Eliminating Darkness

Case Studies of Lighting Up Lives with Solar Energy Project

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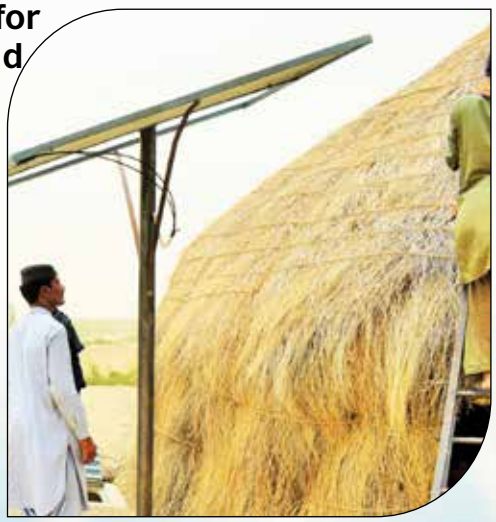

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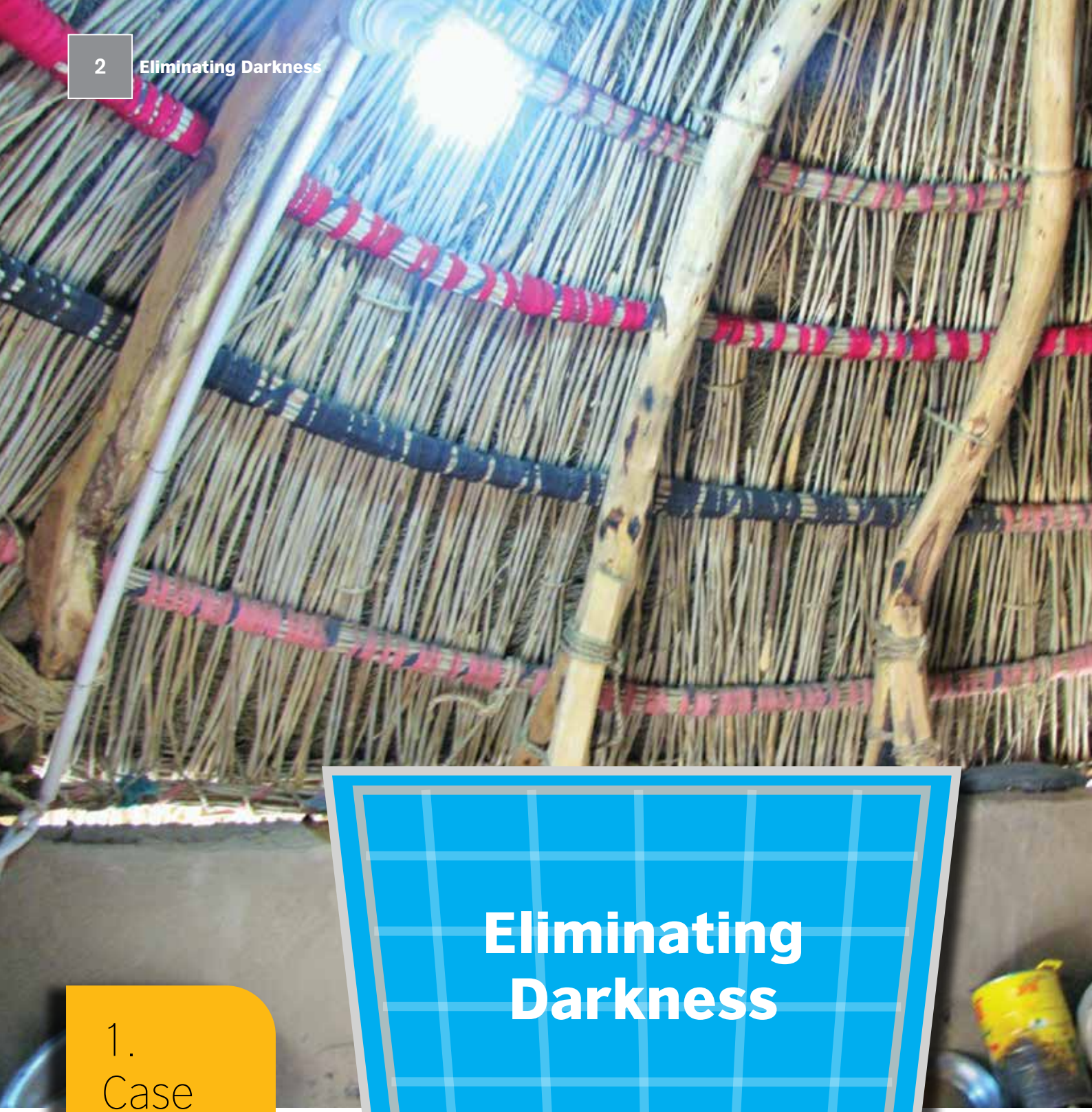


Eliminating Darkness

1.
Case
Study

A Story of 12 Years Teerath, who study with happiness with Solar Energy System

Teerath is one of the many children in village Veersani Kamrhar whose family has received a Solar Energy System to light up their homes and eliminate the darkness of decades from their lives. 12 years old Teerath lives in village veersani karmahar in the deserted area of Taluka Dahili, District Tharparkar, Sindh which still might require many decades to connect with national grid station to get the electricity in the village. Teerath lives with his father Ghulab Malh, mother Monika and seven sisters in a three-room traditional thatched hut locally called "***Chaonro***". Teerath studies in 5th class and walks around 6 kilometers from his village every day to regularly attend the school. His favorite subject is science and he wants to be a doctor in future. Teerath's mother Monika has also hope that one day her son will become a doctor. Teerath's father works as a casual labor at flour mill to feed his family. One can observe the happiness and swiftness of Teerath when he shares that

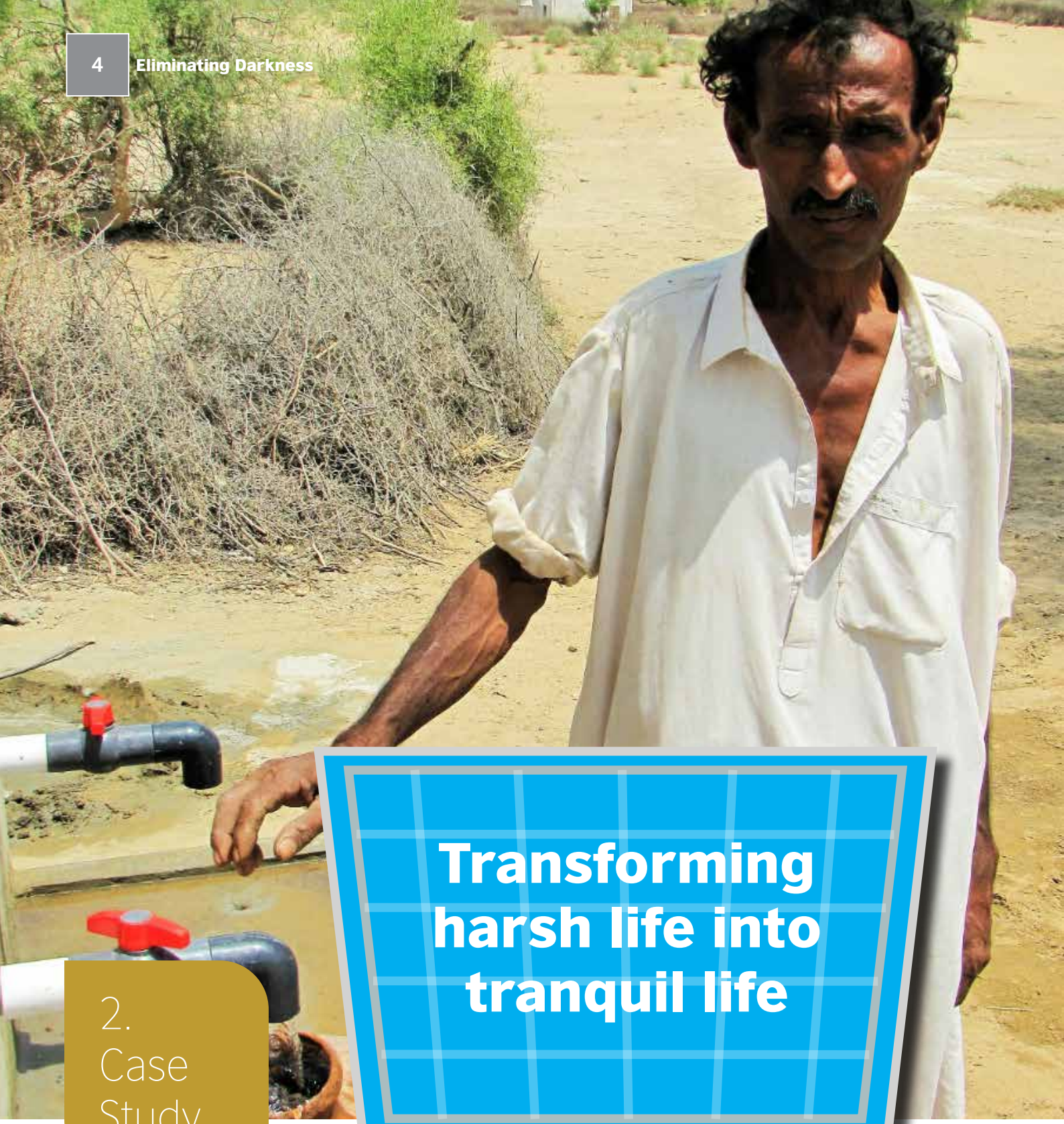
"We are very happy to have "SHAMSI Bijli" (local name of Solar Energy) in our house which has brighten our life and now my mother can cook happily at night as she always used to cook before the sunset. She can do some other work at night too",

he says. While responding to the question about the source of lighting huts they used before the solar energy, Teerath rushed to their wooden hut and brought small ordinary lantern in his hand and said,

"This was the only source that we could afford but now we have received the solar energy system at our home including 04 LED bulbs, 02 fans and a backup battery which allows us to work at night and my family is very delightful and now I can study and complete my school work at night as well".

Teerath's mother Monika showed high hope in Teerath's bright future.

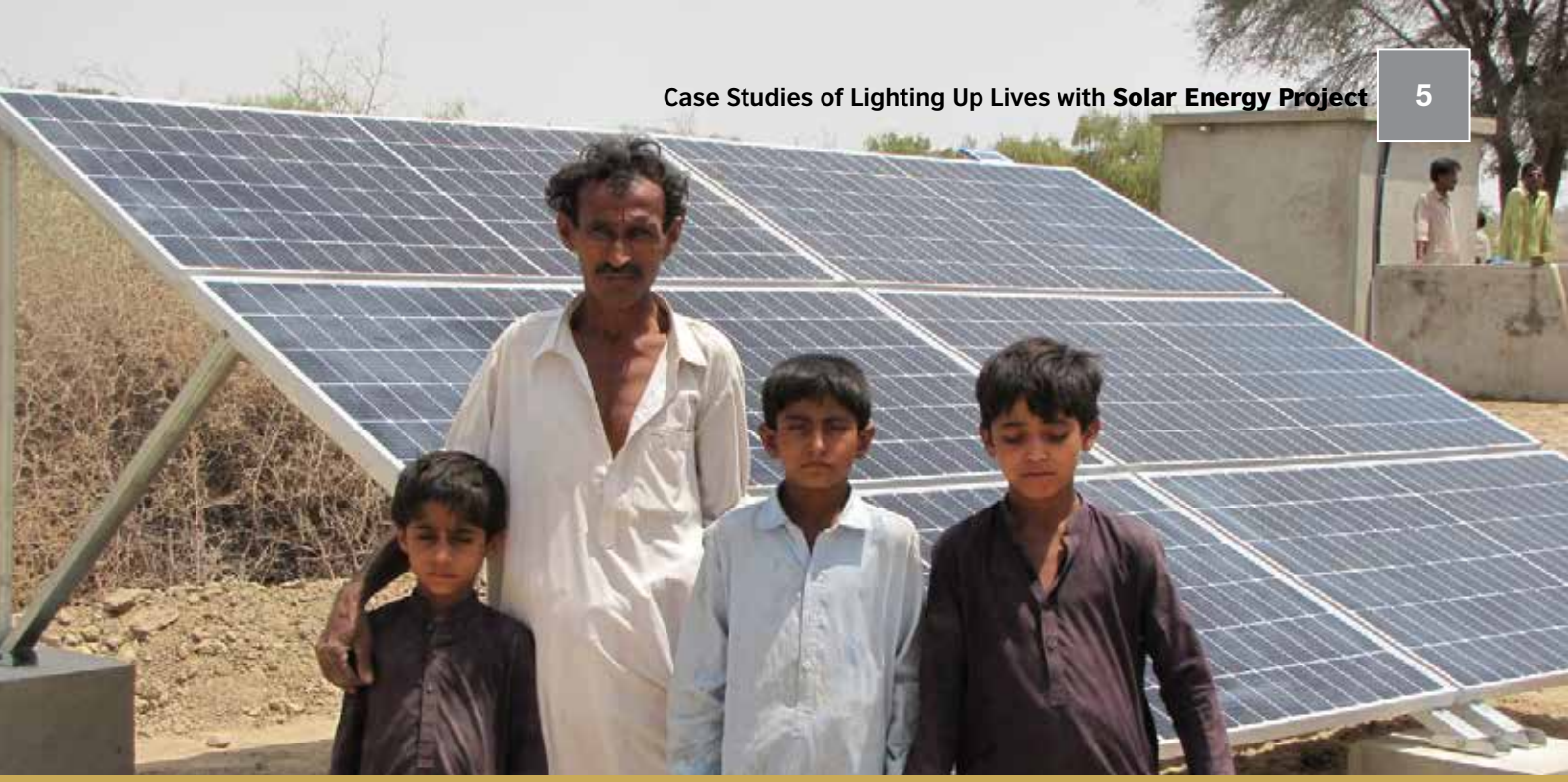
"RDF and KNH has not only provided light in our house, but in our lives", says Monika.



Transforming harsh life into tranquil life

2.
Case
Study

A Story of life after Solar Powered Dug Well in the village



Hussain Nohrio, 46 years old man, used to spend half of his day to fetch water from 300 feet deep well with long rope and a camel from the period of around 25 years for his family and his community. Now, a new solar submersible water pump and elevated water collection tank in his village has eased his and his neighbors' daily life.

If one has visited desert areas of Tharparkar, can imagine that the life in rural deserted area of District Tharparkar is not easy, where basic services are difficult to access, and safe clean water is hard to find. Drinking water is particularly important in Tharparkar, where many communities keep moving and migrating in the search of safe drinking water as massive population of district is dependent on their livestock to survive. Rains are the only source of recharging dug wells.

More than 1.4 million people and about six million livestock heads live in the area, where annual rainfall averages can be as low as 9mm, and drought is common. Yet, only 47 percent of District Tharparkar's population has access to water. This means that many families are forced to walk long distances every day to fetch water from open deep wells which is not an easy task.

Hussain Nohrio lives with his family in village Same-jo-tar, situated over 35 kilometers from the nearest town Chachro, in District Tharparkar. This area of Tharparkar is covered with dry sand dunes, and is mostly inhabited by herders living in small villages.

"Getting enough drinkable water for my family and for my community was never easy," Mr. Hussain explained***. "I used to wake up early in the morning and used to take my camel and rope to fetch the water from deep well and crowd of children and women with black truck tubes on their donkeys used to linger so they can have their turn."***

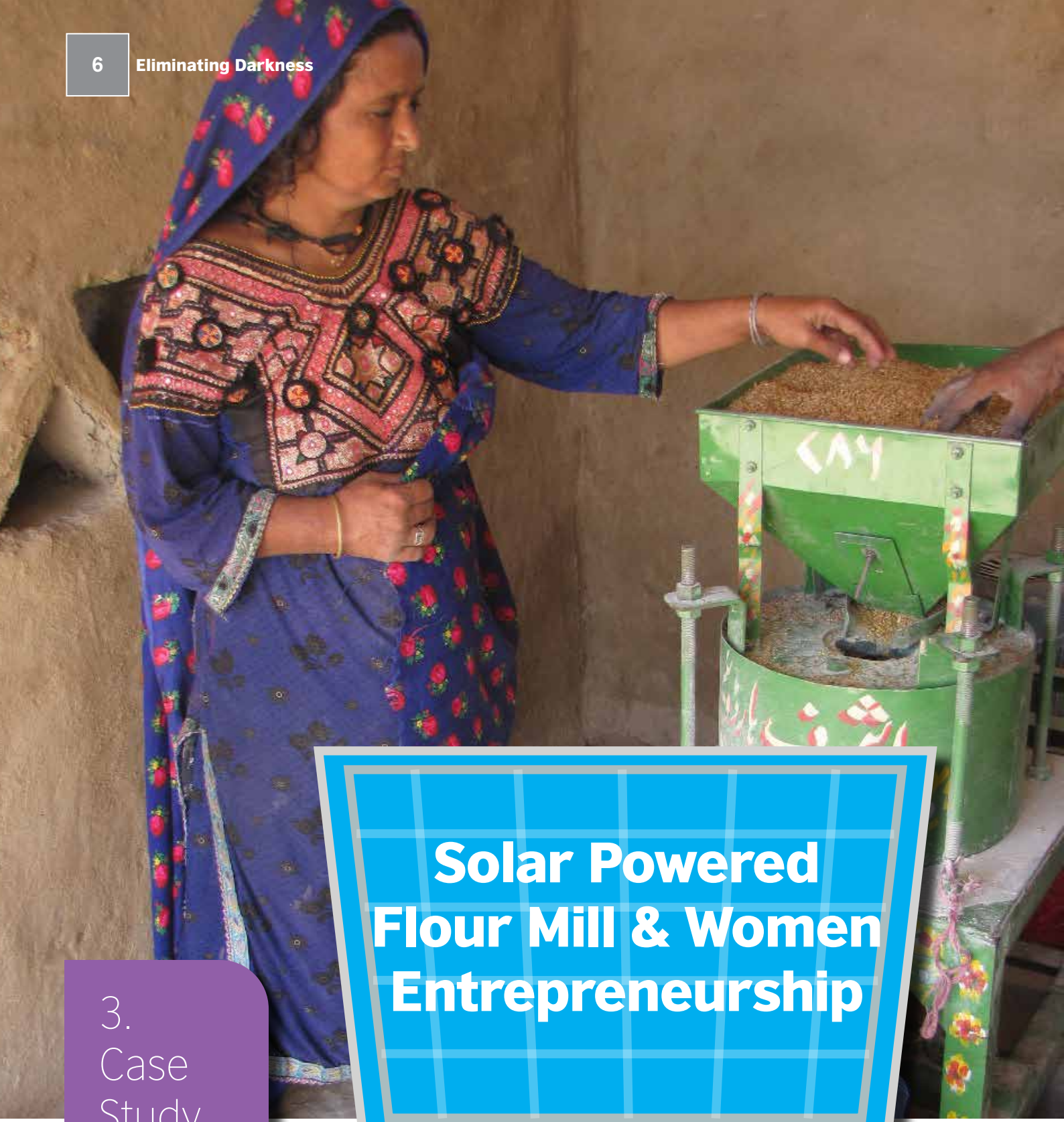
Now, solar submersible water pump and an elevated water collection tank at the deep well in his village has completely transformed the tough routine life of villagers. Moreover, the women and children have received immense relief, especially children can spend more time on their studies and women can support their families by making traditional handicrafts and look after their livestock.

Research and Development Foundation (RDF) and Kindernothilfe with the generous assistance of German Federal Ministry for Economic Cooperation and Development works in Tharpkarkar district of Sindh, Pakistan for resilience building of the communities to withstand climate induced disasters.

"Sometimes, I used to spend half of my day fetching water which was not even sufficient for us," Hussain says***. "But since we had no other options, we had to do this for the survival."***

RDF through the KNH supported and BMZ funded 'Lighting Up Lives' project has installed ten solar pumps in ten such communities, which has made life of climate affected people much easier. The project has put in place a robust system of the operation and maintenance to ensure sustainability of the intervention. Youth have also been trained and community maintenance funds are established during the project period.

"We used to prioritize the collected water for drinking and cooking only. We didn't have enough for bathing or washing clothes. So, the facility of solar pumps provided by RDF has made us to take care of our hygiene as well", he added.



Solar Powered Flour Mill & Women Entrepreneurship

3. Case Study

A Story of Rural Entrepreneur Ms. Hajiyani, who runs a Solar Powered Flour Mill

Thirty eight years old Ms. Hajiyani w/o Hakim Bhatti, a small entrepreneur and a mother of six children, is a very vocal, wise and hardworking women who lives in the remote deserted village Ishaque Faqir Rajar which is located around 20-KM away from Taluka Khipro, District Sanghar. Hajiyani's husband, who is suffering from some medical problems since long time, runs a small pushcart to sale lemon juice in summer season. Hajiyani herself is running a small shop in the village. Her semi-pakka house consist of two rooms, out of which, one room is solely allocated for her shop.

Sharing her early life story, she told that she used to go to school when she was young and always wanted to continue her education but unfortunately, she couldn't continue and got married in her young age. Recalling her difficult times, she has passed in deserted far flung area in poverty with limited resources, she shared that it became harder and harder for her husband to run their family and it seemed impossible to accomplish her dream of better life and prosper future of her kids that she has always wished for. Gradually she realized that she can be a helping hand for her husband for fulfilling the household expenses. She established a small shop within her house through her little savings. She kept all basic grocery items in her shop. With time, she gained enough knowledge about buying and selling techniques that allowed her to think about other ideas to expand her business.

During the intervention of the "Lighting up Lives" Solar project in her village, Ms. Hajiyani showed her interest in flour mill machine powered with solar energy system so that she could grind the flour for her customers and sell it at her shop as it was heavy on her pocket to purchase flour and transport it from Khipro city on regular basis. She knew that she would never be able to bear the cost of flour mill machine and solar energy system but she had clear vision and complete business plan that worked.

Hajiyani paid 30 % of total cost from her savings and received a solar powered flour mill through the intervention of RDF's solar project. She learnt to operate the flour mill along with her husband. Now she has stored grains and is grinding around 3-4 mounds flour daily in her own mill and selling the flour at her shop. Hajiyani and her husband Hakim Bhatti are blissful and grateful for the assistance that made it possible for them to have their own flour mill in a small village which is a great addition to their livelihood source. Hajiyani expressed her willingness to spend her additional income for her children's good education and for her husband's proper treatment.

"I'm looking forward to expand my business further for securing my children's future. My harsh life never allowed me to continue my education but now I can see my dream to provide good education to my children is coming true through my increased livelihood" shared Hajiyani.

Improved Health Services through Solar Power Technology

4. Case Study

A Story of improvement in Basic Health Unit after getting Solar System

Ensuring good health services in the remote deserted areas of district Tharparkar is still a big challenge. Basic Health Unit (BHU) Jadam Jhinjhi is one of the health facilities in deserted area of Tharparkar, which is around 60 Kms away from Taluka headquarters Chachro and administratively run by Peoples Health Initiatives (PPHI) on behalf of Health Department Government of Sindh.

BHU is one of the busiest units in the deserted area where the outreach catchment number is 7676, that covers almost 7 large populated villages of surroundings and compelled to refer the patients to the Taluka headquarter hospital because of lack of facilities.

Dr. Suresh Kumar, medical officer, who is serving in the BHU with small number of supporting staff with two female lady health workers (LHWs), shared

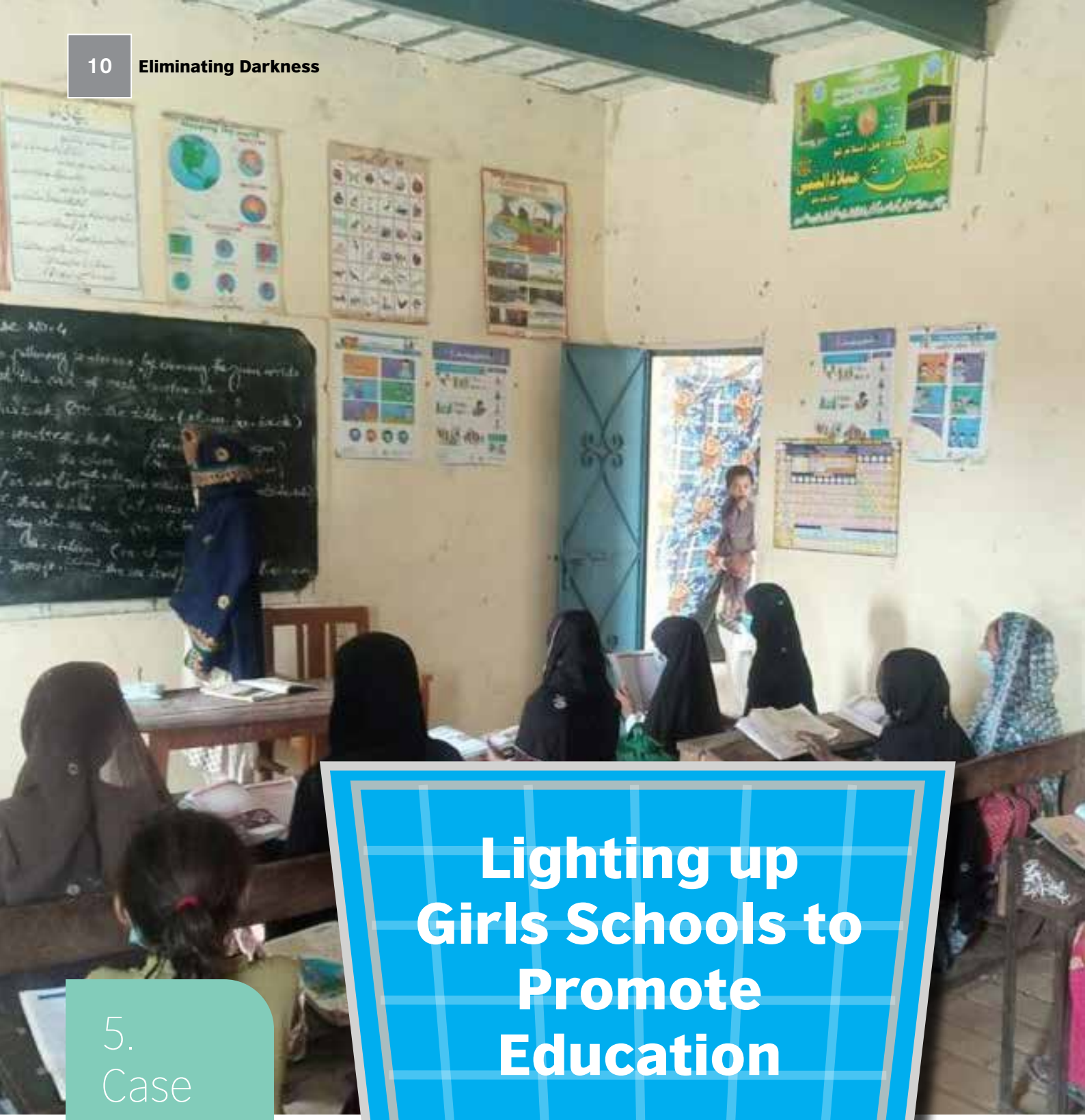
"I used to treat outdoor patients without basic facilities including power supply as the area is not connected with national grid and I faced a lot of difficulty due to it. "

One of the patients shared,

"In the absence of electricity, doctors used to diagnose patients outside the hospital building under the trees, which was unhygienic and could cause many other problems. We were also not satisfied with the diagnosis. Also, doctors' attitude towards patients was not good because of such inconvenience."

Mostly patients visited the unit for curing the diseases like Ulcer, respiratory infection, urinary tract infection, and pneumonia. The medical practitioners used to face great trouble in treating the patients. They were even unable to nebulize the patients especially children, women and old aged people with pneumonia or respiratory infection for providing them immediate relief. But now this BHU has been facilitated with solar power system installed in the health facility by the Research and Development Foundation through its "Lighting Up Lives" project. The total monthly target of the BHU Jadam Jhinjhi is 1111 patients per month but after the installation of solar power system, an increase in the number of daily outdoor patients is observed and that is the reason that brought the BHU Jadam Jhinjhi among top ranked health facilities in the area for providing best health services. Recently, BHU has got 40 family planning cases, 20 new cases of pregnant women, 16 post pregnancy checkup cases. Previously, not much such cases were observed.

The health unit staff expressed gratitude to RDF and KNH for facilitating them with solar power system which has significantly improved the environment to work more efficiently and is providing better health services in the far flung deserted area of Tharparkar.



Lighting up Girls Schools to Promote Education

5. Case Study

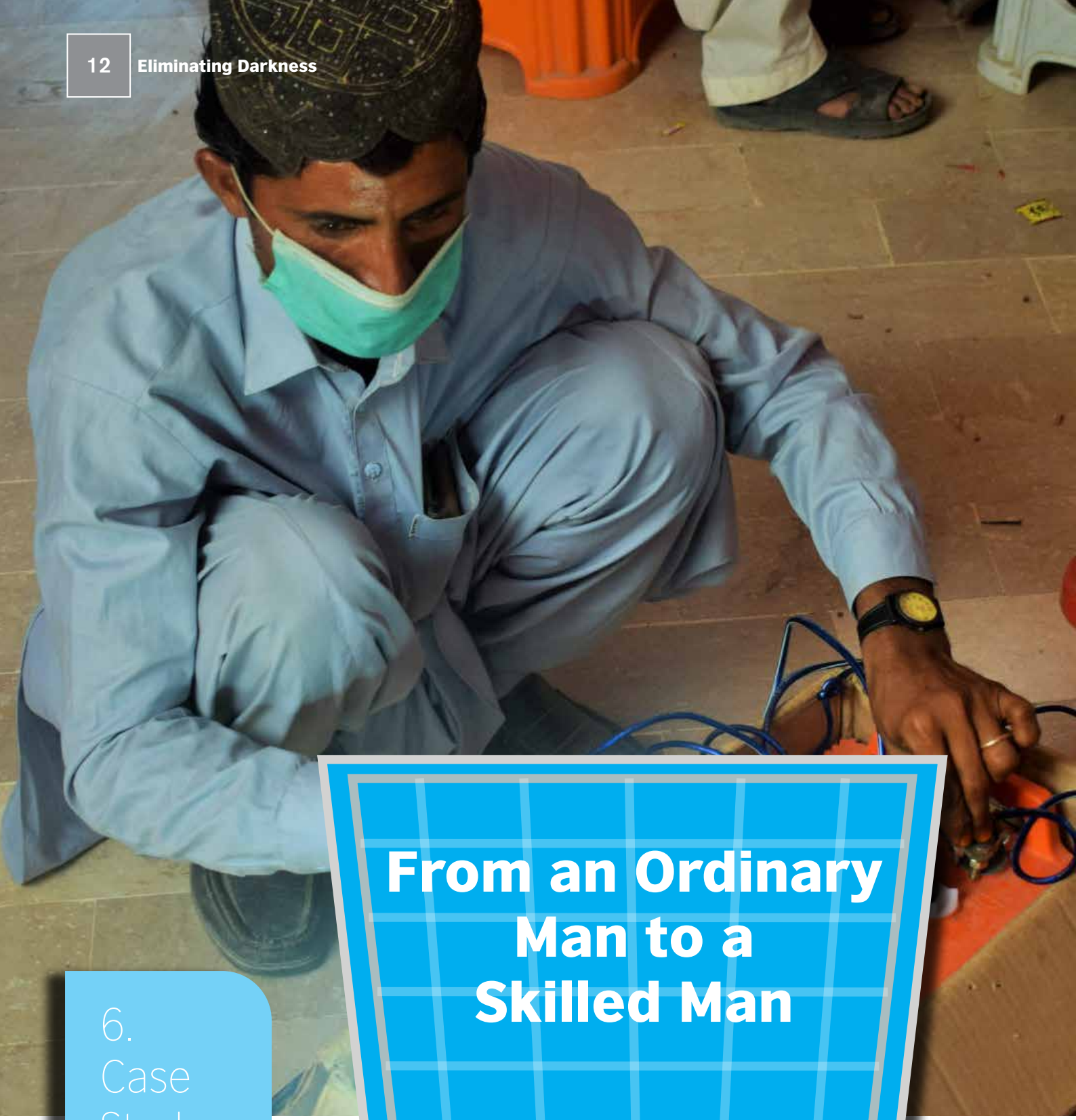
A Story of reducing irregularity of girls students from school

Government High School (GHS) Sachal Jhinjhi is one of the old schools of deserted region of district Tharparkar, Sindh. The GHS Sachal Jhinjhi is situated around 60 Kms away from the taluka headquarters Chachro. The school was established in 1979 by the efforts of local community social activist Sachal Jhinjhi who donated his 4 acres land to government to establish the school. Since the school was established, the village sachal jhinjhi has never been connected with national grid and the students have been studying without basic facilities such as water, proper sanitation and power supply. Currently the students who are studying in the school have to travel about 5 Kms by foot, covering sand dunes in the harsh weather every single day.

The school has an enrollment of 441 students including 66 girls and many of them have been irregular to attend the school due to lack of facilities. Mr. Sohrab Jhinjhi, principal of the school who have been struggling to promote education in the area and have always been trying to create a friendly learning environment for the students, uttered that they belonged to deserted area where they are facing numerous challenges.

He further shared that the school has produced a number of meritorious students who have become well known personalities in the last four decades. He further explained that government has provided very limited resources to the school which creates a lot of hindrances in leading an educational institute in a deserted area and that is a big challenge for him.

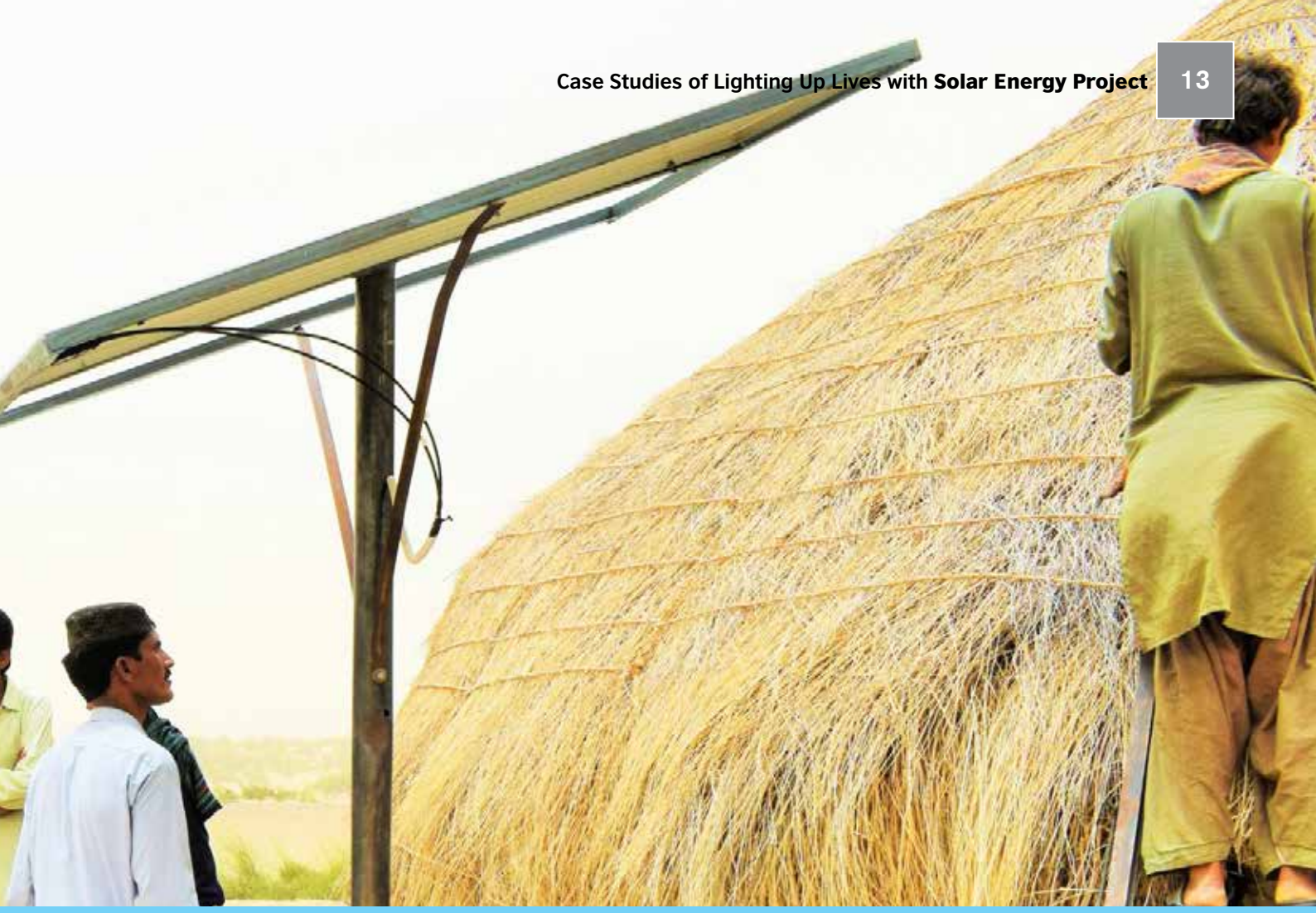
Mr. Sohrab Jhinjhi showed delight while speaking about the solar power system provided to school by Research and Development Foundation through its “Lighting up Lives” project and expressed that he still believes it as a miracle that Government High School Sachal Jhinjhi has received a heavy-duty solar power system which is the solution to many problems that have been faced by the management and students of the school. The electricity problem, suffocation in summer in the class rooms, poor water and sanitation system in the school and many other issues including irregularity of students is being addressed by having a solar power system in the school. Mr. Sohrab Jhinjhi shared the importance of this school that this is the only high school in the 20 Kms radius of the deserted area of Tharparkar, which is providing quality education in the area. He is highly thankful for the assistance and have high hope for the brighter future of his students and school.



From an Ordinary Man to a Skilled Man

6. Case Study

A Story of A youth Kewal Ram, who got solar electrification training



Kewal Ram, a 30 years old ordinary young man, grew and lives in village Kho Gapni, Meghwar Paro union council Kamil Hingoro taluka Khipro district Sanghar, which is surrounded by sand dunes of Achro Thar desert and is well known for its unique topography in Sindh. Low precipitation, water scarcity, shortage of herbs and shrubs for livestock grazing, shortage of resources in far flung area with poor transport creates terrible situation for the people of Achro Thar. Even the indigenous people have no access to basic facilities including education, health, safe drinking water and power supply.

Kewal Ram, in such arduous condition, continued his education and passed intermediate and learnt to make traditional Khata in his village. Though his major livelihood source is livestock rearing. With limited resources, Kewal Ram has always been working hard to provide better life to his children and family.

During the selection of villages to solarize under the "Lighting up Lives" solar project implemented by Research and Development Foundation (RDF) with the assistance of Kindernothilfe and BMZ to ensure the operation and maintenance of post installation, Kewal Ram was the active young man who was nominated by his village committee for the solar O&M training.

Kewal Ram eagerly attended one month full time training on operation and maintenance organized by one of the best training institute SZABIST. Kewal acquired the technical skills to fully install and uninstall the solar power system and resolve the issues of household level technical problems in the solarized villages as this would be very expensive for the community to hire someone from the nearby towns at regular basis.

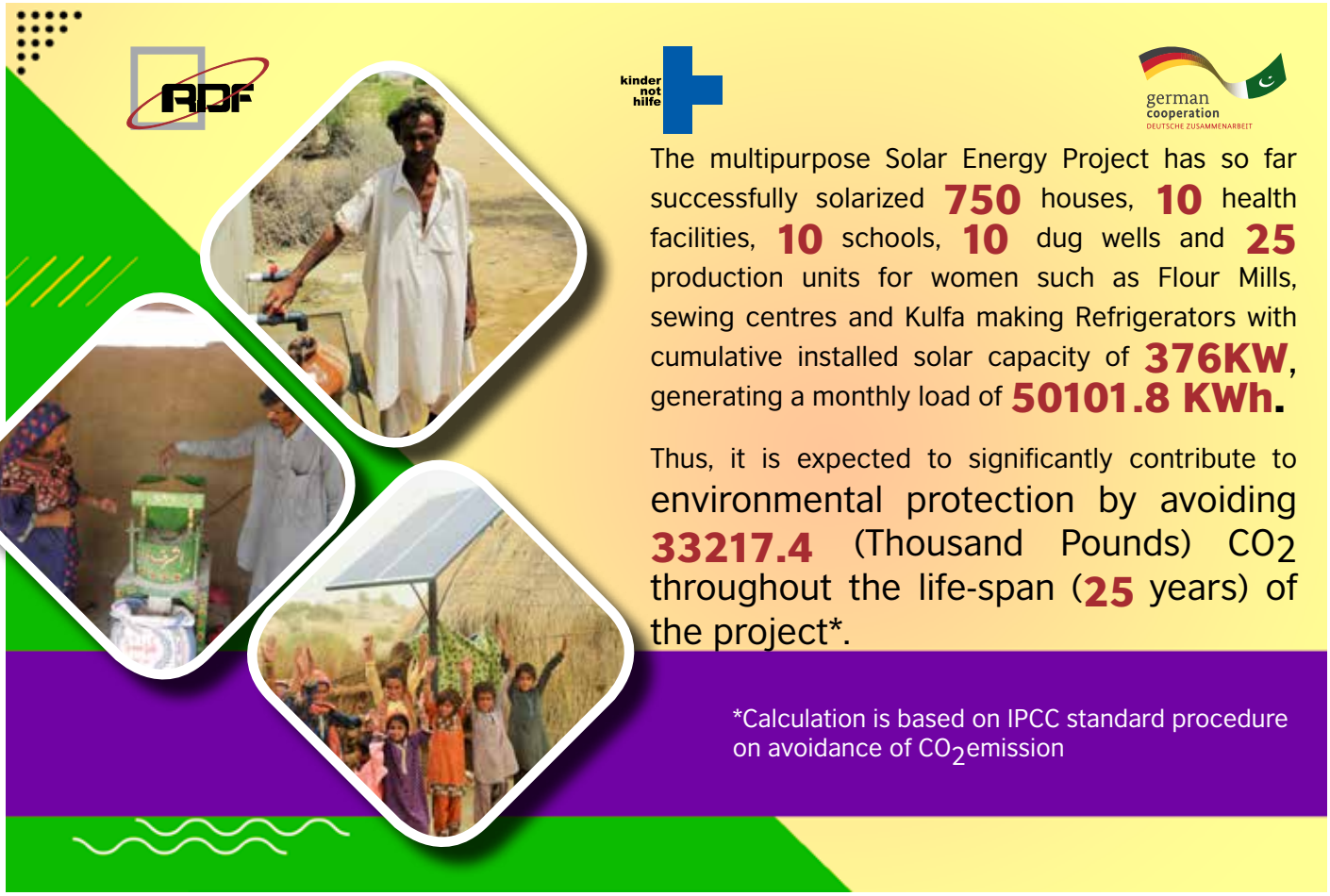
Kewal Ram shared that the training on solar O&M was a great experience of his life and he has gained the skills that has made him capable to earn and sustain his livelihood. He further shared that he is the only technician in his village and many other surrounding villages where he can extend his services and make new customers. Kewal Ram has started earning in a very short period of time through solar power system installation and repairing. He is now planning to open a small shop of solar items in his village so that he could save his time and provide all the services at door step in the deserted region, enabling people to lighten up their wooden houses and enjoy their lives with sustainable power source.

Kewal Ram is excited and thankful for the opportunity which has transformed his life from an ordinary man to a skilled man who is now capable to make his dreams come true and provide a brighter future to his family.

7.

Mitigating Climate Change; Avoidance of CO_2 in the Atmosphere

The project has not only addressed the needs of climate-affected communities, such as the need of electrification of homes, alternative livelihoods, functional WASH facilities and lighting for education and health facilities, but also reduced the consumption of fossil fuels (diesel, paraffin and wood) and it is mitigating climate change. It is calculated that the project would mitigate 33217.4 thousand pounds of CO_2 emissions through its life period of 25 years. The mitigation values are calculated as per guidelines of IPCC.



The avoidance of CO_2 emission is a measure for the contribution to climate protection and thus reduces the greenhouse effect. CO_2 is emitted during the generation of electrical power as a result of burning fossil fuels (e.g. coal). Electricity which is generated through solar energy does not produce (additional) CO_2 emissions. Thus, it is expected that the lighting up lives project is expected to significantly contribute to environmental protection by avoiding 33217.4 (Thousand Pounds)[1] throughout the life span (25 years) of the project.

1 Estimations made by consultant based on IPCC standard procedure on avoidance of CO_2 emissions (ipcc_wg3_ar5_annex-ii.pdf, link accessed on 10-07-2021).

Solar Households (39600 KWh Units Consumed Per Month of the Project)			
	Natural Gas	Diesel Generator	Coal
Avoided CO_2 Emissions (Thousand Pounds)	36.036	84.348	87.516
Schools (1388 KWh Units Consumed Per Month of the Project)			
	Natural Gas	Diesel Generator	Coal
Avoided CO_2 Emissions (Thousand Pounds)	1.26308	2.95644	3.06748
Hospitals/BHU (1388 KWh Units Consumed Per Month of the Project)			
	Natural Gas	Diesel Generator	Coal
Avoided CO_2 Emissions (Thousand Pounds)	1.42688	3.33984	3.46528
Dugwells (4320 KWh Units Consumed Per Month of the Project)			
	Natural Gas	Diesel Generator	Coal
Avoided CO_2 Emissions (Thousand Pounds)	3.9312	9.2016	9.5472
Flour/Salt Mills (1785.6 KWh Units Consumed Per Month of the Project)			
	Natural Gas	Diesel Generator	Coal
Avoided CO_2 Emissions (Thousand Pounds)	1.624896	3.803328	3.946176
Refrigerator (4320 KWh Units Consumed Per Month of the Project)			
	Natural Gas	Diesel Generator	Coal
Avoided CO_2 Emissions (Thousand Pounds)	1.3104	3.0672	3.1824
Total CO_2 Emissions Avoided by the Project Per Month (Thousand Pounds)			**33217.4**

U.S electric utility and independent power electricity generation and resulting CO_2 emissions by fuel in 2019

	Electricity generation million kwh	CO_2 emissions million metric tons	million short tons	pounds per kwh
Coal	947,891	952	1,049	2.21
Natural gas	1,358,047	560	617	0.91
Petroleum	15,471	15	17	2.13

Electricity generation in net electricity generation.
Includes electricity-only power plants. Combined heat and power plants are excluded because some of their CO_2 emissions are from heat-related fuel consumtion.









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