Pilot Program for Climate Resilience Program Approval Request			
1. **Country/Region:**	*Nepal*	2. **CIF Project ID#:**	(Trustee will assign ID)
3. Source of Funding:	☐ FIP	☒ PPCR	☐ SREP
4. Project/Program Title:	*Expansion of IFC-PPCR Strengthening Vulnerable Infrastructure Project*		
5. Type of CIF Investment:	☐ Public	☒ Private	☐ Mixed
6. **Funding Request in million USD equivalent:**	*Grant: n/a*	*Non-Grant: USD 14.40 million (or Nepalese Rupee equivalent)*	
7. Implementing MDB(s):	*IFC*		
8. National Implementing Agency:	*Private sector*		
9. **MDB Focal Point and Project/Program Task Team Leader (TTL)**:	*Headquarters- PPCR Focal Point:* *Joyita Mukherjee (jmukherjee1@ifc.org)* *Laura Gaensly (lgaensly@ifc.org)*	*TTL:* *Haruhisa Ohtsuka (HOhtsuka@ifc.org)*	
10. **Program Description (including objectives and expected outcomes):**			

1. Program Description:

This Project proposal corresponds to the "*Investment Project-2: Climate Proofing Vulnerable Infrastructure"* of the IFC-managed PPCR Program for Nepal, "*Building Climate Resilient Communities through Private Sector Participation*" as listed in Nepal's SPCR.

In September 2012, the PPCR-Subcommittee approved USD3 million of PPCR concessional finance for the "*Climate Proofing Vulnerable Infrastructure Project"* (the Project or IFC-PPCR Project) which aims to strengthen climate change risk management capacity of Nepal's private sector by climate proofing vulnerable hydropower plants. To date, IFC has invested in one hydro project under the IFC-PPCR Project, and based on IFC's engagement and business development in the sector, there is a need for additional investments to strengthen vulnerable hydropower plants in Nepal against climate change impacts.

IFC is, therefore, proposing to access *additional* PPCR concessional finance for Nepal that remains unused (USD14.40 million) from Nepal's endorsed SPCR to expand its investments and meet the demand for financing climate resilience in Nepal's hydropower sector (see enclosed cover note for more information on use and availability of PPCR funds in Nepal). IFC has consulted with the Government of Nepal (GON) to access the unused balance of concessional finance under the Nepal PPCR Program, and the Government has expressed

full support to this proposal.

Approval is now sought from the PPCR Subcommittee to allocate this USD14.40 million in concessional finance to IFC's Climate Proofing Vulnerable Infrastructure Project, thereby increasing total allocation for this Project from USD3 million (which is already approved by the PPCR Sub-Committee as mentioned above) to USD17.40 million (with the addition of USD14.40 million). The objectives on the use of the funds remain the same as the approved IFC-PPCR Project, which is to promote private sector investments in climate-proofing vulnerable infrastructure. A context for the sector, the market barriers, and the proposed Project are described below.

1. Country and Sector Context

Nepal is a landlocked country of about 27.8 million people with a per capita income of USD730[1]. While the country is endowed with significant theoretical hydropower potential of about 84,000 MW and economically viable potential of 43,000 MW, the installed hydropower generation capacity as of July 2013 was only 746 MW.

Over 90% of grid electricity in Nepal is generated by hydroelectric facilities. Demand for electricity has been growing at close to 9% per annum over the last decade, and it is expected to grow rapidly at about 9.7% per annum in the next 10 years. Supply, however, has not met the increasing demand and the country faces regular power outages. In November 2013, the supply demand gap was approximately 410 MW when the peak demand reached 1,201 MW, resulting in interruption of energy supply for 14 hours a day. This deficit of electricity supply has been a major constraint to economic development and poverty alleviation in Nepal.

Average annual consumption remains very low at about 70 kWh per capita, even for urban Nepal, compared to 733 kWh for India and 2,600 kWh for China. Given supply shortages and low electricity access rates (only 40% of the population has access to electricity); the country depends primarily on biofuels, mainly wood, to meet its energy needs. This has serious consequences for Nepal's environment, as the consumption of fuel wood accelerates deforestation and soil erosion. Moreover, small and medium businesses rely mainly on captive diesel generators (about 400 MW) with expansive imported diesel when grid supply is not available, which poses financial burden to these enterprises and constrains their ability to grow.

Although Nepal has opened hydropower generation to private investment since 1993 with 13,000 MW in total licensed to independent power producers (IPPs), only 92MW has been commissioned so far with most of the IPPs facing barriers to raise financing mainly due to low technical capacity in the sector (discussed below). In response to the energy crisis and to achieve a sustainable, reliable and affordable electricity supply, Nepal has embarked upon an ambitious effort to develop the country's single largest natural endowment for power generation—hydropower – through IPPs. At this time, roughly 4,000 MW of hydropower projects are under advanced stages of development with support from various development partners—both bilateral agencies, as well as multi-lateral development banks (MDBs).

Nepal's hydropower sector faces additional challenges due to climate change which can jeopardize the recent and planned developments in the sector. Changes in hydrological cycles and the depletion of water resources

[1] As per World Bank data of Year 2013.

are among the biggest challenges facing Nepal. In-depth analysis of water resources in Nepal reveals two critical impacts of climate change on hydropower: (i) glacial lake outburst floods (GLOFs), and (ii) variability of river runoff. Both of these impacts are affecting not only hydropower generation but also rural livelihoods and agriculture. It is estimated that a global temperature rise of 4^{o}C can result in the loss of 70% of snow and glacier area due to melting of snow and ice. The melt water will accelerate development of glacial lakes and increase the potential of GLOF events. Hydropower companies in Nepal have reported generation loss between 3-8% per annum due to GLOFs, landslides and variation in rainfall pattern. These phenomena have also resulted in increased sediment concentration, accelerated erosion of turbines and frequent maintenance shutdowns. Thus whilst the government of Nepal embarks on a major effort to develop the country's vast hydro potential, climate change impacts have started to increase both economic and environmental risks and are likely to intensify over time. The objective of this IFC-PPCR Project is to ensure that vulnerable hydropower plants in Nepal are funded and constructed in a manner such that they are resilient to the anticipated adverse effects of climate change.

2. Project Context

In September 2013, the PPCR Sub-Committee approved USD3 million of PPCR concessional finance for the IFC-PPCR Project with the objective to promote climate resilience in vulnerable hydropower plants. As of April 2015, IFC has invested part of the PPCR funds together with IFC's own commercial financing in an early-stage equity investment. This investment has enabled IFC to play an instrumental role in developing a hydropower project as a co-developer by providing technical, legal and financial support.

In particular, the PPCR funds were essential in supporting supplementary work related to climate adaptation assessments. Typically, hydropower projects conduct Cumulative Impact Assessments which only review ***historical*** hydrological data, forest cover, land-use and geo-morphological dynamics (changes in hydrology, precipitation and temperature for specific locations) to determine the proposed management measures for operating hydro plants. Under a climate change scenario, the review of historical data is insufficient, and projects may require further studies and potential modifications during the implementation phase, which can be costly and even jeopardize the project's long-term viability. With the support of the PPCR funds, the project will be able to incorporate analysis of climate change related ***future*** hydrological and geo-morphological dynamics in the project design.

Without PPCR funds the project developer would not have proceeded with the assessment of future climate related risks because most private investors are not willing to pay for these additional costs. While project developers and owners bear the long-term risks of climate change impacts, investors and financiers have the ability to exit a project within a shorter time-frame and, therefore, do not place a value on identifying and mitigating some of the longer-run financial and environmental impacts in a project.

Early results of future climate related risks assessments have identified some measures to increase the adaptive capacity or "climate proof" the hydropower project. In addition, IFC has concluded that the identified adaptation measures could be applied to other hydro plants that are going to be developed in the same geographical region. These measures include construction and operational design changes that add costs to

projects. However, for the same reasons as mentioned above, private sector investors are not willing to provide funding for the additional costs associated with climate proofing hydropower plants. Moreover, IFC would like to conduct similar climate risk assessments for other hydro plants that are in its pipeline. The balance of PPCR funds that were allocated to IFC in 2012, however, are not sufficient to cover the costs of these measures and to conduct additional assessments and more is required to invest in climate resilience in hydropower projects in Nepal.

IFC is, therefore, proposing to use the balance of its current PPCR allocation under the "*Climate Proofing Vulnerable Infrastructure Project"* as well as *additional* PPCR concessional finance for Nepal that remains unused (USD14.40 million) to meet the demand for investments in increasing the resilience of the Nepal's hydropower plants.

The proposed Project is being developed in close collaboration between IFC and World Bank teams working in the sector in Nepal. The Project is part of the World Bank Group (WBG) strategy to support Nepal's energy sector development through financial and technical assistance. The World Bank Group has made its program in Nepal's hydropower sector a high priority transformational engagement supporting (i) climate proof infrastructure that are vulnerable to impacts of climate change, (ii) address acute power shortages in Nepal, and (iii) demonstrate a model of public-private partnership in development of new hydropower generation in Nepal, a post-conflict, low income, IDA country which critically needs reliable additional power sources in a sustainable manner that is resilient against the effects of climate change.

The IFC PPCR-Nepal Project will complement the World Bank's effort in Nepal hydropower sector supported by the South Asia Water Initiative (SAWI). The World Bank's work in the sector includes the Sustainable Hydropower Development Project which supports, among other initiatives, the improvement of water resources management and regulations, including updating of the Water Resource Act. In addition, other technical assistance activities are being financed by the World Bank to provide capacity building and introduction of regulations to manage climate change, environmental, and social implications of hydropower and power sector projects.

Given the recent devastating earthquakes that occurred on April and May, 2015, IFC is reviewing the impact on the proposed Project. At this point in time, with the information currently available, there is no expectation of significant impacts in terms of time and cost on the proposed Project. Moreover, the hydro projects that are currently under IFC's pipeline have taken into account the possibilities of earthquakes in their design and projects specifics include resistance to earthquake and seismic shocks. It should also be noted that the pipeline projects do not have any pondage/reservoir needs to raise concerns about flooding events. As the IFC team continues to monitor and review the impact of the recent earthquake on the proposed IFC-PPCR Project, changes will be made as needed. Hydropower remains an integral part of the country's future energy mix and this proposed Project will help the country develop one of its most sustainable power sources.

3. Description of Market barriers:

Climate adaptation is a new area for the financial sector globally. While sustainable development of the hydro power sector is urgently needed, several barriers keep private project sponsors and financiers from

incorporating risks and opportunities related to climate change in their projects.

i. High costs of adaptation: Climate related land degradation, land use changes, and deforestation has triggered increased frequency and severity of landslides in Nepal causing significant erosion and silt overflow and damage to turbines and other equipment. As a result, there is a significant increase in the operational complexity and costs. Some hydropower companies are experiencing large sediment load during the rainy season, resulting in increased operational costs, generation inefficiencies and early replacement of equipment. To avoid equipment damage, plants must reduce generation output or even shutdown completely. In turn, this leads to high maintenance costs and reduces operating revenues. While operational modifications (such as investment in additional desanders, sedimentation chambers and silt trapping, erosion resistant parts and watershed management) may be needed, the costs of these measures are often prohibitively high to finance and install. Moreover, there is also lack of approaches, experiences and financing available for incorporating climate change considerations into project design and operation.

ii. Lack of long-term financing for climate adaptation: Insufficient local supply of fixed-rate long term financing to hydro projects is a predominant barrier to financing climate adaptation projects in Nepal. Local lenders lack technical capacity and project finance experience. Most local banks also lack technical expertise and suitable financial products in originating, assessing and financing hydropower projects. As a result, financiers focus on overall asset quality and require additional developer resources and personal guarantees, constraining developer's ability to acquire the necessary finance for projects. Moreover, as explained in the previous section, most private investors are not willing to pay for additional costs related to climate change adaptation. Given that investors and financiers have the ability to exit a project within a shorter time-frame, they do not place a value on providing the additional finance required for some of the longer-run financial and environmental impacts in a project. In some cases, when investors are willing to provide the required additional finance, their financial offering is not suitable to project financing needs and it impacts the economic viability of already challenging hydro projects. This challenging context poses high risks to private developers attempting to develop hydropower generation projects in a manner that can sustain future adverse climate change events. To date, there is no track record of IPP/private investments in Nepal that have undertaken climate-proofing investments.

iii. Foreign Exchange Risk/Local Currency Financing: Energy output from hydropower projects sold to Nepal Electricity Authority are often under contracts denominated in local currency with no pass-through of foreign exchange fluctuations. Since the price of power in the local market is denominated in local currency, local currency financing for hydropower projects is key for the development of the sector. If investors financing (from the private sector, MDBs and PPCR) are all provided in hard currency such as USD, project developers will face significant foreign exchange risk that they are not able to absorb. This risk is exacerbated in a country like Nepal where the currency is tied to the Indian Rupee (INR) by means of a tenuous peg, which in itself is a risk along with the risk of INR devaluation. While some project developers (especially larger developers) have the capacity to assume currency risks on corporate balance sheets for borrowing in USD or INR, most hydropower projects are not sufficiently robust to cover such risk. Finally, there is no commercial USD/Nepalese Rupee (NPR) swap

market, making USD/NPR loans difficult to hedge.

4. Project Objective and description

The Project aims to strengthen vulnerable hydropower plants in Nepal against climate change impacts. Through the Project, IFC will provide a combination of its own and PPCR financing to hydropower projects with the objective to finance adaptation measures in hydropower design, constructions, operations and upgrades.

PPCR funds are required to address the high and additional cost of incorporating adaptation measures that most private investors do not see the value and are not willing to pay for. These measures could include: (i) different types of equipment, (ii) additional infrastructure including increased spillway design capacity, (iii) precipitation and real time sediment monitoring systems, (iv) downstream flood protection, (v) stream-flow monitoring and early warning systems; and (vi) climate risk impact assessments.

By providing long term financing and investing in local currency, PPCR will enable project developers to mitigate financial risks that are currently hindering the development of climate resilient infrastructure. It is expected that these PPCR investments will establish a track record for the development of climate resilient hydropower capacities, sending a positive signal to investors and financiers looking to enter the hydro sector in Nepal, and eventually catalyzing further investments in climate resilient hydro projects.

5. Terms of the PPCR funds

Note that final agreement to provide PPCR financing is subject to full due diligence and approval by an internal IFC approval body as well as IFC's Board of Directors. The terms of each individual PPCR transaction will be reviewed and approved by a separate Blended Finance Committee, which is independent from and different than the Investment Review Meeting which reviews and approves the terms of IFC's own commercial investment. All projects financed under the Project will be required to meet IFC's environmental, social, governance and other compliance requirements as well as all the requirements of Nepal.

11. Consistency with Investment Criteria:

The Project is embedded in the broader context of sustainable development and poverty alleviation contexts as elaborated in Nepal's SPCR. By investing in a climate resilient hydropower sector, the Project will contribute to a sustainable and more efficient sector that is required to address the deficit of electricity supply in Nepal which has been a major constraint to economic development and poverty alleviation. Moreover, the Project will help address associated climate change impacts (in the form of floods and irregular energy supply) on communities and business.

The Project aims also to demonstrate a model of private sector engagement in climate adaptation in Nepal's hydropower sector. To date, there is no track record of private financing in Nepal that is climate-proofing investments. This is a transformative Project as it will establish a track record for private investments in climate proofing Nepal's hydropower sector, and consequently scale up and leverage additional private investments for climate resilient infrastructure financing. The replication potential of this Project is significant, especially considering opportunities throughout the region.

12. Stakeholder Engagement

This Project builds on the stakeholder engagement process that was conducted during the development of Nepal's SPCR. During the design phase of the PPCR program for Nepal, IFC carried out identification missions and discussions with private sector sponsors and financiers, government agencies, sectors experts, and other development agencies, to identify key opportunities for our interventions. Moreover, the expansion of the *Climate Proofing Vulnerable Infrastructure Project* has been discussed with and is fully supported by the Government of Nepal.

13. Gender considerations

Women make up more than half of Nepal's population. However, women lag behind in economic activities compared to men, and are involved mostly in household activities. By culture and tradition, women spend a lot of their time in sourcing wood from forest to be used for energy. If they have access to more reliable and sustainable sources of energy, women could dedicate their time to more productive activates, and have the opportunity to enhance skills that could be used in industries such as agriculture and livestock. Moreover, since women spend an important part of their time indoors, providing clean energy can have substantial impact on women's health by avoiding indoor pollution.

Gender aspects will be reviewed in accordance with the World Bank Group environmental and social management framework that will be applied to each investment project.

16. Project/Program Timeframe

Expected Board Approval Date: First project approval expected within 9-12 months of Sub-Committee approval.