Ricardo Energy & Environment

The State of Palestine's Nationally Determined Contribution (NDC) implementation plans for the energy sector

Energy distribution

Report for Federal Public Service of Health, Food Chain Safety and Environment of the Belgian Government
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List of abbreviations

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AECID	Agencia Española de Cooperación Internacional para el Desarrollo
AFD	French Development Agency (Agence Francaise de Developpment)
BMZ	Ministry for Economic Cooperation and Development (Germany)
EBRD	European Bank for Reconstruction and Development
EIB	European Investment Bank
EQA	Environment Quality Authority
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
GIZ	German Development Cooperation
GCF	Green Climate Fund
IKI	International Klimaschutzinitiative
INCR	Initial National Communication Report
JICA	The Japan International Cooperation Agency
KFW	KfW Development Bank
MoLG	Ministry of Local Government
NAP	National Adaptation Plan
NAMA Facility	Nationally Appropriate Mitigation Action Facility
NDC	Nationally Determined Contributions
NRO	Netherlands Representative Office
PEC	Palestinian Energy and Environment Research Centre
PENRA	Palestinian Energy and Natural Resources Authority
PETL	Palestinian Electricity Transmission Company Limited
PV	Solar photovoltaic
UK	United Kingdom
UNDP	United Nations Development Programme
USAID	United States Agency for International Development
WB	World Bank

1 Introduction

This plan for **energy distribution** is intended to enhance Palestine's opportunities to access climate finance and thereby facilitate successful implementation and delivery of Palestine's Nationally Determined Contribution (NDC). Details of the methodology used to develop this plan are provided in Annex 1.

The plan addresses the following overarching conditional (NDC) action:

- "Providing reliable electricity supply (West Bank)", with the following sub-actions:
    - Construction of 161/33 KVA Electrical Sub-Stations
    - Interconnection with Jordan
    - 161 KV transmission grid in the West Bank
    - Connection points replacement, merger and rehabilitation.
    - "Electricity grid upgrading (West Bank)", a separate conditional NDC action, included as a sub-action, as advised by the Palestinian Electricity Transmission Company (PETL) and includes activities in relation to:
        - Underground and above-ground transmission lines
        - Connection points
        - Multi-source energy supply
        - Electrical substations, and
        - The electricity grid.

2 Relevance to GCF Country Programme

The Green Climate Fund (GCF) Country Programme includes the following funding proposal, which is relevant to this NDC implementation plan:

Enhancing energy security by assessing and upgrading the grid system and upgrading of power generation technology. "This programme seeks to enhance energy efficiency and security by assessing and upgrading the outdated grid system and enhancing the efficiency of the old power generation technology."

3 Reasons for prioritisation of NDC actions

The two NDC actions under this plan for energy distribution were scored particularly highly by national stakeholders (Table 1).

Table 1 Priority scores for NDC actions

NDC action	Government support	Adaptation benefits	Mitigation benefits	Capacity available	Technology available	**Total**
Providing reliable electricity supply (West Bank)	10	10	10	5	5	**40**
Electricity grid upgrading (West Bank)	10	10	10	2.5	5	**37.5**

These scores drew upon and were justified by information in the following sub-sections that address each of the priority criteria.

3.1 Government support

Both NDC actions are supported in the National Policy Agenda (2017-2022)[1], Energy Sector Strategy (2017-2022)[2], Energy Sector Strategy for Palestine (2015-2020)[3] and Decree of Law (2015) On Renewable Energy and Energy Efficiency[4].

3.2 Adaptation benefits

Under all three climate scenarios on which the NAP is based, "Providing reliable electricity supply (West Bank)" through securing additional supply of energy from neighbouring countries will reduce the need for national industries to meet increased energy demand from their own generators or to reschedule their production according to when energy is available. This should avoid increases in production costs[5] and be beneficial to many sectors, including industry, water and agriculture[6].

[1] Text reads: "Establish Palestine's utilities, prioritizing the electricity and water sectors."; "Expand community access to reliable energy"

[2] Text reads: "Energy secured to the consumer in sufficient quantities and with technical and environmental specifications that meet international standards."

[3] Text reads: "In the case of the Palestinian situation, which is characterized by the scarcity of domestic energy sources, a small market, and occupation obstructions, the concept of Energy Security focusses on diversifying the import sources (therefore reducing the excessive dependency on Israel as the sole source for energy, both electricity and oil products), in addition to increasing the utilization of local resources with a strong focus on renewable energy. The only indigenous energy source that is securely supplied is renewable energy. It represented 16% of the final energy consumption in 2012 and is mainly utilized as solar energy and biomass for thermal uses. However, the utilization of the renewable energy potential is studied extensively and is one of the priorities of PEA. The current Renewable Energy Action Plan foresees the generation of 240GWh annually from renewable energy sources by 2020 mainly from PVs (expected to reach 45MWp by 2020), and wind installations (expected to reach 44MW by 2020). Concentrated solar power plants with a capacity of 20MW and biogas plants with a capacity of 21MW by 2020 complete the plan for generation expansion of renewable energy technologies."

[4] Text reads: "All energy efficiency and renewable energy measures in this column contribute to this goal but the goal is not explicitly stated in the decree".

[5] NAP prioritisation, the information applies to the same NDC action in the Gaza Strip, however, is relevant to the West Bank

[6] NAP prioritisation

Implementation of “Electricity grid upgrading (West Bank)” will be beneficial in all three climate scenarios on which the NAP is based. The benefits include reducing electricity losses, improving resilience to increased energy demand due to higher temperatures and decreasing vulnerability to extreme rainfall events[6], and increase in renewable electricity capacity that can be connected to the grid leading to an increase in renewable electricity generation in Palestine.

All three of the NAP’s climate scenarios suggest temperature will increase with warmer periods becoming more prominent in time. This will increase demand for energy, e.g. for air conditioning. The electricity grid is old and degrading, which makes it vulnerable to interruption as a result of overloading (a situation made worse by electricity losses from the grid) and extreme weather conditions. One of the scenarios includes an indication that rare wettest days may become more frequent[6]. In terms of urgency for action, the existing electricity supply is already unreliable, so this is a problem that needs to be resolved urgently, as any increases in temperature and, hence, demand for energy will make the situation worse. With Palestine's temperatures projected to increase by 1-1.5 degrees C by 2025, upgrading the electricity grid needs to be upgraded continuously, as demand increases, to avoid it becoming overloaded[6].

3.3 Mitigation benefits

The energy sector represents the largest source of GHG emissions in the State of Palestine (62% of overall emissions), with energy generation contributing 20% of these emissions[7]. At present, the State of Palestine imports most of its electricity. If “Providing reliable electricity supply (West Bank)” is secured through energy imports, any increase in energy supply from neighbouring countries may be offset by a reduction in energy generation by national industries with little resultant impact on net GHG emissions. “Electricity grid upgrading (West Bank)” is crucial to enable diversification of energy sources and integration of renewable energy sources. The electricity grid upgrade will enable Palestine to reduce its heavy reliance on imported energy[7] increase domestic renewable-energy generation and thereby significantly reduce GHG emissions. Reducing electricity losses by upgrading the grid will also reduce the amount of energy generation required and, in turn, help to further reduce GHG emissions[6] .

3.4 Capacity available

Local electricity companies only have the knowledge and skills to upgrade the grid for medium voltage, i.e. local distribution network[6]. Hence, detailed technical training on high voltage transmission networks is needed for PETL staff and for the distribution companies, to allow them to develop and maintain transmission lines.

3.5 Technology available

Available technologies relate only to medium-voltage applications and not to high voltage[6].

[7] INCR

4 Activities

Target established by national stakeholders for this implementation plan:

Upgrade of the electricity grid to enable distribution of renewable energy, primarily from solar PV, by 2030

National stakeholders have identified the following specific activities to achieve the overarching target associated with the NDC actions:

1. **Assessing:**
    a. **Current distribution network.** The current distribution network has not been assessed since 1996-97.
    b. **Electricity that can be generated at different locations on the grid using PV technology.** There is a need to assess the capacity of each of the distribution networks to incorporate PV electricity, rather than considering them as one pool, and to assess potential interconnection to increase the grid's capacity for absorbing PV electricity.
    c. **Available capacity and knowledge/skills gaps** that need filling through international expertise for grid upgrading. The capacity and technologies required for high-voltage applications need to be assessed.
2. **Reviewing and updating the existing grid implementation plan** based on the assessments.
3. **Capacity building of PETL and electricity distribution companies' staff** to enable them to: commission and review studies; install and connect the grid to a renewable energy grid (to be developed to allow more renewable electricity generation), including training on software and software acquisition; and become familiar with relevant international specifications and standards.
4. **Developing the enabling environment**: revising national regulations and policies for connecting the grid to the renewable energy grid
5. **Implementation**
    a. **Upgrading, extending the existing four electrical sub-stations, rehabilitating the existing, and constructing a new 33 KV feeders from those existing substations.** Rehabilitating the existing 33kV feeder network and adding any necessary extensions. Upgrading existing transformers and building new ones, as well as the required extension of the grid to increase its capacity to absorb PV electricity.
    b. **Replacing, merging and rehabilitating existing connection points.** The numerous existing connection points with the Israeli electricity company need to be rationalised by combining many of them. Another issue is that many of the connection points are currently very old and owned by municipalities. Merging connection points will increase the capacity of the grid to absorb PV electricity, especially with regard to those isolated grids that are not connected to existing PETL substations. The latter will need to be connected once the national grid has been developed.
    c. **Developing a National Control Dispatch Centre for PETL for all transmission, sub-transmission networks, connection points and sources of electricity supply.** This control centre, together with all its

components (GIS and SCADA), will enhance PETL's ability to maximise capacity for solar energy through monitoring the electrical system in real time and controlling the system remotely.

d. **Constructing the transmission network and five new 161/33 kV substations.** The existing substations do not cover the entire West Bank and are connected to each other by 161kV transmission lines. Hence, more stations need to be built and connected via a transmission network, which will enable regional interconnection with neighboring countries, especially Jordan. This will increase the capacity of the Palestinian electrical system to absorb solar energy.

5 Timeframes, indicative costs, existing funding and likely sources of funding

For each of the activities, (Table 2 below) identifies:

- The implementation period
- Indicative costs
- National contributions (help-in-kind)
- Existing international funding
- Any remaining funding gap, and
- International public funding sources that represent options for addressing the funding gaps. Note that international funder priorities are subject to change and negotiation.

6 Institutional arrangements

Figure 1 (below) sets out the institutional arrangements for implementing this plan for energy distribution, identifying PENRA as the lead organisation for a cross-ministerial project steering committee (and intended to be the main counterpart with international public funders), as well as project stakeholders and project delivery partners. To ensure the implementation plan is delivered and the Project Steering Committee is functional, it will be of key importance for PENRA to allocate appropriate resources and clearly designate internal ownership for each activity in the implementation plan.

7 Recommendations for an enabling environment

The successful delivery of this plan will be ensured by developing a supportive enabling environment where it does not yet exist. This may include updating or developing related legislation, regulations, statutory guidance (and standards), national or sectoral policies and strategies, and incentives (including fiscal measures) that would contribute to ensure the successful implementation of the activities or remove potential barriers to implementation.

Overall, the policies in place are sufficient to support the targets, and no existing policies and/or incentives contradict its achievement. Other cross-sectoral recommendations for development of the enabling environment to support the implementation of this plan identified by national stakeholders that will be given further consideration include:

- **Palestine's Environment Law Amendment** that is yet to be enacted **should be used as an enabling context** for the development of the legislation, regulation, statutory guidance, policies, strategies or incentives that are relevant to this plan
- **Developing regulations for employers** to ensure that awareness-raising and training activities are included within the terms of their employment, so that individuals are paid to attend during working hours. This will improve women's access to such activities by addressing the time and economic constraints that they face. Implementing this recommendation requires securing formal approval from the Council of Ministers.
- **Developing regulations and statutory guidelines to enforce gender budgeting,** i.e. analysing all budget lines and financial instruments for climate change adaptation and mitigation from a gender-perspective, to ensure gender-sensitive or gender-responsive investments in relevant programmes (e.g. addressing technology transfer and capacity building), such as this plan.
- **Developing a policy that enables and facilitates public-private partnerships** for the delivery of programmes that provide public benefits. The Ministry of National Economy can be responsible for taking forward this recommendation and securing formal approval from the Council of Ministers.

8 Challenges for implementation

The State of Palestine constitutes the Occupied Palestinian Territory, which is made up of the West Bank (including East Jerusalem) and the Gaza Strip, based on the borders of June 1967 and are separated by Israel, the occupying power. Neighbouring countries include Jordan to the east and Egypt to the south. The Oslo II Accord, formally entitled the 'Interim Agreement on the West Bank and the Gaza Strip of 1995', created three territorial zones in The West Bank: Area A, where the Palestinian Government has responsibility for public order and internal security; Area B, where the Palestinian Government assumes responsibility for public order for Palestinians, while Israel controls internal security; and Area C, where Israel maintains exclusive control[6].

Challenges for implementation include:

- Need for Israeli approval to establish a high voltage grid connection with Jordan
- Need for permission from the Israeli Civic Authority grid and transmission lines and licensing in Area C[8].

Fragmentation of responsibilities for electricity distribution between the southern and central West Bank, and the northern West Bank, and the Gaza Strip.

[8] NAP vulnerability assessment

Table 2 Timeframes, indicative costs, existing funding (USD million) and likely sources of funding

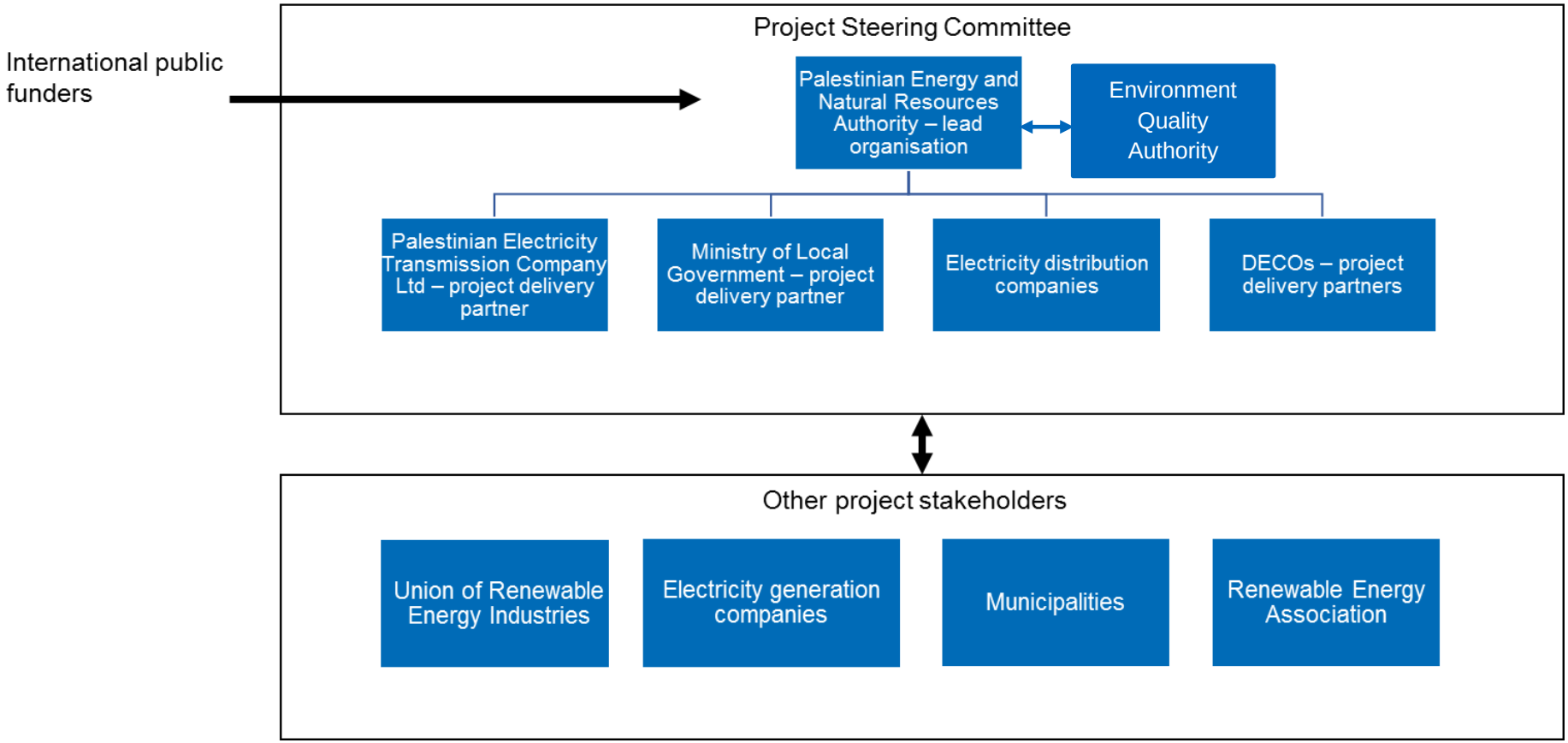
Activity	2020-2025	2026-2030	2031-2040	Unit cost	No. of units	Unit type	Total cost	National contrib'n	National help-in-kind[9]	Internat'l funding	Funding gap	Indicative international public funding options to address funding gaps
1a				0.20	1	Assessment	0.13[10]	0.01	7%	0	0.12	AECID; AFD; BMZ; EBRD; EIB; FAO; GiZ; IKI; JICA; KFW; NAMA Facility; NRO; UK; UNDP; USAID; WB
1b				0.15	2	Assessments	0.30[11]	0.02	7%	0	0.28	
1c				0.10	1	Assessment	0.10	0.01	10%	0	0.09	
2				0.10	1	Update activity	0.10	0.01	5%	0	0.09	
3				0.40	1	Capacity building activities	0.40	0	0	0	0.40	
4				0.10	1	Capacity building activities	0.10	0	0	0	0.10	
5a				22.00	See footnote[12]	Sub-station upgrade	22.00	0.22	1%[13]	0	21.78	
5b				0.15[14]	150	Connection points	22.50	0.23	1%[15]	0	22.27	
5c				3	1	National control dispatch centre	3.00	0	0	0	3.00	

[9] Staff time, logistics during the study; arrange meetings, provide information
[10] USD 0.13 for West Bank (USD 0.07 also for Gaza Strip), information provided by national stakeholders
[11] Five training courses with 10 trainees with a cost of USD 0.03m per course amounting (total of USD 0.15m), software (cost USD 0.1m) and standards (USD 0.15m), information provided by national stakeholders
[12] Includes USD 2m for the 161/33 KVA extension of the electrical sub-stations in Tarqumia and Jenin and Sarrah and USD 16m for rehabilitating the existing, and constructing new 33 KV feeders, information provided by PETL
[13] Only staff time and logistic, local transportation, supervision
[14] Cost of each connection point, information provided by PETL
[15] Only staff time and logistic, local transportation, supervision

Activity	2020-2025	2026-2030	2031-2040	Unit cost	No. of units	Unit type	Total cost	National contrib'n	National help-in-kind[9]	Internat'l funding	Funding gap	Indicative international public funding options to address funding gaps
5d				150	See footnote[16]		150.00	0	0	0	150.00	
TOTAL							**198.73**	**0.5**		**0**	**198.23**	

[16] Includes USD 75m for the five new 161/33 KVA substations and USD 75m for constructing the transmission network between existing and proposed substations, information provided by PETL

Figure 1. Institutional arrangements for implementation



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Palestinian Energy & Natural Resources Authority

سلطة الطاقة والموارد الطبيعية الفلسطينية

مكتب الوزير

Date:24/08/2021

Excellency Mr. Jameel Mtour

Chairman of Environment Quality Authority

Subject: Endorsement of the NDC Implementation Plans for the Energy Sector

The Palestinian Energy and Natural Resources Authority (PENRA) sends you best regards and wishes you good health in these difficult days of COVID 19, and would like to thank you for your extended and continued efforts to protect the Palestinian Environment.

Reference is made to the subject and to your kind request for an endorsement letter, and in my capacity as Chairman of PENRA, this is to confirm that the Palestinian Energy and Natural Resources Authority fully endorse the NDC Implementation Plans for Energy Sector, that was jointly prepared with PENRA, National Committee for Climate Change and key stakeholders as part of the project implemented by Environment Quality Authority and NDC Partnership and funded by the Islamic Development Banks.

List of Plans and estimated budget:

1. Upgrading Electrical Power Supply System (198.73 MUSD)
2. Improving Energy Efficiency (253.3 MUSD)
3. Increasing Electrical Energy Production from Renewable Energy Resources (662.75 MUSD)

I would like to reiterate that these plan is in conformity with the National Priorities and relevant Sectoral Strategies as well as the guidance of the Palestinian Council of Ministers.

Sincerely Yours,

Eng. Zafer Milhem

PENRA Chairman

دولة فلسطين State of Palestine PENRA سلطة الطاقة والموارد الطبيعية

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سلطة الطاقة الفلسطينية
الرقم 554.8.2021
التاريخ 24.8.2021

Palestinian Energy & Natural Resources Authority

سلطة الطاقة والموارد الطبيعية الفلسطينية

مكتب الوزير

التاريخ: 2021/8/24

معالي الاخ / أ.جميل مطور حفظه الله

رئيس سلطة جودة البيئة

تحية طيبة وبعد،،،

الموضوع: اعتماد خطط العمل لتنفيذ المساهمات المحددة وطنيا في قطاع الطاقة

Subject: Endorsement of NDC Implementation Plans in Energy Sector

تهديكم سلطة الطاقة والموارد الطبيعية أطيب التحيات وتتمنى لكم موفور الصحة والعافية وتتقدم لكم بجزيل الشكر على جهودكم الموصولة والهادفة لحماية البيئة الفلسطينية، بالإشارة ألى الموضوع أعلاه وبناء على طلبكم يرجى العلم بأن سلطة الطاقة والموارد الطبيعية **تؤيد وتدعم خطط العمل لتنفيذ المساهمات المحددة وطنيا** والتي تم اعدادها بالتنسيق والتعاون مع مؤسستنا وأعضاء اللجنة الوطنية لتغير المناخ والشركاء ذوي العلاقة وذلك ضمن نشاطات المشروع المنفذ من قبل سلطة جودة البيئة وشراكة المساهمات المحددة وطنيا وبدعم من البنك الاسلامي للتنمية.

قائمة بأسماء الخطط والكلفة الاجمالية المقدرة وفقا للرسالة الواردة من مؤسستكم الموقرة والدراسات ذات الصلة:

1. Upgrading Electrical Power Supply System (198.73 MUSD)
2. Improving Energy Efficiency (253.3 MUSD)
3. Increasing Electrical Energy Production from Renewable Energy Resources (662.75 MUSD)

مع العلم بأن هذه الخطط تأتي انسجاما مع توجيهات مجلس الوزراء وبما يتوافق مع الاولويات الوطنية والاستراتيجية الوطنية لقطاع الطاقة.

وتقبلوا فائق التقدير والاحترام،،،

المهندس ظافر ملحم

رئيس سلطة الطاقة والموارد الطبيعية

دولة فلسطين State of Palestine سلطة الطاقة والموارد الطبيعية PENRA

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