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Orignal Article

Feasibility Study of Clean Energy

Khalaf Abdurrahman Al-foudhily, Salah Ud-Din Khan

Sustainable Energy Technologies Center, College of Engineering, King Saud University, P.O.Box 800, Riyadh 11421, Saudi Arabia

KEYWORDS

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ABSTRACT

RET Screen is Clean Energy Management Software for analyzing energy efficiency, renewable energy, and cogeneration project feasibility and ongoing energy performance. We used four techniques for renewable energy, Tidal power, PV, Solar thermal power and geothermal to do study feasibility. And we used Saudi Arabia as location in this paper and we used 50 kw as power capacity for all techniques. In this paper we have compared between all techniques to do curve for fuel consumption begin from 2006 to 2019 so we used in curve the baseline predicted and actual to compare between the techniques by using RET Screen program to take the data and put it in excel to create the graphs and put it here in paper as graphs and tables.

1. Introduction

We used feasibility to compare between different techniques and we used alkhafji in Saudi Arabia as location to do all these techniques and the capacity is 50 kw so as we know in Saudi Arabia. we have many resources of renewable energy such as sun, and the sun here in Saudi Arabia we have 200 hours during year [1-4]. In this paper there are 4 techniques we have compared between PV, Geothermal, solar thermal power and Tidal by fuel consumption during year from 2006 to 2019. In solar thermal power the result gives us the actual for fuel consumption decrease in the begin but in 2014 increase, and in geothermal decrease but less than solar in begin but in 2014 more than solar thermal power, for the PV in the begin the actual be stable from 2006 to 2007 and decrease in 2011 but in 2012 be increasing, but for the tidal in 2007 the actual and baseline be equal approximately then in 2008 it be decreasing until 2010 it becomes the maximum decrease [5-7]. In this paper, we compared different techniques for modeling fuel consumption from 2006 to 2019. We used baseline predictions and actual data to compare the techniques. The data was collected using the RET Screen program, then transferred to Excel to create graphs and tables for inclusion in this paper.

2. Research Methodology

In RET Screen there are three steps first step start in benchmark to determine the location and facility then second step is feasibility to determine the energy, cost, emission, finance and risk the last step is performance it gives us the data, analytics, and report. For the first step we choose Saudi Arabia as location and in facility we use power plant, and the type is different depend in what kind of technique you want we use four techniques all as benchmark is 0.100. The second step for energy we used 50 KW as capacity. The last step we talked the results from the data and copy manual into excel to create the graphs and tables. Then compare between the four techniques.

Corresponding author email address: rzia1585@gmail.com

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3. Result and discussion

In this section, the comparison between renewable energy, Tidal power, PV, Solar thermal power and geothermal has been performed. The solar thermal power data sheet and graphical explanation see Table.1-2

Table.1. Solar Thermal Power excel sheet

Period	Begin	Heating Degree-Days 16 C	Baseline Predicted m³	Actual Fuel Consumption m³
1	1/1/2006	734.4	9,427	9,625
2	1/1/2007	822.8	10,521	3,423
3	1/1/2008	774.9	9,929	2,960
4	1/1/2009	976.2	12,420	3,721
5	1/1/2010	792.7	10,149	2,057
6	1/1/2011	886.7	11,312	2,289
7	1/1/2012	829.3	10,601	2,643
8	1/1/2013	838.4	10,715	4,116
9	1/1/2014	883.7	11,275	7,222
10	1/1/2015	935	11,910	5,621
11	1/1/2016	794.7	10,173	3,032
12	1/1/2017	746.3	9,574	2,604
13	1/1/2018	873.4	11,147	5,755
14	1/1/2019	912.9	11,636	4,223

Table.2. Solar Thermal Power data and graph

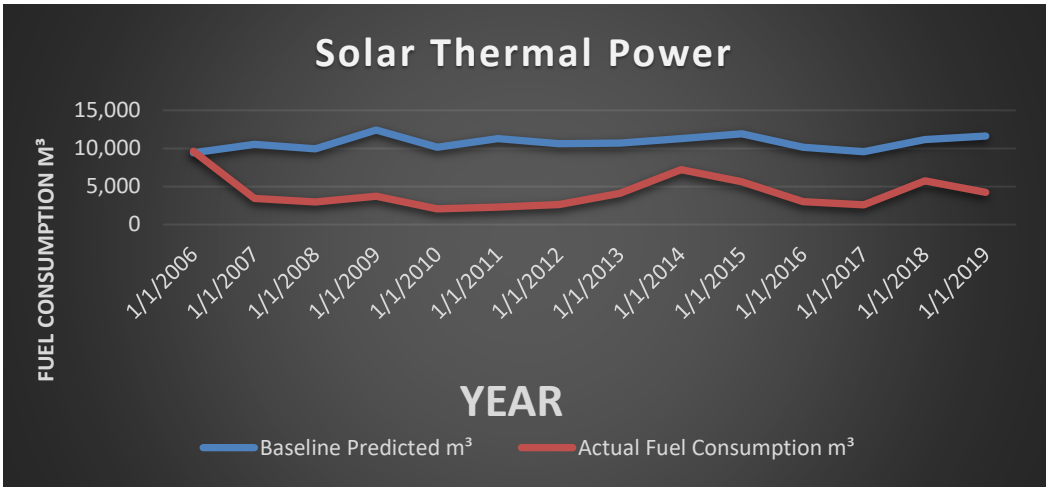
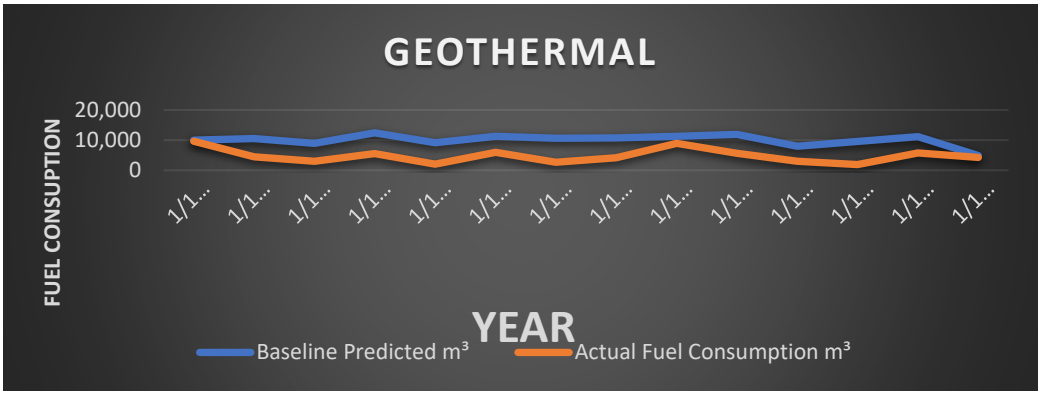


Table.3. Geothermal Power data and graph



As we see here in the begin the fuel consumption in actual become decreasing until 2007 then become increasing from 2012 to 2014 to be maximum after that back to decrease into 2017 so the most increase in 2014 and minimum actual fuel consumption in 2010 see Table.3. As we see here in the begin fuel consumption in actual become decreasing until 2008 then become increasing in 2009 then back to decrease in 2010 but in 2014 be maximum and in 2017 be minimum see Table.4-5.

Table.4. Photovoltaic Power excel sheet

Period	Begin	Degree	Baseline Predicted m³	Actual Fuel Consumption m³
1	1/1/2006	734.4	8,909	6,977
2	1/1/2007	822.8	11,934	6,987
3	1/1/2008	774.9	9,209	5,545
4	1/1/2009	976.2	13,899	6,798
5	1/1/2010	792.7	10,149	4,121
6	1/1/2011	886.7	11,312	3,239
7	1/1/2012	829.3	10,601	7,990
8	1/1/2013	838.4	10,954	4,116
9	1/1/2014	883.7	11,200	7,222
10	1/1/2015	935	11,910	5,621
11	1/1/2016	794.7	9,876	3,032
12	1/1/2017	746.3	9,574	4,213
13	1/1/2018	873.4	11,147	5,755
14	1/1/2019	912.9	13,987	4,223

Table.5. Photovoltaic Power table and graph

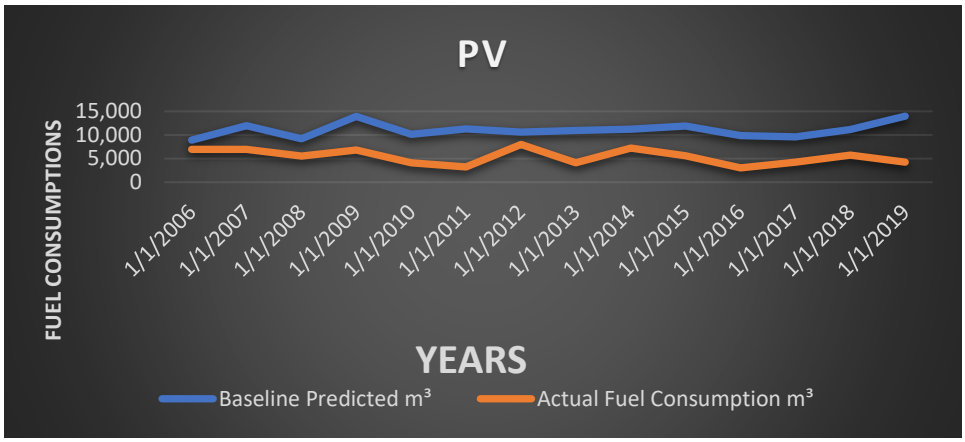
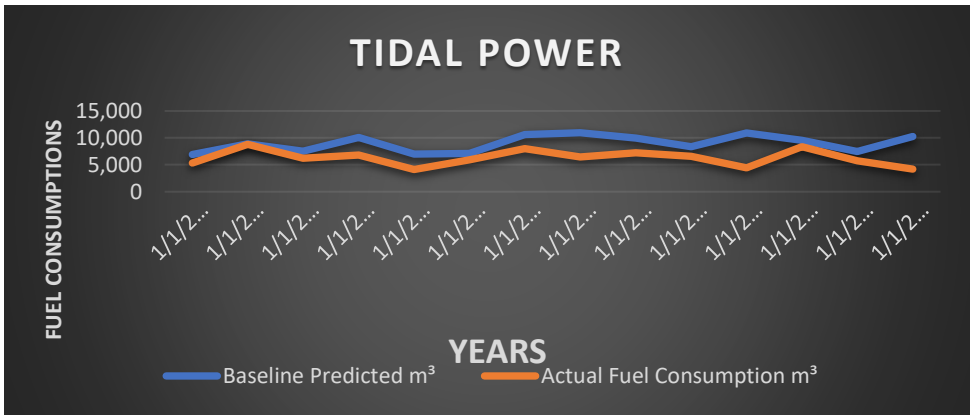


Table.6. Tidal power excel sheet

Period	Begin	Degree	Baseline Predicted m³	Actual Fuel Consumption m³
1	1/1/2006	734.4	6,909	5,309
2	1/1/2007	822.8	8,907	8,800
3	1/1/2008	774.9	7,545	6,232
4	1/1/2009	976.2	10,101	6,798
5	1/1/2010	792.7	6,992	4,121
6	1/1/2011	886.7	7,132	5,909
7	1/1/2012	829.3	10,601	7,990
8	1/1/2013	838.4	10,954	6,454
9	1/1/2014	883.7	9,933	7,222
10	1/1/2015	935	8,332	6,600
11	1/1/2016	794.7	10,912	4,433
12	1/1/2017	746.3	9,574	8,343
13	1/1/2018	873.4	7,454	5,755
14	1/1/2019	912.9	10,233	4,223

As we see here in the begin fuel consumption in actual become stable until 2007 then decrease to 2008 then back to increase in 2009 after then back to decrease until to 2011 in 2012 the fuel consumption be maximum point and in 2016 be minimum see Table.6-7.

Table.7. Tidal power data and graph



As we see here in the begin fuel consumption in actual become increase in 2006 but here in 2007 the actual be equal with baseline predicted then be decrease until 2010 then back to increase until 2012 so in 2007 be maximum point and in 2010 be minimum.

4. Conclusion

In the end as we observed in different techniques it gives us the different actual fuel consumption and baseline so here in 2007 there is most fuel consumption in tidal power more than the others techniques and in 2017 there is minimum point fuel consumption in geothermal more than others.

5. Acknowledgement

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