

LUSAIL CITY (DOHA – QATAR) POWER SYSTEM STUDY

Purpose of the Study

Main Issues that initiated the Study

With its numerous hotels, sports arenas and leisure centres, Lusail City, a new part of Doha, will be one of the most important and significant cities hosting the main stadium, teams, fans and audiences during the 2022 World Cup.

1. Problems with developers' requests for Building Permits due to not adequately allocated power per plots;
2. Expectations of load increase due to reasons from 1.
3. Concerns about cables' and transformers' capacity due to expected load increase.

Purpose of the Study

Project Tasks

1. To improve Design criteria keeping in mind latest international and regional standards and available local and regional electricity consumption data;
2. To provide new power allocation based on revised Design Criteria;
3. To create network model in appropriate software (PSS Sincal is selected due to its capability and also it is Kahramaa (Qatar General Electricity & Water Corporation) software tool for distribution network analysis and planning) and new loads which provides: analysis of network operation under modified circumstances, its redesign and future what-if analysis for any future changed circumstances;
4. To redesign network corresponding to CP05A and CP06A plots where the biggest power allocation is expected due to Design Criteria revision.

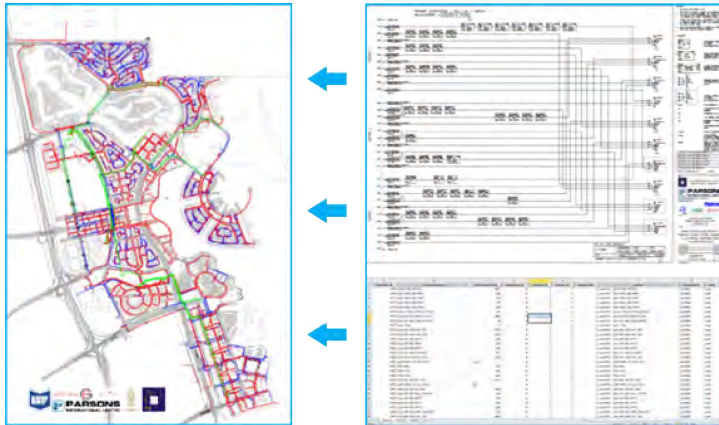


Katara Towers Lusail City Marina district

Current Network Design and Model Preparation

NETWORK DESIGN BASE

1. Kahramaa approved loading capacity of cables and transformers - restrictive, with regarding cable capacity;
2. “n-1” principle regarding outages of primary substation transformers and 11 kV cables;
3. Related to maximum demand load calculated according to Existing Design Criteria, which is approved by Kahramaa.



MODEL PREPARATION:

1. Based on network design drawings, Kahramaa approved IFC drawings, and As Built drawings;
2. All available network elements data are incorporated in the model starting from 415 V cables up to 220/66 kV substations;
3. If available, network from mega-developers' areas also included into model:
4. Model prepared in PSS Sincal in order to provide easy “what-if” analysis regarding future changes in spatial load and network design;
5. Competent staff are trained to use model.

Identified Constraints

- GFA (Gross Floor area) is the most relevant parameter for load assessment.
- Load density is based on land use types, typologies and subcategories - and for building permit approval it should be calculated according to Kahramaa's regulations, because designers are responsible to Kahramaa for the design of electrical installation which provide safe electricity usage.
- In order to provide sustainable development, for some categories of energy consumption it is necessary to define energy consumption limits which provide rational energy usage - based on standards.
- Definition of diversity factors should be based on actual Kahramaa's measurements starting from smart meters and including SCADA systems.

List of Used International, Regional and Domestic Standards, Regulations and Recommendations

1. BS-EN 15603 - Energy Performance of Buildings - Annex C
2. IECC-2012
3. ASHRAE 90.1
4. Dubai Electricity and Water Authority Rules
5. British Council for Offices (BCO-2009) Guide
6. BSRIA Rules of Thumb
7. Qatar Construction Specifications 2010
8. Global Sustainability Assessments System by GORD
9. Regulation's for the Installation of Electrical Wiring, Electrical Equipment and Air Condition Equipment (Kahramaa)
10. Electricity Planning Regulation for Supply 2012 (Kahramaa)

