



Energy security – between opportunities and challenges

A specialized study of the electric power in north and east Syria

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SUMMARY:

Electrical energy and its system are classified as critical infrastructures that operate the economy and society and affect various elements , and the component of environmental system , it is the way to increase the physical and vital production of societies if they are provided with appropriate values for the standards of development , and on the country, the inability to provide their supplies leads to a decline in economic production and stimulates the spread of abnormal phenomena affecting society (such as unemployment , migration , and weak productive purchasing power), in addition to its impact on the health of the vital elements of the environment (such as humans, animals, and plants) and material (such as air ,water and soil) , and based on this extreme importance and impact , the researchers dealt with the electric power sector in its three stages : generation , transmission , distribution and consumption .

Where the study began by addressing the natural resources and their availability regardless of their investment or not , and found missed opportunities in natural gas and limited imposed in water as essential and primary energy sources to be relied on to cover the base loads , and also discovered that there is a promising potential in solar energy , wind , and then biomass with its various applications , the most important of which is the principle of distributed generation with off-grid systems or mini-grids , by passing by introducing these renewable sources how to link them and integrate them within certain system non-renewable sources .

The researchers were also surrounded by diagnosing and analyzing the current situation in order to reached the gap in each stage of securing electricity service to consumers , and their vision of generation side was summed up by a deep deficit of 68% for two main reasons , the first of which is stage high dependence rate on hydroelectric stations , which exceeds 80% and the Euphrates water crises in this case Infrastructures are available with high capacities , but the natural resource need to operate them is not available , and the second is the low thermal efficiency in thermal plants whose efficiency does not exceed 20 % as a result of operating their infrastructure outside its design life by more than 6 years , and here the natural resource (free and associated gas) is available , but there are no developed infrastructures to exploit it as required .

As for the phase of power transmission and distribution , the grid suffers from many problems , the most important of which is the loss of the loop link feature , and its wear most of its substations are in addition to being destroyed , some of them (such as Hassaka main station) as a result of the hostilities , in addition to the failure to extend many lines as a result of the start of the crisis , which it was found that it would solve part of the problems of the current grid, in which the losses are up to 40% and it is characterized by interviewed and complex when distributed within the population centers , and this is what makes it difficult to control and maintain process .

When addressing consumption patterns , the researchers revealed that the sector most dependent on it in the GDP receives the least amount of Electricity , which is the agricultural sector , and without electrifying the countryside and their agricultural activities , the aspired development will not take place in the regions of north and east Syria , and by calculating the per capita share of electricity currently produced , estimated at 1.23 kWh/capita*day , through which it is possible to know the extent of the depth deficit in securing energy supplies when compared to the per capita share of energy in the Middle East and North Africa , which is 7.6 kWh /capita*day , and by classifying the energy consuming sectors , it was found that household consumption was and still is at the top of the energy consuming patterns by 63% , and this would stain societies the regions of north and east Syria in consuming societies , where the percentage of industrial consumption does not exceed 10% .

The energy sector, with its infrastructure and operators, does not receive any significant imported, so the studiers calculate the levelized cost of producing a unit Energy amounting to 0.058\$/kwh, on this basis, which gives the Autonomous- Administration the right to collect more than 1.6 million dollars per month, only to cover the cost of the consumed natural resource, while not getting more than 163,000 dollars per month.

In all of these analyzes , the researchers intended to build an analysis of strengths weaknesses, opportunities and threats SWOT, which directed their efforts in solving the outstanding problems in the electric power system , starting from generation through transportation to consumption and its patterns , where the researchers proposed a new energy component aimed to increase per capita share of electric in the region of north and east Syria from 1.23 to 3.8 kWh/capita*day, and they put forward a package of power generation projects on the basis of it , taking into account the principle of diversification of sources , thus covering the minimum deficit in the consumption side , which amounts to 480 megawatts of electrical capacity , with the proposition of possible alternative until implementation the strategic projects , and in the phase of energy transmission and distribution , they focused on rehabilitating the current structures with the aim of restoring the advantage of the loop connection of the network. As for consumption and its patterns, they recommended to localization of measurement and control systems, and they presented a schematically reasonable and socially affordable tariff if that seeks towards the goal of gradual liberalization of prices of primary energy carriers, and also addressed the necessity of controlling devices and equipment imported from abroad, focusing on household appliances, not for their capabilities, but rather for its large number.

The study concluded with a set of long – term recommendations that can be considered as long and basic strategies for the recovery process for the future development, as well as many short – term recommendations that serve the long – term and solve some of the current problems by the possible methods and ways.

PERFACE:

Infrastructure , with its grids and facilities , is the basic structure necessary for the operation of society and the economy , which has a direct impact on the environment and its components , and therefore the achieving of development and searching for the best geographical locations and the most optimal organizational forms for such structures depends on the extent of deep understanding of the region ,s identify and its economic , social and environmental characteristics , and the degree of development of projects that its spatial resources are invested sustainable and evaluated based on the most appropriate indicators and evidence that express the situation and are very appropriate in order to move towards development and enable its various characteristics of sustainable balance or integrated and continuous , various sustainable units (resources ans sources) and developed processes (system and techniques) to obtain outputs controlled in time , cost and quality.

It is well known that energy is one of the most important basic ingredients for facilitating activity and other human activities. it also represents a strategic dimension in achieving economic, political and social security alike, as the absence or failure of energy services or their lack of access to all regions and groups affects the trends of some economic, social and political indicators. therefor, the concept of energy security and sustainability emerged, which means providing energy supplies in its various forms, at an affordable cost, for all regions, social groups and economic activities, in quantities commensurate with local demand for it and looking towards external export, and that its supplies are safe and reliable for all.

Achieving the foregoing faces a number of challenges , foremost of which is the limited availability of traditional sources of energy from crude oil , natural gas and coal , and their unsustainability , and issues related to the rights of future generations in these sources , as well as their unavailability in all regions and their concentration in some regions excluding others , as well as its harmful effects on the environment , humans and all living creatures as a result of greenhouse gas emissions , the most important of which is carbon dioxide resulting from burning these sources , and the consequent effect of climate changes that many regions in the world began to suffer from therefor , improving energy efficiency , and shifting towards increasing the share of renewable energy sources in the energy mix , has become a strategic and imperative matter for most countries of the world to secure the energy needs of current and future generations on the one hand , and preserve the environment also limiting the climate change effects on the other.

The energy sector in Syria also acquires the strategic character par excellence due to the direct position it occupies, as it alone constitutes 20% of the gross domestic product, and the export of oil and its derivatives constitutes about 35% of foreign exchange earnings

and finances about 30% of the state's general budget¹, including that The localization and sustainability of energy infrastructure projects is a major challenge for the eastern region of Syria in the reconstruction phase, as it considered a heavy factor and on of the most important supra – regional links guiding the development path and determining its shape and type as well as transportation , water and communications as critical infrastructure and if this happens , as it capable of attracting investments to the region , advancing its development and removing it from its classification as a remote area in a developing country.

The great economic role played by the Autonomous Administration regions of Syria in general, which is manifested through its provision of agricultural, energy and water resources, is not commensurate with the share it contributes to the GDP of Syria at the time (11% only), as the regions of north and east Syria (Al-Hasakah, Al-Raqqqa, and Deir ez-Zor governorates), are considered a major reservoir for strategic agriculture, and a vital producer of energy carriers at the national level in Syria. Despite the concentration of most of the national oil and gas reserves in these areas at a rate of up to 85%, there is the issue of oil and gas export without refining and the absence of large petrochemical industries; The reserves are also expected to deplete within 15-20 years from now², and given that it is the food basket of Syria for its abundant agricultural production of strategic crops (it contributes by 52% of the total wheat production, and by 61% of the total cotton production in Syria)³. It still exports raw agricultural materials instead of manufactured goods, it also suffers from a low standard of living (the relative values of the poor in urban areas are 20.33% and 37.78% in rural areas)⁴, and weak social services, health, for example, every 1155 people have one hospital bed, and for every 1209 people there is only one doctor, and for education as well, of the one million people, only 14,387 people attend secondary schools, and workers as well. The unemployment rate among the age group ranging between (15-64 years) is estimated at 7.89%, and their number is 131,418. individual)⁵, The spatial problem can be summed up in the clear discrepancy in the levels of development between the areas of energy production (the regions of northern and eastern Syria) and the places of consumption (especially the governorates of the interior, Damascus and Aleppo), and these areas complain of desertification issues, local warming and air pollution, which causes a significant increase in energy consumption through the increasing need for ventilation, air conditioning and cooling in homes, workplaces and transportation.

¹ Source: (Regional Planning Commission, 2012)

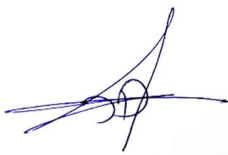
² Source: (Ministry of Local Administration and Environment ,UNDP, 2008)

³ Source: (ministry of agricultrure and agrarian refom, 2020)

⁴ the Tenth Five-Year Plan, table 1.6.1 (Application of the Minimum Income Vulnerability Line)

⁵ Source: based on the analysis of the data of the Statistical Bulletin in 2006 (central statistics office, 2020)

Therefore, the deficit in energy supplies in all its forms worsened a decade ago, accompanied by the start of the ongoing Syrian crisis, and it began to expand dramatically to a rate of 68.6%⁶ in all areas of the current AANES areas⁷, Its infrastructure investing in primary energy sources has been destroyed, and has received a load disproportionate to its absorption capabilities as a result of military operations, waves of migration and the disordered concentration of population in the main cities, Therefore, reducing this deficit in light of the current economic, social and political conditions is not an easy task. It requires a real approach to remedy the risks of its continuation, Accordingly, this study and similar ones are considered the basic building block on which it must be built to get the region out of its deep energy crises and its internal and external repercussions on the level of society, economy and the environment.



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⁶ only to rise the per capita share to 3.8 kWh /day, which is the lowest need in proportion to the average per capita need of 7.6 kWh / day in the Middle East North Africa.

⁷ NES regions, with an area of 53,300 km² and population of 4,21,022 people, according to agency studies.