# CONCLUSIONS

In this project, two-stage procedure has been presented to determine the optimal locations and sizes of DGs and capacitors with power loss reduction as an objective function. In stage-1, two LSIs have been used to select the candidate locations for the optimal placement of DGs and capacitors to reduce the search space. In stage-2, the BBA has been utilized to find the optimal locations and sizes of DGs and capacitors according to single objective function. The objective function is power loss minimization, while satisfying the security and operational constraints. The obtained results are compared with other methods. Through the comparative study, it can be found that:

* Efficient and accurate proposed procedure has been introduced to find the optimal placement of DGs and capacitors using proposed LSIs and BBA compared with other techniques.
* Efficient proposed LSIs have been introduced to rank the load buses, based on two LSIs. However, the most sensitive buses are considered as the candidate buses for the installation of DGs and capacitors, while the most insensitive buses are not considered for the installation of DGs and capacitors.
* The proposed LSIs have been characterized as; simple, efficient, accurate, non-iterative process, minimum time computation and suitable for large-scale power systems.
* The optimal results using the proposed procedure have been compared with other methods, and have been proved that the capability of the proposed procedure to find the optimal solution of objective function with voltage profile and power factor improvement.
* The BBA gives convergence curve with more accurate and efficient optimal placement of DGs and capacitors in distribution systems.
* The proposed BBA mathematical model is very simple since it has few parameters.
* The BFS load flow algorithm has been used successfully for the load flow calculations.
* The proposed procedure represents a potential tool to reduce the system losses and improve the voltage profile.
* The proposed procedure has been tested on 34-bus radial distribution system. Moreover, a real distribution system of the East Delta Network (EDN) as a part of the UEN has been used to show the capability of proposed procedure.

Finally, enhancement the distribution system reliability has been used using DGs and/or capacitors. In addition, the importance of LSIs as proximity indicators for ordering the load buses to reduce the search space in the optimization procedure has been presented. Moreover, the proposed procedure represents a potential tool to improve the distribution system performance as well as help the system operators.