

Concept note

Advancing climate resilience in Palestine by transitioning the Palestinian energy sector towards sustainability and promoting Area C solar projects

Introduction

This concept note is a part of “*Advancing Climate Resilience: Area C Solar Power for Gaza and West Bank and Regional Water Security*” - a Joint project of the European **European Commission’s Foreign Policy Instruments** and **EcoPeace Middle East**. EcoPeace Middle East is a unique organization that brings together Jordanian, Palestinian, and Israeli environmentalists aiming to advance both sustainable regional development and the creation of necessary conditions for lasting peace in our region. EcoPeace has offices in Amman, Ramallah, and Tel Aviv, and its 30 years of work in Environmental Peacebuilding has been rewarded with a Nobel Peace Prize nomination in 2024.

This project’s objective is to achieve increased regional cooperation and agreement on joint action on climate, energy, and human security, through the creation of (1) increased awareness and political will of key national and international decision makers on water security as central to national and regional security; and (2) evidence base for implementation of rapid response measures to build climate resilience for Palestinians.

This concept note aims to outline the political and technical context and bottlenecks for promoting a Palestinian transition into a more sustainable and less dependent energy sector, by diversifying the sources of energy through promotion of the construction PV projects in Area C of the West Bank, through expansion of purchase of renewables from Jordan and through the construction of a unified Palestinian transmission backbone, connecting the various parts of the West Bank and allowing wheeling of energy to the Gaza strip. This concept note will also propose several relevant pilot projects that could prove the feasibility and necessity of the ideas presented in this note.

Background - The Palestinian energy sector

The Palestinian energy sector faces significant challenges, primarily due to its heavy reliance on Israel for energy imports, which undermines its energy security and economic stability.

The Palestinian energy sector relies heavily on imported energy, with 94% of its electricity demand met through imports from Israel and Jordan. The remaining 6% is supplied by solar PV capacity, which includes both PV plants and rooftop systems. The electricity demand in the West Bank is met through a combination of supply from 4 PETL substations and various injection points managed by municipalities or directly by consumers. These include over 259 connection points via medium voltage lines (33kV and 22kV) operated by the Israeli Electric Corporation (IEC), with distribution to end users handled by Palestinian electricity distribution companies and local councils.

The structure of the electricity sector in Palestine includes key entities such as the Palestinian Energy and Natural Resources Authority (PENRA), the Palestinian Electricity Regulatory Council (PERC), Palestinian Electricity Transmission Ltd (PETL), and 6 distribution companies (DisCos) that manage 75% of the electricity distribution system. The remaining 25% is managed by local municipalities and councils.

PENRA is responsible for setting policies and granting licenses for the construction, management, operation, and maintenance of electricity generation, transmission, and distribution. PERC ensures fair competition, guarantees consumer interests, and makes recommendations to PENRA regarding electricity tariffs and network extension costs. PETL, a state-owned company, is responsible for transmitting electricity from suppliers to the DisCos and maintaining the transmission infrastructure, including substations, interconnection points, and high-voltage lines.

The Palestinian energy sector faces several challenges, including its dependence on Israeli imports, which impact energy security and economic stability. The sector's fragmented distribution network and lack of a unified high-voltage transmission backbone hinder efforts to meet growing demand and achieve energy independence. Additionally, the Palestinian Authority's (PA) finances are strained by the accumulated debts of DisCos due to customer nonpayment, which Israel deducts from taxes and customs collected on behalf of the PA. Regulatory and permitting challenges in Area C, comprising over 60% of the West Bank, further complicate the development of large-scale solar PV plants and the upgrading of the transmission network.

While Area C of the West Bank, as described below, has the main potential land for constructing significant renewable projects, the Oslo Accords have left this under direct civilian administration of Israel. The lack of control over Area C, which is crucial for energy projects, impedes the Palestinian plans to exploit natural energy resources such as solar and wind energy sources.

Shaping a path towards transition

Transitioning the Palestinian energy sector to a more sustainable and less dependent future demands significant investments and reforms in this sector, alongside a change in the bilateral framework that regulates the Palestinian-Israeli energy relations.

In order to assess what should be done to transition, EcoPeace Middle East initiated a pre-feasibility study and hired a team of consultants led by Mr. Ali Hamoudeh from Rukon for Electrical Consultancy & Solutions Agency. The aim of the research was to carry out a plan to study the potential for building utility-scale solar plants in Area C of the West Bank and to assess the Palestinian transmission network and the possibility of wheeling the excess power to Gaza through the Israeli grid.

The ultimate objective of the study is to enhance energy security, diversify energy sources through developing solar PV plants in the West Bank, and importing solar PV power from Jordan rather than relying solely on Israel. The findings form the base of a broader study.

In the first quarter of 2025,, the consultancy team submitted its final report to EcoPeace Middle East. Based on this report, EcoPeace identifies several opportunities, challenges, and solutions that allow the transition of the Palestinian energy sector.

The opportunities

A first and immediate solution for the Palestinian transition and a sustainable future is connecting more renewable, mainly PV, projects to the Palestinian grid in the West Bank. PENRA has set a goal to install an additional 1430 MW from renewable sources by 2030. By the end of 2024, around 300 MWp has been installed in all sectors and according to different mechanisms of connections.

An analysis of the West Bank's geography was conducted by EcoPeace's team of consultants to point out potential areas for such projects. The report identifies Area C of the West Bank (subject to Israeli civilian administration) as the most suitable part of the West Bank for the construction of large-scale solar PV plants. While Area A and Area B of the West Bank are subject to the Palestinian Authority for civilian administration affairs, they are relatively limited and more densely populated. Area C constitutes about 62% of the West Bank area, including some highly promising locations for large-scale PV energy production. Theoretically, and according to available statistics of the potential of renewable energy production in the West Bank,

the installed power could be increased far beyond the specified target of PENRA, as shown in the table below:

	Total Surface Area (km²)	Available Area (km²)	Potential Capacity (MWp)
Area A&B	2,488	3	103
Area C	3,732	98.5	3,374
Total	6,620	101.5	3,477

To select the most optimal sites for utility scale PV solar plants, EcoPeace's team of consultants considered various criteria, including a solar radiation; topographic considerations such as, elevation, slope, and far shading; distribution of population and built-up areas; access to existing and planned high-voltage substations and transmission backbones; and environmental factors such as air quality, climate, rainfall and hydrology.

Based to these criteria, the team selected several locations in the north, middle, and south parts of the West Bank. The map attached (see annex), created by the team and with the support of a Geographic Information System (GIS) expert, proposes possible locations in Area C of the West Bank. The exact land area of each proposed location is provided in the full report submitted to EcoPeace. PENRA is currently concluding a detailed study for a Solar Green Corridor in the Tubas-Jenin Area, the study should also present opportunities for . It should be noted that each West Bank location presents distinct administrative and technical conditions for solar development, requiring tailored permitting and coordination approaches.

An initial assessment by the consultancy team proposes that even with the construction of Battery Energy Storage Systems, the electricity costs of PV-generated energy for customers in the West Bank would be competitive compared to the current costs for electricity originating from Israel or Jordan.

The challenges

Although the production potential is significant, constructing PV projects in Area C (under full Israeli civil and security control) poses unique permitting challenges. In the West Bank, land acquisition for solar PV development is a key issue that requires thorough discussion, particularly concerning permits, licenses, site accessibility, and

other relevant provisions tied to pre-approved locations. The process involves multiple Israeli authorities and stringent regulatory requirements, making it a complex undertaking.

Among the complex demands and challenges set by the Israeli planning and construction authorities in the West Bank are pre-conditions regarding land use and zoning approval; building and development permits; grid connection permits and power wheeling permits; security approvals for the project and access to the site; environmental assessments and archeological surveys.

Even in cases when the Israeli authorities promote tenders for constructing PV projects in Area C on state-owned lands, according to Israeli classifications, offers may be submitted by any individual or entity (Israelis and Palestinians alike), while the authorities may tend to prefer projects that would sell energy to the Israeli grid, hence putting any Palestinian (private or institutional) attempt to apply to such a tender at a disadvantage, this has been made evident by the lack of progress on approving a list of 23 project applications that have been followed by various actors from international community for the past years. That situation stands in contrast to the situation in the water sector, where a joint water committee, established through the Oslo Accords, allows formal discussions between the Palestinian and the Israeli sides in order to mutually promote infrastructure projects.

A second obstacle to implementing a large-scale Palestinian PV production project in the West Bank is the absence of a unified and integrated national grid. The Palestinian energy sector is made up of isolated distribution networks managed by various DisCos and municipalities with no interconnection, posing a significant barrier to reaching and potentially exceeding the target of 1430 MW or more. The inability of the Palestinian Transmission Electricity Company (PTEL) to establish and control high voltage lines by the Israeli authorities in Area C is a major impediment to unifying the grid and allowing PETL to resume its role as mandated by the Palestinian electricity legislations.

The solutions

Our findings suggest 3 different solutions that promote the Palestinian transition to a sustainable and less dependent energy sector:

- 1. Promoting a bilateral framework between the Palestinian and Israeli governments regarding utilizing lands in Area C for Palestinian energy needs**

When discussing infrastructure-related relations in the West Bank between the Palestinian and Israeli governments, a useful comparison may be made between the water sector and the electricity sector in the West Bank.

The regulatory framework of electricity in the West Bank, similar to water, reflects the complexities of governance in a region marked by shared authority and geopolitical tensions. The energy sector is regulated by a mix of Palestinian and Israeli bodies with oversight mechanisms established through the Oslo Accords that emphasize cooperation but often lead to delays and limitations on infrastructure development. In both sectors, energy and water, resource dependency on Israel remains a critical issue, affecting access, pricing, and overall stability.

To allow for better collaborative utilization of lands in the West Bank for the Palestinian energy needs, a new regulatory framework must be drafted. Such an agreement should recognize that Area C is the main source of potential vacant lands that can be utilized for energy infrastructure projects (production, transmission, and distribution).

The proposed agreement should define PENRA as an entity with a distinct status allowing it to initiate projects within Area C in a separate channel, rather than the common planning and construction committees. This mechanism could be utilized for the construction of PV production plants in the proposed sites, as well as for the construction of backbone transmission and distribution infrastructure, as discussed below.

In order to facilitate the PENRA led projects in area C, as long as Israel holds civilian control over area C, EcoPeace proposes to establish a temporary joint energy committee, parallel to the joint water committee (JWC) that was established following the Oslo accords. Such a committee would be a platform for regulatory coordination of the relevant Palestinian and Israeli authorities and would help bridging barriers regarding the construction of the proposed infrastructure projects that are proposed below, and that require a significant prior and ongoing coordination and connection with the Israeli existing infrastructure. A main lesson to be taken from the experience of the joint water committee is that this proposed committee should not become an obstacle by itself, delaying the progress of projects because of political and technical disputes between the Palestinian and the Israeli sides. In the case of the energy sector, we believe that the inherent Israeli interest in reducing the

Palestinian total dependency on Israel may help in making this proposed temporary joint committee a more productive and successful platform.

2. Expanding the purchase of renewables from Jordan

Jordan currently exports electricity to the Jerusalem District Electricity Company (JEDCo) in the West Bank through a 132 kV transmission line, which is temporarily operated at 33 kV due to infrastructure limitations. This line, connected at the Al Rama Substation near the border, has a capacity of 80 MW, with total exports reaching 194 GWh in 2023. To expand energy imports and support future renewable energy projects for the West Bank and Gaza, it is crucial to develop a high-voltage (HV) interconnection at 132 kV or preferably 400 kV. A 400 kV line would significantly improve transmission efficiency and accommodate growing demand. According to our consultancy team, the estimated investment needed for a 400 kV grid connection between Jordan and the West Bank, including a substation and 2 km transmission line, **is 5,000,000 USD.**

One key strategy for increasing electricity exports is direct purchase from Jordan's National Electric Power Company (NEPCO). In this model, the West Bank would buy electricity at a negotiated price and capacity, with NEPCO integrating the exported load into its grid planning. The existing Sweimeh and Al Rama substations provide a solid foundation for expanding cooperation, ensuring a stable and reliable energy supply. Larger purchase volumes could also lead to more favorable pricing terms for the West Bank.

A more sustainable approach involves developing an Independent Power Producer (IPP) project in Jordan, connected to the Jordanian national grid. This project could focus on renewable energy projects and transmit electricity to the West Bank and Gaza through a wheeling agreement. However, successful implementation requires upgrades to the West Bank's grid as detailed below. This strategy would support regional clean energy goals while providing long-term energy security.

Another solution is establishing a dedicated renewable energy project in the Jordanian part of the Jordan Valley, designed specifically to supply the West Bank and Gaza. This project would include battery storage for grid stability and phased energy distribution based on demand. Key requirements include securing land agreements, building dedicated transmission infrastructure, and conducting feasibility studies on solar PV efficiency in the region.

By investing in renewable energy and high-voltage interconnections, the West Bank and Gaza can enhance energy independence and reduce reliance on external suppliers. A dedicated substation and transmission line could create an “island” project, physically in Jordan but functionally part of the West Bank grid. Additionally, a backup connection to Jordan’s national grid could provide emergency support, ensuring a stable and sustainable electricity supply for the future.

A fourth solution set recently by EcoPeace and already praised by various stakeholders (including the Greek Independent Power Transmission Operator - IPTO) relates to the integration of the Prosperity Agreements with the recovery of energy supply to the Gaza Strip, as well of the subsea interconnection to Cyprus (the Great Sea Interconnector), allowing Jordan to export energy to Europe in addition to Israel and Palestine. EcoPeace proposes that alongside the repairment of the 120MW lines connecting Israel and Gaza, a similar capacity of renewable projects would be built in Jordan and supplying the Israeli grid, allowing a swap that would result in reducing the dependence of the energy supply in the Gaza Strip in direct purchase from Israel due to the wheeling/swap agreement between the three parties.

3. Unifying the Palestinian electricity network with a backbone transmission line connecting the West Bank and wheeling to the Gaza Strip

One of the primary constraints limiting the feasibility of future renewable energy projects in Area C, as well as of export of electricity from Jordan to the West Bank—and consequently to Gaza, is the lack of a high-voltage (HV) transmission line within the West Bank. Without such infrastructure, the current transmission system operates at a lower voltage, restricting the amount of electricity supplied to the Palestinian grid (including by local production or by purchasing from Jordan).

Hence, our findings suggest that it is crucial to promote a 132 kV transmission line (twin conductor double circuit), running from the north to the south of the West Bank. This line would facilitate internal electricity distribution within the West Bank and provide the infrastructure needed for future energy projects. A dedicated branch to Gaza (conducted within a separate wheeling agreement with Israel) would facilitate the transfer of renewable energy from projects developed in Jordan or the West Bank, contributing to Gaza’s reconstruction efforts and long-term energy security.

Initial calculations of EcoPeace's consultancy team estimate that a 200 km 132 kV double circuit transmission line costs approximately **75,000,000 USD**. Each of the six proposed 132/33 kV substations, equipped with five outdoor cells and two 80 MVA 132/33 kV transformers, is expected to cost around **6,000,000 USD (36,000,000 USD for six substations)**. While this estimated cost is quite large, the economic benefits of this project (for the Jordanian and Palestinian economies) and their impact on the energy prices in the West Bank should be studied more broadly to assess its overall value.

Projects oriented advocacy

Palestinian energy stakeholders underscore the need for a dual-track approach that combines immediate, tangible projects with long-term structural reform, as well as clear investment guarantees and financial incentives to attract private-sector engagement in renewable energy projects, especially in areas with high regulatory uncertainty. In the short term, this means prioritizing lands with clear legal ownership to avoid delays, expanding micro-grids and community-based solar systems such as the Tubas battery project, and integrating storage solutions where possible. In parallel, Palestinians must push for systemic change by reforming legislation to regulate renewable energy storage, adjust electricity tariffs, and create enabling conditions for private sector investment, including the development of a high-voltage backbone transmission line to connect West Bank cities and eventually link with Gaza.

Stakeholders also emphasized the importance of advancing political and technical tracks simultaneously—advocating for fair permitting with Israeli authorities while seizing every available opportunity to implement projects on the ground. Private sector engagement, supported by green finance and risk-mitigating grants, will be critical, alongside lessons learned from previous large-scale projects to ensure complementarity and impact.¹ In addition to that, it was also proposed by various stakeholders to establish regional energy storage centers in the West Bank, particularly through lithium battery systems, to enhance energy autonomy, stabilize supply, and improve grid resilience.

Ultimately, renewable energy in Area C is about more than electricity; it represents climate resilience, economic empowerment, and the right to self-determination. A solar farm in Area C is not merely panels on land—it is a symbol of Palestinians

¹ It should be noted that a Palestinian Private Public Partnership Law is currently being drafted. That law, when approved, would support incentivising the Private Sector to invest in Green Energy.

harnessing their resources, investing in infrastructure, and shaping their future. Lessons learned from the permitting impediments imposed over a list of 23 Palestinian projects that are planned in Area C, shows the necessity to push for establishing clearly defined steps and protocol, as a temporary solution, to advance on projects in Area C.

By combining practical community initiatives with high-level policy reform, the Palestinian energy system can transition from dependency to sovereignty, lowering household costs, creating jobs, strengthening institutions, and fostering regional cooperation on shared environmental challenges. For this vision to materialize, donors, development agencies, and regional partners must provide both political backing and financial investment—supporting unified energy infrastructure, legislative reforms, and environmental diplomacy. Every project, whether a rooftop micro-grid or a transmission line, carries the same message: Palestinians have the right and the capacity to power their own future—cleanly, sustainably, and independently. The solutions proposed are for a longer term of time for that some possible pilot projects could be conducted as a beginning:

1. **Clear-Ownership Solar Farms in Area C** – Develop utility-scale solar plants (10–20 MWp) on lands with verified legal ownership to avoid permit disputes and demonstrate a politically viable renewable model.
2. **Community Micro-Grids & Storage** – Deploy decentralized solar-plus-battery systems in rural Area C communities to lower costs, improve reliability, and create local green jobs.
3. **Green Finance & Policy Reform** – Establish a Green Finance Facility and pass supportive legislation on storage, tariffs, and grid access to attract private sector investment.

Gender Sensitivity Considerations

Women in Area C of the West Bank generally live in conditions marked by restricted mobility and access to education or healthcare. Beyond that energy poverty directly impacts food security (e.g., limited irrigation or refrigeration capacity), water access (due to dependence on electrically powered wells and pumps), and economic participation; especially for women managing home-based or agricultural livelihoods. Additionally, the lack of accessible energy increases dependence on diesel generators, which raises household expenses, contributes to air pollution, and undermines climate-resilience goals. These factors collectively reduce community

adaptive capacity and reinforce cycles of poverty and inequality, particularly among women and youth. By emphasizing the accessibility and independence of renewable energy, this concept can more clearly highlight the interlinkages between energy, gender, and resilience.

Conclusion

The dependency of the Palestinian energy sector on Israel is a result of ongoing tensions. It hinders Palestinian climate change mitigation as it sets obstacles for the transition to more sustainable energy sources.

The 3 proposed solutions, though not completely ignoring the relations with and dependency on the Israeli energy sector, suggest some vital steps towards a much-needed shift. This transition may not only make a difference to the energy sector itself but may also open a door for broader regional collaboration between Palestine, Jordan, and Israel regarding mutual and interdependent solutions for the energy needs of each country. To operationalize these solutions, three pilot projects are proposed: (1) *Clear-Ownership Solar Farms in Area C* to demonstrate a scalable and politically viable renewable energy model on lands with verified legal ownership; (2) *Community Micro-Grids & Storage* to provide decentralized, reliable, and affordable clean energy for rural communities while creating local green jobs; and (3) *Green Finance & Policy Reform* through a dedicated facility and enabling legislation to attract private investment and support renewable expansion. Strengthening energy security and investment protection through storage, incentives, and predictable permitting frameworks will be key to ensuring long-term sustainability and private-sector confidence

For Israel (whose support is crucial to the implementation of the proposed solutions), reducing that dependency and changing the current arrangements would actually be beneficial: the ongoing controversy regarding the electricity supply and payments sets a burden on the Israeli economy and financially destabilizes the IEC.

Meanwhile, by breaking free from unilateral dependency and fostering cooperative frameworks, Palestine can turn energy vulnerability into a catalyst for regional resilience and climate action. Those proposed steps come in one line with PENRA's contemporary strategy and plans.

The content of this concept note and opinions expressed are the sole responsibility of EcoPeace Middle East and do not necessarily reflect the opinion of the European Commission or any other funder of EcoPeace Middle East.

Map 1: Proposed Solar PV Plants Locations and Backbone Transmission Line

