Non – Technical Summary

Photovoltaic Plants, Poland

Company: Quadran Polska Sp. z o.o.

7 October 2019

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Document title	Non-Technical Summary
Document subtitle	Photovoltaic Plants, Poland
Date	7 October 2019
Client Name	EBRD Quadran Polska

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Acronyms and Abbreviations

EIA	Environmental Impact Assessment
E&S	Environmental & Social
ESDD	Environmental and Social due Diligence
GHG	Greenhouse Gas
NTS	Non-Technical Summary
PV	Photovoltaic

1. INTRODUCTION

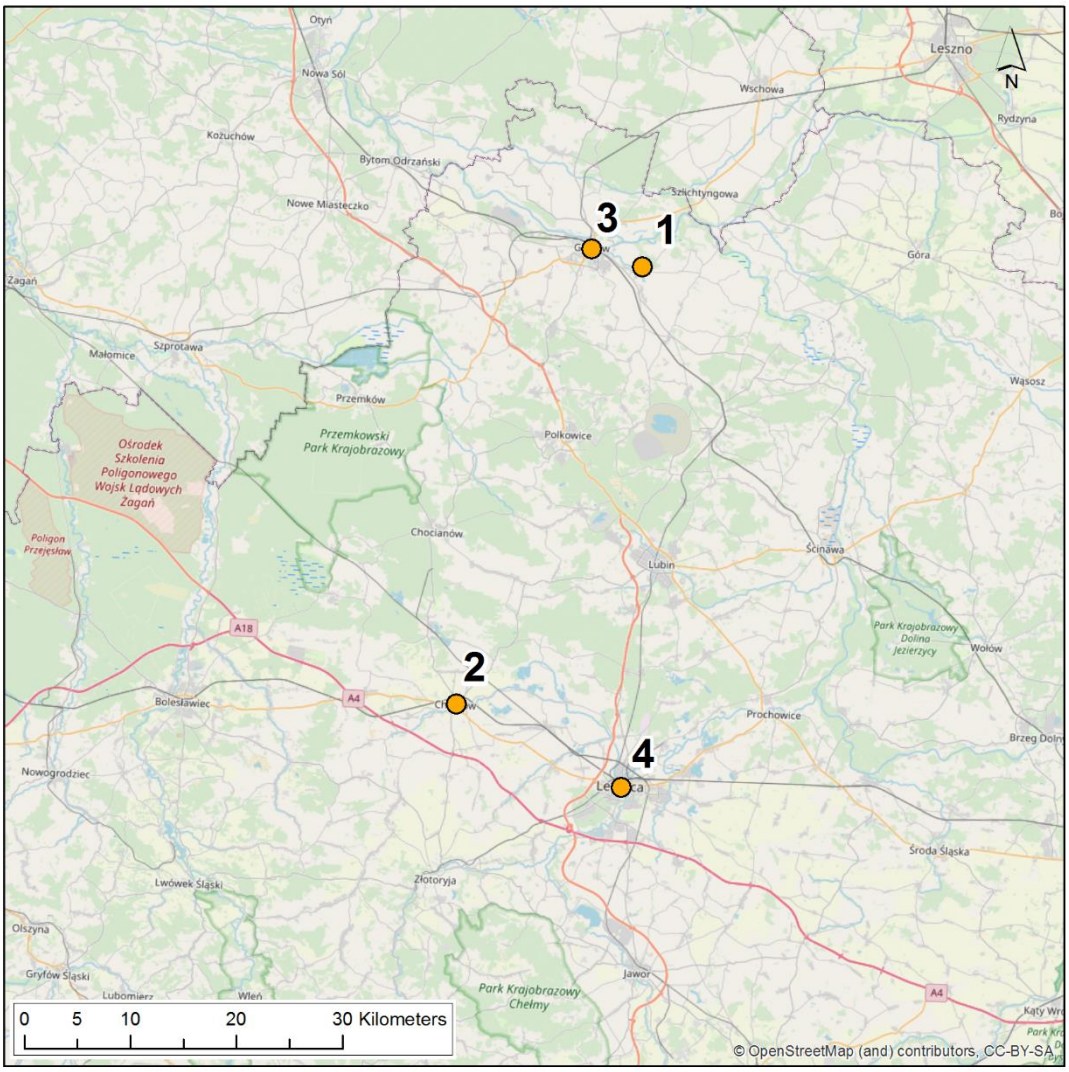
This Non-Technical Summary (NTS) provides an overview on the environmental and social impacts (E&Ss) associated with the construction, operation and decommissioning of a portfolio of 28 *Photovoltaic Power Projects* in Poland (hereinafter referred to as *"the PV Projects"*) and on the measures considered to keep these potential impacts at acceptable levels so that no harmful effects are induced and all applicable norms and regulations are met.

These PV Projects are grouped in three main clusters, named after the previous developers from which Quadran Polska acquired them, as follows*:*

- Cluster EWG – comprises five PV Projects located in Dolnośląskie Voivodeship, southwestern Poland, approximately 60 km from each other; these are already constructed by the previous owner (EWG Sp. z o.o.) and in operation since April 2019;
- Cluster WWS – comprises eleven PV Projects located in Dolnośląskie Voivodship, southwestern Poland, located approximately 90 km from each other; all are in the pre-construction stage and named after the initial developer WestWind ENERGY Polska Sp. z o.o.;
- Cluster Solma – comprises twelve PV Projects located in Kujawsko-Pomorskie Voivodship, northern and central Poland, approximately 35 km from each other; all are in the pre-construction stage and named after the initial developer Solma Mirosław Wojciechowski Sp. z o.o.

The locations of these PV Projects, by clusters, is illustrated in figures below.

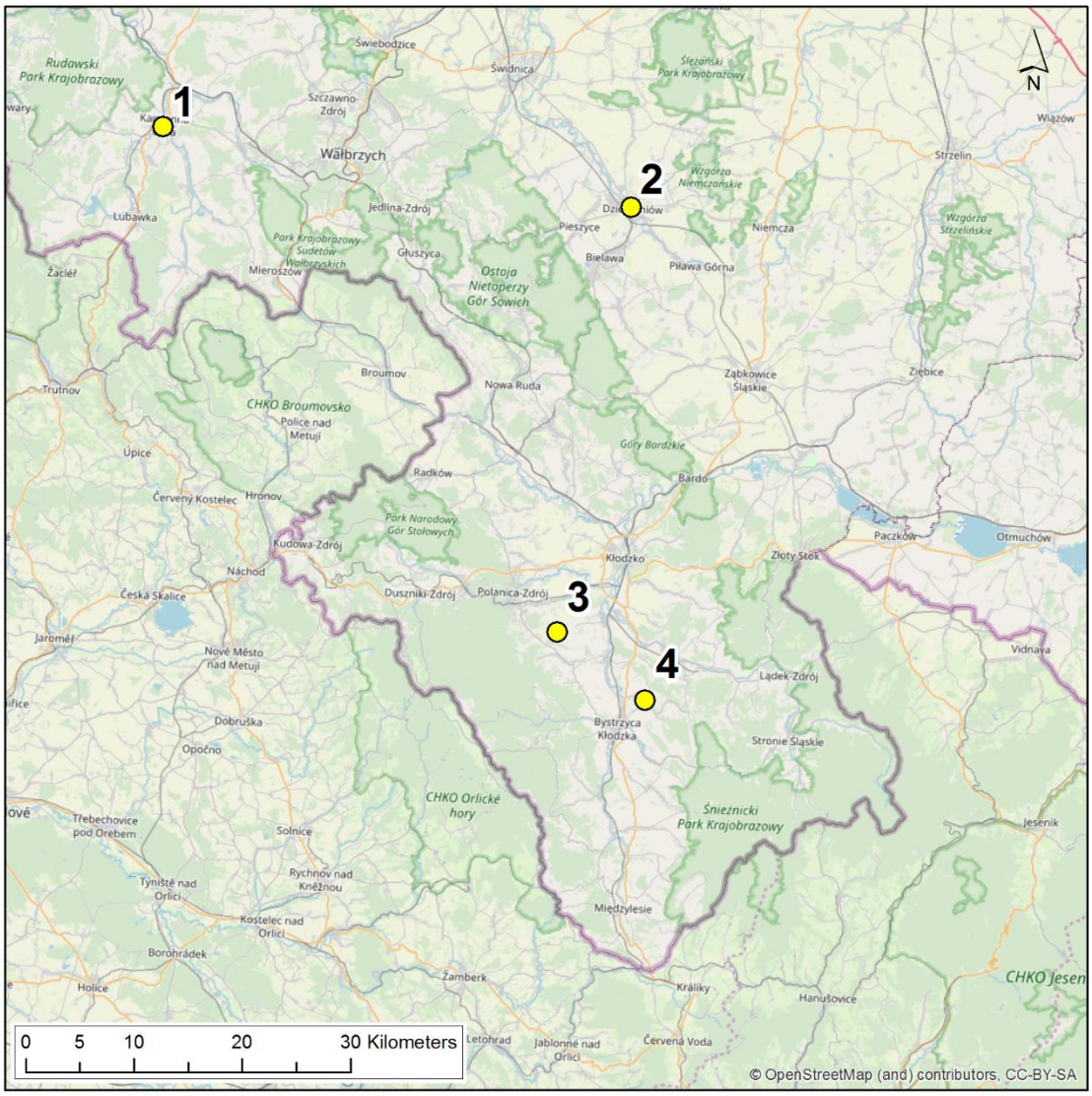
Figure 1-1 Location of the cluster EWG (existing)



Existing PV plants (EWG)
1. Borek Zabornia
2. Chojnów
   - III, IV
3. Głogów
4. Legnica

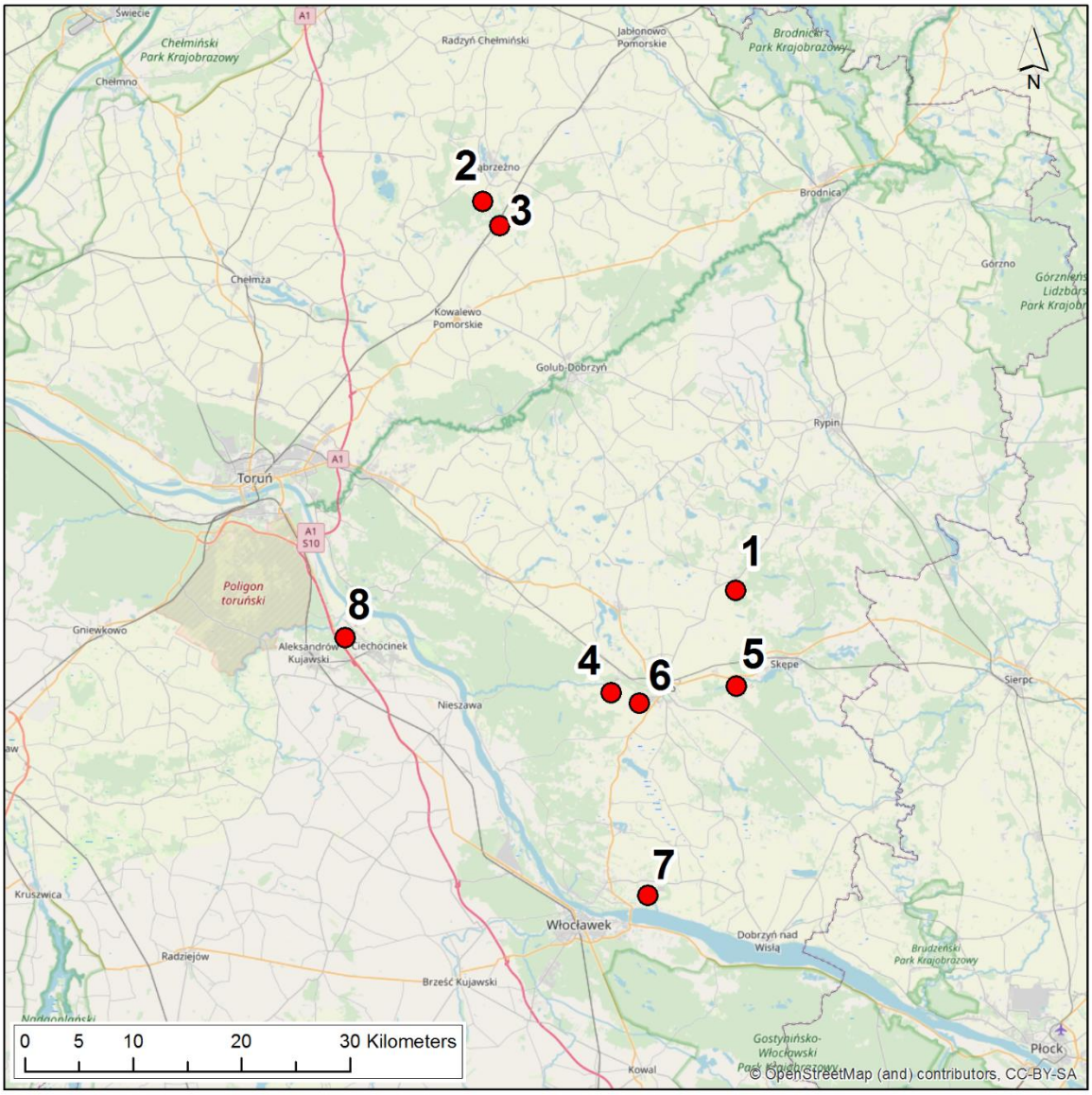
Source: OpenStreetMap, edited by ERM

Figure 1-2 Location of the cluster WWS (planned)



Source: OpenStreetMap, edited by ERM

Figure 1-3 Location of the cluster Solma (planned)



Planned PV plants (Solma)
1. Chrostkowo Nowe (Solma 1)
2. Czystochleb (Solma 2)
3. Małe Radowiska
   - I (Solma 3)
   - II (Solma 11)
4. Maliszewo (Solma 4)
5. Żuchowo (Solma 5)
6. Biskupin (Solma 6)
7. Krępiny
   - I (Solma 7)
   - II (Solma 8)
   - III (Solma 9)
   - IV (Solma10)
8. Wygoda (Solma 12)

Source: OpenStreetMap, edited by ERM

The current Owner of the PV Projects is seeking to enter a financial agreement with international lender institutions such as the European Bank for Reconstruction and Development (EBRD), having strict environmental and social requirements (Performance Requirements - PRs) for project financing. In order to assess how the Project meets these standards, ERM was commissioned to undertake a gap analysis of the environmental documents prepared for the PV Projects against the EBRD PRs.

Information regarding the environmental documents developed for each of the 28 PV Projects and the status of their approval is presented in Table 1.1 below.

Table 1.1 Environmental documents developed for each of the 28 PV Projects and approval status

Cluster name	PV Project name	Environmental Impact Assessment required (yes/no)	Date of Environmental Decision (to carry out the PV Project) issue	Entity issuing the Environmental Decision
EWG	Borek Zabornia	No	December 19th, 2014	Head of Głogów Commune
	Chojnów III	No	January 25th, 2015	Head of Chojnów Commune
	Chojnów IV	No	June 12th, 2014	Head of Chojnów Commune
	Głogów	No	August 6th, 2013	Head of Głogów Commune
	Legnica	No	February 5th, 2015	Mayor of Legnica
WWS	Kamienna Góra 1, 2 and 3	No	November 6th, 2013	Head of Marciszów Commune
	Piskorzów 1 and 2	No	December 18th, 2013	Head of Domaniów Commune
	Starków 1A and 1B	No	May 5th, 2016	Head of Kłodzko Commune
	Starków 2	No	May 5th, 2016	Head of Kłodzko Commune
	Stary Waliszów 1 and 2	No	March 4th, 2014	Mayor of Bystrzyca Kłodzka
	Stary Waliszów 3	No	March 4th, 2014	Mayor of Bystrzyca Kłodzka
Solma	Chrostkowo Nowe (Solma 1)	No	August 2nd, 2016	Head of Chrostkowo Commune
	Czystochleb (Solma 2)	Yes	September 9th, 2015	Head of Wąbrzeźno Commune

	Małe Radowiska (Solma 3)	No	July 17th, 2015	Head of Wąbrzeźno Commune
	Maliszewo (Solma 4)	No	October 29th, 2015	Head of Lipno Commune
	Żuchowo (Solma 5)	Yes	September 9th, 2015	Mayor of City and Commune of Skępe
	Biskupin (Solma 6)	No	June 19th, 2017	Head of Lipno Commune
	Krępiny I (Solma 7)	No	April 19th, 2013	Head of Fabianki Commune
	Krępiny II (Solma 8)	No	July 11th, 2017	Head of Fabianki Commune
	Krępiny III (Solma 9)	No	September 21st, 2017	Head of Fabianki Commune
	Krępiny IV (Solma 10)	No	September 21st, 2017	Head of Fabianki Commune
	Małe Radowiska II (Solma 11)	No	October 25th, 2017	Head of Ryńsk Commune
	Wygoda (Solma 12)	Yes	September 12th, 2017	Head of Aleksandów Kujawski Commune

Where EIA reports were prepared, these identify the environmental and social impacts anticipated to occur as a result of the Project implementation and define mitigation measures. For PV Projects where a Project Information Card was prepared, this provides a high-level overview of environmental impacts.

Additionally, as part of this process, and to bridge the gaps identified to lender requirements, ERM also developed additional documents such as:

- this NTS;
- a Corporate Stakeholder Engagement Framework (see Section 4).

The above documents will be translated into Polish and together with the local EIA reports and/or Project Information cards will form the disclosure package for the Project and will be made publicly available. Furthermore, the Corporate Stakeholder Engagement Framework will be used by the Project Owner to develop a Stakeholder Engagement Plan for the Project.

The disclosure package will be publicly available in hard copy at Quadran's office at the following address: 2c Wagonowa Street, 53-609 Wroclaw. Additionally, the electronic form of these documents will be available for consultation on:

- Project Owner website: www.quadran-international.com; and
- EBRD website (www.ebrd.com).

There is a mechanism in place to receive and address grievances, questions, comments and suggestions from stakeholders. Such grievances regarding the Project can be submitted through the following channels:

- by regular mail to: Quadran Polska, 2c Wagonowa Street, 53-609 Wroclaw, Poland;
- by e-mail to: biuro@quadran-international.com;
- by contacting the Project's Communication Officer: Miroslaw Polec, Head of Development, email: m.polec@quadran-international.com, phone: +48 512 086 694.

2. SUMMARY OF THE PORTFOLIO OF PV PROJECTS

2.1 Site selection criteria

The locations of the PV Projects were selected based on a number of criteria, which included:

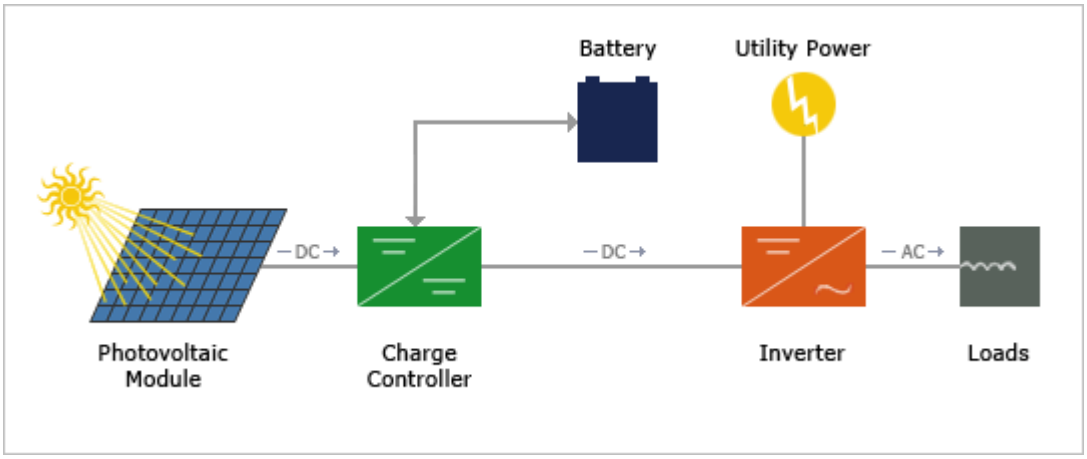
- the sites are characterized by optimized sunlight conditions;
- the sites have good access via the existing public roads;
- suitable geotechnical ground conditions;
- land availability;
- limited environmental, health and social predicted impacts (e.g. health protection buffers, low-value landscape area etc.).

2.2 PV Technology

PV panels are composed of photovoltaic cells, which convert solar energy into electricity.

Produced electricity is transmitted by low voltage power cables to the inverter, where direct current (DC) is converted to alternating current (AC). Then, electricity is sent to the transformer station.

Figure 2-1 PV system diagram



Source: http://2.fqem.spvgg-trier.de/muc/pv-system-diagram.html

PV plants operate 24 hours a day, all year long, with the generation of solar energy depending on the intensity of solar radiation. The service life of the panels is estimated at 25-30 years.

Based on the information provided in the environmental decisions, solar panels of EWG, WWS and Solma clusters will be washed using water and biodegradable detergents.

2.3 Description of the portfolio of PV Projects

2.3.1 Existing PV power plants (EWG)

The description of the PV Projects in the portfolio is provided in **Error! Reference source not found.** below.

Table 2.1 Presentation of PV Projects in the portfolio

Cluster name	PV Project name	Capacity of PV Project (MW)	Total footprint of the PV Project (ha)	Located in protected natural area (yes/no)	Communes affected by the PV Project	Closest residential area (distance and orientation)	PV Project schedule	Includes transformer station in the PV Project components (yes, no)	Total length of access roads for the PV Project	Total length and voltage of transmission lines (underground)
EWG	Borek Zabornia	0.911	3.75	No	Głogów Commune	1 km southwest	Civil works were completed in April 2019, and the official commissioning date was in April 2019	Yes	7.5 m	9.9 km
	Chojnów III	0.992	4.34	No	Chojnów Commune	0.5 km east		Yes	6.0 m	1.9 km
	Chojnów IV	0.949	2.90	No	Chojnów Commune	0.5 km east		Yes	6.0 m	10.9 km
	Głogów	0.990	2.00	No	Głogów Commune	0.5 km south		Yes	7.5 m	9.9 km
	Legnica	0.787	2.81	No	City of Legnica	0.5 km south		Yes	4.25 m	4.6 km
WWS	Kamienna Góra 12 and 3	0.990	2.00	No	Marciszów Commune	0.5 km north	Civil works have been started at the beginning of September 2019 with commissioning planned for January 2020.	Yes	No information available	No information available
	Piskorzów 1	0.982	1.60	No	Domaniów Commune	0.5 km southeast		Yes	No information available	No information available
	Piskorzów 2	0.998	2.14	No	Domaniów Commune	0.5 km southeast		Yes	No information available	No information available

Cluster name	PV Project name	Capacity of PV Project (MW)	Total footprint of the PV Project (ha)	Located in protected natural area (yes/no)	Communes affected by the PV Project	Closest residential area (distance and orientation)	PV Project schedule	Includes transformer station in the PV Project components (yes, no)	Total length of access roads for the PV Project	Total length and voltage of transmission lines (underground)
	Starków 1A	0.989	1.88	No	Kłodzko Commune	0.2 km north		Yes	No information available	No information available
	Starków 1B	0.998	1.88	No	Kłodzko Commune	0.2 km north		Yes	No information available	No information available
	Starków 2	0.495	1.08	No	Kłodzko Commune	0.2 km east		Yes	No information available	No information available
	Stary Waliszów 1	0.997	2.02	No	City of Bystrzyca Kłodzka	0.2 km north		Yes	No information available	No information available
	Stary Waliszów 2	0.995	1.86	No	City of Bystrzyca Kłodzka	0.2 km north		Yes	No information available	No information available
	Stary Waliszów 3	0.997	2.02	No	City of Bystrzyca Kłodzka	0.25 km northwest		Yes	No information available	No information available
Solma	Chrostkowo Nowe (Solma 1)	0.990	2.00	No	Chrostkowo Commune	0.25 km northwest	Civil works have been started at the	Yes	No information available	No information available

Cluster name	PV Project name	Capacity of PV Project (MW)	Total footprint of the PV Project (ha)	Located in protected natural area (yes/no)	Communes affected by the PV Project	Closest residential area (distance and orientation)	PV Project schedule	Includes transformer station in the PV Project components (yes, no)	Total length of access roads for the PV Project	Total length and voltage of transmission lines (underground)
	Czystochleb (Solma 2)	0.840	1.90	Yes	Ryńsk Commune	0.25 km south	beginning of September 2019 with commissioning planned for January 2020.	Yes	9.7 m	No information available
	Małe Radowiska (Solma 3)	0.950 M	1.80	No	Wąbrzeźno Commune	0.25 km northeast		Yes	37.2 m	No information available
	Maliszewo (Solma 4)	0.920	1.70	No	Lipno Commune	0.3 km south		Yes	No information available	No information available
	Żuchowo (Solma 5)	0.980	2.00	Yes	City and Commune of Skępe	0.2 km west		Yes	No information available	No information available
	Biskupin (Solma 6)	0.980	2.10	No	Lipno Commune	0.2 km southeast		Yes	No information available	No information available
	Krępiny I (Solma 7)	0.999	2.00	No	Fabianki Commune	0.1 km south		Yes	No information available	No information available
	Krępiny II (Solma 8)	0.809	2.00	No	Fabianki Commune	0.1 km south		Yes	No information available	No information available
	Krępiny III (Solma 9)	0.773	1.60	No	Fabianki Commune	0.1 km south		Yes	No information available	No information available

Cluster name	PV Project name	Capacity of PV Project (MW)	Total footprint of the PV Project (ha)	Located in protected natural area (yes/no)	Communes affected by the PV Project	Closest residential area (distance and orientation)	PV Project schedule	Includes transformer station in the PV Project components (yes, no)	Total length of access roads for the PV Project	Total length and voltage of transmission lines (underground)
	Krępiny IV (Solma 10)	0.668	1.60	No	Fabianki Commune	0.1 km south		Yes	No information available	No information available
	Małe Radowiska II (Solma 11)	0.750	1.60	No	Ryńsk Commune	0.25 km northeast		Yes	No information available	No information available
	Wygoda (Solma 12)	0.785	1.60	Yes	Aleksandrów Kujawski Commune	0.1 km southeast		Yes	No information available	No information available

2.4 Other Projects in the Area

Based on public information, the operating PV power plants located in the vicinity of the PV Projects included in Quadran Polska's portfolio are presented in Table 2.2 below:

Table 2.2 Operating PV plants identified in the vicinity of the PV Projects in Quadran Polska's portfolio

Cluster name	PV Project name	Location of the PV plant identified in the vicinity of the PV Project	Capacity of the PV plant identified	Distance to the PV Project	Orientation
EWG	Borek Zabornia	Sława	200 kW	25 km	North
	Chojnów III and IV	Złotoryja	200 kW	15 km	South
	Głogów	Sława	200 kW	24 km	North
	Legnica Piekary	Legnica	1000 kW	6 km	Northwest
WWS	Kamienna Góra 1, 2 and 3	No PV power plants have been identified in the vicinity of the Projects			
	Piskorzów 1 and 2	Wrocław	739 kW	20 km	Northwest
	Starków 1A, 1B and 2	No PV power plants have been identified in the vicinity of the Projects			
	Stary Waliszów 1, 2 and 3	No PV power plants have been identified in the vicinity of the Projects			
Solma	Chrostkowo Nowe (Solma 1)	Czernikowo	4000 kW	18 km	West
	Czystochleb (Solma 2)	No PV power plants have been identified in the vicinity of the Project			
	Małe Radowiska and Małe Radowiska II (Solma 3 and 11)	No PV power plants have been identified in the vicinity of the Project			
	Maliszewo (Solma 4)	Czernikowo	4000 kW	16 km	Northwest
	Żuchowo (Solma 5)	Czernikowo	4000 kW	25 km	Northwest
	Biskupin (Solma 6)	Czernikowo	4000 kW	18 km	Northwest
	Krępiny I, II, III and IV (Solma 7, 8, 9 and 10)	No PV power plant have been identified in the vicinity of the Projects			

	Wygoda (Solma 12)	Czernikowo	4000 kW	15 km	Northeast

Considering the distances at which these additional PV plants were identified, it is unlikely that cumulative impacts will arise.

The Company Quadran Polska is committed to maintain exchange of information on the results of biodiversity monitoring for the PV Projects with owners and operators of the other PV plants identified in the respective areas.

2.5 Environmental Performance

The total annual energy production from the PV Projects is planned at:

- 4.585 MWh/year (90% Probability) for the operational PV Projects in the EWG Cluster;
- 10.418 MWh/year (90% Probability) for the PV Projects to be constructed in the WWS Cluster;
- 10.211 MWh/year (90% Probability) for the PV Projects to be constructed in the Solma Cluster.

As a positive effect, the PV power plants operation results in a significant reduction of greenhouse gas (GHG) emissions, by replacing CO_2 emitting power generation facilities.

In addition to GHG emission savings, the operation of PV power plants also results in significant avoidance of post-combustion emissions.

The equivalent production of electricity by the largest Polish hard-coal power plant would result in the following emissions (estimations based on emission factors for 2011):

Table 2.3 Avoidance of emissions that would be generated by coal-fired power plants

PV plant / Parameter	Measurement unit	EWG Cluster	WWS Cluster	Solma Cluster
CO_2	Kg/MWh	2925,2	6646,7	6514,6
PM		0,4	0,9	0,9
SO_2		12,1	27,4	26,9
NO_x		7,9	17,9	17,5

3. SUMMARY OF IMPACTS AND MITIGATION MEASURES

EIA Reports prepared for the PV Projects (see Table 1.1 above) identify environmental risks and impacts associated with the respective PV Projects and define mitigation measures. For PV Projects which did not require an EIA Report, the Project Information Card includes information only about the specific environmental impacts associated to such development projects and define appropriate mitigation measures.

3.1 Soil and Groundwater

Impacts on soil and groundwater generated by PV Projects could potentially result from leakage of lubricants from the transformer substation. However, this is unlikely due to the liquid retention systems integrated into the structure of the electrical substations.

The following mitigation measures were defined to avoid potential contamination:

- regular checks and maintenance works are performed in order to keep all equipment in good condition;
- maintenance works are restricted to specially designated platforms with strict control of spills;
- maintenance machinery and vehicles can move only on designated internal roads;
- procedures for responding to emergencies/spills of hazardous materials, and procedures for storage and handling fuel, as well as for waste management are developed and implemented;
- no hazardous substances are stored at the sites.

With the above mitigation measures in place, impacts on soil and groundwater are unlikely to be significant.

3.2 Surface Water

3.2.1 Existing PV power plants (EWG)

Surface water courses identified in the vicinity of the PV Projects in Quadran Polska's portfolio are presented in Table 3.1 below:

Table 3.1 Surface water courses identified in the vicinity of the PV Projects in Quadran Polska's portfolio

Cluster name	PV Project name	Name of the surface water course identified in the vicinity of the PV Project	Distance to the PV Project	Orientation
EWG	Borek Zabornia	Odra River Czarna River	0.7 km 0.8 km	North Northwest
	Chojnów III and IV	Skora River Unnamed water reservoirs	1.6 km 3.7 km	South Northwest
	Głogów	Odra River Krzycki Stream	1.6 km 2.8 km	South North
	Legnica Piekary	Wierzbiak River Unnamed water reservoirs Kaczawa River	Adjacent 1.0 km 3.7 km	East Northeast West
WWS	Kamienna Góra 1, 2 and 3	Bóbr River Nysa Szalona River	2.6 km 3.5 km	Southwest North
	Piskorzów 1 and 2	Unnamed stream Żurawka Stream	0.3 km 1.6 km	Southeast Northeast
	Starków 1A and 1B	Duna Dolna River Wielisławka River	1.7km 4.2 km	North North

		Nysa Kłodzka River	4.7 km	East
	Starków 2	Duna Dolna River Wielisławka River Nysa Kłodzka River	0.4 km 2.6 km 5.1 km	North North East
	Stary Waliszów 1 and 2	Unnamed stream Nysa Kłodzka River	0.3 km 1.2 km	North West
	Stary Waliszów 3	Unnamed stream Nysa Kłodzka River	0.8 km 1.3 km	East West
Solma	Chrostkowo Nowe (Solma 1)	Unnamed water reservoir Unnamed water reservoir Sarnowskie Lake	1.4 km 2.4 km 3.4 km	South North Northeast
	Czystochleb (Solma 2)	Struga Stream Lake Frydek Zamkowe Lake Sitno Lake	1.9 km 2.4 km 3.7 km 4.0 km	East Northeast North Northeast
	Małe Radowiska and Małe Radowiska II (Solma 3 and 11)	Unnamed stream Unnamed water reservoir	1.5 km 1.5 km	East Northeast
	Maliszewo (Solma 4)	Mień River Sumińskie Lake Kikolskie Lake	0.2 km 4.0 km 4.0 km	North North North
	Żuchowo 5 (Solma 5)	Mień River Unnamed water reservoir Wielkie Lake	0.5 km 1.5 km 1.9 km	North West East
	Biskupin (Solma 6)	Unnamed stream Mień River	0.1 km 1.6 km	West, southwest North
	Krępiny I, II, III and IV (Solma 7, 8, 9 and 10)	Vistula River	1.0 km	North
	Wygoda (Solma 12	Tążyna River Vistula River	0.5 km 1.6 km	Northwest Northeast

The plants will not be supplied with water for potable and sanitary purposes. Based on the information provided in the environmental decisions, solar panels will be washed using water and biodegradable detergents.

Therefore, the sites will not impact the quality of surface waters.

3.3 Air Quality

During the construction of the PV Projects, air emissions consist of dust generated from construction activities (e.g. traffic on local roads, land moving) and combustion related emissions from vehicles and construction equipment. These impacts are mitigated by employing good construction practices including use of well-maintained construction equipment and employing dust abatement measures.

No significant air quality impacts are associated with the operation of the PV Projects. Operational traffic emission impacts are those associated with a limited number of vehicles accessing the site for maintenance or security purposes.

3.4 Biodiversity and Nature Conservation

3.4.1 Site Context

The Project is located on agricultural lands and arable fields; the elevation varies between 68 m above sea level (a.s.l.) and 459 m a.s.l.

3.4.2 Legally Protected Sites

Three PV Projects included in the Solma Cluster (2, 6 and 12) are located in designated Landscape Legally Protected Sites. For this reason, EIA Reports were prepared for the respective PV Projects as presented in Table 1.1 above.

The legally protected areas identified in the vicinity of each PV Project are presented in Table 3.2 below.

Table 3.2 Legally protected areas identified in the vicinity of the PV Projects in Quadran Polska portfolio

Cluster name	PV Project name	Name of the legally protected area identified in the vicinity of the PV Project	Distance to the PV Project	Orientation
EWG	Borek Zabornia	Łęgi Odrzańskie Natura 2000 PLH020018	0.6 km	East, northeast
		Łęgi Odrzańskie Natura 2000 PLB020008	0.6 km	East, northeast
		Dolina Baryczy Landscape Protected Area	6.8 km	East
		Uroczysko Obiszów Reserve	9.6 km	South
		Przemkowski Landscape Park	19.0 km	Southwest
	Chojnów III and IV	Dolina Czarnej Wody Landscape Protection Area	1.9 km	Northeast
		Bory Dolnośląskie Natura 2000 PLB020005	5.8 km	Northwest

Cluster name	PV Project name	Name of the legally protected area identified in the vicinity of the PV Project	Distance to the PV Project	Orientation
		Źródliska koło Zimnej Wody Natura 2000 PLH020092	9.6 km	Northeast
	Legnica Piekary	Jezioro Koskowice Reserve	2.0 km	East
		Torfowisko Kunickie Reserve	3.6 km	Northeast
		Pątnów Legnicki Natura 2000 PLH020052	6.0 km	North
		Chełmy Landscape Park	15.0 km	South
	Głogów	Łęgi Odrzańskie Natura 2000 PLB020008	0.5 km	South
		Łęgi Odrzańskie Natura 2000 PLH020018	0.5 km	South
		Dolina Baryczy Protected Landscape Area	5.0 km	East
WWS	Kamienna Góra 1, 2 and 3	Góry i Pogórze Kaczawskie Natura 2000 PLH020037	0.2 km	West
		Rudawy Janowickie Natura 2000 PLH020011	1.9 km	Southwest
		Rudawski Landscape Park	2.4 km	West
		Masyw Trójgarbu Landscape Protection Area	6.7 km	Southeast
		Buki Sudeckie Reserve	6.8 km	North

Cluster name	PV Project name	Name of the legally protected area identified in the vicinity of the PV Project	Distance to the PV Project	Orientation
	Piskorzów 1 and 2	Grądy Odrzańskie Natura 2000 PLB020002	8.7 km	North, northeast
		Grądy Odrzańskie Natura 2000 PLH020017	9.5 km	North, northeast
		Zwierzyniec Reserve	13.0 km	East
	Starków 1A, 1B and 2	Góry Bystrzyckie i Orlickie Landscape Protection Area	3.2 km	West
		Pasmo Krowiarki Natura 2000 PLH020019	4.5 km	East, southeast
		Piekielna Dolina koło Polanicy Natura 2000 PLH020010	5.9 km	Northwest
		Dolina Bystrzycy Łomnickiej Natura 2000 PLH020083	6.1 km	Southwest
		Sztolnia w Młotach Natura 2000 PLH020070	7.6 km	South
		Góry Stołowe Natura 2000 PLB020006	7.8 km	West
		Góry Stołowe National Park	11.0 km	Northwest
	Stary Waliszów 1, 2 and 3	Pasmo Krowiarki Natura 20000 PLH020019	1.9 km	North, northeast
		Góry Bystrzyckie i Orlickie Landscape Protection Area	4.6 km	West
		Śnieżnicki Landscape Park	5.8 km	East

Cluster name	PV Project name	Name of the legally protected area identified in the vicinity of the PV Project	Distance to the PV Project	Orientation
		Dolina Bystrzycy Łomnickiej Natura 2000 PLH020083	5.8 km	Northwest
Solma	Chrostkowo Nowe (Solma 1)	Jezioro Skąpskie Landscape Protection Area	3.8 km	Southeast
		Przełom Mieni Reserve	7.1 km	South
		Torfowisko Mieleńskie Natura 2000 PLH040018	7.8 km	Southeast
		Stary Zagaj Natura 2000 PLH040038	10.0 km	South
	Czystochleb (Solma 2)	Torfowisko-Jeziorno-Leśny Zgniłka-Wieczno-Wronie Landscape Protection Area	Within	Within
		Wronie Reserve	7.0 km	Northwest
		Doliny Drwęcy Landscape Protection Area	7.5 km	Southeast
	Małe Radowiska and Małe Radowiska II (Solma 3 and 11)	Torfowiskowo-Jeziorno-Leśny Zgniłka-Wieczno-Wronie Landscape Protection Area	0.05 km	Northeast
		Doliny Drwęcy Landscape Protection Area	2.8 km	Southeast
		Dolina Drwęcy Natura 2000 PLH280001	11.0 km	Southeast
	Maliszewo (Solma 4)	Niziny Ciechocińskie Landscape Protection Area	0.7 km	West

Cluster name	PV Project name	Name of the legally protected area identified in the vicinity of the PV Project	Distance to the PV Project	Orientation
		Bór Wąkole im. prof. Klemensa Kępczyńskiego Reserve	6.7 km	Southwest
		Przełom Mieni Reserve	10.5 km	East
		Cyprianka Natura 2000 PLH040013	10.7 km	South
	Żuchowo 5 (Solma 5)	Jezioro Skępskie Landscape Protection Area	Within	Within
		Przełom Mieni Reserve	0.4 km	Northwest
		Stary Zagaj Reverve	0.8 km	Southeast
		Stary Zagaj Natura 2000 PLH040038	1.7 km	Southeast
		Torfowisko Mieleńskie Natura 2000 PLH040018	6.0 km	Northeast
		Torfowisko Mieleńskie Reserve	6.0 km	Northeast
		Przyrzecze Skrwy Prawej Landscape Protection Area	9.0 km	Southeast
	Biskupin (Solma 6)	Stary Zagaj Reverve	0.8 km	Southeast
		Niziny Ciechocińskie Landscape Protection Area	2.1 km	West
		Jezioro Skępskie Landscape Protection Area	4.5 km	East
		Jezioro Piaseczyńskie Landscape Park	8.9 km	Southeast

Cluster name	PV Project name	Name of the legally protected area identified in the vicinity of the PV Project	Distance to the PV Project	Orientation
		Cyprianka Natura 2000 PLH040013	9.0 km	Southwest
		Stary Zagaj Natura 2000 PLH040038	10.0 km	West
	Krępiny I, II, III and IV (Solma 7, 8, 9 and 10)	Włocławska Dolina Wisły Natura 2000 PLH040039	2.8 km	Northwest
		Kulin Reserve	4.0 km	West
		Gostynińsko-Włocławski Landscape Park	5.0 km	South
		Dolina Dolnej Wisły Natura 2000 PLB040003	7.0 km	Northwest
		Cyprianka Natura 2000 PLH040013	8.8 km	Northwest
		Nizina Ciechocińska Landscape Protection Area	9.3 km	Northwest
	Wygoda (Solma 12)	Nizina Ciechocińska Landscape Protection Area	Within	Within
		Ciechocinek Natura 2000 PLH040019	2.0 km	Northeast
		Dolina Dolnej Wisły Natura 2000 PLB040003	2.1 km	Northwest
		Nieszawska Dolina Wisły Natura 2000 PLH040012	2.1 km	North, northeast, east
		Ciechocinek Reserve	2.8 km	Northeast

Cluster name	PV Project name	Name of the legally protected area identified in the vicinity of the PV Project	Distance to the PV Project	Orientation
		Wydmowy na południe od Torunia Landscape Protection Area	3.9 km	Northwest
		Wydmy Kotliny Toruńskiej Natura 2000 PLH040041	6.2 km	Northeast
		Uroczysko Koneck Reserve	8.4 km	South

3.4.3 Birds

Bird surveys were conducted for the PV Solma 5 (in October 2016 and December 2016) and Solma 12 (April 2017 and May 2017). No birds were observed during the survey for Solma 5. The Solma 12 survey indicated the presence of Eurasian skylark (*Alauda arvensis*), listed in Annex II of the Birds Directive.

The PV Projects are located on arable lands, affected by significant transformation as a result of agricultural activities. The Environmental Decisions issued for the operational PV Projects in the EWG Cluster did not impose any mandatory requirements to monitor birds at any stage of these PV Projects' implementation.

However, considering that agricultural areas can potentially constitute breeding habitats for protected birds that nest on the ground (e.g. thrush nightingale), the Environmental Decisions require surveys to be undertaken prior to starting construction works or set specific requirements for construction period for the PV Projects in the Solma Cluster (i.e. Solma 2, Solma 4, Solma 5, Solma 6, Solma 7, Solma 8, Solma 9, Solma 10) in order to confirm that no breeding habitats will be affected. With the implementation of this mitigation measure, impacts to birds are unlikely to arise during the construction of the planned PV Projects.

According to EIA, no bird monitoring requirements are considered necessary for the operation of the PV Projects. However, on a voluntary basis the Project Owner will conduct a site visit for EWG cluster and additional bird survey for WWS and Solma clusters. Considering the above, if adequate mitigation measures are implemented, no significant impacts on birds are expected.

3.4.4 Other Biodiversity Receptors

3.4.4.1 Habitats and Flora

Habitat survey was not required for the PV Projects in the three clusters, with the exception of Solma 2, 5 and 12 PV Projects (Solma Cluster). For these three PV Projects, a habitat assessment was undertaken at the stage of developing the EIA Report and indicated the PV Projects would only affect agricultural lands with no flora species of conservation concern.

According to EIA, no impacts on habitats and flora are expected to arise during the operation of the PV Projects. However, on a voluntary basis the Project Owner will conduct an additional screening on vegetation for EWG cluster and supplemental vegetation survey for WWS and Solma clusters. Considering the above, if adequate mitigation measures are implemented, no significant impacts on habitats and flora are expected.

3.4.4.2 *Amphibians, Reptiles and Mammals*

Surveys were conducted for PV Solma 5 (April 2017) and PV Solma 12 (April and May 2017) to understand how the areas are used for breeding and feeding by amphibians, reptiles and mammals. For Solma 5 only a small number of mammals were observed. For Solma 12, no amphibians, reptiles or mammals were identified.

However, due to the close proximity of a small water reservoir, the control of excavations was recommended during the construction phase in order to remove any trapped animals. In order to allow the movement of amphibians, reptiles and small mammals, a distance has been defined to be kept between the ground and the fence.

According to the EIA, no significant impacts on amphibians, reptiles and small mammals have been identified in relation to the PV Projects. However, on a voluntary basis the Project Owner will conduct a site visit to document herpetofauna and mammals for EWG cluster and additional surveys for WWS and Solma clusters.

Considering the above, if adequate mitigation measures are implemented, no significant impacts on herpetofauna and mammals are expected.

3.5 Landscape and Visual Impacts

The PV Projects include the construction of solar panels with a height not exceeding 4 m together with accompanying buildings (transformer substation building and technical building). Given the construction height, the PV plants are visible only from the closest areas (within a few hundred meters).

In order to mitigate any potential landscape and visual impacts, the transformer substation and the technical buildings within the PV Projects were or will be painted in gray or green colors.

No landscape and visual impacts are anticipated as a result of implementing the PV Projects.

3.6 Cultural Heritage

Cultural heritage sites identified in the vicinity of the PV Projects in Quadran Polska's portfolio are presented in Table 3.3 below.

Table 3.3 Cultural heritage sites identified in the vicinity of the PV Projects in Quadran Polska's portfolio

Cluster name	PV Project name	Name of the cultural heritage site identified in the vicinity of the PV Project	Distance to the PV Project	Orientation
EWG	Borek Zabornia	Park and Palace Complex in Borek	2.0 km	South
		Church of Corpus Christi in Głogów	5.0 km	West
		City Hall in Głogów	5.0 km	West
	Chojnów III and IV	Train Station in Chojnów	1.5 km	South

		Church of Saint Peter and Paul	2.0 km	South
		Historic city center	2.0 km	South
	Legnica Piekary	City Park	4.0 km	Northwest
		City Hall	4.0 km	Northwest
		Hisotric city center	4.0 km	Northwest
	Głogów	Train Station in Serby	3.0 km	West
		Church of John of Nepomuk in Wilków	3.5 km	Southeast
		Chruch of Corpus Christi in Głogów	5.0 km	Southwest
		City Hall in Głogów	5.0 km	Southwest
WWS	Kamienna Góra 1, 2 and 3	Church in Pastewnik	2.1 km	South
		Church in Domanów	2.4 km	East
		Church in Marciszów	2.5 km	South
	Piskorzów 1 and 2	Church of Saint Michael in Piskorzów	1.0 km	Southeast
	Starków 1A and 1B	Park and Palace Complex in Starków	1.0 km	North
		Church of Saint Nicholas	1.5 km	North
	Starków 2	Church of Saint Nicholas	0.5 km	South
		Park and Palace Complex in Starków	1.0 km	South
	Stary Waliszów 1, 2 and 3	City Hall in Bystrzyca Kłodzka	2.0 km	West
		Evangelical Church in Bystrzyca Kłodzka	2.0 km	West

		Church of Saint Michael in Bystrzyca Kłodzka	2.0 km	West
Solma	Chrostkowo Nowe (Solma 1)	Church of Saint Barbara in Chrostkowo	3.0 km	Northwest
	Czystochleb (Solma 2)	Magistrates' Court in Wąbrzeźno Chruch of Holy Mary Church of Saints Simon and Jude	3.0 km 3.0 km 3.0 km	North North North
	Małe Radowiska and Małe Radowiska II (Solma 3 and 11	Kurgan	1.5 km	Southwest
	Maliszewo (Solma 4)	Evangelical cemetery in Żabieniec	3.0 km	Southwest
	Żuchowo (Solma 5)	Mill in Żuchowo Palace and Park Complex in Karnkowo	0.4 km 2.8 km	Northwest Northwest
	Biskupin (Solma 6)	City Park in Lipno	2.5 km	Northeast
	Krępiny I, II, III and IV (Solma 7, 8, 9 and 10)	Palace in Zarzeczewo	1.0 km	North
	Wygoda (Solma 12)	Graduation towers in Ciechocinek	3.5 km	Southwest

Based on the information presented in the Environmental Decisions, the PV Projects are not likely to generate a direct negative impact on the historical monuments.

Moreover, based on the information provided in the Environmental Decisions, the sites are located outside the range of any documented archaeological stands; therefore, neither the Environmental Decision nor the Building Permit imposed an obligation to conduct construction works under archaeological supervision.

To manage any unknown cultural heritage identified during the construction of the planned projects, the developer will prepare and implement a Chance Find Procedure.

Impacts on cultural heritage during operation of the PV Projects are unlikely to arise.

3.7 Socioeconomic Impact

Socioeconomic impacts associated to the PV Projects at the construction stage included loss of agricultural land, and impacts on livelihoods and local economic activities. The total footprint of each PV Project in presented in Table 2.1 above, and the respective land areas were leased from the land

owners. No physical displacement is required for the PV Projects. The land for the PV Projects was leased from the land owners for a period of 25-30 years.

Land acquisition EWG cluster

The cession and superficies agreements for the land required for the Project were concluded with land owners on a voluntary basis. No owners were forced to give up their land and no physical resettlement was required for the development of the Project. The lease contracts are valid until 2038, in case of Głogów 1 until 2042.

Land acquisition WWS cluster

The cession and superficies agreements for the land required for the Project were concluded with land owners on a voluntary basis. No owners were forced to give up their land and no physical resettlement is required for the development of the Project. The lease contracts are valid until 2043, in case of Kamienna Góra until 2042 and in case of Piskorzów until 2044.

Land acquisition Solma cluster

The cession and superficies agreements for the land required for the Project were concluded with land owners on a voluntary basis. No owners were forced to give up their land and no physical resettlement is required for the development of the Project. The lease contracts are valid until 2037-2046.

- Positive impacts identified in relation to the PV Projects include: direct employment opportunities during the PV Projects construction and operation; it is estimated that an average workforce of 30 people will be required for the construction of the planned PV Projects;
- increase of the annual income of land leasers for each solar panel;
- improvement of the local communication routes;
- increasing the communes' income through payment of fees and taxes;
- annual community support initiatives.

The current Project Owner will develop and implement a Stakeholder Engagement Plan (see section 4) which will also include a formal grievance management procedure for each PV Project.

3.8 Community Health, Safety and Security

3.8.1 Environmental Noise

The noise sensitive receptors are the residential properties located in the vicinity of the PV Project sites. These closest residential properties to each PV Project are presented in Table 2.1 above and it is not considered relevant to generate a potential impact.

During the construction phase, the following activities are likely to generate noise:

- traffic of construction machinery and vehicles to and within the PV Project site;
- ground disturbance activities (e.g. excavations).

Construction activities will be conducted in line with the regulatory requirements in force and will avoid night-time in order to reduce any impacts on noise sensitive receptors.

During the operation, solar panels will not generate any noise.

3.8.2 Glare Effect

Solar panels are designed to absorb light and not reflect it. However, this means that light may be redirected in a specific direction. While PV panels can therefore cause reflections, their intensity is far lower than that of direct sunlight.

In order to minimize reflections, the panels will be coated with anti-reflective coating.

3.8.3 Electromagnetic Interference

PV power plants could potentially cause electromagnetic interference with aviation radar and telecommunication systems (e.g. microwave, television, and radio).

There are no airports in the PV Projects areas, so there are no risks associated with aviation radar interferences. The nearest airports are located in Wrocław and Bydgoszcz, more than 30 km from each PV Project site.

Electromagnetic fields (EMF) are produced by any wiring or equipment carrying electric current. The potential effects of EMF on human health vary depending on the frequency and intensity of the fields. For PV power projects, EMF generation is associated with the overhead transmission lines and substation.

The following measures were adopted to protect employees and the local communities:

- all works on maintenance and repair of the electrical are carried out in compliance with the safety regulations related to these activities;
- electrical substation is fenced and equipped with adequate warning signs;
- entrance to the electrical substation is prohibited except for employees holding adequate permits;
- the substation is regularly inspected for compliance with the relevant safety requirements, constant monitoring is implemented, monthly, quarterly and annual inspections are carried; and
- access to the transformer substation is restricted, and audible and visible warnings are used.

In addition, an obligation to present an as-built study regarding exceedances of the permissible levels of electromagnetic fields was imposed for Solma 2.

No significant residual impacts from electromagnetic interference are predicted.

3.8.4 Public Access and Health and Safety

Appropriate public communication to allow timely notice of affected residents before major construction operations or traffic movements on public roads were implemented during the construction phase of the operational PV Projects in EWG Cluster.

The SEPs to be developed for each PV Project will define an engagement action plan to be implemented for each PV Project, according to its stage of development. For example, for the planned PV Projects, the SEP will define engagement actions to inform on the progress of the project and major construction milestones (e.g. supply of equipment to the sites).

Impacts on community health and safety are predicted to be not significant.

3.9 Cumulative Impacts

Projects can generate impacts in isolation or cumulatively with other projects existing or planned to be developed in the area. Additional projects identified in the Project area are presented in Section 2.4 above.

According to the EIA reports and Project Information Cards, cumulative impacts are considered unlikely to arise given the distance between the PV Projects.

3.10 Transboundary Impacts

Considering the nature, scale and location of the PV Projects, which are located at a distance of at least 15 km from the nearest border with the neighboring country, as well as the range of potential impacts generated by the investment, transboundary impacts are not anticipated.

3.11 Impacts during Decommissioning

Impacts caused by decommissioning activities are in principle comparable with impacts during the construction phase.

The projected operational lifetime of a typical PV Project is 25 years. After this period there are two options: repowering the site and replacing existing panels or decommissioning the site, removing the panels and other major structures and restoring the site.

Prior to decommissioning, a method statement, detailing how the site will be restored is usually prepared and approved by the relevant authorities.

Presently, PV modules are removed and reused elsewhere, if possible. In the case of the foundation works, upper sections are removed and the voids backfilled with appropriate materials to support the land use at that time. Underground cables and deep concrete foundations are usually left in place, as removal is likely to cause more disruption than leaving them in-situ. However, if techniques allowing removal of underground cables with limited disruption and impacts will be available at the time of decommissioning these will be appraised and considered. Areas affected by the PV Project and decommissioning activities will be restored to the land use agreed for the respective plots at that moment in time. The electrical control building and internal equipment is removed and reused or recycled where possible.

4. ENVIRONMENTAL AND SOCIAL MANAGEMENT

The EIA Reports and Project Information Cards performed for the Project identified the potential environmental and social impacts associated with the Project and also defined mitigation measures to be implemented in order to maintain these impacts within acceptable limits. The gap analysis of the EIA Reports and Project Information Cards against EBRD PRs also indicated a number of actions that still are necessary for the Project to meet said standards. These measures have been defined in the following documents that will be used during the Project implementation:

- the Environmental and Social Action Plan (ESAP), which represents a roadmap for implementation of key environmental and social actions required for the Project; furthermore, the ESAP will define additional monitoring measures which will be implemented during Project operation, including responsibilities and timelines for implementation;
- the Corporate Stakeholder Engagement Framework (SEF), which defines the overall engagement strategy and which will be further used by the Project Owner to develop a Project specific Stakeholder Engagement Plan (SEP). The SEP will define the relevant Project stakeholders, planned engagement activities, resources from the Project Owner to deal with stakeholder engagement, community grievance mechanism and management process along with monitoring and evaluation. The Project SEP will aim to lay the foundation for an effective, bilateral communication between the Project and its stakeholders and to build reliable relations between the Project and affected communities. Regular stakeholder engagement will also enable the Project Owner to gain a better understanding of the ways in which communities prefer for receive information about the Project. The Project SEP will be made available to the public on the Project Owner's website, and as hard copy to local authorities and communities. It will be periodically updated as needed, to reflect engagement undertaken, stakeholder feedback and potential changes in the Project.