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Key messages

- Sialkot is facing rising electricity prices (230% since 2007) and load shedding¹ of up to six hours a day. Despite using diesel generation to cover the electricity shortfall, Sialkot's industry, which exports more than US\$1.6 bn a year in goods, has lost more than 10% of its revenue.
- A CDKN-led project to assess a Nationally Appropriate Mitigation Action (NAMA) as a policy tool to provide renewable energy to the city's industrial sector showed that the use of photovoltaic panels for industry could mitigate up to 377,000 tons of carbon dioxide and gain average savings of US\$27,400 per year on electricity costs.
- Lessons from the process include:
 1. Industry should have the opportunity to influence the NAMA process from the start, validate results mid-way and have a permanent presence in subnational decision-making on climate change. This builds trust, increases the legitimacy of results and improves management.
 2. Sharing preliminary data with stakeholders can help to spark debate. It is not necessary to await 'perfect' data before engaging; rather, data and analysis can be improved through stakeholder feedback.
 3. Providing examples of financial schemes from other NAMAs or similar projects can help to unlock the dialogue and stimulate action to secure investment.

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Renewable energy solutions for Punjab's industrial sector: Evaluating the NAMA approach in Sialkot City, Pakistan

Pakistan's energy sector is in crisis. Inadequate electricity supplies cost the country US\$14 bn annually² and some 11,000 small and medium enterprises (SMEs) operate at just 60% of capacity. In 2015, Pakistan's Ministry of Climate Change and the Punjab Power Development Board asked the Climate and Development Knowledge Network (CDKN) to assess whether a Nationally Appropriate Mitigation Action (NAMA) would be an appropriate tool to support renewable energy solutions for Sialkot in the Punjab, one of Pakistan's most emblematic industrial hubs of mainly export-oriented industry. For example, the factories of Sialkot supply 40 million footballs a year, rising to 60 million in World Cup years – an estimated 70% of the global production of hand-sewn footballs. To facilitate exports, Sialkot has had its own customs office since the mid-1980s, and in 2007 the city opened an international airport.³

With CDKN support, Ecofys (Netherlands) and PITCO (Pakistan) analysed Sialkot's industrial energy demand and the availability of renewable energy technologies in Pakistan. During the summer of 2015, over 100 Sialkot industrialists participated in workshops analysing their energy demands, the distribution among different company sizes and the renewable energy options available, along with associated costs, savings potential and emissions reductions.

The project's main objective was to evaluate the scope for renewable energy solutions to energy shortages

among the SMEs that make up the industrial sector in Sialkot, and the potential role of NAMAs as a policy tool to support them. The project was expected to build understanding of the viability of renewable energy-based industrial solutions, particularly with regard to supporting industrial development and energy sustainability, in the process delivering mitigation and adaptation co-benefits such as job creation, energy efficiency and environmental protection. While the conventional development approach for the industrial sector of Sialkot would be to fill the gap in electricity needs with diesel generators, the

In Sialkot some 11,000 small and medium industries are operating at 60% of total capacity . . . We are on a war footing regarding energy supply."

– Mr Ahmed Zulfiqar Hayat, Leather Garments Manufacturers & Exporters Association of Sialkot

project identified the benefits that photovoltaic (PV) panels can offer compared with diesel. Diesel-generated electricity is 55% more carbon intensive and 50% more expensive than electricity from the grid. PV panels connected to the grid emit no greenhouse gases and incur no fuel costs, and were therefore suggested as the technology to be targeted by the potential NAMA.

The project was seen as innovative as there is currently little by way of detailed analysis on coupling renewable energy solutions with climate change mitigation options in Pakistan. NAMAs are seen to be a potential policy tool to provide leverage for mitigation in energy, industry and other sectors. However, NAMAs are a relatively new concept and the understanding and assessment necessary for selecting and planning NAMAs is largely still missing in Pakistan.

Strengthening industry's focus on renewable energy

- The project enhanced the level of understanding of NAMAs as tools to deliver renewable energy solutions for industry in Sialkot and elsewhere in Pakistan.
- The techno-economic assessment of the different renewable energy solutions and associated co-benefits was innovative and well received by industry.

- The stakeholder engagement efforts successfully raised interest in using renewable energy to solve the electricity crisis faced by Sialkot's industries.

The success of the project was mostly due to an active process of stakeholder engagement. The team (CDKN, PITCO and Ecofys) visited stakeholders in person before any analysis was conducted. They met with the Ministry of Climate Change in Islamabad and the Punjab Power Development Board in Lahore, the two agencies that requested support from CDKN for this technical assistance. They also spent two days in Sialkot, introducing the team to seven industrial associations, listening to industry's concerns, and clarifying the project's purpose. This approach allowed the team to make use of existing political power structures, which proved important in ensuring buy-in from industry in Sialkot. The close interaction further allowed the team to access data that were not

publicly available, and to validate assumptions held by Sialkot experts.

Overall, the assessment of the NAMA as an effective tool for renewable energy solutions gained traction with industry in Sialkot. Representatives from all industrial associations in the leather, sports and surgical sectors attended the initial meetings and workshops in Sialkot. Over 20 representatives, along with the president of the Sialkot Chamber of Commerce and Industry, attended a final workshop in Islamabad, demonstrating the momentum gained by the concept of installing PV panels to address Sialkot's energy needs. Given how active industry is in Sialkot, it might be possible for the deployment of PV panels in the city to be carried out without (national) government coordination. Based on the results of the final workshop, it seems likely that unilateral actions will move PV installation forward in the coming years, mainly driven by industry support at the subnational level led by the Sialkot Chamber of Commerce and Industry.

Building on this earlier success, CDKN is now implementing Phase II of the project with the objectives of:

- developing the NAMA instrument for rooftop PV panels for Sialkot

We have been off the national radar for so long that we have learned to do things ourselves. The city has redefined what is possible with its 'can do' spirit, as it has built and operated its own private airport and is connecting a highway to the nation's arterial motorway in 2016."

– Fazal Jillani, president, Sialkot Chamber of Commerce and Industry

- SMEs, specifically to provide a reliable source of energy to Sialkot industry, including the private sector
- increasing awareness within Sialkot's private sector about climate finance opportunities (such as the Green Climate Fund) for possible co-financed NAMA implementation options.

Route to implementation

For the most effective implementation, the government would need to participate more actively in the development of the NAMA. The Ministry of Climate Change is mandated to carry out such work countrywide (including providing support to subnational entities). The Ministry would need to support more actively the creation of a PV market in Sialkot, and search for financial resources, domestic or international, to fund the NAMA. Specifically, the government would need to approach foreign governments and multilateral funds to assess their interest in the analysis already carried out. The government would have to become the guarantor of the NAMA by convening and coordinating the industrial associations in Sialkot (demand) and the technology providers (supply), as well as domestic and international donors (finance).

Implementation of the NAMA could happen in stages, with an initial stage launching a number of pilot projects for industries with PV panels. The government would then have to create a process to select the factories to install the pilots, the technology suppliers, and the finance channels and mechanisms (guarantees). This pilot phase would need to be complemented with a



Female workers at the Saga football factory in Sialkot conduct quality control inspections before shipment.

Factory-to-factory solutions from 300 kilowatts to 1 megawatt are common PV solutions for half a dozen factory clusters."

– A leading industrialist at a project workshop

monitoring, reporting and verification system stringent enough to provide quality results, but simple enough for the government to implement successfully.

Challenges and lessons learned

Phase I of the project identified three main issues:

- data availability
- government engagement
- industry awareness.

Data availability

Quantitative analysis is important as it not only informs decision processes, but also serves as a communication tool. Analysis provides all parties involved with material to discuss and express their positions. The data that could be collected from publicly available sources were limited to the electricity provided by the grid from the Gujranwala Electric Power Company and proved insufficient for robust quantitative analysis. By gathering additional data through in-person surveys (67 in total) and by visiting factories in Sialkot, the project team was able to raise awareness of and expectations for the project.

The strong focus on stakeholder engagement and collaboration proved to be an enabling factor for the project. Industries that had provided data wanted to see how their information would be used in the analysis, so preliminary analyses based on the data collected were presented to validate the results and obtain feedback on how to improve assumptions. This ensured

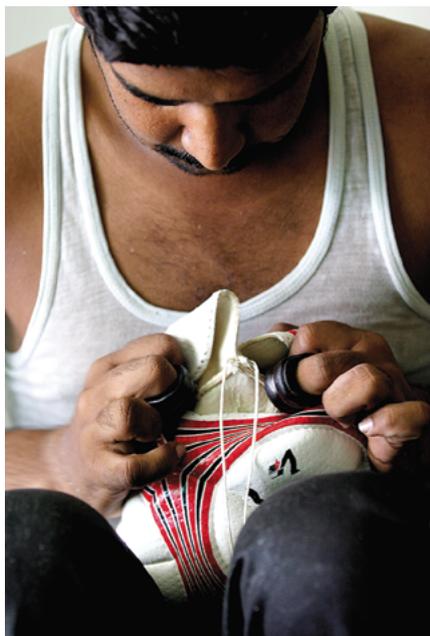
stakeholder buy-in to the objectives of the project that resulted in its unilateral advancement, despite limited government engagement. The likelihood of long-term viability will then depend on how industry uses the analysis performed by CDKN and the consultants to identify potential pilot projects, select the appropriate technology and secure funding. There is a risk that, if this project is not implemented appropriately, it could deter similar efforts in the future.

Government engagement

The study uncovered a number of controversies in Pakistan that need to be tackled before a strong NAMA concept can be further developed. These revolve mainly around responsibilities for the electricity supply, with industry seeing the government as responsible for solving the energy crisis – and the government seeing industry as strong enough and better equipped to tackle this challenge.

With its low level of greenhouse gas emissions, Pakistan faces numerous social, economic, development and national security challenges that often take priority over climate-related topics. In the case of the Sialkot NAMA, the maximum emission reductions calculated⁴ are around 377,000 t CO₂ – relatively low savings in the international context. However, the NAMA has numerous health, employment and business co-benefits, and applying renewable energy technology in industry would be highly innovative for Pakistan. It will be important to underline these benefits to the national government and to continue the engagement process.

The government, and specifically the Ministry of Climate Change, lacks the



A worker at the Saga football factory stitches together football panels in Sialkot.

capacity to address the opportunities offered by a sustainable development pathway. There is limited experience within government of the variety of developmental co-benefits that are often part of mitigation and adaptation interventions, and that are prominent in the deployment of renewable energy technologies to fulfil national electricity needs.

An early failure in the implementation of renewable energy solutions in industry could potentially inhibit efforts that propose similar solutions in the future. A possible solution would be to develop a private sector NAMA, with the design, support and implementation led entirely by private sector entities: Sialkot's SMEs, their trade unions and the Chamber of Commerce.

That said, it is hoped that the Ministry of Climate Change will offer its support in preparing an overarching NAMA framework motivated by the leadership of Sialkot's action.

Additional resources provided to the Ministry would enable it to enhance its understanding of NAMAs and the opportunities these policy interventions offer for fulfilling national sustainable development goals.

Industry awareness

Finally, at the subnational level, the project team faced initial push-back from industry in Sialkot, which leaned towards a conventional electricity solution for the city as a whole, rather than just for industry. Industrialists also had many misconceptions about renewable energy technologies, particularly their belief that the quality of electricity varies depending on the renewable energy source (e.g. hydro is better than solar).

This was addressed by listening closely to their concerns and addressing their questions through rigorous analysis, demonstrating that the project team took them seriously and was willing to listen and provide a solution tailored to their preferences.

Lessons for decision-makers and practitioners elsewhere

Engage with associations and chambers of commerce in highly industrial cities

It is very likely that industrial associations or the chamber of commerce have convening power that extends beyond the industrial sector. In the case of Sialkot, the Chamber of Commerce and Industry performs as a court, hearing cases on credit defaults, fraud, theft, marriage and public services (e.g. public lighting), among others. Thus the Sialkot Chamber of Commerce and Industry has established its authority over time and is more likely to make

city decisions regarding the climate-friendly economic development of its own initiatives.

Institutional arrangements need to consider the most relevant organisations, whether governmental or not, taking into consideration the roles the organisations are expected to play. If one organisation is not sufficiently proactive (such as the Government of Pakistan as patron of the NAMA), the project is likely to fail unless other organisations are willing and able to fill the gap. There are, however, numerous actions that national governments can take to incentivise subnational action without having to play a central coordinating role, particularly in its ability to access finance. Additionally, national governments participate in higher-level forums in which they can showcase actions at the subnational level and gain political support.

Ensure all stakeholders have ownership in the debate

Each person participating in the project should have something to gain (or lose) from the success (or failure) of the project. This project benefitted from strong subnational leadership that was open to partnering with private institutions, and was able to secure buy-in from these stakeholders to pursue the installation of PV panels. Both parties could clearly see the potential gains from the project.

Unfortunately, the same degree of engagement was not achieved at various government tiers. One way to change this is to identify potential gains and losses for a government within the project. If the NAMA is able to provide the government with a clear gain, whether financial resources or increased capacity to develop a policy it is mandated to implement, it is very likely that it will allocate sufficient financial and/or human resources to the NAMA. Focusing initially on engaging with other stakeholders who can lead the way to successful implementation, and to demonstrating potential gains from the project, offers the opportunity to engage representatives at the national government level.

Research financial schemes and actively involve local financial institutions

The most pressing issue in almost all the project's conversations with the government and industry was finance. Even if all technical and policy challenges had been tackled, finding the financial resources often led to an impasse. Providing examples of financial schemes that had worked in other countries' NAMAs, or similar development projects, helped to unlock the dialogue. It proved important to be able to indicate local financial institutions that could potentially help replicate those financial schemes. It is vital to research the financial institutions available and talk to them in advance to learn about their products and how they could be applied to the project.

Endnotes

- 1 Load shedding is the energy utilities' method of reducing load on the power generation system when electricity demand exceeds supply; it involves temporarily switching off supply to different geographical areas.
- 2 Pasha, H.A. (2013) *Economic costs of power loadshedding in Pakistan*. Lahore: Institute of Public Policy, Beaconhouse National University.
- 3 Kazim, H. (2010) 'Globalization in Pakistan: The football stitchers of Sialkot'. *Der Spiegel*, 16 March.
- 4 Based on the project's Phase I analysis of electricity shortages and demand, and a potential switch from diesel generators to PV.



Sialkot is the world's largest supplier of footballs and home to dozens of sporting goods factories.

Further reading

Khan, D. (2016) *Financing Nationally Appropriate Mitigation Actions: Insights from CDKN's experience*. CDKN: London. (<http://cdkn.org/resource/working-paper-financing-nationally-appropriate-mitigation-actions-insights-cdkn-experience>).

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