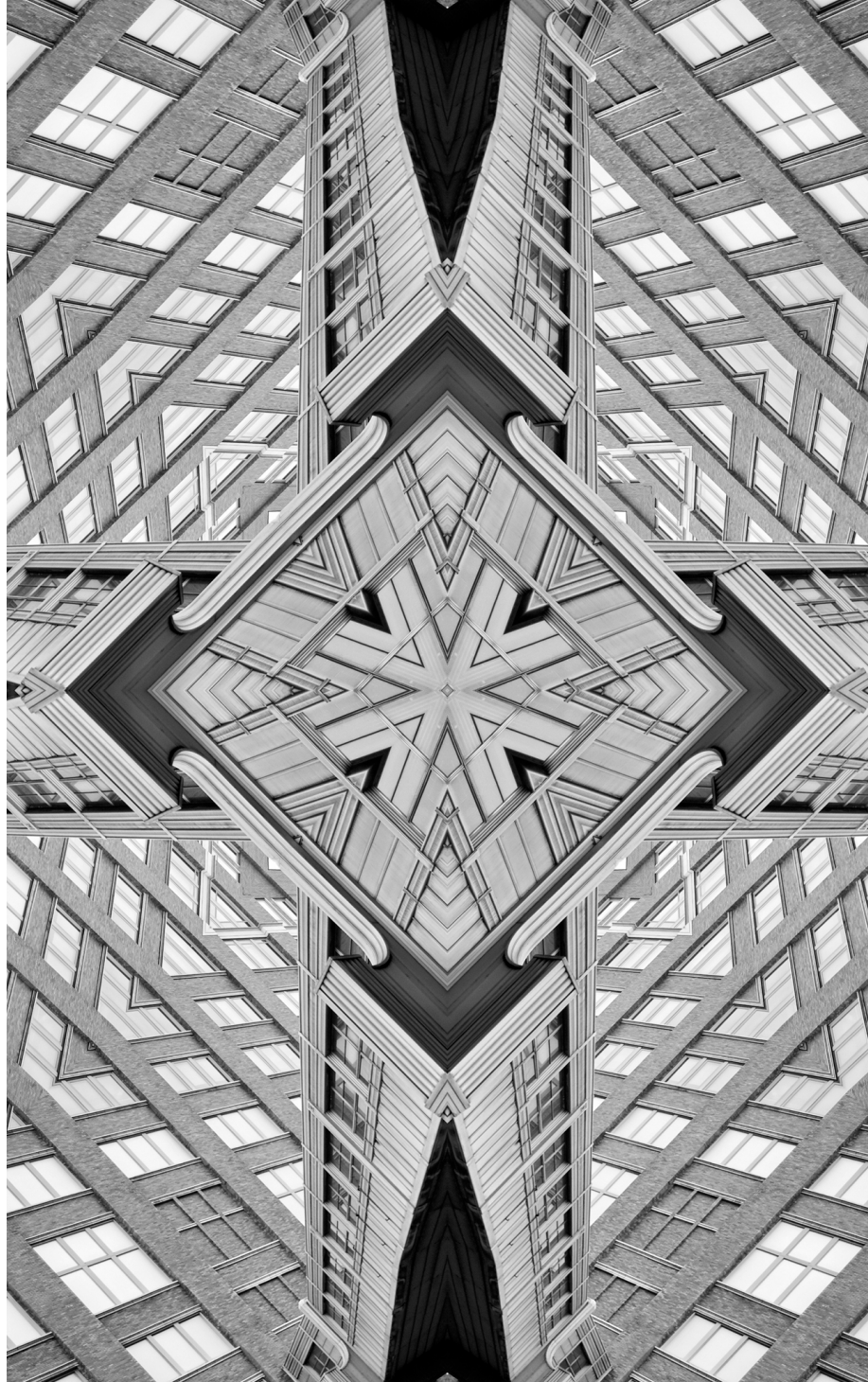


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Mainstreaming Gender in India-Africa Partnership for Energy Access

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Abstract

The seventh of the Sustainable Development Goals (SDGs) aims to ensure access to affordable, reliable, sustainable and modern energy for all by 2030. This challenge is acute in the African continent, home to large populations without access to electricity and clean cooking fuel. This brief explores the scope for cooperation between India and Africa in not only achieving SDG 7, but while doing so, also considering the targets set by SDG 5 towards ensuring gender equality. Already, there is sporadic cooperation between India and African countries, primarily in capacity-building. The International Solar Alliance (ISA), formed in 2016 under India's leadership, also highlights Africa's favourable conditions for harnessing solar energy. The brief builds on these initiatives and underlines the gender dimension.

Cooperation between India and African countries has expanded over the past several decades, and today, the two sides are partnering in manifold ways in the economic, political, and socio-cultural domains. One of these areas of partnership is energy, where initiatives have been mostly in the form of capacity-building. For example, India provides trainings to primarily elderly women in African countries under the nearly-six-decade-old programme called Indian Technical and Economic Cooperation (ITEC).^a In 2011, at the Second India-Africa Forum Summit in Addis Ababa, the two sides agreed on cooperating in electrifying houses, setting up biomass gasifiers systems,^b and building solar charging stations.¹ With the initiation of the International Solar Alliance (ISA) in 2016, new pathways for partnership between India and Africa opened to address energy access issues.

Both India and the African countries are working to achieve the seventh of the United Nations Sustainable Development Goals (SDGs), which aims to ensure access to affordable, reliable, sustainable and modern energy for all by 2030. In 2019, India achieved near-universal household connectivity to electricity, with over 900 million citizens acquiring electricity connection in their households since 2000.² Despite attaining almost universal electrification, however, the challenges of reliability and affordability of power remain in many locations.³ About 660 million Indians remain without modern and clean cooking fuels and technologies.⁴ Meanwhile, in Africa, the International Energy Agency (IEA) estimates that by 2030, 530 million people in the continent will still have no access to electricity and nearly one billion people will not have access to clean cooking fuel.⁵

Indeed, for the world to fulfil the SDGs towards “Energy for All” by 2030,⁶ the focus must now be on nations that still have significant ground to cover. It will also be crucial to approach such a task using a gender lens, as women are most affected by the lack of access to electricity and clean cooking fuels and technologies.⁷ This brief explores the gender-sensitive approaches that India and African countries can take in partnerships for expanding access to electricity and clean cooking fuel.

a The Government of India initiated ITEC in 1964 as a bilateral programme of assistance, and 161 countries have been invited to share in the Indian developmental experience.

b Biomass gasifier converts solid biomass fuel into combustible gas that, in turn, is used for producing heat or electricity.

Energy Access in India and Africa: Scope for Cooperation

In 2018, only 47.7 percent of the population in Sub-Saharan Africa (SSA) had access to electricity.⁸ Within the continent, the rates of electrification vary across countries. For example, 75 percent of the population in South Africa and in Kenya have access to electricity, while 11 countries^c report access to electricity for less than 30 percent of their population. In India, despite rapid electrification, many areas continue to be affected by unreliable power supply. The share of Renewable Energy (RE) in total installed generating capacity of electricity (utilities) in India is about 28 percent.⁹ According to the International Renewable Energy Agency (IRENA), India ranks ninth in terms of total electricity generation capacity and fourth in electricity generation using wind and solar resources.¹⁰ However, over the past three years, India has seen a high growth in total installed generating capacities and Grid Interactive Renewable Power (GIRP),^d with the total installed capacity of GRIP at 78.3 GW¹¹ in 2019, i.e. 12 percent more than in the previous year, adding to the country's experience in terms of policies, implementation and technologies that can foster greater electricity access to all.

In the area of clean cooking, the International Energy Agency (IEA) in its “Tracking SDG 7” report estimates that about one-third of the global population will still be without clean cooking fuels and technologies by 2030, with the majority in SSA; India will have the largest deficit in clean cooking fuel, with about 732 million people without access. SSA is currently the only region in the world that has experienced an increase in the population of those without access to clean cooking fuels and technologies.¹² In India, the clean

“Working towards the SDGs on universal access to energy requires a gender lens; women are most affected by lack of electricity and clean cooking fuel.”

c Burundi, Burkina Faso, Congo (Dem. Rep.), Guinea Bissau, Liberia, Madagascar, Malawi, Niger, Sierra Leone, South Sudan and Chad.

d From 1990 to 2019, the global net installed capacity of electric power plants (main activity and auto producer), increased from 75 GW to 412 GW (United Nations, as of February 2021).

e The Prime Minister's Ujjwala Yojna was launched in the year 2016 with the target of providing 50 million LPG connections to poor families.

Energy Access in India and Africa: Scope for Cooperation

cooking initiative is largely LPG-centric. However, although government data indicates that nearly 80 million LPG connections have been provided to poor households in rural areas under the Ujjwala Yojna^e launched in 2016, according to the 76th National Sample Survey, only 48.3 percent of the rural households and 86.6 percent of urban households in India use LPG as fuel for cooking.¹³

The ISA, headquartered in India, was launched in 2016 with the following mission: “Every home no matter how far away, will have a light at home.”^f It currently has 86 member countries and seeks to include the 122 sun-belt nations that lie between the two tropics.¹⁴ From Africa, 30 countries are ratified members of the ISA. Thus, it can play a crucial role in strengthening India-Africa Cooperation in the sphere of energy access.

Under the Indian Technical and Economic Cooperation (ITEC) Programme initiated in 1964, India has partnerships with 161 countries, including those in Africa. The programme provides short-term trainings to delegates in India every year, conducted by organisations identified by the Ministry of External Affairs. Some of these training modules include energy-access components, e.g. the three-week course on “Energy Access and Human Development”^g was organised by The Energy and Resources Institute (TERI)^h for three consecutive years (2015-17).

In 2008, the Barefoot College was recognised as a training institute under ITEC, and “Solar Mamas/Grandmothers” from African and Latin American countries are trained there to design, install, and maintain solar-based lighting or electrification systems at the household level. The initiative is considered a successful model for providing basic lighting facilities to un-electrified households through women entrepreneurs. The college established five regional training centres in Africa,¹⁵ and the initiative has helped improve household electrification in rural areas of 36 countries in the continent.¹⁶ In 2021, however, the ITEC lists only one course on Renewable Energy Technologies and there are no dedicated courses on energy access.¹⁷

f In the context of India’s contribution to combating climate change, French President Francois Hollande has called it “India’s gift” to the world.

g The author was the course coordinator.

h TERI is an independent organisation headquartered in New Delhi, with capabilities in research, policy and implementation on energy, environment, climate change, and sustainability.

Energy Access in India and Africa: Scope for Cooperation

Table 1 shows how India-Africa cooperation can improve solar electrification in both regions and ensure increased energy access to fulfil SDG 7. The potential spaces for strengthening cooperation include the following: enhancing electrification rates; increasing the share of grid-interactive renewable power, primarily solar; expanding the scope of energy access courses offered by the ITEC or similar programmes; and increasing access to clean cooking fuels and technologies.

**Table 1:
Potential Spaces on Energy Access
within the India-Africa Cooperation
Framework**

Gaps	Strengths	Potential
<ul style="list-style-type: none"> ● Africa: Poor access to electricity ● Africa: Poor access to clean cooking fuels and technologies, especially in SSA ● India: Inadequate access to LPG (which is positioned as the primary clean cooking fuel for all) 	<ul style="list-style-type: none"> ● Africa: High solar potential ● India: High growth in access to electricity ● India: Increasing rates of total installed generating capacities ● India: Increasing share of GIRP ● Collaborative: The ISA with about 30 African countries as ratified members ● Collaborative: Short courses and trainings covered under the ITEC Programme 	<ul style="list-style-type: none"> ● Improving share of GIRP, especially using solar energy ● Enhancing electrification rates ● Exploring avenues of improving access and usage of clean cooking fuels ● Expanding the scope of energy access courses under the ITEC and similar programmes

Energy Access in India and Africa: Scope for Cooperation

So far, energy access has not received due importance within the framework of India-Africa Cooperation. What little collaboration exists is in the form of training courses under the ITEC Programme, most of which focus largely on RE. The Second India Africa Forum Summit (2011) introduced the concept of supporting infrastructure for electrifying households and solar charging stations. In this, collaborating with the ISA can help African countries ensure increased access to electricity through solar electrification, which is also a priority for India as evident in its vision of “One Sun, One World, One Grid.” At the same time, it is crucial to ensure equity in the participation of women and in the sharing of the benefits of achieving SDG 7.

“Every home no matter how far away, will have a light at home.” ~International Solar Alliance.

India is the fifth-largest investor in Africa, focused on health, and oil/gas-related sectors. The Duty-Free Tariff Preference (DFTP) Scheme and the African Continental Free Trade Area Agreement (AfCFTA) are expected to increase trade between India and Africa. There is little evidence so far of beneficial trade between the two in the context of energy-access projects and goods, e.g. home-based systems or installation of power plants. However, there have been instances of successful association during phases and aspects of projects on energy access in African nations. At present, such initiatives are sporadic and depend largely on grant-making institutions. Therefore, more concerted efforts are required to increase the pace of access to electricity and clean cooking fuels and technologies, while also ensuring gender inclusivity, in both regions.

Electrification Rates

Initiatives related to solar-based lanterns, home-lighting systems, and off-grid small plants often involve women in key roles such as management, promotion, installation, and maintenance at the field level. Both India and Africa have exhibited successful models of lighting through off-grid models involving women as key players in the value chain, e.g. Solar Sisters in Africa, which supports local women in Africa to create clean energy businesses; and Sarla Improved Cookstoves in Karnataka, India, which are fuel-efficient smokeless wood-burning stoves built by women entrepreneurs. The training of “Solar Grandmothers” from African nations, under the Barefoot College Initiative, is another example: it empowers village women to take up installation and maintenance of solar-based decentralised units at their villages. The women who have undergone training then organise trainings for many others.

However, in the context of the long-term objective within SDG 7, i.e. grid-electrification, the involvement of women has been significantly limited. To achieve SDG 7.1 (electricity for all), many African countries plan to expedite the grid-electrification process, which will increase grid connections and reduce the requirement for solar lanterns and home-lighting systems. This decline in off-grid space and rapid shift to grid electrification and RE-based large power plants will diminish the role of women in the energy sector if gender-mainstreaming is not incorporated at all levels, i.e. policy, planning, implementation, and maintenance. Thus, the training programmes under

India-Africa Cooperation must diversify to include women in grid-electrification work. Since off-grid power is a low-cost option and can be explored at a decentralised level, facilitating a more gradual shift to grid or having off-grid provide power backup for reliability can ensure the continued involvement of women in the energy access value chain. In parallel, opportunities must be created for women in grid electrification as well.

India has seen some success in this in Maharashtra, Odisha and West Bengal, where the State Electricity Distribution Companies involve women in electricity distribution, as part of their policy for metering, billing, and repair work.¹⁸

Case Study: Zanzibar¹⁹

“Between 2011 and 2015, 13 women were trained in India by Barefoot College on solar energy operations, including assembling, installing, repairing and maintaining various solar components. The training took six months. Upon return to Zanzibar (Tanzania), they became master trainers who pass the solar engineering skills to other women in training centers located in rural Zanzibar through a model dubbed Barefoot College Zanzibar. The women are illiterate or semi illiterate. Since the Zanzibar training centers opened their doors, they have trained 42 women from 22 villages who have in turn installed 958 houses from eight villages with solar energy.”

Source: Fair Planet

Grid Interactive Renewable Power (Solar)

The ISA can play a significant role in increasing the share of solar-based electricity in total generation amongst the member countries, which includes India as well as 30 African countries.^k For example, under the private investment initiative of ISA, India's National Thermal Power Corporation Limited (NTPC) has bagged the Project Management Consultancy (PMC) contract for the development of 500 Mega Watt Solar Park in Mali.²⁰ However, an increase in the share of solar-based electricity in total generation would also demand investments for improving *transmission infrastructure* and *maintenance structure*. In addition to infrastructure development, gender inclusivity must be ensured from the beginning. Women are inadequately represented in the fields of STEM (Science, Technology, Engineering and Mathematics), and this extends to RE as well. Worldwide, women take up 32 percent of all full-time jobs in the RE sector, and only 22 percent in oil and gas.²¹ This number declines further in countries or societies with more stringent gender roles. However, since initiatives related to solar-based GIRP are still at a nascent stage in many of the developing and least developed countries, there is greater scope for gender integration from the outset. The following measures can help achieve such integration:

- The India-Africa Cooperation can focus on enabling women students to opt for STEM courses and subsequently take up STEM jobs in RE-based power plants and in project development.
- The inclusion of customised training modules for women engaged in the RE sector or with STEM qualifications can help. India and Africa have already developed e-learning platforms in the health sector, and similar learning platforms can be conceptualised for gender integration in the energy space.

k See <https://isolaralliance.org/membership/countries> for the list of member countries.

Case Study: NTPC uses its solar power skills in Africa²²

“As part of ISA strategy, NTPC Ltd plans to help Gambia and Malawi develop solar power parks and is eyeing project management consultancy contracts in Sudan, Mozambique, Egypt, Uganda, Rwanda and Niger. NTPC also got such contracts in Mali and Togo.”

Source: Livemint

Clean Cooking Fuel

Access to clean cooking fuel remains a challenge in most developing countries. In India, despite LPG connections being provided to almost 97 percent²³ of all households, 48.3 percent²⁴ of rural households still depend on solid fuel for cooking due to issues such as affordability, refilling of LPG cylinders, and easier availability of solid fuels at no cost.¹ Access to clean cooking directly impacts women, especially rural women, since they are tasked with kitchen duties and they are the ones, too, who go out to collect the solid fuels. A crucial deterrent in the complete transition to LPG as clean cooking fuel is the challenge associated with importing LPG.

¹ Solid fuels are firewood, coal and agricultural residues.

Some African countries are exploring the feasibility of electricity as an option for clean cooking. The Government of Morocco, for example, along with the IEA, organised a workshop titled “Towards Clean and Sustainable Cooking: The Outlook for Electric Cooking in Morocco” in November 2019 to discuss electricity as a cooking fuel in rural Morocco. India, too, is conducting pilots with induction stoves²⁵ and is pushing a policy for promoting electricity-based clean cooking in energy access roadmaps.²⁶ A study has revealed that the acceptance of induction stove as primary cooking technology is low in rural India.²⁷

Research and development related to solar-based electric cooking technology is still at a nascent stage. Considering the shared interest of India and Africa in this area, the India-Africa Cooperation, as well as the ISA, must focus on research, development and use of electricity-based cooking, preferably solar, to transition to clean cooking fuels from solid fuels without relying on fossil fuels. The inclusion of solar-based cooking technology will directly impact women as primary users of the technology.

Energy Access Courses in ITEC

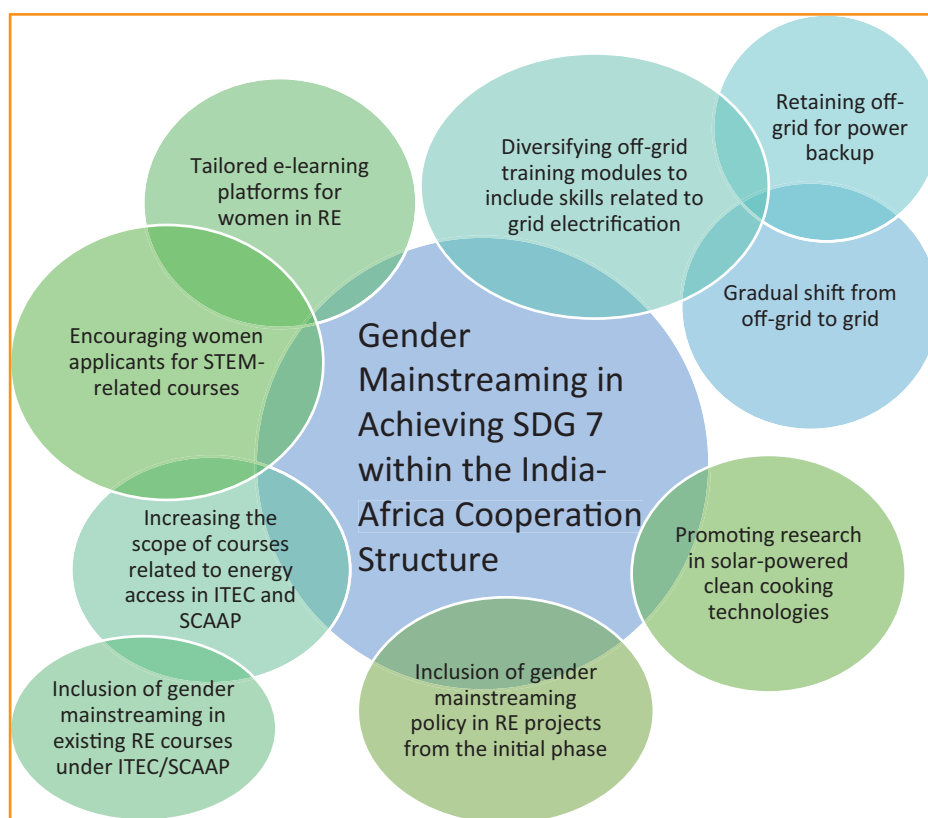
Under the ITEC Programme, courses on RE technologies and project management already exist and many delegates from African countries have participated in ITEC and SCAAP programmes. There is scope for building on this existing cooperation, while also ensuring gender mainstreaming in these courses, wherever the modules allow. Tailored, gender-inclusive courses on energy access and transition to clean energy may also be introduced (or reintroduced) as energy access issues gain a stronger focus in these countries.

“Maharashtra, West Bengal, and Odisha have had some success in involving women in the entire energy access value chain.”

Supporting Gender-Inclusive Energy Access

Improved electrification and access to clean cooking in India are heavily dependent on government policies, since these are Central subjects. Infrastructure, political, economic, geographical and social factors influence the overall access to grid electricity and LPG connections at all levels. In Africa, this demands investments in new infrastructure and maintenance of the existing ones. Partnerships between countries can aid electrification rates and access to clean cooking to some extent. The existing framework of India-Africa cooperation, and the ISA, can support Africa in achieving SDG 7 (especially SDG 7.1 and 7.2) in a gender-inclusive way by incorporating specific measures (See Figure 1) and ensuring adequate representation of women in value chains.

Figure 1:
Gender Mainstreaming towards SDG7



Source: Author's own

Supporting Gender-Inclusive Energy Access

Recommendations

- Retaining the scope of off-grid models as a backup in the electrification process
- Enhancing the skill level of women in the grid-electrification space
- Encouraging women in STEM-related courses
- Introducing e-learning platforms on energy access for women
- Promoting research and development on solar-based cooking technologies
- Expanding the scope of energy access under the ITEC/SCAAP programme


“The existing framework of India-Africa cooperation can support Africa in achieving SDG7 in a gender-inclusive way by incorporating specific measures and ensuring adequate representation of women in value chains.”

Conclusion

Dr Manjushree Banerjee has been working on issues of energy access for 18 years, 12 of which she spent with The Energy and Resources Institute (TERI).

For the world to achieve SDG 7.1 (universal access to electricity) and 7.2 (universal access to clean fuel and technologies for cooking), in alignment with SDG 5 (gender equality), the focus must now be on nations that are substantially behind, incorporating rigorous planning and consistent gender-mainstreaming. In this context, several African countries and India share common problem areas and goals.

Driven by its need to achieve reliability in power supply across the country, India is promoting solar electrification through the ISA, which has the potential to contribute strongly towards SDG 7 amongst African countries as well. At the same time, India can benefit from Africa's favourable conditions for harnessing solar energy. Electrification, in turn, can also influence industrial, economic and social growth, creating new pathways for further cooperation. Moreover, electricity can be a great fuel (preferably using a renewable source of generation) for clean cooking as an alternative to LPG.

Much work remains to be done towards the goal of energy access for all, especially with a focus on gender equality. This is true both in terms of giving women the opportunities to benefit from energy access, and for them to participate in the decision-making process to achieve such goals. Cooperation between India and Africa has the potential to strengthen the energy access initiatives to achieve SDG7. Improving women's skills and expertise in RE and grid-electrification at various levels, making a gradual transition from off-grid to grid-electrification, and promoting research on solar-based electric cooking will benefit the energy access space in a gender-sensitive manner and ensure gender mainstreaming in future projects between India and Africa. 

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