



SOLAR INVESTMENT ACTION AGENDA

Mobilizing \$1 trillion in solar investment



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Call to Action

To meet both climate goals and growing energy needs over the coming decades, it is urgent to rapidly scale solar investment. This Action Agenda provides an initial template for identifying and analyzing high-impact opportunities for solar investment that can help reshape and build the global clean energy economy at the pace and scale needed. Critically, solar investment must reach all countries and all people, including those whose energy needs are unmet today. Equitable access to solar investment cannot be left out of the ambitious planning and commitments surrounding the world's climate protection and development efforts. Mobilizing \$1 trillion in solar investment by 2030 provides the ambitious benchmark needed for solar energy to play its role in the energy mix and in alleviating energy poverty.

Join the International Solar Alliance, World Resources Institute and Bloomberg Philanthropies in creating and implementing the *Roadmap to Reach \$1 Trillion of Solar Investment by 2030*, which will be released in 2022.

The Roadmap will:

- Identify high-impact opportunities to equitably scale solar investment and deployment;
- Define strategic interventions by policymakers and investors to increase the level and pace of investment;
- Strengthen coalitions of diverse partners — governments, private sector leaders and international financial institutions — to identify and scale investment in high-impact opportunity areas; and
- Commit to help mobilize \$1 trillion of solar investment by 2030.

For more information, contact ScalingSolarInfo@wri.org.

The Solar Imperative

Scaling solar investment is ESSENTIAL to build just, resilient and climate-safe economies.

This investment will help drive global electrification and provide affordable energy access to hundreds of millions of people in developing countries. Scaling solar deployment can help countries:

- Deliver cleaner electricity to meet growing demand across a range of end uses, including buildings, transport, industry, irrigation and agriculture, and water desalination;
- Generate multiple benefits, including the creation of local jobs and improved human health, safety and gender equality;
- Diversify the energy supply to increase energy security and improve system resilience; and
- Meet targets for Sustainable Development Goal (SDG) 7 (*Affordable and Clean Energy*), SDG 13 (*Climate Action*), and Nationally Determined Contributions (NDCs) to the Paris climate agreement.

Scaling solar investment is URGENTLY NEEDED to ensure a just transition and meet climate goals.

Solar investment today lags far behind global needs; average annual solar photovoltaic (PV) investment will need to approximately double through 2050 if solar energy is to achieve its climate mitigation potential and deliver net-zero greenhouse gas (GHG) emissions in the second half of this century.¹ Even more critically, solar investment is not reaching those countries and communities that need it most. Developing and emerging economies — which host two-thirds of the world's population — receive only 20% of global renewable energy investment,² and most of this investment flows to the larger emerging economies rather than to the countries with the highest levels of energy poverty. Annual clean energy investment in developing countries must increase more than seven times to put the world on track for net-zero emissions by 2050.³ In the face of the continued growth of electricity demand (which will double in the next three decades⁴), the rise in extreme weather events, and volatile fossil fuel prices across global markets, it is urgent to realize solar energy's potential to deliver secure, clean and resilient energy to communities.

Scaling solar investment MAKES ECONOMIC SENSE.

Rapidly declining costs of solar technologies and battery energy storage systems over the past decade make solar energy competitive in both large-scale power generation and decentralized energy markets. Solar is cost-competitive with fossil fuels (and other renewable options) for new-build generation capacity in major countries that account for over half of the world's population.⁵ The levelized cost of electricity from solar PV fell 85% between 2010 and 2020,

from \$381 per megawatt-hour (MWh) to \$57/MWh,⁶ and is predicted to continue to fall; projected costs are \$20-80/MWh by 2030 and to \$10-50/MWh by 2050.⁷ Battery energy storage systems — which are increasingly integrated into solar systems at the construction stage to boost the reliability of intermittent supply — are also falling rapidly, and new long-duration storage technologies are emerging. Prices of lithium-ion battery packs that can store excess solar energy declined approximately 85% from 2010 to 2018⁸ and are expected to drop another 60% by 2030⁹, driven in part by economies of scale due to the rise in electric vehicle demand. In parallel with these technology and price advances, steady growth in commitments and actions by governments, corporates and international finance institutions are catalyzing private investment in solar and creating momentum for rapid growth.

Now is a PIVOTAL MOMENT for action.

To ensure that we capture the immediate benefits of solar energy, governments, businesses and investors must act now with urgency to scale investment. In 2022, building from this *Action Agenda*, World Resources Institute (WRI) and Bloomberg Philanthropies will partner with the International Solar Alliance (ISA) to develop a Solar Investment Roadmap to facilitate investment at scale, in line with ISA’s \$1 trillion investment goal by 2030. More specifically, the Roadmap will identify those regions that have not yet seen sufficient solar investment.

Global Solar Capacity and Investment

Meeting global climate and development goals will require enormous growth in solar generation capacity, and thus in solar investment. Achieving the goals set in the SDGs will require an examination of how to ensure solar growth occurs equitably and reaches the regions, countries and communities with the highest levels of energy poverty.

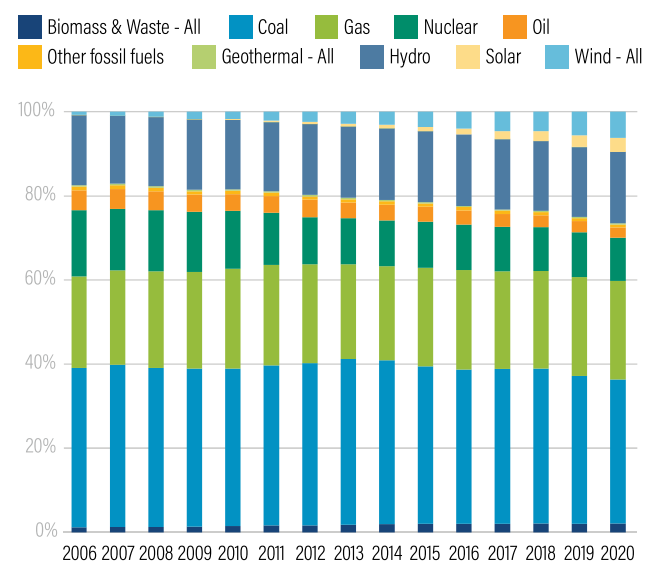
Rapidly falling costs of solar energy in the last decade have created significant momentum in power markets. Global installed capacity of solar PV has increased from 40 gigawatts (GW) in 2010 to 707 GW in 2020,¹⁰ bringing solar energy’s share in the global electricity mix from a negligible 0.2% in 2010 to about 3% in 2019^{11, 12} (see figure 1).

Despite this progress, the rate of solar energy deployment is off track from the pace required to achieve net-zero emissions globally by 2050. To meet this goal, Bloomberg New Energy Finance (BNEF) estimates that solar energy must meet 17% of total global electricity demand by 2030 and 22% by 2050. This includes electricity needed to ramp up green hydrogen production by 2050¹³.

To achieve global net-zero emissions as projected in BNEF’s “Green Scenario,”¹⁴ cumulative installed capacity of solar PV must reach 4.3 terawatts (TW) by 2030. An additional 1 TW will be needed for industrial use (such as the production

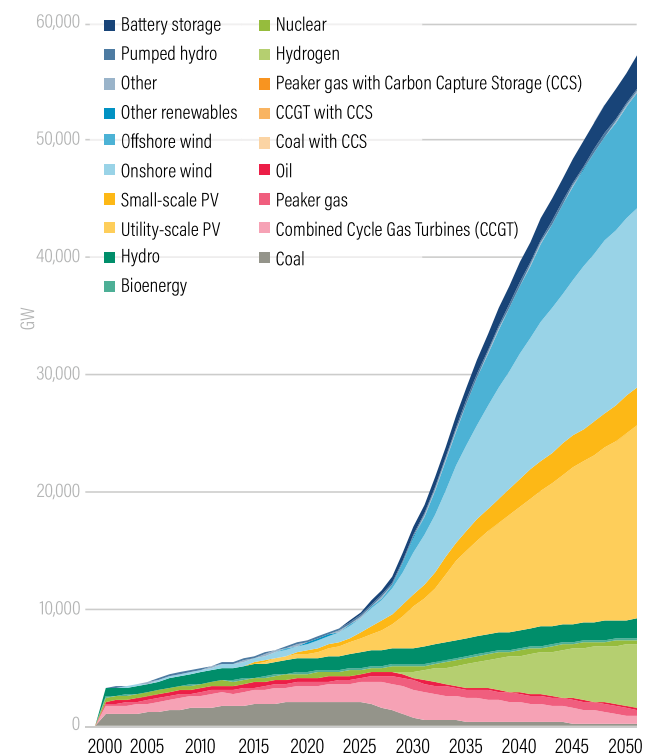
of green hydrogen), bringing the total to 5.3 TW. By 2050, solar capacity will need to reach 19.7 TW to deliver clean electricity for a net-zero future (see figure 2).¹⁵

Figure 1 • Share of Global Power Generation by Technology



Source: BloombergNEF Power Transition Trends 2020.

Figure 2 • Global Installed Electric Power Capacity in BNEF’s 2021 “Green Scenario” for Net Zero by 2050



Source: BloombergNEF New Energy Outlook 2021.

To meet these solar energy capacity goals, average annual investment in solar technology must more than double in this decade. Global solar investment reached approximately \$169 billion in 2020 (see figure 3), but levels of investment, including in battery capacity, need to total \$3.4 trillion by 2030, averaging about \$377 billion per year, to achieve the 5.3 TW of projected solar energy output needed.¹⁶

In addition to rapidly increasing solar investment around the world, there is a critical need to ensure that finance and investment are more equitably distributed. While the share of installed solar capacity has grown substantially across Asia over the past decade, reaching almost 60% of total global installed capacity in 2020, Africa continues to account for less than 2% of global capacity, despite having the richest solar resources in the world¹⁷ (see figure 4). In fact, Africa — which is home to 17% of the world’s population and 75% of the global population lacking access to electricity¹⁸ — received only 4% of global power supply investment in 2020.¹⁹

The Action Agenda

Barriers to scaling solar investment vary by type of technology and market. These include perceived and real risks to investment returns, such as low creditworthiness of off-takers or immature private sector markets, political risk due to political instability, and regulatory uncertainty. These barriers and risks in turn lead to a lack of pipelines of bankable projects for investment. While proven solutions to each of these barriers exist, implementing solutions at scale will require concerted effort across actors — from governments, private investors and the development finance community.

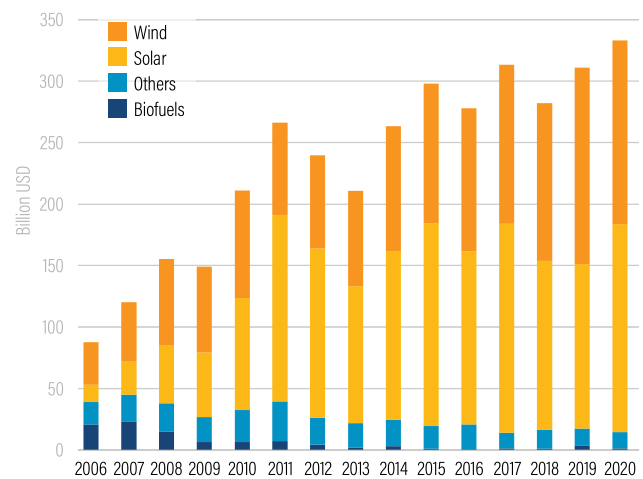
This Action Agenda outlines potential opportunities for coordinated, catalytic action to address barriers and accelerate the pace and scale of solar investment.

It includes an inventory of strategic elements for successfully scaling solar investment — focusing on boosting investment readiness, engaging investors and channels of finance, supporting pipeline development, mitigating financial risk and mobilizing partnerships to facilitate rapid scaling of investment.

The Action Agenda also identifies nine solar investment scaling opportunities for consideration in the Roadmap that will be developed in 2022. The proposed high-impact opportunities are divided into three categories based on the context in which they are deployed and the priority needs they fulfill:

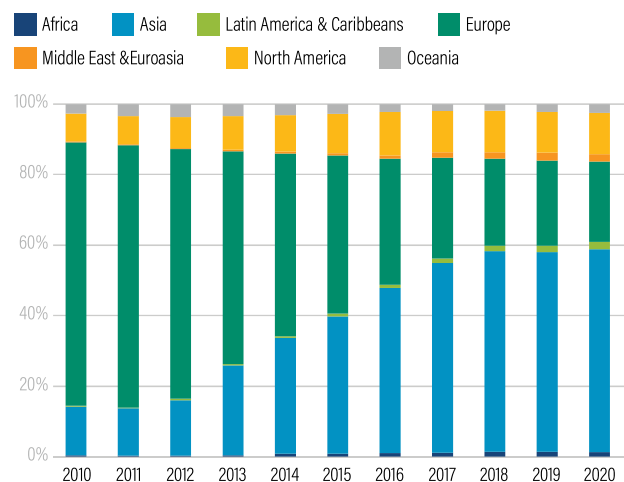
- **Off-grid energy access opportunities** — Deploying off-grid solar in rural, low-income areas or other areas with low electricity access or security. Co-benefits include improving economic livelihoods, rural incomes and equality for women and girls, and delivering universal clean energy access to improve economic development and human welfare (SDG7).

Figure 3 • Global Investment in Renewable Energy, 2010-2020



Source: BloombergNEF Renewable Energy Investment Tracker 1H 2021.

Figure 4 • Regional Share of Global Installed Capacity from Solar PV, 2010-2020



Source: IRENA Statistical Yearbook 2021.

- **Utility-scale solar PV deployment opportunities** — Increasing large-scale, grid-connected or distributed solar in emerging markets. Co-benefits include improving energy security and diversity by reducing fossil fuel and hydro-power dependency and export reliance, improving grid reliability, and decarbonizing the power supply, as well as improving air quality, creating jobs and supporting regional and social development priorities.
- **Next-generation technology opportunities** — Scaling the deployment of other solar energy technologies such as concentrated solar power (CSP), the development of solar-related combined systems, and the use of solar energy for green hydrogen production. These new applications of solar and next-generation technologies

may help to reach difficult-to-serve locations and sectors that are challenging to decarbonize. Co-benefits could include decarbonization of heavy industry to reach net-zero emission targets, energy security and system resilience benefits, and affordable access to low-carbon electricity in areas with limited land availability.

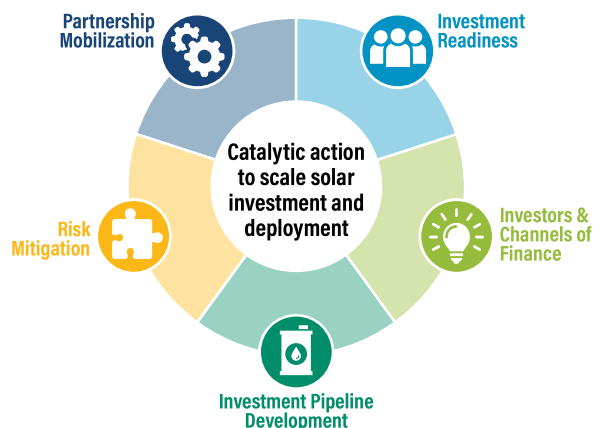
For each proposed high-impact opportunity, the Action Agenda highlights examples of strategic elements important for successfully scaling up investment and facilitating mutually reinforcing commitments and action — or “ambition loops” — by public and private actors.

Elements of the Action Agenda

Strategies for accelerating solar investment and deployment must be pursued in the context of broader energy system development trends. The electrification and decarbonization of end-use sectors, including buildings, transport and industry, are driving the pace and scale of growth in demand for clean electricity. To strengthen the position of solar energy in this mix, enhancing access to affordable finance is essential. Significant increases in private investment will be critical to achieve the scale of growth needed, along with public investments and finance — including development finance — to mitigate risk and attract private investors.

This Action Agenda provides insights from the solar investment and finance community on actions needed to scale solar investment and deployment. Drawing from published analyses and expert consultations undertaken by WRI and ISA, a number of pre-requisite strategic elements for successfully scaling solar investment have been identified.

Figure 5 • Elements of the Action Agenda



Activate Ambition Loop

Ambition loop to mobilize private investment: Mobilizing private investment and finance is central to achieving the \$1 trillion investment objective. Public-private engagement processes can generate a virtuous circle – an “ambition loop” of mutually reinforcing commitments and action with support from a range of enabling partners. Demonstrating successful mobilization of investment and finance increases the appetite of both public and private actors to support capacity building, enabling policy and regulatory reforms, as well as investment planning and allocation of public finance to catalyze private investment.

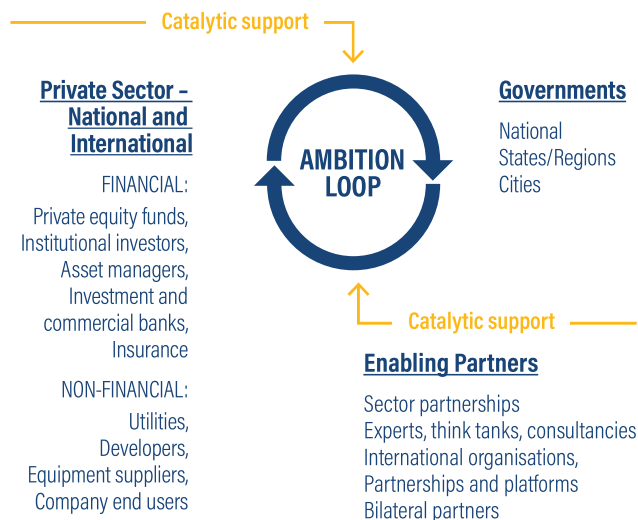
Solar Investment Roadmap Will: (To be completed in 2022)

- Create an orchestrated process to strengthen coalitions and mobilize finance to equitably scale up solar investment in line with ISA’s \$1 trillion goal by 2030.
- Identify and analyze high-impact solar investment opportunities and provide detailed guidance for catalytic actions that can overcome barriers to their implementation, leveraging a range of existing initiatives and key platforms to boost their impact.
- Galvanize joint commitments by diverse partners – governments, private sector and international financial institutions – to show measurable progress in scaling solar investment in high-impact opportunity areas.
- Provide clear scaling goals and metrics to measure progress toward \$1 trillion of investment and track the resulting benefits, including improvements in energy access and energy security.

Figure 6 • Actors in the Ambition Loop

Public Financial Institutions & Providers of Concessional Finance

MDBs, IMF
DFIs, ECAs
NDBs, Green banks, Central banks
Funds and facilities (e.g. GCF, GEF)
Donors & Philanthropy



Strategic Elements for Scaling Solar

Table 1 • Strategic Elements for Scaling Solar

INVESTMENT READINESS	<ul style="list-style-type: none"> ▪ Set national-level climate mitigation or net-zero targets and plans, with target-setting and planning for solar investment within the electricity energy system to provide signals to investors on long-term policy commitment and stability. ▪ Carry out country diagnostics in consultation with local stakeholders to prioritize solar investment needs and preferred pathways to achieve development and clean energy goals and strengthen the ambition loop for solar investment. These diagnostics should identify socioeconomic and climate benefits from solar investment and integrate understanding of local conditions, readiness and potential for solar investment. ▪ Establish solar investment goals and develop a solar procurement program to achieve national clean energy targets and attract private sector participation in developing and deploying utility-scale solar projects. ▪ Identify appropriate market designs, business models, procurement strategies and deployment schemes to build a national-level solar investment program — including strategic public investments to strengthen the grid and renewables integration (through improved transmission and distribution, battery storage, demand side management and related infrastructure). ▪ Reform policy and regulatory frameworks across energy, trade, fiscal and finance sectors to reduce costs of solar, mitigate financial risk, boost market demand and enhance the business environment for solar investment within the context of clean energy market reform (including strengthening property rights, contract enforceability and anti-corruption measures).
INVESTORS & CHANNELS OF FINANCE	<ul style="list-style-type: none"> ▪ Identify the main providers of equity (including household savings, SOE/SME balance sheets, utilities, national and local governments, solar developers and private equity and venture capital funds) and of debt (including international national and local commercial financial institutions, development banks and development finance institutions (DFI), and capital markets) for solar investments in various solar market segments. ▪ Identify relevant investment channels, including for international institutional capital and concessional and blended finance; analyze investor gaps by type of opportunity and possible solutions for bridging them. ▪ Create platforms for investor and corporate engagement with policymakers and regulators, and aggregate platforms that can help scale investment to the institutional level. ▪ Strengthen local financial intermediaries and enhance their capacity to finance solar investments. ▪ Promote collaborations between public and private financial institutions to ensure availability of financing vehicles that enable accelerated flows of private capital, such as structured debt or equity funds with blended finance, green bonds and securitization.
INVESTMENT PIPELINE DEVELOPMENT	<ul style="list-style-type: none"> ▪ Publicize solar deployment targets to provide clarity for developers and investors to prepare future investment pipelines: Design, communicate, and implement solar investment programs for on-grid (like solar power auctions) and off-grid deployment. ▪ Support early-stage pre-investment feasibility studies (including mapping solar resources and local energy demand/supply dynamics). ▪ Utilize dedicated tools to support the private sector’s development of project pipelines, including framework agreements with project developers, joint ventures between DFIs and project developers, and platforms companies led by project developers or fund managers. ▪ Identify bankable solar investment projects that help achieve energy access, energy security or clean energy transition goals. ▪ Provide support for regional solar resource assessments, funding for pre-feasibility and feasibility studies, financial incentives (such as tax holidays and tariff relief) and financial structuring advice for project developers.
RISK MITIGATION	<ul style="list-style-type: none"> ▪ Identify risks that require mitigation in the specific country, sector or technology context, including off-taker credit risk, legal and political risk, technology performance risk and currency convertibility risk. ▪ Make use of available non-financial risk mitigation strategies such as standardized contract structures and investing alongside public financial institutions and local institutional investors. ▪ Map available financial risk mitigation instruments at project, corporate and portfolio/fund levels. Develop financial risk mitigation strategies, such as local currency hedging, targeted guarantee or insurance instruments, and first loss tranches in equity or debt fund structures. ▪ While some risk mitigation instruments are available on commercial terms, it may be necessary to mobilize concessional/ blended finance support for risk mitigation from philanthropic organizations, bilateral donors and global climate funds such as the Global Environment Facility, Climate Investment Funds, and the Green Climate Fund.
PARTNERSHIP MOBILIZATION	<ul style="list-style-type: none"> ▪ Create platforms for engagement, including among actors in a South-South context — governments, corporate and business partners, commercial banks, public financial institutions, philanthropic institutions and other enabling partners. ▪ Enhance tailored capacity building programs with key actors, for example on project finance for utilities, companies and communities to advance project investment.

Identifying High-Impact Opportunities

The Solar Investment Roadmap, to be developed in 2022, will identify and analyze high-impact opportunities to guide policymakers and investors in scaling solar investment and deployment. Three categories of opportunity are highlighted below: off-grid energy access; utility-scale deployment; and next-generation solar technologies for industry and the power sector where solar deployment at scale has potential to deliver large social, economic and climate change benefits. Within each of these, we share examples of several

high-impact opportunities that will be considered for inclusion in the Roadmap. The high-impact opportunities (HiO) overview below also highlights potential solutions that will be further developed in the Roadmap — strategic interventions that could help increase the level and pace of investments in each of these areas. Additionally, it lists examples of existing project opportunities for scaling that the Roadmap will examine.

Table 2A • Proposed High-Impact Opportunities and Strategic Actions for Scaling Solar

OFF-GRID ENERGY ACCESS OPPORTUNITIES				
<p><i>Priority: Deploy off-grid solar in rural, low-income areas or other areas with low electricity access or security.</i></p> <p><i>Co-benefits: Boost economic livelihoods and rural incomes, improve equality for women and girls, deliver universal access to clean energy for economic development and human welfare (SDG7).</i></p>				
Investment Readiness	Investors and Channels of Finance	Project Pipeline Development	Risk Mitigation	Partnership Mobilization
<p>Launch national energy access and electrification planning, including clear deployment targets and timelines for off-grid and mini-grid solar, and prioritize or establish government- or SOE-led procurement for energy access service areas. Enhance knowledge and credit assessments related to the bankability of off-takers.</p>	<p>Use targeted DFI funding, including from national development banks (NDB), and philanthropic funding to ensure liquidity and commercial credit for businesses that provide lighting, solar home systems and other off-grid services. Create new business models to support consumer-based finance.</p>	<p>Build business incubators to advance business model development and project pipeline preparation, aggregation and securitization through streamlined advice, pre-approval and eligibility processes; strengthen commercial financing through capacity building and training for business/project developers and local financial institutions (LFI), for example in collaboration with local universities.</p>	<p>Develop hedge mechanisms to protect against currency exchange rate risk; work through local commercial banks to support local credit line facilities with concessional finance; develop early-stage risk financing or vehicles to aggregate and securitize small projects.</p>	<p>Create platforms for collaborative partnerships; convene LFIs with commercial interests (such as telecom companies with off-grid solar service providers, mini-grid developers).</p>
<p>Proposed HiO 1 – Business development for solar lighting and solar home system services to boost clean energy access</p> <p>Solution Highlight: Enable policies such as household subsidies to increase affordability for rural households and smallholders; identify and fund outreach and community aggregation programs.</p> <p>Example:</p> <ul style="list-style-type: none"> Lighting Global Initiative's Pay-As-You-Go (PAYGo) business model enables financing for solar home systems and other solar-powered appliances from business consortia to address the challenges of energy access and financial inclusion for rural and low-income communities. The program comprises multiple stakeholders, including investors (private and debt investors, local and international banks, and DFIs), business partnerships with telephony companies, PAYGo executives, and experts from the energy and financial sectors, to develop and adopt common reporting standards and greater transparency to aid current and potential investors. 				
<p>Proposed HiO 2 – Off-grid solar for dedicated uses for rural health services and clinics, for schools, and for agriculture (including water pumping, irrigation, cold storage and food processing)</p> <p>Solution Highlight: Build partnerships among DFIs, national and local governments, commercial banks and other local stakeholders, such as agriculture cooperatives and health service providers, to promote and budget for workforce training on technical installation and maintenance of off-grid solar systems; boost training for local bank loan officers to increase local debt financing; and support targeted public financing and subsidy to ensure affordability.</p> <p>Examples:</p> <ul style="list-style-type: none"> AfDB-sponsored Facility for Energy Inclusion Off-Grid Energy Access Fund (FEI OGEF) supports the growth of off-grid energy access companies across Africa to develop their capacity to access capital at scale, in order to help small businesses and households gain access to stable off-grid electricity supply. The program implements innovative transactions with local currency and capital markets to close the financing gap in the region. Sustainable Energy for All (SEforAll)'s Power Healthcare program provides support from governments and development partners to increase investment in electrification of healthcare facilities. Support includes technical assistance and knowledge sharing, innovative finance and business models to de-risk investment, and analysis of data to measure sectoral impacts. 				

Table 2A • Proposed High-Impact Opportunities and Strategic Actions for Scaling Solar (Cont.)

Proposed HiO 3 — Mini-grid solar PV for areas with low or unreliable grid coverage

Solution Highlight: Mobilize partnerships with DFIs, NDBs and local banks to mitigate financial risk of investments and improve bankability. Adapt new business and funding models to mobilize the private sector, such as using auctions or results-based financing to incentivize developers. Use geographic information system (GIS) and geospatial data to identify suitable areas for mini-grid projects and target public subsidies to improve financial viability of new business models and ensure affordability to off-takers. Build partnerships with local organizations to identify customers for targeted use of results-based payments (supported through public grants and soft loans) to make mini-grid solar PV installations profitable for developers.

Examples:

- World Bank Group Energy Sector Management Assistance Program's [Global Facility on Mini-grids](#) accelerates private sector investment in mini-grids and increases the deployment of portfolios of mini-grids in World Bank operations and client country electrification programs.
- Rockefeller Foundation's [Smart Power Initiative](#) in India provides a mini-grid business model, which is operated by local private energy service companies, to provide distributed electricity access to power lighting, fans, electric pump-sets, appliances and motors for both household and productive use.

Table 2B • Proposed High-Impact Opportunities and Strategic Actions for Scaling Solar

UTILITY-SCALE SOLAR PV DEPLOYMENT OPPORTUNITIES

Priority: Increase large-scale solar in emerging markets for grid-connected or distributed solar.

Co-benefits: Improve energy security and diversity by reducing fossil fuel and hydro-power dependency and import reliance, improve grid reliability and decarbonize the power supply, while also improving air quality, creating jobs and supporting regional and local development priorities.

Investment Readiness	Investors and Channels of Finance	Project Pipeline Development	Risk Mitigation	Partnership Mobilization
Set national-level renewable energy targets with specific solar objectives, power sector planning on grid, transmission and distribution and battery storage, and national solar investment plan and related grid-system investment planning; consider carbon pricing mechanisms; adopt standardized regulations to enable solar investment for self-consumption and private procurement.	Establish investment platforms with associated fund structures that enable international institutional capital to co-invest in utility-scale solar.	Provide assistance for design of public procurement schemes for acquisition of grid-scale solar energy and share success models and best practices.	Mitigate risks through the use of financial vehicles at the project level (such as an off-taker credit risk guarantee) or portfolio level (for instance, a private equity fund with a concessional first loss tranche).	Enhance system operator capability to forecast and manage intermittent solar resource availability; conduct feasibility studies for public investment and share best practice business models to scale private investment.

Proposed HiO 4 — Government-, SOE-, or utility-owned power generation and transmission and distribution projects with private sector as equipment suppliers and EPC contractors

Solution Highlight: Standardize and improve transparency of contracts for turnkey utility-scale solar projects implemented by national utilities for solar power generation as well as transmission and distribution infrastructure projects, including projects that foster interconnected solar energy infrastructure at a regional or global scale. For such competitively tendered projects, the selected winning bid consortium (often consisting of solar engineering, procurement and construction (EPC) companies, equipment suppliers, and solar developers) facilitates project development and deployment and usually hands over operation of the completed project to the utility. Identify sources of concessional and non-concessional debt (such as multilateral development banks or other DFIs), utility-owned commercial debt where utility companies are solvent and have good credit ratings, and sovereign debt such as green bonds to support more turnkey projects where appropriate.

Example:

- [Jawaharlal Nehru National Solar Mission in India](#) — to meet its target of deploying 100 GW of grid-connected solar power by 2022 — helps create policy conditions to rapidly scale up large-scale, government-owned solar projects across the country; and reduces the cost of solar power generation through long-term policy planning, large-scale deployment goals, aggressive research and development, and supply chain domestication.

Proposed HiO 5 — Privately owned IPP model procured by government, SOE, or utility, either through auction or self-developed

Solution Highlight: Governments should standardize independent power producer (IPP) regulations and use reverse auctions and/or feed-in tariff regimes to secure private investment in grid-tied solar projects and related solar deployment to ensure grid access and integration. Design and announce public procurement schemes for acquisition of grid-scale solar energy to meet solar deployment targets, and clarify achievable timelines for investors. Share and create awareness of success stories and business models for procurement best practice. Promote net metering, standardize bankable project and legal documentation, and enhance private sector consultations in pre-competitive phase of program development.

Examples:

- World Bank Group's "Scaling Solar" program aims to make privately funded grid-connected solar projects operational within two years and at competitive tariffs, and to create new regional markets for solar investment. The program provides simple and rapid tendering to ensure strong participation and competition from committed industry players and fully developed templates of bankable project documents to eliminate negotiation and speed up financing, as well as risk management, credit enhancement, and tender-related financing and insurance. The program has implemented utility-scale solar projects in ISA countries, including Cote d'Ivoire, Ethiopia, Madagascar, Senegal, and Zambia.
- AfDB's Desert to Power Initiative empowers North African country governments to expand grid-connected solar power generation capacity by supporting independent power producers in the solar sector and hybridizing existing thermal power plants, upgrading existing transmission and distribution infrastructure and power management systems, and constructing new transmission and distribution networks.
- Sustainable Renewables Risk Mitigation Initiative — developed through collaboration across World Bank Energy Sector Management Assistance Program (ESMAP), French Development Agency (AFD), International Renewable Energy Agency (IRENA) and ISA — identifies public investment needed to unlock private investments at scale and provides tailored risk mitigation instruments. The program also helps governments develop medium-term strategies for setting targets and deploying renewables.

Proposed HiO 6 — Privately developed and owned with commercial, industrial, or SME off-takers and contracts directly negotiated between suppliers and large consumers

Solution Highlight: Private sector partners should build coalitions to champion and highlight their needs from governments and DFIs in target markets, and to document and share experience to ensure LFI understand the business models, commercial viability and risk profiles. Governments should develop clear regulations for third-party transmission access and pricing for utility wheeling services over the transmission network, and equitable schemes for burden sharing for the financing of necessary grid upgrades and expansion to connect solar resources (for example, solar parks) with existing points for power evacuation. Encourage availability of robust financing to private solar PV companies offering ground-mount and rooftop solar PV installations to commercial and industrial customers.

Examples:

- Africa GreenCo Program aims to attract private sector investment to renewable energy generation in sub-Saharan Africa at lower cost and with less reliance on government support through the introduction of an independently managed but government co-owned creditworthy intermediary off-taker.
- Clean Energy Investment Accelerator scales clean energy deployment (including, for example, solar energy projects operating as "virtual power plants") across commercial and industrial sectors by enabling private sector purchases to send a strong demand signal and meet the sectors' clean energy goals; developing innovative demand aggregation and procurement models to grow project pipelines and unlock access to finance; and working with national and subnational governments to strengthen policy frameworks to increase clean energy investment and deployment.

Table 2C • Proposed High-Impact Opportunities and Strategic Actions for Scaling Solar

NEXT-GENERATION TECHNOLOGY OPPORTUNITIES

Priority: Scaling the deployment of other solar technologies (such as CSP), the development of solar-combined systems, and the use of next-generation technologies, often in difficult-to-serve locations and/or sectors.

Co-benefits: Long-term decarbonization of heavy industry to reach net zero emission targets, energy security and system resilience benefits, affordable access to low carbon electricity in areas with limited land availability.

Investment Readiness	Investors and Channels of Finance	Project Pipeline Development	Risk Mitigation	Partnership Mobilization
Set ambitious NDCs and clean energy targets with specific strategic planning and roadmap to prioritize, support and leverage next-generation solar technologies to achieve long-term climate mitigation and decarbonization goals.	Set regulatory framework to open up power purchase agreements (PPAs) to private companies and promote joint ventures among private companies, utilities and SOEs.	Design national demonstration/market development programs, including early-stage demand and price support as well as public investment in pilot projects.	Allow power producers to supply power from any of their sources to lower power production and transmission and distribution costs.	Pursue internationally or nationally coordinated & funded research and development (R&D) and smoother permitting process supported by environmental and social impact studies, site-condition assessments, market research and energy-yield forecasts.

Proposed Hi0 7 – Floating Solar PV in areas with limited land availability

Solution Highlight: For this new solar technology that involves project development in water bodies rather than on land, policies to facilitate project pipeline development play a critical role in attracting investment — for example, by facilitating permitting processes like water rights permitting and dedicated tendering or auction processes for large-scale projects.

Example:

- [Flexibilization Scheme](#) in India allows power generation companies to meet their supply obligation via renewable energy and establish or procure renewable energy generation capacity anywhere in the country, which opens up demand and opportunities for floating solar projects. The largest floating solar PV project in India, with 25 megawatts (MW) installed capacity, was commissioned by a government-backed company, the National Thermal Power Corporation, under this policy in 2018, on the reservoir of the company's 2 GW thermal station.

Proposed Hi0 8 – Solar-produced Green Hydrogen to support decarbonization of heavy industry and transportation

Solution Highlight: The development of green hydrogen needs dedicated government R&D funding, well-coordinated international collaboration and shared public and private investment, due to high up-front infrastructure costs and the need for scaling up the size and production of electrolyzers. Governmental or DFI concessional finance (loans and grants) are important to finance early-stage facilities and production. Early-stage market risk can be mitigated by building demand certainty through mandates and/or price incentives, international standardization and guidelines, and origin certification schemes.

Example:

- [CertifyHy](#) project in the EU helps guarantee the origin of hydrogen to lower the market risk of green hydrogen by increasing transparency for consumers from the industry and transportation sectors.

Proposed Hi0 9 – Solar systems in other applications or combined with new smart-grid, advanced technology battery storage systems or other technologies and infrastructure innovation

Solution Highlight: Access to affordable finance is essential to cover up-front investment costs of scaling other solar energy technologies (such as CSP), piloting advanced smart-grid technology and advanced battery storage systems (for example, smart grids with new generation, long-duration batteries and solar thermal energy storage systems), strengthening supporting infrastructure (such as smart grids at the high voltage/transmission level), and developing solar projects in combination with other non-solar generation technologies (including large-scale wind-solar-battery energy storage systems or solar hybrid with diesel gensets). Development finance and other well-designed public investments and finance are needed to co-fund research, development and demonstration to share risk in early-stage technologies in order to attract private investors while not crowding out private investment. Underground transmission may also be a key technology on the horizon.

Examples:

- [Hawaii Electric's Renewable Dispatchable Generation](#) contract provides a fixed monthly payment to developers and gives the utility dispatch rights over renewable energy facilities, including both wind and solar. This new contract scheme allocates curtailment risk and costs more equitably between utilities and developers and dispatches excess generation for critical grid support services.
- Redstone Project — part of the [South African Renewable Energy Independent Power Producer Procurement Program \(REIPPPP\)](#) — uses ThermoVault technology, an advanced CSP technology with fully integrated molten salt energy storage, to dispatch clean energy 24 hours/day to the South African grid. REIPPPP adapts competitive tender processes to facilitate private sector investment into grid-connected renewable energy generation. Its fast-track process reduces administrative barriers and ensures profits through connection with tariff caps.

The Time Is Now: Join Us

Harnessing the ambition loop described in this Action Agenda can help achieve a solarized future with cleaner, more reliable electricity, and more robust economic opportunities for all. Fully realizing this vision will require public and private sector actors to align around high-impact opportunities and to take mutually reinforcing actions to accelerate momentum. Public financial institutions need to help boost investment readiness and scale up catalytic financing for solar, particularly in countries where investment levels are lagging; national and international private investors need to build on these efforts with successful and scalable business models; and governments at all levels need to take regulatory and legislative action to lay the foundation for solar markets to thrive and compete alongside other clean energy options to reach their full potential for deployment around the world.

The international community can support these activities by ratcheting up commitments to renewable energy — and, specifically, solar energy targets — and by accelerating the pace and scale of solar investment. This Action Agenda can guide these efforts and our collective work to develop a Solar Investment Roadmap in 2022 will provide a path to success.

Please join us in this effort to deliver this ambitious vision to make clean, affordable solar power possible for all. For more information, contact ScalingSolarInfo@wri.org.

Endnotes

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