

Priorities for Electricity Return in Taiz City

Policy Paper

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Executive Summary

People in Taiz city has been living in tragic conditions since the armed conflict started on April 2015, resulting in the collapse of state institutions and the stopped of services, most notably is the electricity that has been cut off completely in Taiz city since the late of May 2015, and which is still until today.

The local electric system was destroyed, and a large main part of the grid was destroyed too, the part remained became subjected to the greatest legal argument after the PEC leased the grid to private companies.

The collapse of the electricity system and the absence of a permanent fuel supply have increased the suffering in Taiz, And due to the absence of electric power, a lot of problems appeared.

For example, the health centres are no longer able to preserve medicine or operate medical equipment. As well, the Local Water and Sanitation Corporation are no longer able to pump clean water, which has contributed to the aggravating of the humanitarian crisis.

Because of the continuous of conflict and the high costs of public electricity sector reformation, many people have been forced to use another alternative sources such as the solar energy, which has become the electricity source for the majority of people, and because of the low income of the most people, they are only able to buy small systems, for lighting and charging their mobile phones, that's why poor quality products abound on the market.

The gradual recovery, relatively return of life to Taiz city and the continued absence of public electricity have led to the emergence of what called "Black markets", for generating electricity.

In Taiz city - The centre of the governorate - which is under the internationally recognized government, there is about 11 to 17 of Commercial Electricity Generation Company, that offers its services at prohibitively expensive prices, the cost of 1 KW was reached to 1000 Riyals, Plus a bimonthly subscription fee. This is doubling the suffers of people and increasing their problems , so it requires urgent action to put an end to the problem.

This paper examines the reasons for the power stopped in Taiz governorate and the damage happened to the electricity sector. As the paper concludes with suggestions for practical solutions and a set of urgent recommendations aimed at restoring electric power in Taiz city, As well as, improving its management and developing its resources, and regarding to the private sector involvement in investment on the field of electricity, in addition to medium- and long-term recommendations at the levels of establishment, financial, administrative and legislative to restore electricity in Taiz city.

Introduction

Electricity is one of the most main service sectors in modern economics, so countries are trying to consistently develop it.

However the electricity in Taiz City is a very different situation.

The electricity system has been stopped since mid-2015 because of the conflict in the governorate and Yemen in general, which has affected the interests of most citizens and caused to the stopped of public and private businesses, that coincided with a severe oil derivatives crisis in the governorate.

The ongoing conflict in the governorate also caused significant damage to the buildings of PEC's branches in the governorate, in addition to the looting of the building's furniture and power grid tools in most of the city's areas that experienced of armed confrontations.

The ongoing conflict in the governorate and the stopped of power generation from Al-Makha'a and Osaifra generating plants for approximately 7 years have compounded the human suffering, and increased losses to the public and private sectors as a result of the public electricity service stopped, resulting in economic, human, health, educational and service damage.

The continuing conflict in the provincial areas has delayed the activation of State institutions and lost opportunities for the electricity return, most notably the lack of the governorate access to the grant of Saudi Arabia related to oil derivatives for the electricity sector in areas under the control of the internationally recognized Government.

This paper addresses the problem of electricity stopped in the city, its effects and official efforts to solve the problem, and the main challenges of rehabilitating generating plants, transmission and distribution networks for electric power in Taiz city, as well as suggested solutions and recommendations.

This paper was based on the review of documents and PEC's reports, studies, research and governmental and non-governmental reports, as well as available open sources, and interviews with officials of PEC - Taiz, unionized workers, interested persons and citizens in Taiz city.

Problem and Context

Because of the war in Yemen since seven years ago, multiple crises and disasters in various aspects of life have been arisen, the outage of public electricity service is one of these disasters. Since 2015, the service of electricity provided by the State to citizens in various Yemeni governorates has been discontinued. The continued disruption of this public service and the limited options made available thereafter, such as generators and solar panels, that led to the emergence of investments in electric power. ⁽¹⁾

Taiz city - the center of the governorate - is located in the south-west of Yemen. It's population is approximately 652,991 Million⁽²⁾, and they are part of the governorate's inhabitants roughly 4.3 Million,

Taiz is the third largest province in terms of population. Electricity in the province of Taiz was centrally connected to the national grid like other Yemeni cities.

In 2013, the total beneficiaries from Taiz Electricity Area Services were about 250 thousand⁽³⁾, Taiz had two power plants: Al-Makha'a (MW 160) and Osaifra (MW 16) - both connected to the national grid⁽⁴⁾, with a total power demand of about 111 MW.⁽⁵⁾

Because of the war, the national network is collapsed and associated assets are damaged. The lack of fuel, maintenance and rehabilitation have brought power plants to stop since the war started ⁽⁶⁾.

The Energy infrastructure in Taiz had been plundered, especially of cables, electrical adapters and power poles. The destruction of the Taiz electricity generating unit - which is the main source of electricity - along with the damage to the high voltage lines linking Taiz to the power plants in Al-Makha'a, contributed to the reduction of the city's power supply⁽⁷⁾.

The PEC was unable to resume its services in Taiz city, due to its heavy losses, the complex safety situation that usually accompanies armed conflicts, the high cost involved in restoring the participants' electrical service, and other factors.⁽⁸⁾

Taiz city's electricity sector relies mainly on diesel, and the conflict has affected on access to fuel. Whereas the price of diesel in Taiz has remained consistently higher than cities of similar size, and has seen notable increases since 2015 ⁽⁹⁾.

Also the discontinuation of YOC of the Taiz branch which is concerned with providing the petroleum derivatives to the governorate and supplying the fuel to the power plants since 2015 has contributed to the doubling of the problem of the electricity return to Taiz city and the failure to obtain the governorate's share of the Saudi Grant related to the oil derivatives for returning the electricity to Yemen.⁽¹⁰⁾

According to the WB's estimates, the energy sector in Taiz will require between 86 to 105 Million USD in a medium-term rehabilitation period, and between 107 to 131 Million USD over a five-year period⁽¹¹⁾. It is worth noting that reducing the estimates of reconstruction in Taiz may be extremely difficult; since there are several secondary damages caused by other factors, such as the looting of energy infrastructure and its facilities by stripped them of copper and selling them. ⁽¹²⁾

1 Amer Abdulkareem, The Yemenis in the maze of losing public services.. About commercial power plants that break the back of the citizen, khuyut platform, October 30, 2020, <https://www.khuyut.com/blog/commercial-power-yemen>

2 Taiz, Urban Profiling File 2019, UN-Habitat, 2020, p. 14

3 The Commercial Activity of the Public Electricity Corporation Report - Taiz, 2013.

4 MoEE, Aden, 2018

5 RCREEE, 2018

6 Improving Electricity Services in Yemen Report, 2021, p. 18.

7 WBG, Yemen Dynamic Needs Assessment: (DNA), Phase 3, 2018.

8 The Report of Armed Conflict Damage Monitoring on Public Services - Taiz. Resource Foundation for Development and Human Rights - Tamdeen Youth Foundation. funded by NED. December 2017.

9 Urban profiling file, ibid

10 Interview with a member of PEC Employees' Union- Taiz

11 WBG, Yemen Dynamic Needs Assessment: (DNA), Phase 2, 2018

12 Tawfiq Sufian, Post-Conflict Reconstruction Strategy Study for the Electricity and Energy Sector in Yemen, International Energy Charter 2019

Solar Power in Taiz

“The non-reliable alternative source”

Due to the ongoing of the conflict and the high costs of reforming the public electricity sector, many were forced to compensate of the energy shortage by the alternative means like: (Solar Energy) which became the source of electricity for the majority of people.

Approximately 75% of people who have access to electricity have become heavily dependent on home solar systems, which provide enough energy to light up and charge phones⁽¹³⁾. The average size of solar systems used by urban households was about 250 watts, and sometimes some households used systems with a capacity of less than 30 watts.⁽¹⁴⁾

City residents rely primarily on solar power and rechargeable batteries to meet their daily electricity requirements. Solar charging services have evolved throughout the city, and their use has increased since 2017. NGOs have supported their use in Taiz, including in many public schools and street lighting. Many residents of Taiz use car batteries to power home devices and inner lighting. Batteries are recharged through local service providers with special generators or solar panels. In addition, the sellers who have the capacity in generating , provide the charging services for mobiles for a small fee.⁽¹⁵⁾

Most people are capable to only buy small systems, which used for home lighting and charging the mobile phones, so poor quality products increase on the market. The Solar power systems with 12 volts - which are without electrical transformers - became popular, and many suppliers began to sell voltage-powered devices with 12 volts: (such as fans, TVs, etc.). Available limited electricity cannot operate household devices, so families have to wash clothes in traditional ways - with hands.

As well as, buying limited amounts of food due to the difficulty of storing food in refrigerators, buying ice-cubes from stores, if preferred drinking cold water and juices.⁽¹⁶⁾

A result of national standards lack for quality control of imported solar PV components, a large number of fake and poor quality PV products are imported, that shortening the life of solar systems. Batteries that represent the highest share of the cost of systems isolated from the grid, usually disabled quickly, and also endanger users' safety. Importing fake products also causes the drain of foreign currency at a time when the country faces economic challenges.

The cost of solar home systems of consumers is extremely high, making it beyond many people's reach. While affordability remains a challenge, so people and low-income earners have recourse to solar energy, for them it is affordable rather than the commercial electricity which is hard for them to obtain due to its high cost. Between two costly options, reliance on solar energy seems to be the most suitable option for many people ; At least they obtain electricity when needed !⁽¹⁷⁾

13 WB, Yemen's monthly economic update, March 2020.

14 MoEE, Aden , 2021

15 Taiz, Urban Profiling File, 2018, p. 72

16 Improving Electricity Services in Yemen Report, ibid, 2021, p. 18.

Parallel Electricity Markets “ Black Markets ”

Three years after the starter of war, the gradual recovery and relative return of life in Taiz city led to the increase demand for electricity service , and the continued absence of public electricity led to the emergence of the so-called (Black Markets), to generate and sell electricity. At present, Taiz city lives at the mercy of commercial electricity, which has become the preserve of wealthy people , shops and various commercial and industrial enterprises.

As a result of increased electricity demand and the lack of alternatives to the local authority⁽¹⁸⁾, and under the justified and protection of the public electricity grid from attacks, burglary and risk of damages resulting from its continued discontinuation, the local authority and the PEC in Taiz have allowed the private sector to rent and use the public grid in exchange for charging the enterprise, with the private sector committing to periodic maintenance of the grid.⁽¹⁹⁾ Whereas some reports indicate that some individuals - who known as electrical generators owners - are operating without any oversight and they sell electricity at prices often up to ten times the cost of service from the public grid.⁽²⁰⁾

The PEC sometimes resorts to purchasing energy from the private sector. The process depends on the PEC which providing oil derivatives to the private sector that generates and sells power to the PEC, which in turn resells it to consumers at subsidized prices.

The Electricity Law No. 1 of 2009 regulates the purchase of electricity from the private sector. However, what happens in Taiz is totally different. Where the Private sector companies generate and distribute electricity using the public grid, sell it directly to consumers and determine the sale price of kilowatt.

The branches of PEC in the governorates, including Taiz, face legislative obstacles related to their lack of legal capacity to conclude concession contracts for the purchase of energy from investors. Whereas the large and medium contracts continue to be reserved for the Prime Minister and the Ministry of Electricity⁽²¹⁾, and to grant the PEC branches conclude investment concessions contracts in amounts higher than 50 million Riyals currently available. That will allow better space to expand and regulate the process of contracting, purchasing and redistributing energy, and will provide an incentive for the private sector to invest in the electricity sector.

In Taiz city - the center of the province - which is under the authority of the internationally recognized Government, there are about 11 to 17 commercial electricity generating company⁽²²⁾, but these companies that were established provided their services at very expensive prices, with the one kilowatt price offered by these businesses amounting to approximately 1000 Riyals, as well as a bi-monthly subscription fee is paid for the provision of the service.⁽²³⁾

18 The former Taiz governor 's directive to the PEC's Head in Taiz about the cooperation with the private sector in generating and selling the power , May 2017.

19 Statement of PEC's former Director in Taiz, Arif Abdulhameed to khuyut Platform, Al-Mu' tasim Al-Jalal, ibid.

20 Taiz, Urban Profiling File, ibid

21 Law No. 23/ 2007 on government tenders and auctions is the law used for purchase processes in the electricity sector. According to this law, the Council of Ministers is responsible for approving tenders in excess of 250 million Yemeni Riyals , and the Ministry of Electricity and Energy is responsible for tenders ranging from 150 to 250 million Yemeni Riyals. While the PEC is responsible for tenders ranging from 50 to 150 million Yemeni Riyals. And the Corporation's branches in the governorates are responsible for all tenders below 50 million Yemeni Riyals.

22 Mohammad Al-Huraiibi, The Fact of Lowering the Commercial Electricity Tariff in Taiz, Al-Mushahed Net, January 5 2022 <https://almushahid.net/90553/>

The Taiz branch of PEC regulates the rates receive by private generator owners and demand them to light the main streets to improve the security situation.⁽²⁴⁾ And that mostly have not taken place.

However, at least 3 additional stations were established in the city without permits, but without paying any fees to the PEC despite using the Corporation's equipment and staff.⁽²⁵⁾

The PEC in Taiz is continuing to allow these individuals to work without punishment. While several reports have even indicated that public and professional officials, who receive salaries from the State, are placed at the disposal of these private vendors under the pretext of lighting Jamal Street - the main road crossing Taiz from east to west⁽²⁶⁾.

Moreover, Private power plants have revealed defects and imbalances that strain people. Many electricity subscriber complain about the commercial plants mishandling in providing the services and the electricity cuts per day, the weak electrical current itself, subscription fees, as well as the way of paying bills every half month.⁽²⁷⁾

23 Invoices received by the researchers for subscribers in Taiz city of August 2022.

24 The report of improving the electricity services in Yemen, *ibid* , p. 18.

25 Al-Harf 28 investigates about electricity in Taiz.. Limited service and huge corruption, *ibid*

26 " Today's news " . Commercial electricity in Taiz instead of the state's electricity . A corruption with documents proves harnessing the potential of the corporation for the benefit of the traders, 27 January 2019 https://akhbaralyom.net/news_details.php?sid=108508 Date of visit: 20 August 2022

27 Interviews conducted by the researchers with a number of electricity subscribers with the commercial power plants in Taiz.

Problem's Effects and Results

As the armed conflict continues in Taiz governorate and the non-return of Government's electricity service, approximately a quarter of a million people (259.072) are lacking of power services. The damage of public energy infrastructure, together with lack of fuel and power equipment, lead to severe disability in the access of both energy goods and electricity supplies. As many water facilities - within the framework of the conflict- affected areas - that rely on electricity or fuel have become dependent on humanitarian assistance. So the access capacity to clean and safe water has been decreased. As well, most of Taiz's water infrastructure is partially functional due to persistent lack of electricity and lack of diesel fuel to power pumps.

According to Khairet Caballari, MENA Regional Director for UNICEF: " Recurrent fuel shortages in Yemen deepen the water and health crisis", he adds: "This comes at a worse time for Yemen's children who suffer from grogginess between violence, malnutrition and the spread of diseases, including acute watery diarrhea and cholera".⁽²⁸⁾

The longtime of Power outages in Taiz city with clear evidence of continued electricity shortages; puts a huge burden on different sectors ,dangerously threatens the city-wide services, the city does not have access to electricity from the public grid and lacks generators (and fuel).⁽²⁹⁾ During the day, Taiz looks a relatively ordinary city, whereas it drowns in total darkness during the night.⁽³⁰⁾

The Energy shortages have a negative impact on the city's health sector, although some hospitals struggling to pay the cost of diesel fuel needed to power their diesel generators, several hospitals can not afford enough fuel to power their generators unless for a few hours a day, they began to imposed the patients to pay fees for fuel costs, whereas some patients - who could not afford the cost - denied from getting the health services . The lack of a reliable source of energy has also adversely affected certain treatments requiring prolonged use of medical equipment.⁽³¹⁾

28 Yemen's water crisis deepens with severe fuel shortage, UNICEF press release, December 19, 2017. <https://www.unicef.org/ar/%D8%AA%D8%AA%D8%B9%D9%85%D9%91%D9%82->

29 Taiz, Urban profiling file, ibid, p.74.

30 Said Abiji, Yemen's Taiz, life is getting harder because of the continue of war and siege , Anadolu Agency, 24 December 2018, <https://www.aa.com.tr/ar/pg/%D9%85%D8%B9%D8%B1%D8%B6-> Date of visit: 15 August 2022.

31 Taiz, Urban profiling file, 2018, p.73

Popular Movements and Disappointed Impacts

Early in June, 2021, Taiz city was on a date with the spark of peaceful protests organized by a number of youth and trade union components in the city to demand the provision of basic services, such as water, electricity and hygiene, and to remove the officials involved in corruption cases and bring them to justice. Youth anti-corruption protests led to the transfer five general managers with corruption files to the judiciary on charges of wasting public money.

The young Muhammad Ali Al-Faqih, a youth member of the Community Oversight, asserts that the files of the Transport & Taxation Offices and the taxes of senior officials and electricity were transferred to the judiciary, which relate to the embezzlement of public funds and administrative offences.⁽³²⁾

The multiplying requirements for electricity access by people in Taiz; payed the private owners to raise the price of one kilo to 1000 YR,⁽³³⁾ which represents a largest value in Yemen. This opened the door to consumers and social media activists to reveal the hidden of private electricity companies and their treat with the State Corporation and the local authority, According to report documents published by the Central Agency for Oversight and Accounting, the net profits of private electricity companies in two years amounted to more than 6 billion YR . Which is worrying number compared to the poor service provided which is unable to operate medium, as well as large devices, as the consumers say.⁽³⁴⁾

Through search and follow-up, it turns out that there is a great awareness of the problem by society, almost a year ago, the hashtag “The return of government electricity is a popular requirement”, is noticed in the city’s shops gates, the hashtag includes a call for residents to practice pressure upon the local authority, to restore the state electricity service, the hashtag is launched by “Ta’izz merchants’ conglomerate”, which is a coordinating form or solidarity league, formed during the years of conflict by a number of traders in Taiz city .

On the other hand, with the growing awareness of the problem scale among citizens, and after almost daily protests by citizens on the city streets, on May 2021, the local authority reached an agreement with owners of commercial electricity companies to reduce the price of the KW to 350 YR, after it have been reaching to 500 YR, and to reduce the monthly subscription from 2000 to 1000 YR, however, the companies did not comply with the statement of the governorate agent.⁽³⁵⁾

32 Rashid Mohammed & Makeen Al-Awjari,... People’s and legal Support Against Corruption in Taiz ...Popular Protests Bring Government Corruption Files to Justice, khuyut platform, September 13, 2021 <https://www.khuyut.com/blog/corruption>

33 Invoices obtained by the researchers, document.

34 Al-Mu’tasim Al-Jalal , May 29, 2021, khuyut Platform, <https://www.khuyut.com/blog/commercial-electricity>, ibid

35 Mohammad Al-Huraibi, The Fact of Lowering the Commercial Electricity Tariff in Taiz, Al-Mushahed Net, January 5 2022, <https://almushahid.net/90553/>

The Reality of Public Policies

The Unregulated Involvement of Private Sector

With the gradual life return to Taiz city, and the high increase need of electricity service, and the continued interruption of government electricity, the idea of commercial electricity has emerged.

In June 2018, the former Governor of Taiz Province had directed to the General Director of the Electricity District in the Governorate, at that time, in cooperation with small private companies to rent electricity equipment and allow the construction of generating plants, and the former Director of Electricity signed the first contract with (Yemen Co) plant, that is owned by a local investor.⁽³⁶⁾ The public network was leased for a fee to the enterprise, with the private sector committing to periodic maintenance of the grid.⁽³⁷⁾

The actions of the former General Director of the Electricity Corporation, faced criticism and objections which have amounted to issue legal opinions cancelling contracting with private electricity companies. Both the central Agency for Oversight and Accounting and the Governorate's Office of Legal Affairs are based on the fact that the procedures of the former Director of Electricity are in contravention of the Electricity Act No. 1 of 2009, which explicitly stipulates that only the Minister of Electricity and the Energy Regulatory Board are legally authorized to grant licenses and regulate the electricity generation and distribution.⁽³⁸⁾

Saudi Grant " Lost Opportunity "

Since 2018, Saudi Arabia has supported Yemen's electricity sector by providing two fuel grants. In early 2019, Saudi Arabia pledged to support Yemen's electricity sector by supplying 190,391 metric tons of diesel and 86,021 metric tons of heavy fuel oil. In early 2021, Saudi Arabia pledged to support Yemen's electricity sector by supplying 909,591 metric tons of diesel and 353,304 metric tons of heavy fuel oil.⁽³⁹⁾

This fuel has been distributed to more than 80 generating plants in areas under the legitimate Government's control through specialized committees working to ensure effective fuel supply to the generating stations. Priority is given to major generating plants and to private generators from which the State Electricity Corporation buys electricity from⁽⁴⁰⁾.

However, Taiz governorate has not benefited from these quantities, because power plants are not operational and electricity is not purchased from private generators.

36 Al-Harf 28 investigates about electricity in Taiz.. Limited service and huge corruption, report, June 1 st 2021
<https://alharf28.com/p-60578>

37 Commercial Electricity in Taiz Overwhelms Public Right, Report, Al-Mu'tasim Al-Jalal , May 29 , 2021 khuyut Platform
<https://www.khuyut.com/blog/commercial-electricity>

38 An official document, obtained by the researchers, issued by the Office of Legal Affairs, No. 146, 24 November 2019.

39 Unlike previous grants, this fuel must be purchased at the local price in Saudi Arabia, meaning that the value of the grant/support is the difference between the international price and the local price in Saudi Arabia.

40 Improving Electricity Services in Yemen Report, ibid, p. 13.

Attempts to determine the tariff price

The government electricity tariff by consumer categories for residential homes ranges from 6 to 19 YR per kilowatt-hour, and commercial and industrial categories from 22 to 30 YR. The commercial category has increased in recent years from 50 to 70 YR / kWh.⁽⁴¹⁾

With rising US dollar exchange rates, which in November 2021 reached approximately 1,400 YR, the branch of the Public Electricity Corporation sought to establish a balanced tariff that takes account of exchange differentials and higher oil derivatives prices. In June 2022, the Electricity Corporation issued the Electricity Price Bulletin in a memorandum for generator owners to approve the amount 611 Riyals per kilowatt.⁽⁴²⁾

The Governor of Taiz has issued a resolution for adoption the Electricity Corporation's pricing proposed in Taiz, to compel the commercial companies. Electricity Corporation's Proposal for Pricing of kilowatt to citizens is based on the sale prices of diesel, ranging from 427 YR per kilowatt, when the price of one liter of diesel is 800 YR, and 638 YR per kilowatt when one liter of diesel reaches 1500 YR.⁽⁴³⁾

The Public Electricity Corporation's bulletin not make any feedback by the owners of private generators, justifying that the local authority failed to fulfil its previous pledges to repay the debt required of government actors and the city's military commanders, which caused the failure to implement a pre minutes signed by them with the local authority.⁽⁴⁴⁾

Governmental Efforts to resolve Taiz Electricity Problem

In the context of addressing the electricity problem in Taiz, The State President Abdurabuh Mansour Hadi in June 2018 directed his Excellency the then Prime Minister Dr. Ahmed Obeid bin Dagher, adopting 30 MW of electricity in Taiz governorate.⁽⁴⁵⁾ These directives have faced many obstacles, most notably : according to a local official, "political variables, and the duration of issuing the directive is large, sufficient to reach and operate."⁽⁴⁶⁾

In: 26 February: 2022, the Supreme Energy Council ordered the establishment of a 30 MW generating plant in Taiz governorate.⁽⁴⁷⁾

41 Public Electricity Corporation data, Aden, 2021.

42 A document obtained by the researchers issued by the Public Electricity Corporation - Taiz, for generators owners contracted with the Corporation on June 8, 2022.

43 A document obtained by the researchers, issued by the Public Electricity Corporation - Taiz and accredited from the Governor's Office of Taiz on May 25, 2022.

44 Mohammad Al-Huraibi, The Fact of Lowering the Commercial Electricity Tariff in Taiz, Al-Mushahed Net, January 5 2022 <https://almushahid.net/90553/>

45 Aden Al-Ghada, President Hadi directs to provide 30 MW to Taiz Governorate, 26 June 2018, <https://adengad.net/public/posts/324487>

46 Al-Mu'tasim Al-Jalal, khuyut Platform, ibid

47 A document obtained by the researchers, issued by the Secretary-General of the Prime Minister of the internationally recognized Government, Mute'e Damaj, on 28 February 2022.

Suggestions and Solutions

Option I : Partial Restart of Osaifra power station

The rehabilitation and maintenance of the Osaifra power station for its full operation, with a total cost of approximately 1.8 million USD, including the maintenance and rehabilitation of the distribution and transformation grid within the city.⁽⁴⁸⁾

This option provides an opportunity to benefit from the Saudi Petroleum Derivatives Grant related to Electricity in Yemen and reduces the operational burden on the corporation.

This option will also contribute to preserving the corporation's transportation and distribution grid from exploiting operators and the private sector. It will also provide financial revenue to the corporation to enable it to continue and develop the generation and distribution of electric power.

Despite the advantages offered by this option, there are difficulties happen, like: the high cost of maintenance and rehabilitation of Osaifra power plant, in addition to the challenges of stopped the Saudi oil derivatives grant and consequently the inability of the Public Electricity Corporation to save operational costs, as well as the problem of power loss experienced by the electricity sector before the conflict.

To meet these challenges, this option can be started gradually and in several stages. Providing an operational balance for the plant, 50% of the staff, furnishing a building, providing computers, transportation & emergency, and working equipment, in addition to providing 50% of the approved balance of electricity Corporation since 2006, which was 62 million YR per month.⁽⁴⁹⁾ Thereafter through revenue can continue restoration and maintenance on a phased basis.⁽⁵⁰⁾

Option II: Power Purchase from the Private sector

The PEC and its branches in governorates under the control of the legitimate Government buy a large portion of the total electricity produced from privately owned diesel generators through power purchase agreements. Annex Table No. 4 shows the volume of energy produced from the power plants of the PEC, as well as the energy purchased in each governorate.

According to this option, the Public Electricity Corporation in Taiz contracts with the private sector to purchase energy , this happens after the approval of the Central Government of Aden and by its supervision. So that the Electricity Corporation purchases energy from private sector companies and redistributes and sells to consumers, in exchange for the provision of oil derivatives to these companies by the Corporation.

48 Study prepared by the Public Electricity Corporation in Taiz.

49 According to an interview conducted by the researchers with the General Director of PEC in Taiz , August 8, 2022.

50 ibid.,.

This option can succeed if concluded in accordance with legal methods which provide transparent, public and fair procedures, so that all companies wishing to contract can apply for tenders and compete transparently. This option can alleviate many of the burdens on Taiz Public Electricity Corporation. It ensures regular electricity access to all areas at uniform prices and contributes to the provision of revenue to the institution to enable it to gradually rehabilitate and maintain power plants and distribution grids.

Nevertheless, there are challenges facing this option, like: the low willingness of the private sector to enter into contractual processes with government actors, especially with insufficient security guarantees, and the collection difficulties faced by the Electricity Corporation, especially by government institutions, will undermine the Electricity Corporation's ability to meet its obligations.

In addition, some stakeholders at the Electricity Corporation believe that there are many reasons which add burdens on the institution for example: the problem of indiscriminate connectivity & technical problems power systems, especially in the absence of a cessation of conflict and the potential for power grids to be damaged. As well as, control the operations of collection processes, and given the potential benefits of the electricity Corporation. This option will not be encouraging for the enterprise to continue with this type of contract. as opposed to the fact that this option may face objections by existing private companies, However, this option cannot meet acceptance by the private sectors currently exist, unless begin to support this option widely from the community and firmly by the security agencies.

Recommendation

The power sector in Taiz requires many interventions and actions at the urgent and medium level, to solve the problem of electricity, notably: re-upgrade and rehabilitate infrastructure and secure fuel supplies, in addition to granting the public Electricity Corporation-Ta'izz additional powers, as well as securing sustainable solutions to energy sources for critical sectors such as water and health in Taiz, thereby neutralizing these sectors from the recurrent crises of the electricity sector.

The main recommendations required to improve the situation of the electricity sector in the city of Taiz can be summarized as follows:

Reformation of the Electricity Tariff Price

The official electricity tariff is low as measured by the decline in the currency's price and its loss of value during the war years. which makes the return of government electricity by the previous tariff a futile option in terms of the financial sustainability of the electricity corporation, Despite the limited tariff on electricity production costs, it does not encourage the corporation to face its current and future mandated tasks, A reasonable tariff hike should therefore be viewed from an operational and non-profit standpoint. In this regard, tariff reform can be carried out in a balanced manner, taking into account household and commercial consumption, and the private sector can be involved in securing electricity supply to certain sectors at commercial prices, while the general electricity supply to housing at a non-commercial tariff continues. This does not mean privatization of the electricity sector, but must be done through the public electricity grid. This trend should be accompanied by an awareness-raising campaign for citizens to illustrate the importance of these reforms with service improvements.

In the short term " Local Authority "

- Coordination with international organizations to support the electricity sector in Taiz city.
- Rehabilitation of distribution grid and power transmission lines in Taiz city
- Urgently rehabilitate the generating plant of Taiz to cover the whole city with electric power.
- Activating the role of the Yemeni Oil Company - Taiz, in order to help secure the arrival of fuel supplies at fixed prices.
- Adopt a clear mechanism for engaging with the private sector that contributes to solving the problem of indiscriminacy in determining consumption tariffs.
- Activate the role of the security and military actors to control irregularities and implement the directives of the local authority regarding the control of electricity irregularities.
- Adopting a general orientation to rely on solar energy, especially for vital facilities such as hospitals and water wells, which is a good option that can greatly contribute to reducing expenditures, improving services, and relieving pressure on the Public Electricity Corporation.
- Private sector contracting should be reviewed to ensure continuous provision of electricity by prioritizing companies that can produce higher and longer electricity during the day.

To Involve the Private sector

- Develop regulations to encourage the private sector in electricity sector investing and urge options for private sector participation as an electricity producer in exchange for securing fuel supplies.
- Ease restrictions on investment in the electricity sector in a competitive and transparent manner.
- Encourage private sector investment in renewable sources of energy, such as solar energy.

In the medium and long-term " Government

- Start the implementation of the Electricity and Power Board's decision to grant Taiz 30 MW of power.
- Developing the legislation governing the electricity and energy sector and encourage the private sector's participation in investment in the electricity sector.
- Strengthening the independence of the Electricity Corporation branch in Taiz governorate.
- Strengthen control over the import of solar-powered household appliances to ensure the quality of imported products.

Forms & Tables

| | Damaged Assets | Damage Size | Damage Type | Estimate of cost of damage in dollars |
|--|---|-------------|-----------------------|---------------------------------------|
| 1 | Furniture | total | Looting + Destruction | 168.000 \$ |
| 2 | Computers, information systems and its appendages | Total | Looting + Destruction | 162.000 \$ |
| 3 | Vehicles and Transportation | total | Looting + Destruction | 1.077.360 \$ |
| 4 | Counters and Tools | | Destruction +Looting | 66.000 \$ |
| 5 | Machines, transfer stations and distribution transformers | partial | Destruction +Looting | 9.200.000 \$ |
| | Transmission and distribution line machines | partial | Destruction | 1.200.000 \$ |
| 6 | Buildings | partial | damage | 481.090 \$ |
| 7 | The Main Store at Public Administration Office | Total | Looting | 534.367 \$ |
| | The store of Sha'ab Saleet (Al-Masbah Area) | total | Looting | 1.797.091 \$ |
| | The Counters Store Next To Osaifra Station | total | Looting | 83.533 \$ |
| | Stationery & Printed materials Store | total | Looting | 28.905 \$ |
| Total: fourteen million, seven hundred and ninety-eight thousand, three hundred and forty-six dollars | | | | 14.798.346 \$ |

Table No. (1) summary of armed conflict damage on assets belonging to the Public Electricity Corporation in Taiz, until 31 December 2017

| | Item/Service | Total |
|---|---------------------|------------------|
| 1 | Sold power kwh | 444.450.301 kwh |
| 2 | Number of consumers | 243.634 consumer |
| 3 | Total Sales | 8.192.523.849 YR |
| 4 | Total Payments | 7.564.795.923 YR |
| 5 | Total arrears | 4.643.183.635 YR |

Table No. (2) Attainment and Indebtedness Index for Small and Large Consumers + Government Category of Taiz Electricity Corporation during the Year: 2013

| | Sector | Need | Cost | Impact |
|---|--|---|-----------------|------------------------------------|
| 1 | Generating Sector (Al-Makha plant) | Maintenance and rehabilitation | 15 Million USD | Full Capacity Working |
| 2 | Generating Sector (Osaifra plant) | Maintenance and rehabilitation | 2 Million USD | 14 KW Working Capacity |
| 3 | Intra-City Generating and Distributing Sector (Osaifra plant Generators) | Maintenance and partial rehabilitation | 1.8 Million USD | 7 KW Working Capacity |
| 4 | Transport Sector | Maintenance and rehabilitation | 7 Million USD | Transport from Al-Makha plant |
| 5 | Distribution Sector | Purchase transformers, maintenance and rehabilitation | 2 Million USD | Power distribution within the city |
| 6 | Rural Electricity Sector (Electrical Generators) | Grid Maintenance and Rehabilitation | 250 Million USD | 3 KW Working Capacity |

Table No. (3) The Requirements and costs for the restoration of electricity sectors and the return of electricity to Taiz governorate

| Area | Power plants of the Public Electricity Corporation (MW) | Purchased power (MW) |
|--------------------------|---|----------------------|
| Abyan(including Lowder) | 22.1 | 18 |
| Aden | 150.2 | 115 |
| Al-Mahra | 46.15 | 0 |
| Hadhramoot the coast | 101 | 105 |
| Hadhramoot the valley | 81.5 | 50 |
| Lahj | 16 | 32 |
| Mareb | 345 | 52 |
| Shabwa | 14.7 | 28 |
| Soqatra | 4.5 | 0 |
| Taiz | 0 | 0 |

Table No. (4) shows the energy produced from the Public Corporation for Electricity and Power purchased from the private sector during 2012.⁽⁵¹⁾

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