Consequences of Electricity Crisis on WASH in Gaza Strip

GAZA
WAITING FOR THE WORST
Acknowledgment

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- Action Against Hunger - ACF
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- Islamic Relief Worldwide - IRW
- Save the Children
- Oxfam
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- The United Nations Children's Fund - UNICEF
This document sheds the light on the humanitarian situation in Gaza strip due to electricity crisis. The analysis of this document shows the deterioration in the quality of delivering the humanitarian basic needs such as water and electricity. In addition, it addresses the consequences of fuel shortage.

**Background to the Electricity Crisis**

Lack of electricity in Gaza Strip is one of the main consequences of the blockade and the Palestinian division. The reduction of the electricity first began in 2006 where it affects the daily life of two million people who have been living in this suffering for ten years.

Electricity power cuts of up to 20 hours per day triggered popular protests in January 2017. While a Qatari-Turkish donation led to a short-term increase in power supply, electricity shortages, including daily power cuts of 12-18 hours across the Gaza Strip, continue to impede the delivery of basic services, especially water supply and healthcare. All 13 hospitals in Gaza, municipality facilities, as well as water and wastewater services continue to be dependent on back-up generators, for which fuel is only available until December 2017 through an emergency fuel operation coordinated by OCHA. With dwindling energy options, coping mechanisms include hospitals in Gaza postponing non-urgent and elective surgeries; increased patient referrals outside of Gaza; households becoming reliant on water trucking from private and uncontrolled suppliers; and wastewater treatment plants curtailing the treatment cycles, thereby heightening the level of partially-treated sewage routinely discharged into the sea.

In mid of April 2017, Palestinian Authority (PA) informed Israeli side it would no longer pay for Gaza’s electricity. Moreover the electricity supplied by the Egyptian line is not reliable. Those two issues have led to 30% drop in electricity supplied by the public electricity grid in Gaza Strip.

**Methodology**

The analysis was conducted based on rapid assessment conducted by WASH partners, desk research, literature review of different studies and reports, and information provided by Coastal Municipal Water Utility (thereafter CMWU).

**Fuel Consumption**

CMWU tracks the critical amount of emergency fuel provided to WASH facilities in Gaza Strip which is needed to operate municipal well pumping stations, sewage units, desalination plants, and floodstorms units. The total amount of fuel provided in the last three years is shown in table (1).

<table>
<thead>
<tr>
<th>Year</th>
<th>Emergency Amount of Fuel (Liter)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>2,678,679</td>
</tr>
<tr>
<td>2015</td>
<td>1,568,290</td>
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</tbody>
</table>
In order to identify the trend of the amount of emergency fuel provided including 2017, chart (1) compares the first six months of each year starting from 2014.

As depicted in chart (1) the trend of fuel consumption has rapidly increased as the population of in Gaza Strip increases and the availability of electricity through the public grid has decreased and is unable to cope with the demand.

WASH facilities rely on two sources of energy, electricity from public grid and electrical generators run by fuel funded predominantly by donors. Since April 2017 after the decision of the Palestinian Authority not to pay the electricity for Gaza, the number of service hours of electricity through the public grid has been decreased. This has led to a greater dependency on fuel to run the generators for operating WASH facilities.

Fuel consumption during summer season is much higher than other seasons. Since the Gaza Strip is a coastal area, the temperature and humidity are relatively high. Therefore the demand for electricity to run cooling systems such as fans and air conditioners is higher. Chart (2) shows the average fuel consumption rate per month, which indicates that the peak of fuel consumption is in August, September, and October. Moreover 37% of the fuel is consumed during those months.
Currently, the amount of emergency fuel available for operating 130 critical WASH lifesaving facilities is 230,000 liters which lasts until end of August 2017.
Since the recent electricity crisis has begun in April 2017 30% of the electricity supplied by the electricity grid has dropped. The average megawatt supplied before April was 190, while the average has been decreased to 134 megawatt after the electricity crisis as chart (3) shows.

Accordingly, the number of hours of electricity cut off has been increased from 16 hours to around 20 hours in July as chart (4) shows.
Both electricity and fuel shortage problems complicate the humanitarian situation in Gaza Strip. The crisis has effectuated the daily life of the population by decreasing the water distribution per capita per day and polluting Gaza Strip’s beaches.

**Access to Water**

Number of Liters per Capita per Day (lcd) has decreased below the WHO recommendation which is 100 l/c/d. The average daily water produced after the crisis according to the data collected from water provider (CMWU) is around 110 liters. However, 32.5% of the produced water is leakage due to water network losses. This percentage is relatively high and it indicates that the water network needs to be strictly maintained or replaced. Successive Israeli wars on Gaza Strip, Israeli restrictions on WASH related materials, (dual use) and lack of funding lead to slowly renovating the water network. Based on these circumstances, and after taking the loss percentage into consideration, the amount of water per capita per day is 77 liters. However, as reported by WASH partners through the rapid assessment in July 2017 - this amount household level is 53 l/c/d.

The difference in water amount between what was reported by CMWU at production side and what was reported by WASH partners is due several reasons. Apart from the water losses in the water network, the lack of synchronicity between the schedule of the availability of water and electricity supply at household level is the main reason of this difference. It is worth mentioning that this synchronization is required to run the household level pumps that is required to drive the water to the roof storage tanks as the pressure inside the water network is very low. Diagram (1) shows the amount of water in each delivery stage.

![Diagram (1): Shows the amount of lcd produced, lost, and received at household level](image-url)
According to the information collected through the rapid assessment conducted by WASH partners, the share of water per capita per day had been decreased significantly. The average of l/c/d received at household before the recent electricity crisis was 84, while this amount has been decreased to 53. Chart (5) compares the l/c/d before and after the crises, and it also shows that 37% of the water amount has been reduced accordingly.

![Chart (5): Average of lcd of water received before and after the electricity crisis](image)

Chart (5): Average of lcd of water received before and after the electricity crisis

Chart (6) shows the l/c/d received at household level disaggregated by governorates. After the crisis people in Rafah receive the minimum amount of water which is 40 lcd followed by Khan Yunis.

![Chart (6): lcd of water received disaggregated by governorates before and after the crisis](image)

Chart (6): lcd of water received disaggregated by governorates before and after the crisis
The current average amount of water received by capita per day is 53% of the recommended amount by WHO. This severe shortage in water in Gaza Strip has not affected the amount of drinking water only, but also other basic water related needs. Diagram (2) shows personal daily activities require at least 100 l/d to be available. In addition, having fewer amount of water leads to health complications due to less drinking water that is being consumed and not practicing hygiene standards.

Diagram (2): Basic water usage that requires at least 100 l/d

L\C\D Provided is Half of Recommended Amount, So What

There is direct link between the some diseases and lack of access to water. Poor hygiene due to lack of water causes diarrhea which remains one of the leading causes of morbidity and mortality worldwide.

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1 Fewtrell L, Kaufmann RB, Kay D, Enanoria W, Haller L, Colford Jr JM. Water, sanitation, and hygiene interventions to reduce diarrhoea in less developed countries
As a result of the crisis, people in Gaza Strip have started compensating the water shortage by purchasing water from private water suppliers through water trucking. In addition to the issue surrounding the quality of the water which is questionable due to possible contamination, the cost of purchasing water increases the burden on those who are most vulnerable, noting that 65% of the population is under the poverty line. The cost of a cubic meter of water provided from water network is between NIS 1.0-1.3, while the cost of a cubic meter of water provided by water trucking in between NIS 30-40. Chart (7) shows the monthly cost of water paid at the household level before and after the crisis. This cost is based on the assumption that each family has 5.7 members and that each person receives 84 liters of safe water a day, which is the amount received before the crisis. It is also assumed that the average cost of a cubic meter of water through the water network is NIS 1.15 while it is NIS 35 water trucking. Prior to the electricity crisis, the average cost of water consumed through water network was NIS 17. This cost has been raised after the crisis where people have started purchasing the water from private suppliers. The average cost has been multiplied more than eleventh times and it becomes NIS 191.

![Chart (7): The average monthly water cost paid at household level before and after the crisis disaggregated by source of water](image)

CMWU managed desalination plants has been impacted by the shortage of electricity as well. The production amount of desalinated water has decreased as the electricity cut off hours have increased. As chart (8) shows a huge drop in production happed in April 2017 when the recent electricity crisis has begun. The average amount of desalinated water produced before the crisis was 108 thousand cubic meters, while after the crisis it has reached to 49 thousand cubic meters. The percentage of the drop in water production is 45%.

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2 Palestinian Center for Human Rights
Wastewater Treatment

A major issue triggered by electricity crisis in Gaza Strip is the poor treatment of wastewater. The shortage of electricity has decreased the operational hours of WASH facilities in general and wastewater treatment plants in particular. In spite of wastewater treatment plants were not working at full capacity prior the recent electricity crisis, the quality of treated wastewater was not bad as it is now. The supply of electricity does not match the in the WASH facilities. Therefore the wastewater that goes to the sea is poorly treated, and it leads to widespread beach pollution.

Three million cubic meters of wastewater is being dumped to the sea on monthly bases through nine sewage outlets distributed cross Gaza’s coastline. The Gaza Strip has five wastewater treatment plants and seven sewage pumping stations. The average level of Biological Oxygen Demand (BOD) of the treated wastewater is much higher than the maximum allowed level according to the Palestinian standards which is 60 mg\l. BOD is a factor that measures the quality of the wastewater treated, and it be used as a gauge of the effectiveness of wastewater treatment plants. Chart (7) shows the BOD level before and after the crisis.
As chart (9) shows there is a sharp rise in BOD level in April when the crisis began in earnest. The smell of the surrounding areas is unhealthy and may carry contagious pathogens. The Palestinian Environment Quality Authority (EQA) has subsequently warned people not to swim in polluted beaches and PWA have declared “no swimming zones” due to the potential health hazards. As diagram (3) shows the contaminated zone has been increased from 48% in May to 73% in July. Demand for the hours required to operate the Waste Water Treatment Plants. Additionally the Israeli authority restrictions on materials for entry into Gaza Strip has led to a critical shortage in spare parts required for operating the machines.
The current electricity crisis and impact upon Gaza is widespread. More than two million people are suffering from the lack of electricity and its consequences. More than one million children less than 18 years old are also affected directly by the electricity crisis as well.

Table (2) illustrates the caseload of affected people and people in need disaggregated by governorate and problem causes.
<table>
<thead>
<tr>
<th>Governorate</th>
<th>People Category</th>
<th>Affected People (K)</th>
<th>People In Need (K)</th>
<th>Limited Access of Water</th>
<th>Beach Pollution</th>
<th>Maximum Number of People in Need</th>
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<td>Gaza North</td>
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<td>1.04 M</td>
<td>1.04 M</td>
<td>1.73 M</td>
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</tbody>
</table>

Table 2: Number of people affected and number of people in need as a result of electricity crisis

**Number of Affected People and People In Need**

As a result of the electricity crisis, the total number of affected people is 2.03M and the total number of people in need is 1.73M
WASH Cluster in Gaza Strip
August 2017