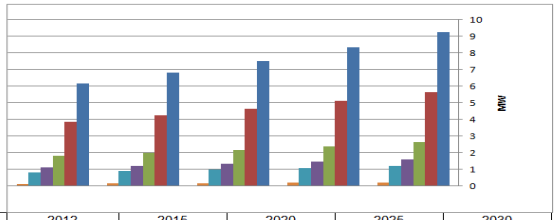
3.2 MSW energy contents

The energy content of Libya MSW was calculated based on the caloric content of MSW materials (Table 1), and the MSW composition. Table 2 shows the energy contents in kW per kilograms(kg) of MSW. Two values of the energy contents per kg of MSW were calculated for the Mass Burn scenario and Mass Burn with recycling scenario. The Mass Burn scenario implies full utilization of MSW for WTE production without recycling and the energy content is estimated at 3.489 kW h/kg. The Mass Burn with recycling scenario assumes removal of all potentially recycled materials from the waste stream and utilizing the remaining MSW for WTE production. The energy content for Mass Burn with recycling scenario is estimated at 1.443 kW h/kg. The big difference between the energy contents of the two scenarios resulted from removing the high energy contents materials (plastic, paper, wood, and textiles) from the Mass Burn scenario and considering them for recycling purposes.

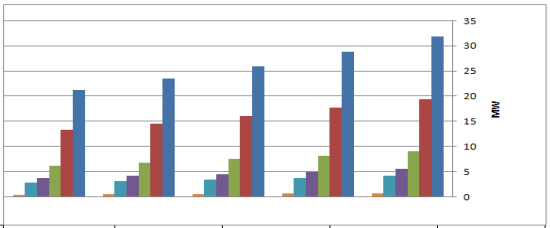
3.3 WTE production forecast

The population and MSW forecast results were used to estimate the WTE production potential in the Libya. The WTE production potentials were calculated for the two scenarios. The Mass Burn with recycling scenario forecasting results are presented in Figure 5. The figure shows a potential to produce about 57 Megawatt (MW) of electricity from MSW by the year 2030. This value forms about 0.14% of the 24.1 GW peak electricity demand in 2030. City potential production results show that Tripoli city has the largest potential of 9MW and the minimum potential is for Sirt City at about 1 MW by the year 2030. The Mass Burn scenario results are presented in Figure 6. The figure shows the potential to produce about 197 Megawatt (MW) of electricity from MSW by the year 2030. This value forms about 1.73% of the 24.1 GW peak electricity demand for that terminal the forecast results for the six cities apropos the two scenarios cities of the Libya. There is substantial difference between the potential energy productions of the two scenarios. The Mass Burn scenario can produce 5 times more than the Mass Burn with recycling scenario. Further investigations are recommended to compare the two scenarios with reference to financial, social, technical, and environmental criteria. The decision to select between the two scenarios is crucial and should be taken at a political level based on the results of intensive research.



yaer	2012	2015	2020	2025	2030
total waste	33	37	43	50	57
Tripoli	6	7	8	8	9
Benghazi	4	4	5	5	6
Jabel alkarbi	2	2	2	2	3
ALmarje	1	1	1	1	2
Sirt	1	1	1	1	1
Gatt	0	0	0	0	0

Figure 5: Mass Burn with recycling scenario results.



yaer	2012	2015	2020	2025	2030
total waste	113	130	149	171	197
Tripoli	21	23	26	29	32
Benghazi	13	15	16	18	19
Jabel alkarbi	6	7	7	8	9
ALmarje	4	4	5	5	5
Sirt	3	3	3	4	4
Gatt	0	0	1	1	1

Figure 6: Mass Burn scenario results.

4.CONCLUSION

The potential contributions were assessed by conducting a quantitative forecast analysis of potential WTE electricity production up to the terminal year of 2030. The analysis considered two scenarios for WTE development: Mass Burn and Mass Burn with recycling. The two scenarios were considered for six cities within the whole country. The Mass Burn with recycling scenario results show a potential production of about 57 Megawatt (MW) of electricity from MSW by 2030. This value forms about 0.24% of the 24.1 GW peak electricity demand in 2030. The Mass Burn scenario results show a potential production of about 197 MW of WTE electricity, which is about 0.82% of the peak electricity demand projected for the terminal year the projected results for each city from the two scenarios can be used to design a future WTE facility in the main cities of Libya. The Mass Burn scenario can produce 5 times WTE electricity more than the Mass Burn with recycling scenario. Further investigations are recommended that will compare the two scenarios based on financial, social, technical, and environmental criteria the environmental studies should also include carbon credit analysis. The socio-economic studies should consider WTE production costs, recycling value, land saving, job creation, and human capacity building opportunities. And technical studies should be focused on determining the optimum waste-to-energy technology to be implemented in the Libya.

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