

١-١- الأنظمة الفوتوفولتائية في العالم (PVPS In The World)

يستلم الغلاف الجوي للكرة الأرضية في الساعة الواحدة ما يقدر بـ $(10 \times 173)^{12}$ كيلو واط ساعة من الطاقة الشمسية ، ولسنة كاملة تستلم ما يقارب بـ $(10 \times 15177.04)^{14}$ كيلو واط ساعة من الطاقة وهو ما يعادل $(20,000)$ مرة ما يستهلكه في جميع بلدان العالم [١] .

ولكن وكما هو معروف فليست كل هذه الطاقة تصل الى سطح الارض فهناك ما ينعكس بواسطة الغيوم او ينعكس او يمتص بواسطة الغلاف الغازي و هناك ما يدخل في تبخير البحار والمحيطات والانهار .

على وجه التقريب وجد بان ما يقدر بـ $(10 \times 2600.8)^{14}$ كيلو واط ساعة من الطاقة تنعكس او تمتص بواسطة الغلاف الغازي او الغيوم وما يقدر بـ $(10 \times 2281.6)^{14}$ كيلو واط ساعة من الطاقة لتبخر البحار والمحيطات والباقي وقدره $(10 \times 6125.82)^{14}$ كيلو واط ساعة من الطاقة الشمسية تتحول الى حرارة فقط . من الجدير بالذكر بان احتياج العالم للطاقة الكهربائية قد ارتفع من ما يقارب $(10 \times 0.0293)^{14}$ كيلو واط ساعة / سنة عام ١٨٥٠ الى ما يقارب $(10 \times 0.298)^{14}$ كيلو واط ساعة / سنة عام ١٩٧٠ والى ما يقارب $(10 \times 0.7032)^{14}$ كيلو واط ساعة / سنة عام ١٩٧٧ مع زيادة عدد سكان العالم من مليار واحد الى اربعة مليارات ، اي ان زيادة مصروفات كل فرد في العالم من (2930) كيلو واط ساعة / سنة عام ١٨٥٠ الى ما يقدر بـ (17600) كيلو واط ساعة / سنة عام ١٩٧٠ [١] .

اليوم وكما هو معروف فان اعتماد الطاقة الكهربائية الرئيسي في العالم على مصادر الطاقة التقليدية مثل (الفحم الحجري ، النفط ، الغاز الطبيعي والقدرة الهيدروليكية) كما هو موضح في الجدول رقم (١) . بالرغم من الفوائد المهمة للمصادر التقليدية للطاقة الا ان هناك مشاكل رئيسية فيها مثل التلوث ، الضوضاء والكلفة العالية والاهم من هذا كله بان هذه المصادر سوف تنضب في يوما ما وكما هو موضح في الجدول رقم (٢) .

لذلك وجب على الباحثين والعلماء والمفكرين العمل على ايجاد مصادر

SUMMARY

The title of our research is " Towards An Expert System for Photovoltaic Power System (PVPS) Design " .

Our research is specialize in finding out all the basic bases that we are in sore need to built an expert system for PVPS design and analysis .

Expert systems are needed to give a new and unpredictable solutions beside it's power in predict the solutions depending on new strategies such as " Deduction , Induction and Heuristic reserach " .

Generally an expert system consist of three essential parts which they are User interface , Inference engine and Knowledge base also there is adynamic database .

We had allready made a try for building an expert system depending on the following :-

- We built a user interface by a various type and color windows and the dialogue between the user and the system .
- We atttempt to built an inferece engine to the system relying on using the matching external predicates or (prolog built in matching process)that matches the desgin facts of aspecific desgin parameters with all rules that built in the knowledge base in a hierarchy method with the prolog stratege of " Depth _first with backword chaining " , when the matching process had been vrefied the desire rule will be fire and it's conclusion will be transfer to the working memory (dynamic database) . After the system had been finished the specific design parameter prolog compiler will reset the database and restarting again .

-Knowledge base is represented by production rule methode which have the advantageous of, hierarchy , easy in implementation and updating and more easier in finding the logicall relations . We constructe all the design parameters as a rules and facts and usually the facts are asked as a questions with limited replaying of Y or N only to select the desire design parameter. We bulit up to 85 algoresithmes depending on papers , textbooks, thesis and previous researchs .

our system will involve the following design parameters :-

-Insolation ,here the study of insolation in $(Kw-h/m^2-day)$ with array tilt angle , clearness factor , ground reflectance index, the ordering of days in the year and latitude of the country.

-Load determination ,the load consumption in $(Kw-h/day)$ have been studied monthly and seasonal .

-Array design ,in which it include the calculation of the rated and maximum current ,voltage and power with both (Dc or AC) operation.In this paragraph we learn how to calculate the rquired array area for aspecified consumption load and how to calculate the number of panels needed in the design .

We Also mention here how to select the type of interconnection and the value of the variables (N,P,S,B) .

finally in this paragraph we learen who to design the storage unit and inverters if we use AC operation .

-Reliability masurments,which represent the raliability of parallel and series items and parallel panels (block P) and series block (brunch S)and parallel brunch (B)until we reach array reliability for both open and short circuit failuer .

-Array problems,which represent both power mismatching and conductor losses with a different values to (S,P,B) .

-Optimization , finally we find out the optimization paragraph order to covers all design parameters optimization like for examp , the best insolation day in any month , the best tilt angle for a month,season and year,also there are system performance optimization with each month or season to a PVPS having tracking system . We have got auseful results with the design for location of(33.5) baghdad / IRAQ as followes :-

- The monthly average clearness factor is(.55),with ground reflectan of (0.2) .

-To design avilage of 10 living unit each have a load of 20Kw-h/day , need an area of (358 m²) or number of panels of (968) in order to provide a power of (41.6 Kw) as (240 volt) voltages and (173 Amp. as atotal current ,(the panels used have a 36 series cell with output voltage and current of 12 DC and 2 Amp. respectivility) .

-For this system we found that we need (17) battery of (20 Amp.) each with inverter of (52 KVA) .

-Finally we built the station on the following variable values (N=36,P=8,B=6) which gives alow level of power mismatching of (2.4%) from the total power and a conductor losses of (880 Watt) with a reliability of 72% , also we see that the case of (S=20,P=4,B=12) is more acceptable than the ex case .

End Of Summary File