Abstract

The improvement of the distribution network performance in the electrical systems leads to increased reliability in the service; it also leads to high financial return that encourages investment in this field. Studies show that 30% to 40% of the investment in the electricity sector is spent on distribution system.

In this study, data and statistics were collected from the Hebron distribution network. We entered all the network data to the ETAP software. We analyze the network during peak periods, average loads, and summer time in order to obtain indicators of the network losses and economic feasibility to reduce them. While analyzing the data, we discovered a decrease in the power factor in the Fahus station because of the industrial load in the area. That led us to do economic feasibility to improve the power factor.

Several scenarios have been developed to improve the network performance and efficiency, one recommendation is to build a ring system for the 33 kV network. We analyzed the network when adding new main connections points to the stations of Al-Hussein and Um Al-Daliya. Also we analyzed Halhul network when connected to a main station via a new main point and its impact on the network in general.

In addition, several solutions were developed to solve the problems of the industrial zone by adding main additional feeder to Alfahs Station and studying the effect of improving the power factor on the network.

الخلاصة

ان تحسين أداء شبكة التوزيع في الأنظمة الكهربائية يساعد على زيادة الموثوقية في الخدمة؛ كما انه يحقق عائدا ماليا يشجع على الاستثمار في هذا المجال، وتظهر الدراسات أن 30٪ إلى 40٪ من الاستثمار في قطاع الكهرباء ينفق على نظام التوزيع.

في هذه الدراسة، تم جمع البيانات والإحصاءات عن شبكة توزيع كهرباء الخليل، و ادخال المكونات الرئيسية لكامل الشبكة لبرنامج الإيتاب وتحليل الشبكة خلال فترةالذروة و عند متوسط الاحمال و في أحد أيام الصيف من أجل الحصول على مؤشرات للخسائر الفنية والجدوى الاقتصادية للحد منها، و عند تحليل بيانات المحطات الرئيسية تبين وجود انخفاض في قيمة معامل القدرة في محطة الفحص بسبب الحمل الصناعي في المنطقة مما استلزم عمل جدوى اقتصادية لتحسين معامل القدرة .

لقد تم تطوير عدة سيناريوهات لتحسين أداء الشبكة و رفع كفائتها منها توصية بعمل ربط حلقي لشبكة 33 كيلوفولت ، وقد تم تحليل الشبكة عند إضافة نقاط ربط رئيسية جديدة لمحطتي الحسين وأم الدالية كما تم تحليل شبكة حلحول عند ربطها مع محطة تحويل رئيسية عبر نقطة ربط جديدة و تأثير ذلك على الشبكة بشكل عام.

و بالاضافة لذلك فقد تم وضع عدة حلول لمعالجة مشاكل المنطقة الصناعية عبر اضافة مغذي اضافي لمحطة الفحص و دراسة تاثير تحسين معامل القدرة على الشبكة .

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List of Abbreviation

	Abbreviation statement
IEC	Israel Electric Company
MPC	Main power station
S/S	Sub-Station
LV	low voltage
ONAF	Oil Natural Air Forced
ONAN	Oil Natural Air Natural
RMU	Ring Main Unit
CCT(RMU)	Cable,cable,Transformer
ACSR	Aluminum Conductor Steel Reinforced
kWh	Kilowatt-hour
LOSSES	The power system losses
AUX Transf.	Auxiliary Transformer
ETAP	Electrical Transient Analysis Program
MW	Mega Watt
NIS	New Israeli Shekel
MVA	Mega Volt Ampere
kV	Kilovolt
SCADA	Supervisory Control and Data Acquisition

List of Symbols

	Bus
	Transformer
	Circuit Breaker
	Cable
	Load