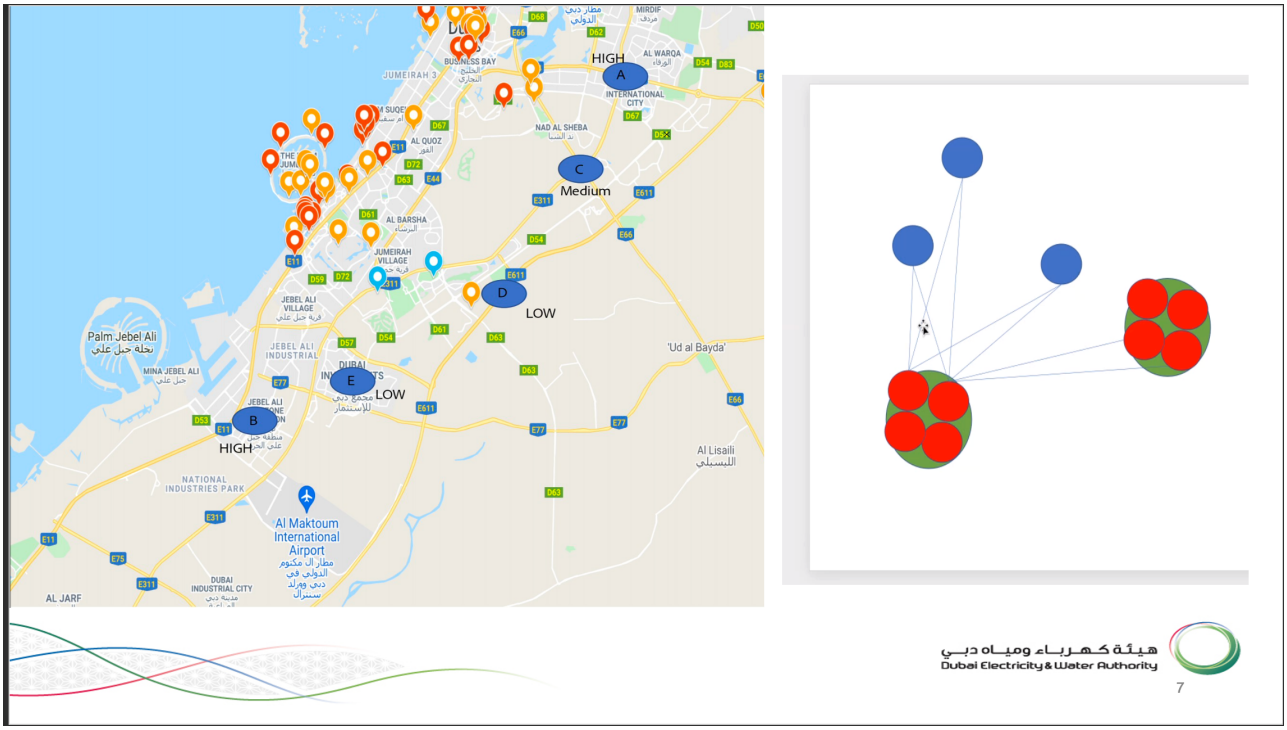
Small Scale Program

Sunday, 20 June 2021 4:24 PM



PROBLEM DEFINITION/FORMULATION - 2

Objective:

Minimizing costs of expanding the network:

- Installation cost (cost of charger, digging, site visits, electricity, …)
- Operational cost (Maintenance, …)

Assuming that total cost for expanding the network with 1 new charger is 'cost' & that we're considering 5 prospective zones with 4 possible locations in one case:

$$\sum_{i=1}^{5} \sum_{j=1}^{4} cost_{i,j} \times x_{i,j}$$

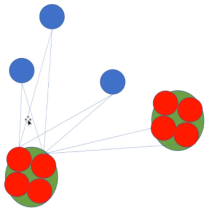
Cost times the binary variable (1 or 0) determining for each zone to determine if the placement of the new charger satisfies the statement – summed for all 5 zones.

PROBLEM DEFINITION/FORMULATION - 3

Constraint 1: Minimizing distances – for example, not more than 10km route distance between two chargers in the entire network

First summation: over all neighbor existing chargers (connected in the network)
Second summation: over all neighbor green circles

$$min(\sum_{i=1}^{k} d(c_i, x_{1,1}).x_{1,1} + \sum_{i=1}^{l} d(g_i, x_{1,1}).x_{1,1})$$



PROBLEM DEFINITION/FORMULATION - 4

Constraint 2:

Restricting the number of new chargers installed per zone to 1 to simplify the problem for now. This number can be changed easily.

⇒ 1 charger in 1 green circle

$$min(\sum_{i=1}^{4} x_{1,i} - 1)^2$$