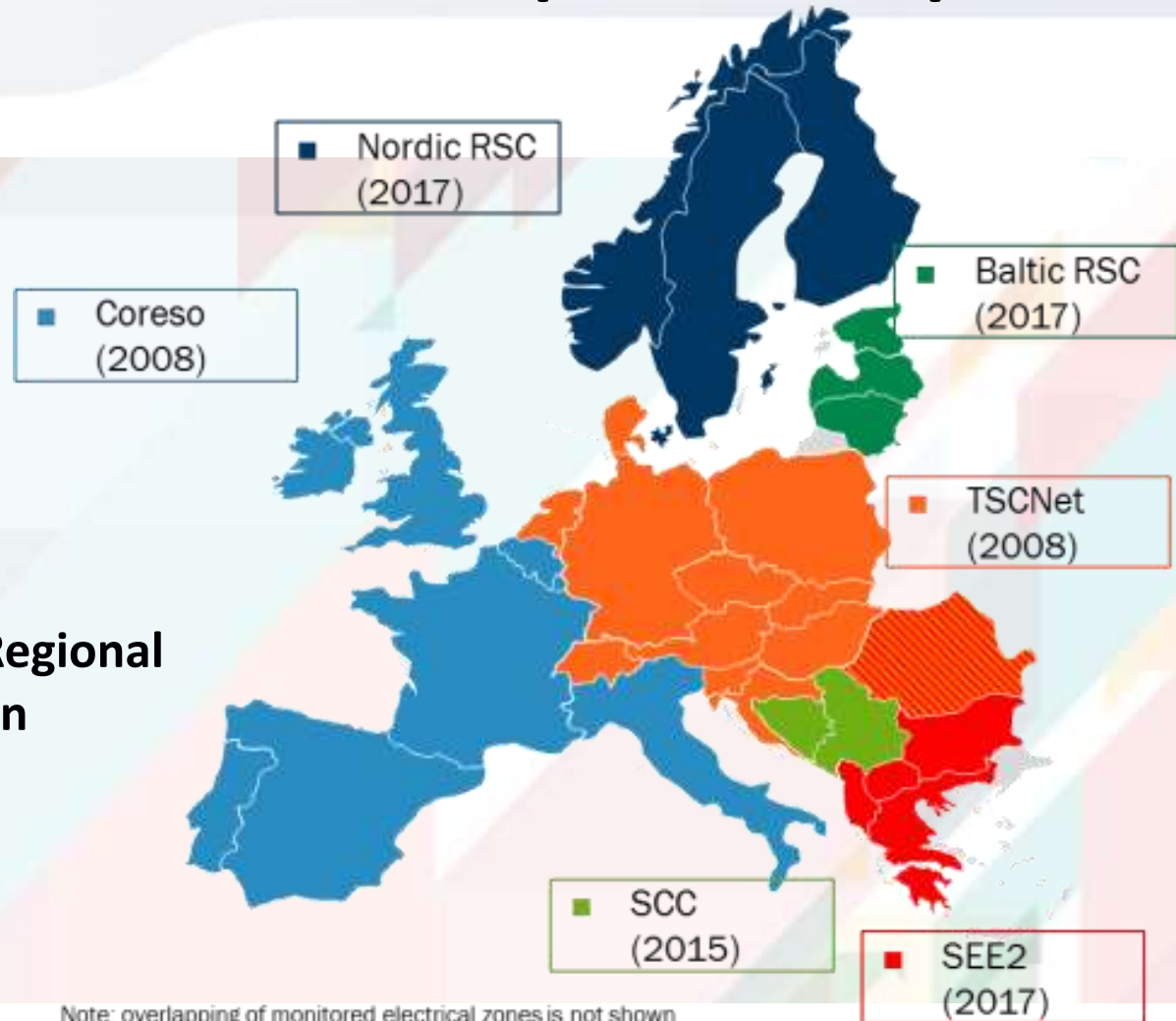
Approach to services European examples



entsoe
Reliable Sustainable Connected

Approach to services European examples

Implementation of Regional Security Coordination Centres (target)



- **Output 1: Grid reinforcement plan, with intermittent renewable energy**
 - Task a - Balancing capacity reserve assessment
 - Review of Generation Expansion Plan (with RE development plan)
 - Sizing of reserve requirement for each country
 - Benefit of a reserve regional cooperation framework, by comparison with:
 - standalone reserve management
 - regional reserve management (on selected pool model)
interconnection need identification

- **Output 1: Grid reinforcement plan, with intermittent renewable energy**
 - Task b - Dispatching operation practice assessment
 - ✓ Identify state of the art practices in NLDC for RES management, Reserve sharing and market integration
 - ✓ Gap analysis report
 - ✓ Recommendations on necessary tools, training, and regional cooperation organisation



- **Output 1: Grid reinforcement plan, with intermittent renewable energy**
 - Task c – Policy and sector review
 - Thorough regulatory analysis
 - Identification of legal barriers / bottlenecks
 - Recommendations on target regional cooperation organisation and regulatory framework
 - Harmonised grid code

- **Output 2: Regional cooperation to share balancing capacity reserve**
 - Analysis of possible mechanisms
 - Role of the Coordinating Dispatching Center (CDC) in UZB
 - Report on regional sharing mechanisms
 - 2 workshops at final and interim stage (including one in Europe ?)

Regional sharing mechanisms

- Target sharing mechanisms for the Region or for a group of countries of the Region, including settlement arrangement and pricing rules for the procurement,
- Necessary changes in the countries' grid codes,
- Necessary and recommended institutional arrangements ,
- SCADA/EMS and communication to support implementation of the mechanisms,
- Necessary investments,
- Tentative step by step schedule

- **Output 3 : Dispatching operation support tool**
 - Generation Forecasting for intermittent RES
 - Feasibility study
 - Benchmark
 - Specification and procurement
 - Trial by KEGOC
 - Feedback



* Not part of this TA

- **Output 4 : Capacity building**

- Reports
- 6 workshops and a final conference
- European experience
- Recommendations in view of international best practices

OUR TEAM

International experts



Pascal Bertolini
Power market design specialist



Pierre-Yves Piliero
Dispatching operation expert



Sebastien Ayffre
Dispatching operation expert



César Clause
System and regional cooperation expert



Renaud Delachaux
*Reserve procurement
and market economist*



Philippe Michal
SCADA/EMS expert



Emmanuel Varret
Power development planner



Hortense Martinez
Policy expert

OUR TEAM

Local experts

Kazakhstan
Chokan Pusrmanov



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Rustam Davletov



Tajikistan
Galina Borisova



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Dovlet Hangeldiyev



Afghanistan
Abdullelah Rasooli



Kyrgyz Republic
Kairat Dzhumailev



Pakistan
Ahsan Maqbool

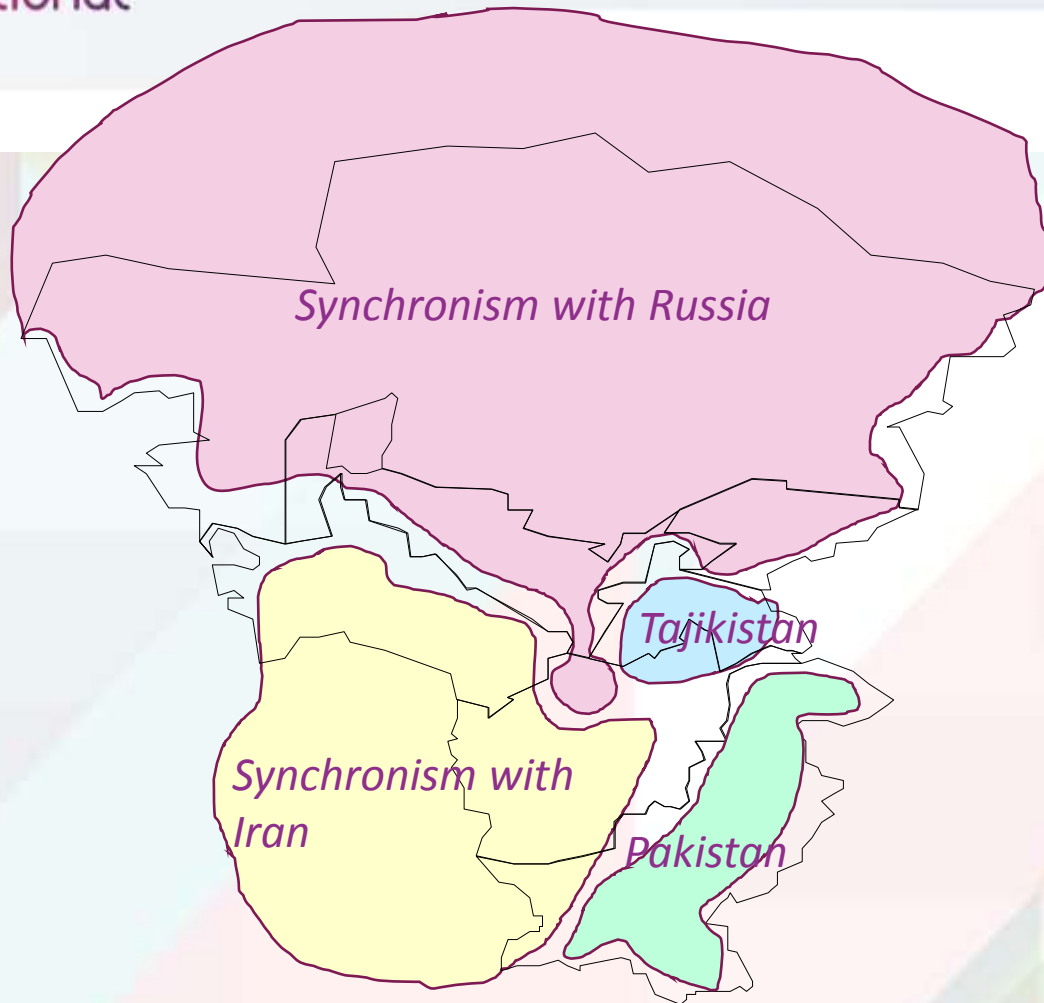


Preliminary findings

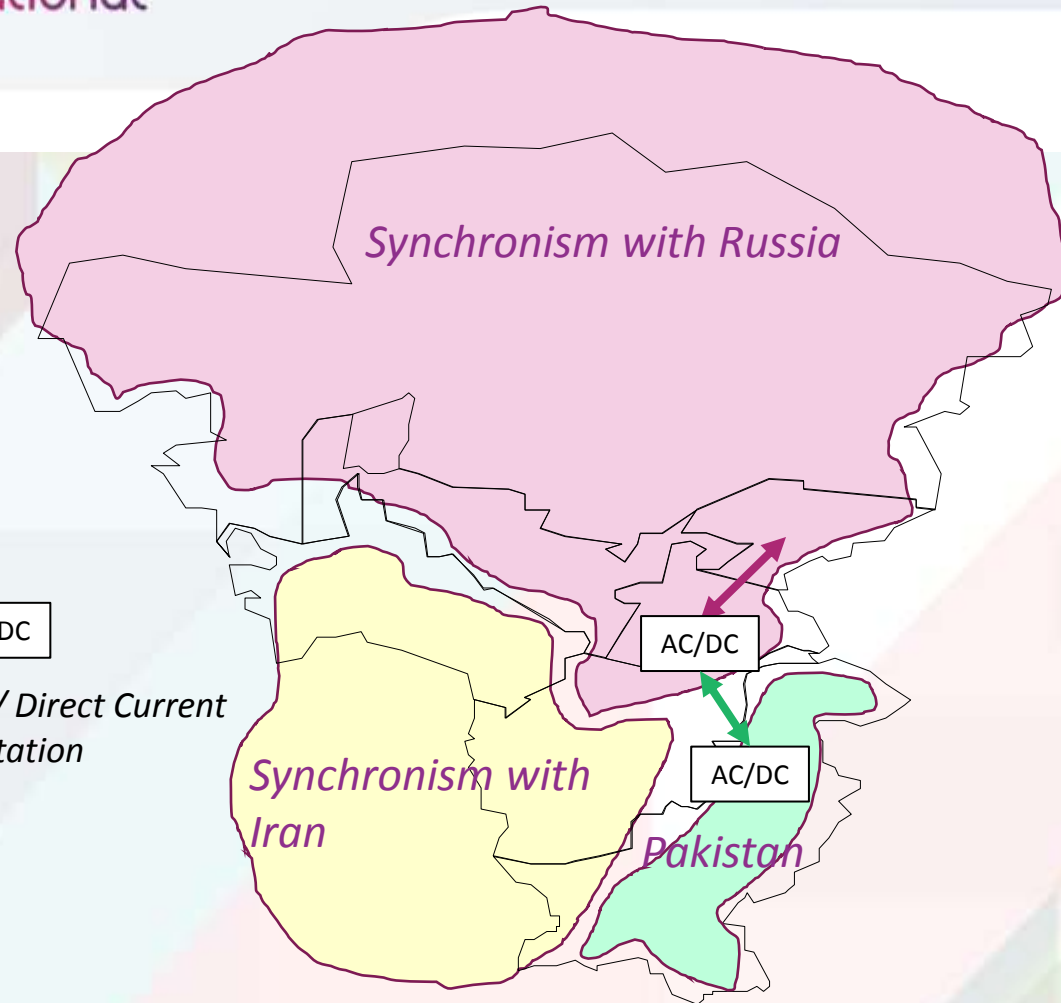
Some possible options for Regional Cooperation

- The “Region” comprising the 7 countries of the project should not be an islanded system. The countries of the Region shall follow trading electricity with neighboring countries (Russia, Iran....)
- Interconnecting all these countries in AC is not realistic (and probably technically unfeasible)
- DC connections (lines or back to back stations) are key to enable a full interconnection of the “Region”.
- The consultant proposes 3 options for the Regional Cooperation from limited integration to the creation of a specific synchronous area in the “Region”

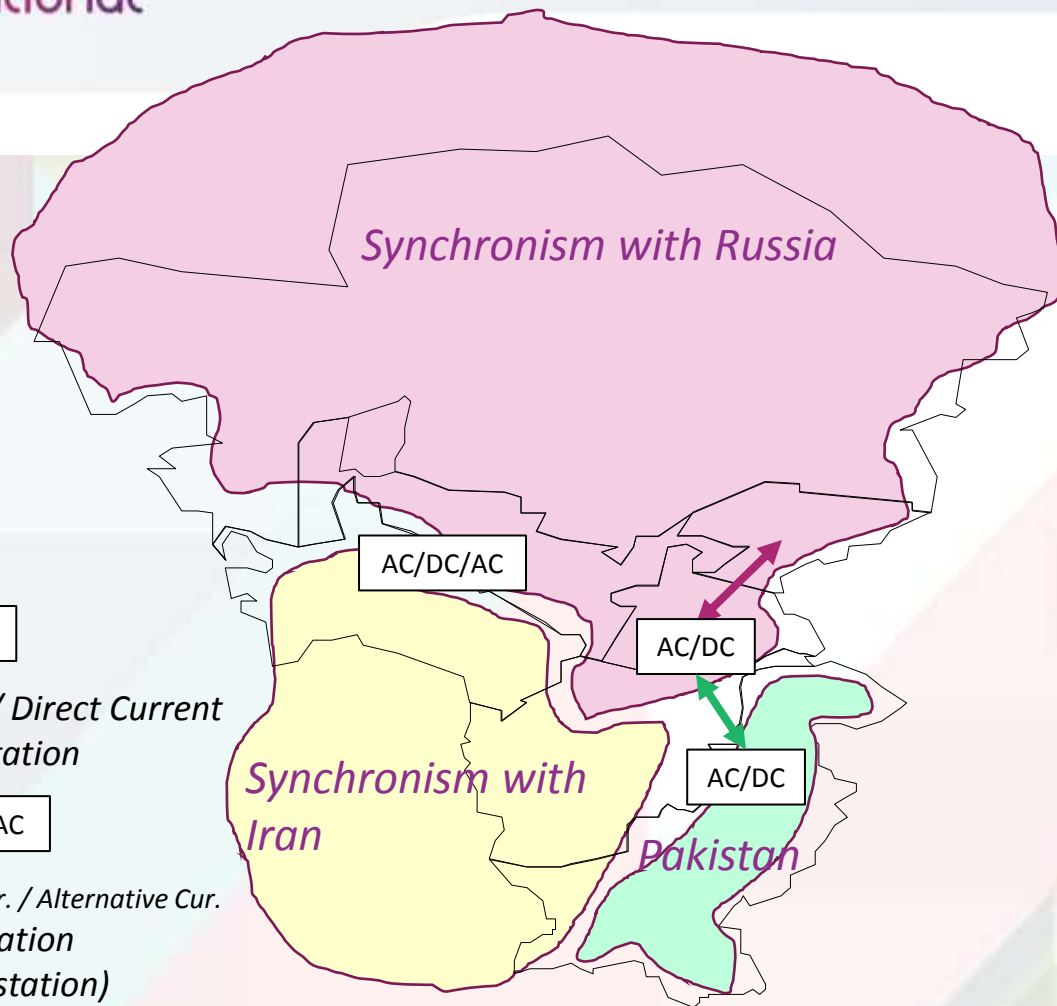
Existing Synchronous areas



Synchronous areas with on-going projects (CASA)



Option 1 : Target with limited regional integration



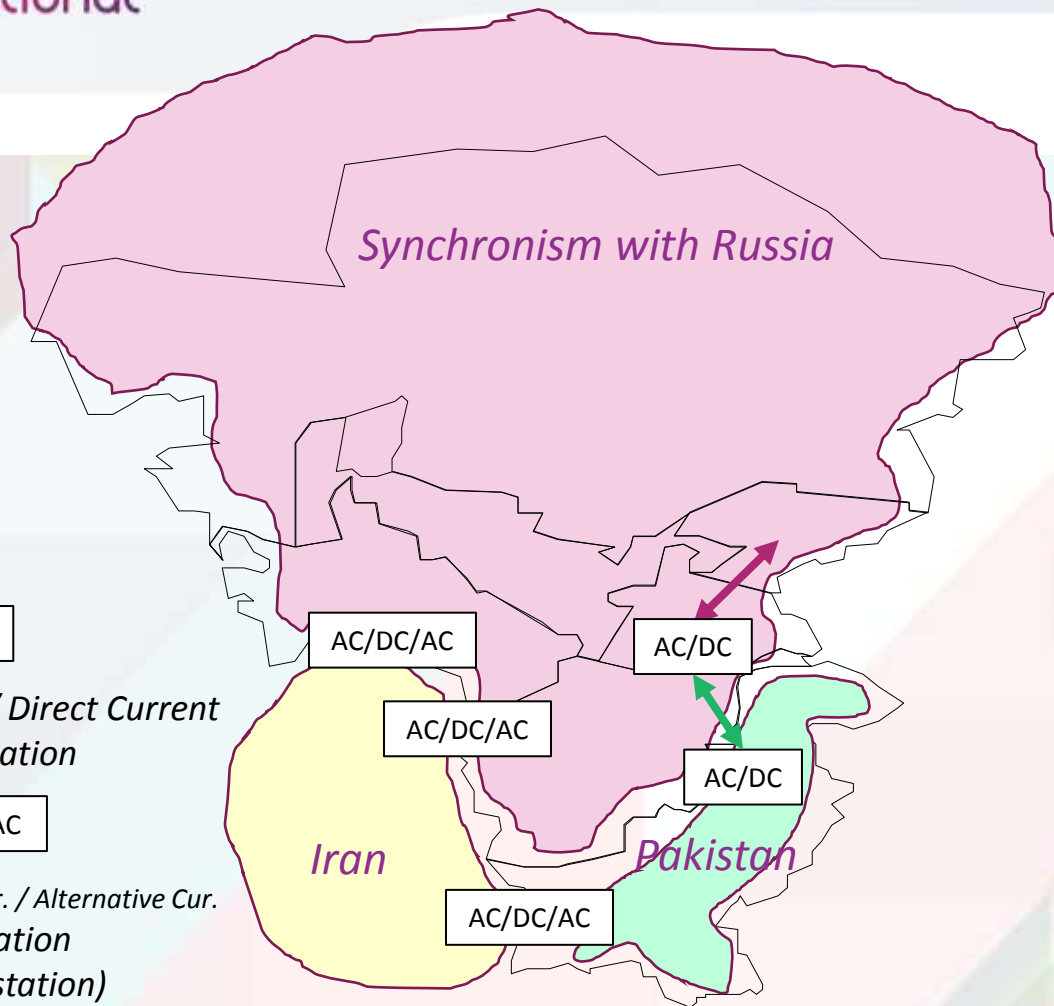
AC/DC

Alternative Current / Direct Current
converter station

AC/DC/AC

Alternative Cur. / Direct Cur. / Alternative Cur.
converter station
(back to back station)

Option 2 : Target with advanced regional integration



Alternative Current / Direct Current
converter station

AC/DC/AC

Alternative Cur. / Direct Cur. / Alternative Cur.
converter station
(back to back station)

Option 3 : Target for Regional cooperation creation of an independant synchronous area

