



# Verified Carbon Standard

## MURAT HEPP



Document Prepared by Ekobil Environmental Services and Consulting Ltd.

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|                                  |                                                                           |
|----------------------------------|---------------------------------------------------------------------------|
| <b>Project title</b>             | Murat HEPP                                                                |
| <b>Project ID</b>                | VCS PD1344                                                                |
| <b>Crediting period</b>          | 05-October-2022 to 04-October-2032                                        |
| <b>Original date of issue</b>    | N/A This is a crediting period renewal request.                           |
| <b>Most recent date of issue</b> | 03-May-2025 is the date on which the document was most recently submitted |
| <b>Version</b>                   | 01.4                                                                      |
| <b>VCS Standard Version</b>      | Version 4.7                                                               |
| <b>Prepared by</b>               | Ekobil Environmental Services and Consulting Ltd.                         |

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# 1 PROJECT DETAILS

## 1.1 Summary Description of the Project

This project Description Document is prepared for the renewal of the crediting period of the VCS Project activity registered under the Project ID VCS 1344.

The original project activity consists of the construction of two Greenfield run-of-river hydroelectric power plants (HEPPs): Murat I and Murat II. These plants are located on the Göksu River flowing through Besni, Adiyaman in Turkey's South-eastern Anatolia Region.

Murat I and Murat II belong to Murat HEPP Energy Electricity Generation and Trade Inc. (hereafter referred as the "project owner").

In the registered PDD, the project capacity of these two cascade-type run-off river hydropower plants was indicated to total 37.221 MW. Later, during the first monitoring period, the total rated electric capacity of the power plants was verified to be 35.478 MWe.

As read from the Murat HEPP Turbine Generator equipment plates, the rated power data, Murat I's installed capacity is 25,230 MWe, while Murat II's is 10,248 MWe. Therefore, the installed capacity is 35,478 MWe. This number is the summation of the values indicated over the generator plates. Later, this capacity is enhanced mechanically by adding five solar PV arrays. Mechanical enhancement suggests that this capacity can only be used as a supportive source when the amount of water to produce electricity is not enough, mainly due to the drought conditions at the geography where the project is installed is severe, indicating a changing climate. As such, the project output is limited to the project's electric capacity that is set to the total of the two hydropower components. The addition of this supporting resource is explained below:

As can be seen in Murat HEPP's updated production license, there is a Hydro project consisting of 6 turbines and generators and a Solar power plant composed of 5 solar PV arrays.

On March 8, 2020, amendments were made to the Electricity Market License Regulations<sup>1</sup> of the host Country (Republic of Turkey). These amendments included provisions for adding auxiliary resources to

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<sup>1</sup> Regulation on the amendment to the electricity market licence regulation, Published on the Official Gazette numbered 31062 On March 8th, 2020, entered into force upon publication.

existing power plants. As a result of this regulation, Murat HEPP has added a 12.006 MWm of solar capacity as an auxiliary resource. This addition did not affect the electric capacity of the project activity which remains same as the previous crediting period. However, the mechanical capacity has increased from 36.789 MWm to a total number of 48.795 MWm with the addition of the Solar Power Groups, planning to generate 18,000 MWh of electricity per year using this auxiliary renewable resource.

The feasibility report for the solar PV arrays completed on 21 August 2020 shows the capacity as 10 MW; later, the host country authorities approved an addition of 2 more Megawatts, resulting a total addition of 12.006 MWm. The generation amount corresponding to 10 MW is indicated as 15,000 MWh for the first intended 10 MW capacity, and the amount corresponding to 12 MW capacity is 20 % more and extrapolated to be 18,000 MWh.

The installation of this auxiliary resource group took place within the boundaries of Murat HEPP; the land used for PV installations was within the project boundary and was not suitable for other land use, such as agriculture or animal grazing, and there was no further need for expropriation. As a result, the commissioning of the Auxiliary Source Solar Power Unit occurred on 20.07.2023. The energy generated by this unit is transmitted to the grid through the same meters and switchyard. It's important to note that this additional solar power unit does not require a separate license from the existing EMRA license, and the installed electric capacity of Murat HEPP will remain unchanged. The electricity it generates is supplied to the national grid at the same tariff for hydroelectric power plants. The financial impacts of integrating this solar power unit as an auxiliary resource are evaluated in the relevant section (See Section 3.5 on Additionality).

The main objective of the project is to generate approximately 150.39 GWh/year<sup>2</sup> of electricity to feed the national grid using a renewable resource in the first 10 years. In the 2nd 10 years of the Project, the Auxiliary Source solar power plant is also expected to generate 18.00 GWh/year. Thus, Murat HEPP is planned to reach 168.39 GWh/year of energy in hydrologically prolific years in total. One must note that these numbers are maximum numbers, and during the first crediting period, the project activity has only passed these numbers twice, but towards the end of the first crediting period, due to the drought experienced in the Mediterranean Basin, this number has dropped significantly. This is the

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<sup>2</sup> EMRA License

motive behind adding solar power arrays to the project activity. By avoiding electricity generation from fossil fuel sources, the project activity reduces greenhouse gas (GHG) emissions that would have occurred in the absence of the project activity.

The average annual emission reductions of the proposed Project are estimated to be 75,362 tonnes of CO<sub>2</sub>e.

The following is the list of Major milestones for the Murat HEPP

**Table 1: Major Project Milestones**

| DATE       | MILESTONE                                                                             |
|------------|---------------------------------------------------------------------------------------|
| 17.09.2006 | The Project is acquired from State Water Affairs(DSI)                                 |
| 3.11.2008  | Water Usage Agreement co-signed with DSI                                              |
| 29.01.2009 | Electricity Production License issued by Energy Market Regulatory Agency (EMRA)       |
| 22.04.2009 | EIA Exemption Certificate issued                                                      |
| Nov.09     | Turbine Purchase Agreement is signed                                                  |
| 13.01.2010 | Financial Closure and Investment Decision for the first crediting period              |
| 13.05.2010 | Invitation letters sent to Village heads for Local Stakeholders Meetings              |
| 14.05.2010 | Stakeholders Meeting announcement at local newspapers                                 |
| 25.05.2010 |                                                                                       |
| 28.05.2010 | Stakeholder Consultation Meeting Held at Şambayat town of Besni district of Adiyaman. |
| 10.06.2010 | Construction Started                                                                  |
| 5.10.2012  | Commissioning Date of Hydro Component                                                 |
| 20.08.2020 | Pannel Supply Contract (Investment Decision Date for the Addition of Solar Component) |
| 21.08.2020 | Feasibility Report Issued for Solar PV (10MW) by Eliss Energy                         |
| 4.10.2022  | End of First Crediting Period                                                         |
| 7.07.2022  | 4K Earth Sciences Ltd. Contracted for the Renewal of Crediting Period                 |
| 20.07.2023 | Commissioning Date of Solar Component                                                 |

## 1.2 Audit History

| Audit type              | Period                               | Program | Validation/verification body name                               | Number of years |
|-------------------------|--------------------------------------|---------|-----------------------------------------------------------------|-----------------|
| Validation/verification | 05-October.2012 to 04.October.2022   | VCS     | RINA Services S.p.A.                                            | Ten years       |
| Validation/verification | 05-October-2012- 30-September-2014   | VCS     | Re-Consult Rüzgar Enerjisi Danışmanlık İç ve Dış Tic. Ltd. Şti. | Two years       |
| Validation/verification | 01-October-2014 to 30 September-2020 | VCS     | 4K Earth Science Private Limited                                | Six years       |
| Validation/verification | 01-October- 2020 – 04-October-2022   | VCS     | EPIC Sustainability Services Private Limited                    | Two years       |
| Validation/verification | 05.October.2022 to 04.October.2032   | VCS     | 4 K Earth Sciences Ltd.                                         | Ten Years       |

## 1.3 Sectoral Scope and Project Type

|                             |                                                                                                                         |
|-----------------------------|-------------------------------------------------------------------------------------------------------------------------|
| Sectoral scope <sup>3</sup> | Sectoral Scope 1: Energy industries (renewable-/non -renewable sources).                                                |
| Project activity type       | The project type is grid connected electricity generation from renewable sources. The project is a non-grouped project. |

<sup>3</sup> Projects, activities, or methodologies may be developed under any of the 16 VCS sectoral scopes: <https://verra.org/programs/verified-carbon-standard/vcs-program-details/#sectoral-scopes>

Complete the table below with information relevant for AFOLU projects:

|                                     |                                                |
|-------------------------------------|------------------------------------------------|
| Sectoral scope                      | Not Applicable Project is not an AFOLU Project |
| AFOLU project category <sup>4</sup> | Not Applicable Project is not an AFOLU Project |
| Project activity type               | Not Applicable Project is not an AFOLU Project |

## 1.4 Project Eligibility

### 1.4.1 General eligibility

As stated in the registered PDD The Project is eligible to be a VCS Project because:

This is not a first time application but this is already a registered project.

VCS v.3.4 took effect on 08.10.2013. Accordingly, the Project is eligible to use this version, because it was registered on 24/07/2014. Before the next version 3.4 took effect on 25.03.2015.

VCS v.3.4 requires project crediting period start date earliest to be 01.01.2002, besides, the Project must also complete the validation within two years of the Project Start Date, which is 05.October 2012. Both conditions are satisfied for the Project activity.

VCS v.3.4 accepts all six Kyoto Protocol gases. The Project aims to reduce CO<sub>2</sub>, which is one of these six Kyoto Protocol gases.

VCS v.3.4 accepts all technologies supported by a VCS approved GHG program. The Project is a hydropower plant, with an addition of Solar PV Group as an auxiliary resource both these technologies are included in the UNFCCC- CDM sectoral scope<sup>1</sup>.

VCS v.3.4 requires the use of one of the VCS program approved project methodologies. The The project activity uses the tools and methodologies approved by the UNFCCC CDM executive board, which is a VCS-approved program.

The project does not benefit from any kind of Official Development Assistance.

In addition to the above, the project is not a grouped project activity, nor de-bundled part of a grouped project activity

Project registered before the version 4 of the VCS published, so it is still eligible.

<sup>4</sup> See Appendix 1 of the VCS Standard

If one Checks the VCS Version 4.7 “APPENDIX 3 DOCUMENT HISTORY AND EFFECTIVE DATES” states : “...For projects subject to new crediting period requirements under VCS Version 4 (i.e., non-AFOLU projects and ALM projects focusing exclusively on reducing N2O, CH4 and/or fossil-derived CO2 emissions) (Section 3.8):

1) Registered projects and projects that complete validation on or before 19 March 2020 remain eligible to apply the crediting period requirements under VCS Version 3....”

This statement is also valid in version 4.7 of the VCS Standard.

#### 1.4.2 AFOLU project eligibility

Not Applicable Project is not an AFOLU Project

#### 1.4.3 Transfer project eligibility

Not Applicable Project is not a transfer project.

### 1.5 Project Design

*Indicate if the project has been designed as:*

- ☒ Single location or installation
- ☐ Multiple locations or project activity instances (but not a grouped project)
- ☐ Grouped project

#### 1.5.1 Grouped project design

Not Applicable Project is not a Grouped project

### 1.6 Project Proponent

Organization name

Murat HEPP Energy Electricity Generation and Trade Inc.

|                |                                           |
|----------------|-------------------------------------------|
| Contact person | Suleyman Sait Yalvaç                      |
| Title          | General Coordinator                       |
| Address        | Cinnah Caddesi No: 55/10 Çankaya / ANKARA |
| Telephone      | +90 312 441 32 62 / +90 312 441 33 42     |
| Email          | syalvac@mehmetgunes.com.tr                |

## 1.7 Other Entities Involved in the Project

|                     |                                                 |
|---------------------|-------------------------------------------------|
| Organization name   | Suen Ltd. / Ecosur America S.A                  |
| Role in the project | Preparation of the Project Description Document |
| Contact person      | Not Applicable (The Company is Closed)          |
| Title               | Not Applicable (The Company is Closed)          |
| Address             | Not Applicable (The Company is Closed)          |
| Telephone           | Not Applicable (The Company is Closed)          |
| Email               | Not Applicable (The Company is Closed)          |

|                     |                                                                   |
|---------------------|-------------------------------------------------------------------|
| Organization name   | Ekobil Environmental Services and Consulting Ltd                  |
| Role in the project | Preparation of the Project Description Document                   |
| Contact person      | Aslı Sezer Özçelik                                                |
| Title               | Dr.                                                               |
| Address             | Ahlatlıbel Mahallesi 1839 sokak no.56 Çankaya 06805 Ankara-Turkey |
| Telephone           | +903124891338                                                     |

|       |                 |
|-------|-----------------|
| Email | info@ekobil.com |
|-------|-----------------|

## 1.8 Ownership

Ownership of the plant, equipment, and electricity generation license belongs to Murat HEPP project belongs to Murat HEPP Energy Electricity Generation and Trade Inc. (Murat HES Enerji Elektrik Üretim ve Ticaret Anonim Şirketi) and all emission reductions/removals are granted to the company. The production license and the operating certification of the company given by the Chamber of Commerce are provided to the validating DOE as proof of the Title.

## 1.9 Project Start Date

|                    |                                                                                                                                          |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| Project start date | 05 October 2012                                                                                                                          |
| Justification      | According to the VCS Version 3.0 of the Validated PDD the project start date is considered as the date electricity supplied to the Grid. |

## 1.10 Project Crediting Period

|                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Crediting period                                      | <input type="checkbox"/> Seven years, twice renewable<br><input type="checkbox"/> Ten years, fixed<br><input checked="" type="checkbox"/> Other (state the selected crediting period and justify how it conforms with the VCS Program requirements)<br>Please note that the Project is registered first according to the version 3.4 of VCS Standard Program, and the registered PDD indicates Crediting period as “10 years, renewable once.” |
| Start and end date of first or fixed crediting period | 05-October-2012 to 04-October-2022 (First)<br>05-October 2022 to 04-October-2032 (Second)                                                                                                                                                                                                                                                                                                                                                      |

## 1.11 Project Scale and Estimated GHG Emission Reductions or Removals:

☒ < 300,000 tCO<sub>2</sub>e/year (project)

☐ ≥ 300,000 tCO<sub>2</sub>e/year (large project)

| Calendar year of crediting period                                      | Estimated GHG emission reductions or removals (tCO <sub>2</sub> e) |
|------------------------------------------------------------------------|--------------------------------------------------------------------|
| 05-October-2022 – 31 December 2022                                     | 18,169                                                             |
| 01-January-2023 to 31-December-2023                                    | 75,362                                                             |
| 01-January-2024 to 31-December-2024                                    | 75,362                                                             |
| 01-January-2025 to 31-December-2025                                    | 75,362                                                             |
| 01-January-2026 to 31-December-2026                                    | 75,362                                                             |
| 01-January-2027 to 31-December-2027                                    | 75,362                                                             |
| 01-January-2028 to 31-December-2028                                    | 75,362                                                             |
| 01-January-2029 to 31-December-2029                                    | 75,362                                                             |
| 01-January-2030 to 31-December-2030                                    | 75,362                                                             |
| 01-January-2031 to 31-December-2031                                    | 75,362                                                             |
| 01-January-2032 to 04-October-2032                                     | 57,193                                                             |
| <b>Total estimated ERRs during the first or fixed crediting period</b> | <b>753,620</b>                                                     |
| <b>Total number of years</b>                                           | <b>10</b>                                                          |
| <b>Average annual ERRs</b>                                             | <b>75,362</b>                                                      |

## 1.12 Description of the Project Activity

The project helps to reduce greenhouse gas (GHG) emissions by avoiding the use of fossil fuels for electricity generation. The proposed facilities for the Murat I project include a diversion weir, a sedimentation pool, a conveyance canal, a fore-bay, a penstock, and the Murat I HEPP building. The proposed facilities for the Murat II project include a conveyance canal, a fore-bay, a penstock, a tail-water canal, a power house, and the Murat II HEPP building. Water from the river is diverted by a diversion weir at an elevation of 516m, then carried by a 15,002m conveyance canal to a forebay.

Accumulated water in the forebay is released through a 135m penstock to the turbines at the Murat I HEPP.

Murat I HEPP's tail-water is carried to a fore-bay through 5,709 m long conveyance canal. Then accumulated water in the fore-bay is released through 125 m penstock to the turbines and therefore electricity is generated at Murat II HEPP. Ultimately water is released to the riverbed.

The electricity generated at Murat II HEPP is transmitted to Murat I by a 6 km long transmission line where both plants' generation is fed into the national grid at Adıyaman Çimento 154 kV interconnection point, through a 10 km long transmission line.

The following table shows the project's primary technical information:

**Table 2** The key technical specifications of the project.

| Main Technical Data |            |                      | Value                                                    |
|---------------------|------------|----------------------|----------------------------------------------------------|
| MURAT I             | Turbines   | Quantity             | 3                                                        |
|                     |            | Power Capacity       | 8.686 kW                                                 |
|                     |            | Flow rate            | 16.67 m <sup>3</sup> /s (Total: 50.00 m <sup>3</sup> /s) |
|                     |            | Rated water head     | 57.00 m                                                  |
|                     |            | Type                 | Horizontal axis francis                                  |
|                     | Generators | Quantity             | 3                                                        |
|                     |            | Rated Power Capacity | 8,410 kWe                                                |
|                     |            | Rated voltage        | 10,500 V                                                 |
|                     |            | Rated current        | 50 Hz                                                    |
|                     |            | Type                 | Horizontal axis synchronized generator                   |
| MURAT II            | Turbines   | Quantity             | 3                                                        |
|                     |            | Power Capacity       | 3.577 kW                                                 |
|                     |            | Flow rate            | 16.67 m <sup>3</sup> /s (Total: 50.00 m <sup>3</sup> /s) |
|                     |            | Rated water head     | 23.40 m                                                  |
|                     |            | Type                 | Horizontal axis francis                                  |
|                     | Generators | Quantity             | 3                                                        |
|                     |            | Rated Power Capacity | 3,416 kWe                                                |

|                   |                     |                   |                                        |
|-------------------|---------------------|-------------------|----------------------------------------|
| MURAT SOLAR POWER |                     | Rated voltage     | 10,500 V                               |
|                   |                     | Rated current     | 50 Hz                                  |
|                   |                     | Type              | Horizontal axis synchronized generator |
|                   | Solar Power Group 1 | Quantity          | 2                                      |
|                   |                     | Capacity          | 4894.4 kWp.                            |
|                   |                     | Invertor Quantity | 23 Huawei sun2000-185 KTL-185 kW       |
|                   |                     | Panel Quantity    | 12236                                  |
|                   |                     | Rated voltage     | 400 Watt                               |
|                   | Solar Power Group 2 | Quantity          | 3                                      |
|                   |                     | Capacity          | 7155.8 kWp.                            |
|                   |                     | Invertor Quantity | 31 Huawei sun2000-185 KTL-185 kW       |
|                   |                     | Panel Quantity    | 17892                                  |
|                   |                     | Rated voltage     | 400 Watt                               |

The technology provider is the Chinese company HRC.

The following table shows the expected level of activity:

| Month              | Oct    | Nov    | Dec     | Jan     | Feb     | Mar     | Apr     | May     | Jun    | July   | Aug   | Sept   |
|--------------------|--------|--------|---------|---------|---------|---------|---------|---------|--------|--------|-------|--------|
| Monthly Energy GWh | 6514.9 | 9091.9 | 15576.8 | 17918.5 | 19163.7 | 24363.5 | 23526.2 | 20893.7 | 8254.0 | 2917.3 | 885.9 | 1278.5 |

**Table 3** *The project's expected (theoretical) level of activity<sup>5</sup>*

<sup>5</sup> Yolsu International Engineering and Consulting Services Co. Feasibility Study Pages 147-155 (Table 4EK1.2 – Table 4 EK1.10 ) and taken from turbine generator equipment plates.

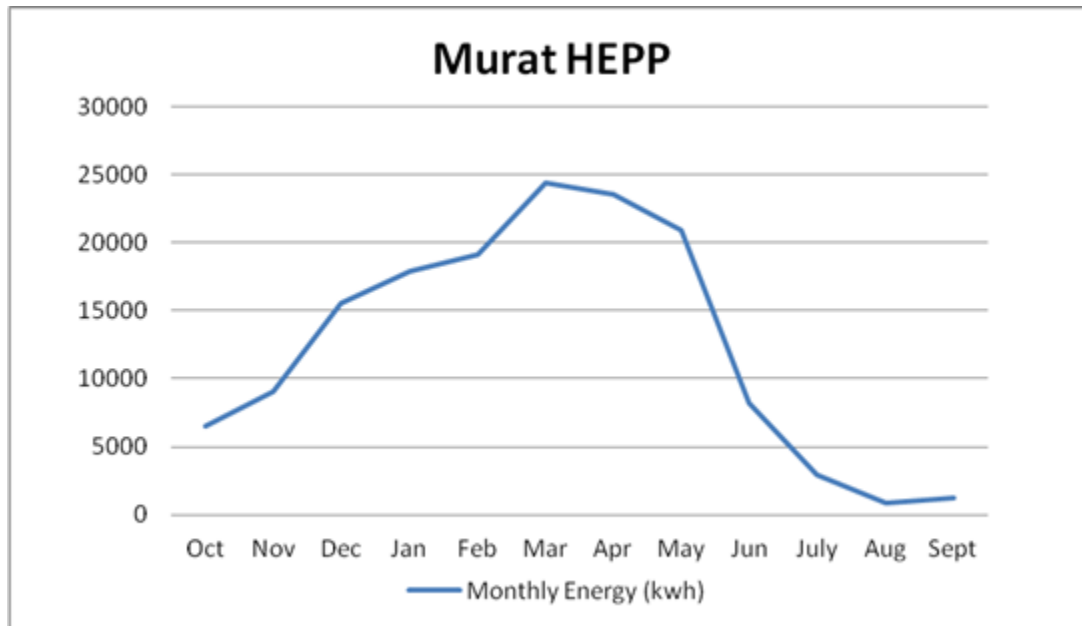


**Figure 1** *Murat's expected level of activity*

The electricity produced at Murat II HEPP is sent to Murat I through a 6 km long transmission line. At Murat I, the combined power generated by both plants is connected to the national grid at the Adıyaman Çimento 154 kV interconnection point via a 10 km long transmission line.

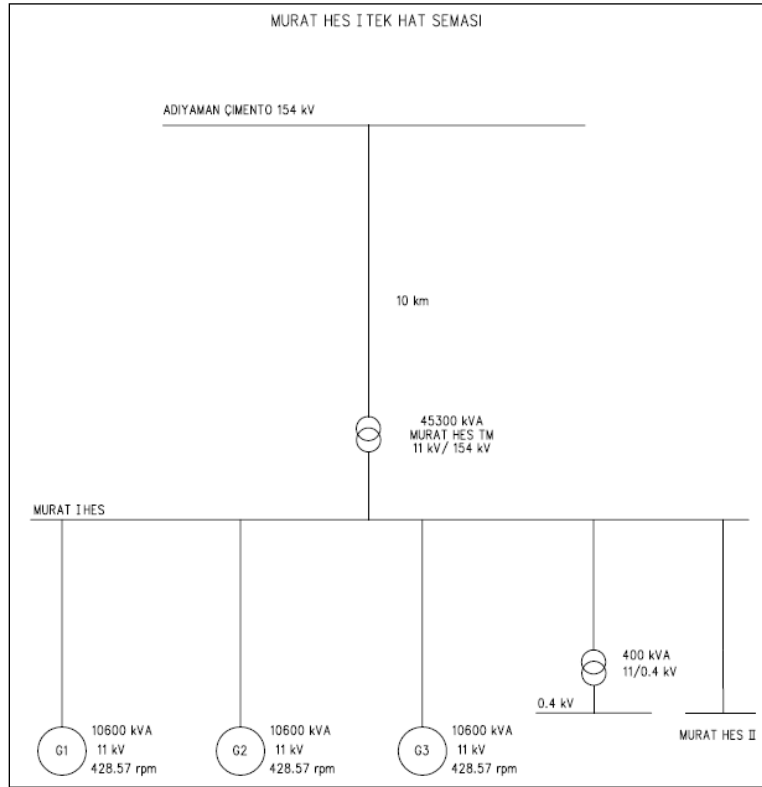


**Figure 2** *Murat I single-line diagram*

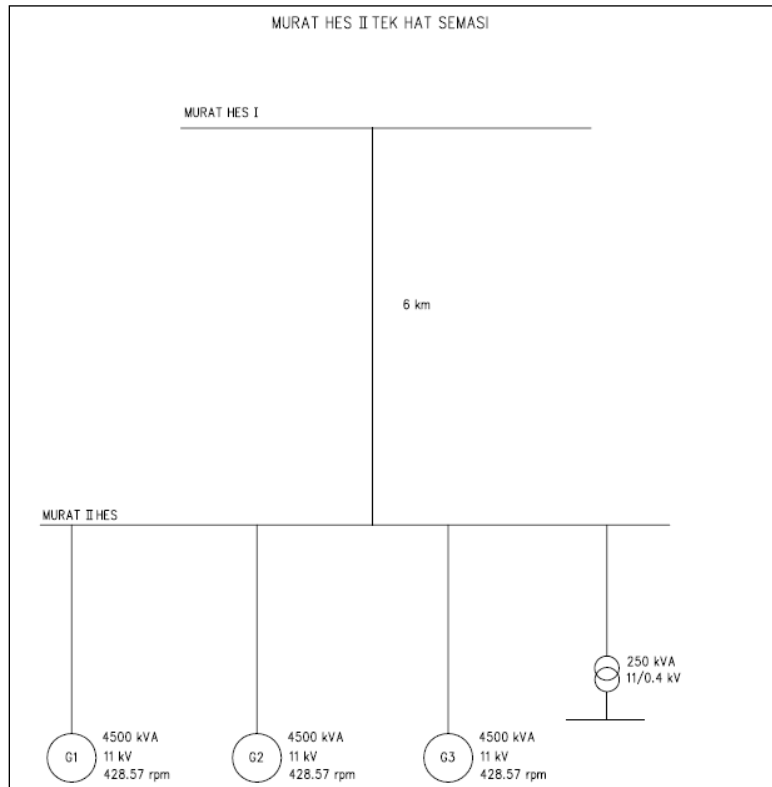


**Figure 3** *Murat II single-line diagram*

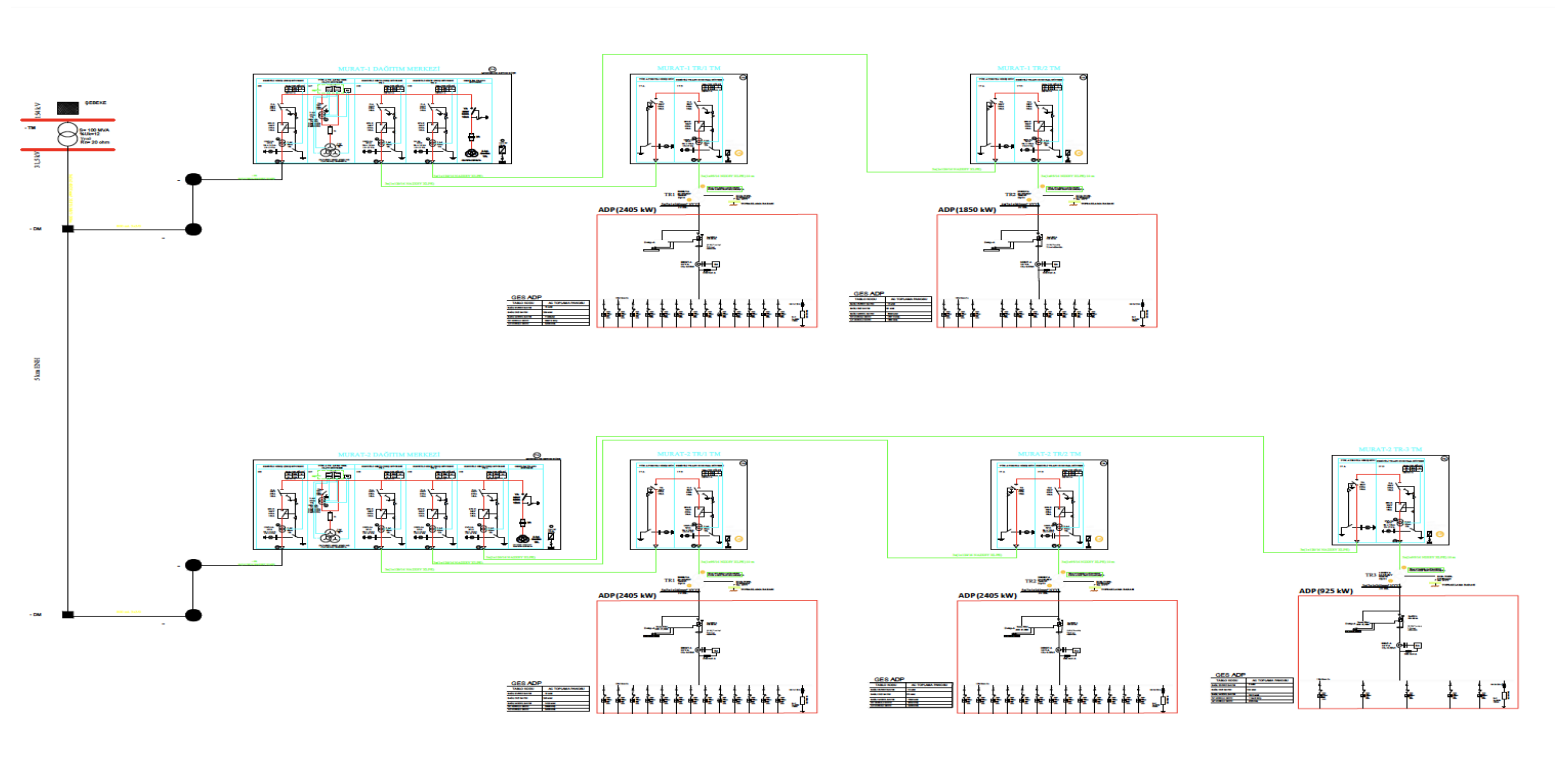


**Figure 4:** Simplified single-line diagram of the solar components added to the project activity.

### 1.13 Project Location

Precise coordinates for the project activity are:

- Diversion weir: 37° 42' 37.33"N, 38° 2' 49.67"E
- Murat I HEPP Powerhouse : 37° 36' 54.17"N, 38° 5' 42.90"E
- Murat II HEPP Powerhouse: 37° 34' 12.00"N, 38° 7' 0.11"E
- Murat Solar Power Plant 1 first units: 37° 36' 56.60"N, 38° 5' 45.90"E
- Murat Solar Power Plant 1 second units: 37° 36' 51.30"N, 38° 5' 43.50"E
- Murat Solar Power Plant 2 first units: 37° 34' 17.20"N, 38° 6' 53.00"E
- Murat Solar Power Plant 2 second: 37° 34' 13.80"N, 38° 7' 2.60"E
- Murat Solar Power Plant 2 third units: 37° 34' 11.60"N, 38° 6' 57.60"E

The following figures show the project's location:



**Figure 5** Turkey's map with the project's location

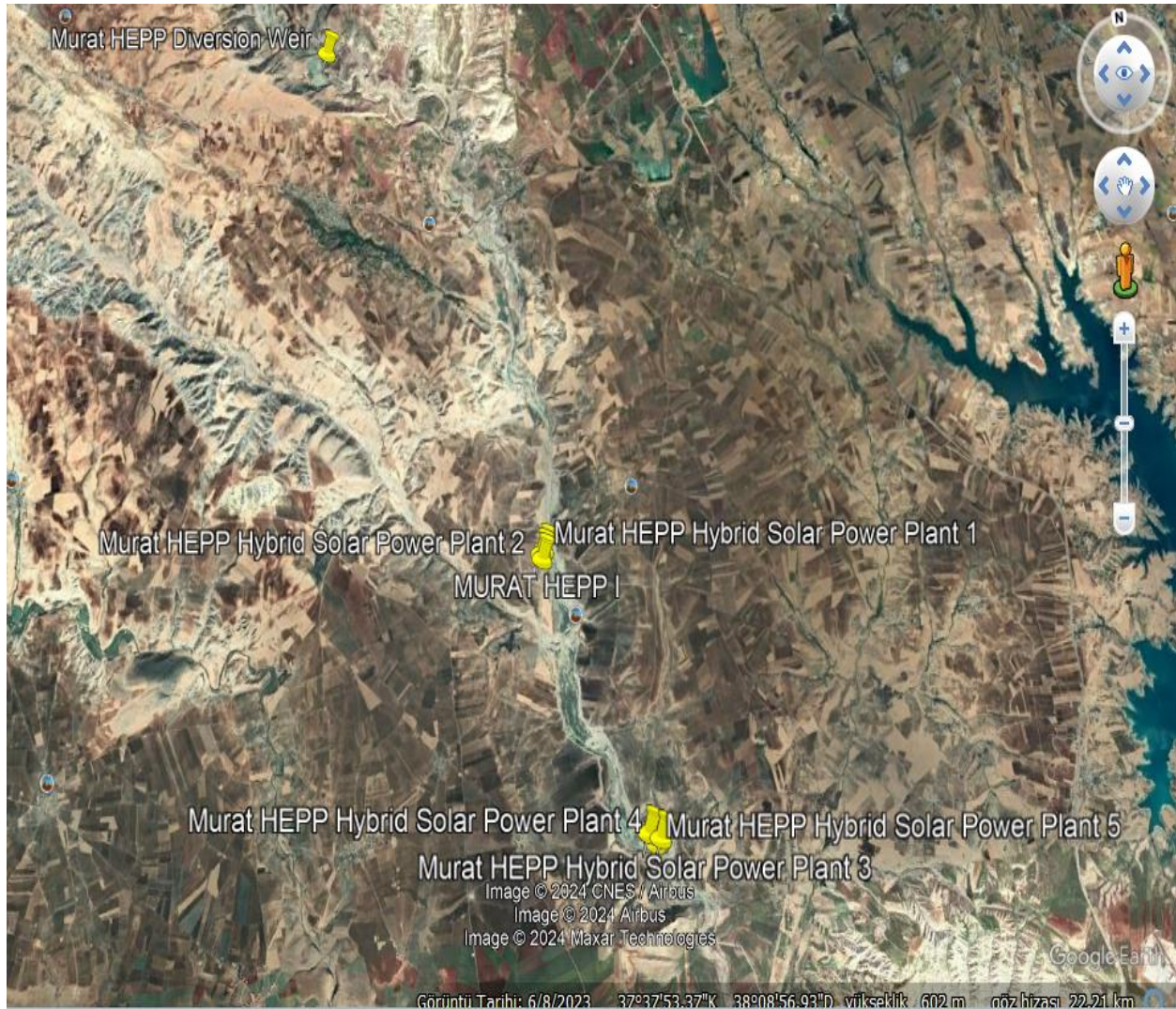


**Figure 6** The project's location

### 1.14 Conditions Prior to Project Initiation

There was no other hydroelectric power plant installation at the project location. Also, there was no other forms of renewable energy installations (no wind or Solar PV). The project activity does not generate greenhouse gas emissions, so it can be excluded that the implementation has been made only to generate GHG emissions with the subsequent reduction. The baseline scenario is the same as

the conditions existing prior to project initiation; as such, please refer to Section 3.4 (Baseline Scenario).

## 1.15 Compliance with Laws, Statutes and Other Regulatory Frameworks

The applicable mandatory laws that are applied for the project are:

- i. *Electricity Market Law*<sup>6</sup>: It was enacted on March 3<sup>rd</sup>, 2001. This Law aims to ensure the development of a financially sound and transparent electricity market operating in a competitive environment under the provisions of the civil law. It also underlines the needs to produce a sufficient, high quality, low cost and environmentally friendly electricity to consumers. The text also provides guidelines to structure the autonomous regulation and the supervision of the market.
- ii. *The Renewable Energy Law*<sup>7</sup>: enacted on May 5<sup>th</sup> 2005; this law compels electricity selling companies to purchase from “Green” energy providers until 2011 at a defined ratio and price. This ratio is based on previous year sales over total energy sold in the country. The price is based on a yearly average wholesale purchase price predetermined by the Energy Market Regulatory Authority (TEIAS).
- iii. *Energy Efficiency Law*<sup>8</sup>: The purpose of this Law is to increase efficiency in using energy sources and energy in order to use energy effectively, avoid waste, ease the burden of energy costs on the economy and protect the environment. It covers the principles and procedures applicable to increasing and promoting energy efficiency in energy generation, transmission, distribution and consumption phases at industrial establishments, buildings, power generation plants, transmission and distribution networks and transport, raising energy awareness in the general public, and utilizing renewable energy sources.
- iv. *The Forest Law*<sup>9</sup>: This law defines the borders of “forest lands” and clarifies the legal details of how these areas shall be used and protected.
- v. *Environmental Law*<sup>10</sup>: This law came into force in 1983; it considers the environment as a single domain, aiming not only to prevent and eliminate environmental pollution, but also to allow the management of land and natural resources in an integrated manner. According to its basic principles, and as also stated in the Constitution, citizens as well as the State bear responsibility for the environment protection. Furthermore, this law states that in all economic activities, every measure should be taken to minimize pollution.<sup>11</sup>

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<sup>6</sup> Law Number: 4628 Ratification Date: 20.02.2001 Enactment Date: 03.03.2001

<sup>7</sup> Law Number: 5346 Ratification Date: 10.05.2005 Enactment Date: 18.05.2005

<sup>8</sup> Law Number: 5627 Ratification Date: 18.04.2007 Enactment Date: 02.05.2007

<sup>9</sup> Law Number 6831 Enactment Date: 31.08.1956

<sup>10</sup> Law Number 2872 Ratification Date: 09.08.1983 Enactment Date: 11.08.1983

<sup>11</sup> “Turkey’s Environment: a review and evaluation of Turkey’s environment and its stakeholders”, May 2002.

<http://www.rec.org/REC/Programs/ExtensionToTurkey/TurkeysEnvironment.pdf>

- vi. Regulation on procedures and principles of signing the agreement of water resources utilization to generate electricity for the electricity market<sup>12</sup>.
- vii. Regulation on Environmental Impact Assessment<sup>13</sup>
- viii. On March 8, 2020, amendments were made to the Electricity Market License Regulations of the host Country (Republic of Turkey). These amendments included provisions for adding auxiliary resources to existing power plants<sup>14</sup>.

Moreover, Turkey has no national, legally binding emission reductions scheme.

The project complies with all aforementioned laws as its activity aims at generating electricity by using a renewable resource, hydroelectric power, in a sufficient, low-cost, and environmentally-friendly manner, using the latest technology available on the market. Additionally, according to the Governorship of Adiyaman Provincial Directorate of Environment and Forestry, the project has no significant impacts on the environment. Therefore, an Environmental Impact Assessment (EIA) not required certificate has been issued on 22/04/2009. (Please refer to **APPENDIX 1** for detailed information)

## 1.16 Double Counting and Participation under Other GHG Programs

### 1.16.1 No Double Issuance

Is the project receiving or seeking credit for reductions and removals from a project activity under another GHG program?

☐ Yes ☒ No

*If yes, provide required evidence of no double issuance as outlined by the VCS Standard.*

### 1.16.2 Registration in Other GHG Programs

Has the project registered under any other GHG programs?

☐ Yes ☒ No

*If yes, provide the registration number and the date of project inactivity under the other GHG program.*

Is the project active under the other program?

<sup>12</sup> Official Gazette: #25150, on 26.06.2003

<sup>13</sup> Official Gazette: #26939, on 17.07.2008

<sup>14</sup> <https://www.resmigazete.gov.tr/eskiler/2020/03/20200308-7.htm>

☐ Yes ☒ No

*Project proponents, or their authorized representative, must attest that the project is no longer active in the other GHG program in the Registration Representation.*

### 1.16.3 Projects Rejected by Other GHG Programs

Has the project been rejected by any other GHG programs?

☐ Yes ☒ No

*If yes, provide the program name(s), reason(s) and date for the rejection, justification of eligibility under the VCS Program, and any other relevant information.*

## 1.17 Double Claiming, Other Forms of Credit, and Scope 3 Emissions

Not Applicable

### 1.17.1 No Double Claiming with Emissions Trading Programs or Binding Emission Limits

Are project reductions and removals or project activities also included in an emissions trading program or binding emission limit? See the *VCS Program Definitions* for definitions of emissions trading program and binding emission limit.

☐ Yes ☒ No

*If yes, provide all required evidence of no double claiming as outlined by the VCS Standard.*

### 1.17.2 No Double Claiming with Other Forms of Environmental Credit

Has the project activity sought, received, or is planning to receive credit from another GHG-related environmental credit system? See the *VCS Program Definitions* for definition of GHG-related environmental credit system.

☐ Yes ☒ No

*If yes, provide all required evidence of no double claiming as outlined by the VCS Standard.*

### 1.17.3 Supply Chain (Scope 3) Emissions

Do the project activities specified in Section 1.12 affect the emissions footprint of any product(s) (goods or services) that are part of a supply chain?

☐ Yes ☒ No

*If yes:*

Is the project proponent(s) or authorized representative a buyer or seller of the product(s) (goods or services) that are part of a supply chain?

☐ Yes ☐ No

*If yes:*

Has the project proponent(s) or authorized representative posted a public statement on their website saying, “Carbon credits may be issued through Verified Carbon Standard project [project ID] for the greenhouse gas emission reductions or removals associated with [project proponent or authorized representative organization name(s)] [name of product(s) whose emissions footprint is changed by the project activities].”

☐ Yes ☐ No

*If yes to all:*

*Provide evidence of the public statement. Evidence must be provided in this section or in an appendix.*

## 1.18 Sustainable Development Contributions

The project expected to contribute to 4 SDGs. These SDGs are provided below:

**SDG 7 Affordable and Clean Energy:** The project contributes to SDG Target 7.2, “By 2030, increase substantially the share of renewable energy in the global energy mix,” by utilizing hydropower as a renewable energy source. The project produces 168,390 MWh of energy per year through renewable means.

### 7.2.1 Total electricity produced by non-conventional renewable sources

**SDG 8 Decent Work and Economic Growth:** The project creates direct and indirect employment opportunities during construction and operation phases, so it contributes to SDG Target 8.5 “By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities and equal pay for work of equal value”. The project provides both long-term and temporary employment; with 38 permanent employees and 192 temporary workers that worked in the construction of the project. None of the employees receive less than or equal to the minimum wage of the Turkish Republic.

#### 8.5.1 Total number of jobs created by the project

**SDG 13 Climate Action:** The project produces clean renewable energy by diminishing CO2 emissions. Therefore, it contributes to SDG Target 13.2 “Integrate climate change measures into national policies, strategies and planning”. The project contributes by 75,363 tCO2e of yearly emission reductions.

#### 13.2.2 GHG emissions reduced per year and amount of net CO2eq.

In addition to the above :

The Murat HEPP Project contributes to the region’s sustainable development in particular and Turkey’s sustainable development in general by:

- increasing the use of renewable energy sources for generating electricity (SDG 7)
- meeting the need of electricity generation and supply in Turkey in a sustainable way,(SDG 7)
- decreasing the consumption of fossil fuels, (SDG 13)
- reducing emission of GHGs from the national electricity grid, thereby reducing the effects of global climate change in the medium and long term, and (SDG 13)
- As mentioned at the registered PDD for the first crediting period, the project supplied jobs for 113 people during the construction phase. Based on the NHS records (22.10.2022), starting from the beginning of the new crediting period, 15 people worked at the subcontracted security company and 20 people were employed for the main operation. The project owner prioritizes the local labor force in selecting employees. As a result, the employment rate and income generation in the region have improved. (SDG 8)

It is worth mentioning that the project has been certified to the following standards:

- OHSAS 18001:2007, occupational health and safety management certificate, valid until 31/07/2025,
- TS EN ISO 14001:2004, environmental management system certificate, valid until 31/07/2025, and
- TS EN ISO 9001:2008, quality management system certificate, valid until 31/07/2025.

During the certification process, all employees (including subcontractors) were trained on the requirements established in these standards. Moreover, the project owner organized monthly trainings and inspections to maintain these certifications.

The project owner has also contributed in the social and economic development of the area by:

- donating 20,000 Turkish Liras (approx. 13,000 USD) to aid to develop sport activities at Adiyaman Sports Club,
- constructing a 6 m wide stabilized road in Şambayat Town’s Balka Village, which is one of the settlements near the project area,

- constructing a 2 m wide and 25 m minaret<sup>15</sup> in the Balka Village's mosque, and
- constructing a cultural affairs facility to be used for social and cultural gatherings. This building was constructed as per request of the locals and holds a great significance since it is also used as a "condolence hall" after the death of a local person, which is an important part of religious and social life.

## 1.19 Additional Information Relevant to the Project

### 1.19.1 Leakage Management

Not applicable as there is no leakage related to the project activity.

### 1.19.2 Commercially Sensitive Information

Not Applicable. There is no commercially sensitive information that needs to be excluded from the public version of the VCS PD to be displayed on the VCS Project Database.

### 1.19.3 Further Information

Not Applicable, as there is no further relevant information to supplement.

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<sup>15</sup> A tower that is usually built alongside all mosques.

## 2 SAFEGUARDS AND STAKEHOLDER ENGAGEMENT

### 2.1 Stakeholder Engagement and Consultation

Please note that most of the information provided below dates back to the pre-construction planning stages of the project activity. However, the stakeholders identified the risks, and the project activity's relationship with its neighborhood has not changed.

The newly added auxiliary solar power unit is installed within the immediate project boundary, and therefore, no further land use change or expropriation has been practiced. Being the major stakeholder in the project site, the local representation of the host country government has issued an EIA not-needed certification after reading the basic project description document related to the addition of the new power unit. As such, it was discerned that there was no need for a formal stakeholder consultation meeting related to the installation of the solar PV component of the project. Another reason for not holding a formal LSC was that by the time of the COVID-19 Pandemic, it was not allowed to hold such a meeting.

However, especially with the help of the village heads, it was explained to the stakeholders that a group of solar PV systems would be added to the project site, and it would only be placed within the project boundaries; no expropriation would be necessary.

Besides the communications, the addition of the new solar component has created new job opportunities, such as day-to-day working opportunities to clean the PV panels during the summer season.

As explained below, communication between the stakeholders and the project is an ongoing ad hoc conversation. This sincere and intimate relationship is perceived very positively amongst the neighboring settlements, especially after the earthquake that hit the area. During the earthquake, the project activity not only provided the construction machinery but also food and temporary settlement.

#### 2.1.1 Stakeholder Identification

##### Stakeholder Identification

There are four categories of the stakeholders that were identified prior to project implementation:

1-Local inhabitants that live in the close proximity of the project site. There are three villages nearby, namely Şambayat, Balka and

Başlı Villages. The elected village heads (titled as Muhtar in the host country terminology) are contacted to reach out these villages.

2-Local and central governmental officers, that are directly related to the project activity since they either monitor the project's permits or are attentive to the voluntary emission avoidance activity. These officials include the host country focal point to UNFCCC, local representative of the central government on Ministry of Environment and Forestry<sup>16</sup>, Environmental Impact Assessment and Planning Directorate, Ministry of Energy and Natural Resources, General Directorate of State Hydraulic Works, 203<sup>rd</sup> Branch of Adiyaman, Besni Municipality Mayorship, District Governorship of Besni, Provincial directorate of environment and forestry, Şambayat Municipality Mayorship.

3.International non-governmental organizations that are attentive to the voluntary carbon market procedures. Such as: WWF Turkey, Greenpeace Akdeniz, UN Development Program, REC Turkey, UN Joint Program for preservation and development of the human rights of children and women.

4.National non-governmental organisations that are attentive to the voluntary carbon market procedures. Such as: Energy Economy Foundation, Federation of Women Foundations of Turkey, TEMA Besni, Environment Protection Agency

From the above categories, the first category that involves local stakeholders were interested in the meeting and there were participants even from neighbouring towns. 37 people signed the participants list. (Please refer to Error! Reference source not found. to find a copy of the original participants list)

None of the stakeholders invited from other categories, local and central government officers and non-governmental organizations attended the meeting because of their busy schedules. Local Military commander attended the meeting half-way through. There were three Muhtars (Village heads) representing their fellow man.

Although specifically encouraged, there were no women at the meeting, probably because of cultural dynamics in the region. In Turkey's rural regions, men are the dominant part of the family and they are the only ones to decide on family or social affairs. Women, on the other hand are responsible for domestic household tasks

<sup>16</sup> Back in 2010 the title of the Ministry was "Ministry of Environment and Forestry" Later it changed to Ministry of Environment and Urban Planning, and Finally it is now named as Ministry of Climate Change, Environment and Urban Planning.

|                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                    | such as child rising, cooking etc. As this has been the case for years, there has been a clear-cut discrepancy between the role of man and women in different stages of their lives. Therefore, it seems to have been the task of men to attend the meeting.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Legal or customary tenure/access rights</b>     | There are no legal or customary tenure/access rights to territories and resources, including collective and conflicting rights, held by stakeholders, Indigenous People (IPs), local communities (LCs), and customary rights holders.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Stakeholder diversity and changes over time</b> | According to Silk Road Development Agency reports, “Adiyaman's economy is based on agriculture by 70%. There are high irrigation potential and fertile lands. Rose, cherry, fig, apple, goji berry is grown in the gardens as well as some modern vegetable gardens • Adiyaman Pistachio, Gölbaşı and Besni grapes are becoming an international trademark. The project has also contributed to the site by providing employment and supporting irrigation of local inhabitants. Thus, improving the economy. The same Agency identifies Adiyaman region as a prosperous district for renewable energy investments. Each such investment provides jobs first at the construction stage and later at the operation stage. In addition to this the trainings provided during these employments, also improve the workmanship skills in the area. |
| <b>Expected changes in well-being</b>              | <p>According to the Project Description report presented to the MoEF to obtain the Environmental Impact Assessment Not Needed certificate, the project is not going to impact any land or aquatic ecosystems as it does not have a reservoir. The project also involves a fish passage system, and the lifeline water is followed up by the gauges installed by State Water Works.</p> <p>The project activity provided jobs during the construction period and is still keeps providing jobs for the local inhabitants and thus contributing to the local economy. In addition to this all the possible procurements are made from the local shops and this as well creates an indirect contribution to the local economy.</p>                                                                                                                |
| <b>Location of stakeholders</b>                    | Stakeholders can be defined as “any group or individual who can affect or is affected by the achievement of the organization’s objective” (Freeman, 1984/2010: 25) From this perspective from the above defined groups of stakeholders Group 1, is located at the vicinity of the project Site, Out of Group 2 stakeholders some are located in the nearest town (Mayorships and Governorships) and District (like State Water Works branch) and the others are located in Ankara (Capital of the host country). There is no Local Committee                                                                                                                                                                                                                                                                                                   |

|                       |                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                       | identified; however Individual Parties can be identified as village Heads that represent the villagers. In addition to that there is the Şambayat Assistance and Solidarity Association and Şambayat Sports Club, Located at the Şambayat Town close to Project Site. These are the civil organizations that the project had provided support as an act of Corporate social responsibility.                                             |
| Location of resources | Project site did not block any access to any territory but there were land that was owned by individuals at the project site that these areas have been expropriated according to host country regulations and the landowners have been fairly compensated. In addition to this, even though the lands were expropriated the project governance has let the owners to continue farming the parts of the lands within the safety limits. |

## 2.1.2 Stakeholder Consultation and Ongoing Communication

|                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Date of stakeholder consultation | 28-May-2010 at the Yayla Cafe in Sambayat Town, Besni, Adiyaman Province                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Stakeholder engagement process   | <p>An invitation was prepared for the Stakeholder Consultation and sent to the national and local policy makers via e-mail. For the participation of different stakeholder groups as defined in section 2.1.1. groups of people to the meeting local head of the villages (Muhtar) and other male locals were asked to attend to the meeting with their spouses.</p> <p>All invitations sent by email, fax and mail contained a non-technical summary of the project in Turkish (please refer to ANNEX 3 to find a copy of the non-technical summary). Also these invitations included the contact information of the then project consultant Suen Ltd. and all stakeholders invited by the above mentioned means were kindly asked to share their comments about the project</p> <p>As mentioned above The stakeholders' consultation meeting was conducted on May 28th 2010 at the Yayla Cafe in Sambayat Town, Besni, Adiyaman Province. This date was chosen, as it was considered to be convenient to all the participants to attend.</p> <p>An invitation was prepared for the Stakeholder Consultation and sent to the national and local policy makers via e-mail. For the participation of various groups of people to the meeting local head of the villages (Muhtar) and other male locals were personally asked to attend to the meeting with their spouses.</p> |

All invitations sent by email, fax and mail contained a non-technical summary of the project in Turkish (please refer to ANNEX 3 to find a copy of the non-technical summary). Also these invitations included the contact information of the project consultant Suen Ltd. and all stakeholders invited by the above mentioned means were kindly asked to share their comments about the project.

Apart from the invited local residents by public announcements, the project participant and Suen Engineering and Consultancy Ltd have invited 20 other national and local stakeholders to participate in the meeting and the assessment process by mails. The invited stakeholders were chosen to represent the local policy makers, Non-Governmental Organizations and local people affected by the project, as described in section 2.1.1.

In addition to the mentioned invitations, two newspaper announcements were made in the regional newspaper Besni Ekspres on May 14th and 25th 2010. The mentioned announcements are shown in the following figure:





Figure 7 Newspaper Announcement for the Local Stakeholder Consultation Meeting<sup>17</sup>

## Consultation outcome

All participants were optimistic about the project's positive impact on the economy of the country and global warming. However, some of the people attended the meeting to ask about expropriation issues since at the time of the meeting, there were still some lands which had not been expropriated yet. People were therefore curious about the result of this matter. However, at the time of the meeting all expropriation matters were underway waiting to be resolved very soon.

"Please note during the first crediting period that at the expropriation issue was positively solved and all the stakeholders have been fairly compensated, some have even be given the permission to keep using their land for agricultural purposes within the safety limits."

One of the main topics at the meeting was related to employment opportunities for the local people. A local participant explained that most of the local people were unemployed and that they needed jobs more than anything else. A representative of the project participant explained that their priority is to employ local people and that they would employ as many as possible. It is expected that

<sup>17</sup> "Besni Ekspres"; Date May 14<sup>th</sup> 2010, page 6

|                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                              | <p>approximately more than 100 people will be employed during construction phase and over 30 people during operation phase.</p> <p>The overall response to the project was encouraging and positive. All the hearings were held in Turkish.</p>  <p><b>Figure 8</b> <i>Scenes from the Local Stakeholder Consultation Meeting</i></p>                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Ongoing communication</b> | <p>In the host country the communication between the project management and the local stakeholders is generally conducted by the provision of mobile phone numbers of the site managers to the village heads, and other local government officials. And when the question about on-going communication was asked during the monitoring period the participants to the meeting admitted that this was the case. But still, there are evaluation forms, and a continuous grievance notebook is kept at the project site to collect further comments as was also announced during consultation meeting. But as the local inhabitants prefer to call the project management and communicate their direct requests and this way any reasonable demand is satisfied, and any complain is resolved.</p> |
| <b>Stakeholder input</b>     | <p>One of the main topics at the meeting was related to employment opportunities for the local people. A local participant explained that most of the local people were unemployed and that they needed jobs more than anything else. A representative of the project participant explained that their priority is to employ local people and that they would employ as many as possible. It is expected that more than 100 people would be employed during construction phase and over 30 people during operation phase.</p>                                                                                                                                                                                                                                                                    |

### 2.1.3 Free Prior and Informed Consent

|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Obtaining consent</b> | <p>The project activity is in line with host country regulations and by the Project Description document submitted to the MoEF declared that it will keep abiding by the law. Therefore, the project has the consent of the Group 2 stakeholders described in section 2.1.1. In addition to this the village heads of the nearby settlements and the nearby towns have been visited and no objections about the project have been recorded.</p> <p>Also, the project company prepared some brochures with the aim of raising awareness and with the intention of informing the local inhabitants about the purposes of the installation of energy production facilities throughout the country, the benefits reflected on the country and the region and the issues to be considered in the level of these facilities. These were distributed to the village residents through the mukhtars. In village squares and coffee houses, the necessary explanations were made, and questions were answered. The wishes and desires of the local people were also listened to, and they were informed that the company would do its part in matters that would benefit the development of the region. This was recorded by the minutes that were signed between the mukhtars of the villages and the project company.</p> |
| <b>Outcome of FPIC</b>   | <p>The project activity did not involve any resettlement. The project had to acquire some land from the local stakeholders. This was done within the expropriation rules of the host country and the landowners were compensated. There was no disagreement between the project and the group of stakeholders defined in section 2.1.1.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

#### 2.1.4 Grievance Redress Procedure

|                                    |                                                                                                                                                                                                                                                                                                                                                 |
|------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Development process</b>         | <p>Although there is a book for suggestions and complaints at the project site, the consensus between the local stakeholders and the project owner is to communicate the problems directly to the site manager and then site manager tackles with the complaints of demands immediately after giving information to the company management.</p> |
| <b>Grievance redress procedure</b> | <p>As described above if there is a grievance or a demand the site manager considers the situation, informs the central office of the company and provides solutions within reasonable limits. During the first crediting period there were no significant complaints and issues. The local stakeholders claim that they have received</p>      |

helped when there is a hardship and especially during the Earthquake period.

### 2.1.5 Public Comments

| Comments received                           | Actions taken                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|---------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Will there be enough water on the riverbed? | <p>Yes. Lifeline Water and downstream water provision is also monitored by the State Water Works by installed gauges.</p> <p>In Fact, there has to be enough water on the river bed to sustain river ecosystem. In dry months, when there is not enough water the plant will not operate until there is enough water.</p>                                                                                                                                                                                                                        |
| Will there be local employment?             | <p>Although this concern is important and highly relevant for social sustainability of the project it does not involve any changes in its design. The construction and operation of the project requires both skilled and unskilled employment. Representatives of the project company explained that recruitment will be from local people as much as possible without any discrimination. However, when there are no skilled staff for various tasks these personnel will be recruited from elsewhere, but still from within host country.</p> |
| Concerns about trees to be cut down         | <p>It is explained that neither tree cutting nor re-planting cannot be done irregularly. To be able to start construction a certain amount of fee has to be paid to ministry of Environment and Forestry to compensate trees to be cut and replanted. Then the local Forestry department coordinates the logging and re-planting processes.</p>                                                                                                                                                                                                  |

|                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Please provide more information about the expropriation process</p> | <p>At the time of the stakeholder consultation meeting, the expropriation process was underway for some of the lands and there were some issues, that were still waiting to be resolved by the related state offices. As this procedure took time those people whose land were undergoing expropriation were inquisitive about the process. Even though most expropriations had been solved before the meeting, there were still a few ones awaiting the final decision of the State. The questions were mostly about technical aspects of conveyance canal. At the end of the meeting all questions were answered by representatives from project company</p> <p>As of today all the expropriation issues are solved and the land owners are not only fairly compensated but some have even given permission to use their lands for agriculture within the safety limits.</p> |
| <p>Other comments</p>                                                  | <p>No major concerns were raised during the entire stakeholders consultation process hence there was no need to make any changes to the project design nor revisit the sustainability assessment. All questions were settled during the meeting. All stakeholders were handed out folders with project consultant Suen Ltd's telephone numbers and they were asked to get in touch with Suen Ltd. if they have any other concerns. Also, a notebook was left on project site to gather ideas or questions from all the stakeholders, including those who were not able to attend the meeting. This notebook was regularly checked however nothing was recorded up until present time.</p>                                                                                                                                                                                      |
| <p>Summary of alterations based on comments</p>                        | <p>The comments given did not lead to an alteration to the project design. Because, the overall feedback about the project was entirely positive. During the first crediting period the project company identified the needs of the local community and provided help and support according to their needs. Currently the project owner provides contribution to local sport teams and local community support organization.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                               |

## 2.2 Risks to Stakeholders and the Environment

### 2.2.1 Management Experience

The project involves operating a hydroelectric power plant. Before being commissioned, the project is evaluated by the Ministry of Energy and Natural Resources, and the operational team's management experience and capacity are approved through a provisional acceptance document. Mr. Vural, a Mechanical Engineer with 15 years of experience, has been managing the site since the construction phase. Additionally, the project company has implemented the following quality management systems: ISO 9001:2005, ISO 14001:2015 for environmental management, and ISO 45001:2018 for occupational health and safety management.

### 2.2.2 Risk Assessment

|                                                            | Risks identified                                                                                                                          | Mitigation or preventative measure(s) taken                                                                                                                                                                                                                                               |
|------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Natural and human-induced risks to stakeholders' wellbeing | The local stakeholders can approach danger zones and can try to swim in the canals or hydropower plant area.                              | A leaflet is prepared to explain this danger and distributed in the villages, the village heads are given an explanation, and the dangers and risks are explained clearly. These communications are recorded by minutes signed by each village head.                                      |
| Risks to stakeholder participation                         | There is no risk identified regarding stake holder participation.                                                                         | As the stakeholders can access the site and can communicate with the site management 7/24 via the provided mobile lines. No need for mitigation                                                                                                                                           |
| Working conditions                                         | High voltage and working near noisy areas, and working close to high speed running water are some risks involved in the work environment. | Host country regulations enforce health and safety prioritizations in the work environment. There are warning signs at the work environments, in addition to this employees are regularly trained regarding health, safety and environment issues. The project has a ISO 45001:2018 OHSAS |

|                                                                                                                                               |                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                               |
|-----------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                               |                                                                                                       | Certification to manage and mitigate risks related to working conditions. The certification is valid until 2023 and is under renewal.                                                                                                                                                                                                                                                         |
| Safety of women and girls                                                                                                                     | Violation of women's rights                                                                           | This is a minor risk and female employee are highly respected and treated with positive discrimination and respect as part of the host country culture. However there are no female employee at the project site as the site is remote and difficult to access no woman have applied to any of the positions. But there are many women employee at the central office of the project company. |
| Safety of minority and marginalized groups, including children                                                                                | No such risk as host country strictly bans child labor and there are no minority at the project site. | Host Country is a party to ILO Convention 138 and there is no child labor involved at the project site.                                                                                                                                                                                                                                                                                       |
| Pollutants (air, noise, discharges to water, generation of waste, and release of hazardous materials and chemical pesticides and fertilizers) | There is no risk identified                                                                           | According to the Environmental and Social Impact Assessment carried out by the project proponent, no negative environmental impact has been identified from the project activity.                                                                                                                                                                                                             |

## 2.3 Respect for Human Rights and Equity

### 2.3.1 Labor and Work

| Risks identified <sup>18</sup>         |                                                                                                                                                                                                                  | Mitigation or preventative measure(s) taken                                                                                                                                                                                                                                                                                                   |
|----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Discrimination</b>                  | There can be discrimination based on gender, race, color, language, religion, belief, sect, philosophical and political opinion, ethnic origin, wealth, birth, marital status, health status, disability and age | Very low risk as any kind of such discrimination is banned by the Article 3 of the “law on human rights and equality institution of Turkey “(Law number: 6701 Acceptance date : 6/4/2016 Published in official gazette : date : 20/4/2016 issue : 29690 Published in directive: order : 5 volume : 57 )                                       |
| <b>Sexual harassment</b>               | No risk identified                                                                                                                                                                                               | Host country bans and controls SH by the above-mentioned law via the “Human Rights and Equality Institution of Turkey”. In addition Turkey protects violation of women and children by the Law No. 6284 on the Protection of the Family and Prevention of Violence against Women.                                                             |
| <b>Equal pay for equal work</b>        | No risk identified                                                                                                                                                                                               | The host country guarantees equal pay for equal work by the Article 23: "1. Everyone has the right to work, to free choice of employment, to work under just and favorable conditions and to protection against unemployment. 2. Everyone has the right to equal pay for equal work without discrimination of any kind." of the Constitution. |
| <b>Gender equity in labor and work</b> | No risk identified                                                                                                                                                                                               | The above mentioned Law number: 6701 encourages gender equality in labor and work, but also gives exception for the jobs that can only be performed by one gender kind due to the                                                                                                                                                             |

<sup>18</sup> The identified risks and commensurate mitigation or preventative measure(s) for forced labor, child labor, and human trafficking, must be inclusive of staff and contracted workers employed by third parties.

|                   |                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-------------------|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                   |                    | nature of the job. However, there were no female applicants to the project activity thus there are no female employee.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Forced labor      | No risk identified | Drudgery is prohibited by Article 18 of the Constitution, and no one can be subjected to the forced labor in the host country.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Child labor       | No risk identified | <p>The employment conditions for individuals under 18 years of age are governed by Labor Law No. 4857 and the "Regulation on the Procedures and Principles of Employment of Children and Young Workers" which is based on this law. These regulations are in place to protect the health and safety, as well as the physical, mental, moral, and social development of children and additionally, they aim to enable these individuals to continue their education and to prevent their economic exploitation. young workers.</p> <p>Employment conditions under 18 years of age are regulated by Labor Law No. 4857 and the "Regulation on the Procedures and Principles of Employment of Children and Young Workers" prepared based on this law. These regulations regulate the working conditions of children and young workers. to protect their health and safety, physical, mental, moral and social development, and to enable them to continue their education and to prevent their economic exploitation.</p> |
| Human trafficking | No risk identified | Human trafficking is banned by the host country REGULATION From the Ministry of Interior                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

|  |  |                                                                                                        |
|--|--|--------------------------------------------------------------------------------------------------------|
|  |  | affairs, through the “REGULATION ON THE FIGHT AGAINST HUMAN TRAFFICKING AND THE PROTECTION OF VICTIMS” |
|--|--|--------------------------------------------------------------------------------------------------------|

### 2.3.2 Human Rights

| Risks identified   | Mitigation or preventative measure(s) taken                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| No risk identified | <p>The UN proclaimed the Universal Declaration of Human Rights on December 10, 1948. This declaration is the most fundamental human rights document. The Declaration was followed by the Covenant on Economic, Social and Cultural Rights and the Covenant on Civil and Political Rights in 1966. Another important human rights treaty is the European Convention on Human Rights. The most important feature of the conventions is that they put the signatory countries under legal obligation. With the amendment of Article 90 of the Turkish Constitution, international conventions signed by Turkey have become part of national law.</p> <p>In order to protect human rights, 'Human Rights Provincial and District Boards' were established in 81 provinces and 800 districts in Turkey in 2000. These boards were restructured with a regulation published in the Official Gazette No. 25298 dated November 23, 2003, and the representation of civil society in the boards was strengthened.</p> <p>These committees work for the protection and promotion of human rights. The Boards are primarily responsible for carrying out the necessary work to prevent human rights violations and to ensure that citizens are treated with tolerance and courtesy in the practices of the administration.</p> |

### 2.3.3 Indigenous Peoples and Cultural Heritage

| Risks identified   | Mitigation(s) or preventative measure taken                                                        |
|--------------------|----------------------------------------------------------------------------------------------------|
| No risk identified | There are no specific indigenous tribes and relicts from indigenous people at the project vicinity |

### 2.3.4 Property Rights

| Risks identified       | Mitigation or preventative measure(s) taken                                                                                                                                                                                                                                                                                                                 |
|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Land ownership changes | <p>Host country has a strict regulation that fairly evaluates value of the land to determine the compensation fees per square meters. This is detailed under the Expropriation Law numbered 2942.</p> <p>Please also note that addition of the auxiliary solar resource was within project boundary and did not cause any further expropriation issues.</p> |

In the expropriation cases, the major party is the government authority, the “Energy Market Regulatory Authority,” and the project owner is the intervener. The legal adviser to the project owner explains that a large number of expropriation cases are finalized, some of the cases that have not been finalized continue in the court of first instance, some of them are at the appeal stage, and in some cases, the plaintiffs (land owners) have been settled with the plaintiffs (land owners) and the plaintiffs have waived the lawsuit.

The receivables of the plaintiffs (landowners) have been paid in full in all of the cases that have been decided and finalized, and the plaintiffs do not have any unpaid receivables, for this reason, execution proceedings continue.

On this occasion, the project owner Murat Hes Enerji Elektrik Üretim Ve Ticaret A.Ş. has not victimized any right holder, and their legal rights have not been prejudiced.

In the ongoing case, the Project owner continues their out-of-court and in-court settlement negotiations with the plaintiffs at every stage and makes offers to them at every stage. In the event that the offers are not accepted by the plaintiffs, again after the lawsuit, in accordance

with the court decision, the amounts deserved by the plaintiffs are to be paid in full by the project owner company.

### 2.3.5 Benefit Sharing

Not Applicable the project does not have an official benefit sharing arrangement

|                                                    |  |
|----------------------------------------------------|--|
| Process used to design the benefit sharing plan    |  |
| Summary of the benefit sharing plan                |  |
| Approval and dissemination of benefit sharing plan |  |

## 2.4 Ecosystem Health

|                                        | Risks identified                                                                                 | Mitigation or preventative measure(s) taken                                                                                                                                                                                                                                                                                                                       |
|----------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Impacts on biodiversity and ecosystems | No or very low Risk                                                                              | As explained at the SEIA report Titled Final Project Description Report the project site is not posing any threat to the biodiversity and ecosystems. There will be enough lifeline water to support downstream life and the project will stop retaining water behind the regulator if the upstream flow drops seasonally.                                        |
| Soil degradation and soil erosion      | During construction phase the construction activity have caused some soil disturbance            | The topsoil is preserved prior to construction and replaced after construction phase. The areas with erosion or mass flow risk have been identified and best practice on slope stability have implemented.                                                                                                                                                        |
| Water consumption and stress           | The regulators will change the flow regime temporarily                                           | There is a fish passage to allow free movement of the fish species. In addition, the lifeline water will be released to the riverbed at all times. The irrigation at the downstream has been facilitated to support local economy.                                                                                                                                |
|                                        | The Solar Pannels are washed with Ground water pumped, filtered and released back to the stream. | The solar panels need to be washed by de-ionized water. For this the facility has a small installation where they have the capacity to store 10 m <sup>3</sup> (10t) of water daily. The pannels need to be cleaned up daily for 3 months during summer season. As such the 360 m <sup>3</sup> of e-ionized water is being used while 180 m <sup>3</sup> of water |

|  |                                                                                                                                                                                                                                                                                                                                                                                        |
|--|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | is returned back to the stream during de-ionization process. The source of the water is ground water that accumulates along the river bank and no chemicals are used in the process and the water returns back to the ground after the washing. The amount of water used annually totals 540 m <sup>3</sup> . This is a very small amount and does not effect the ecosystem functions. |
|--|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Please note that the project has conducted tree-planting activities in collaboration with the local Department of Forestry. A Five-hectare area has been planted with almonds, apples, peaches, apricots, plums, dates, pistachios, and pine trees. After an audit by the committee led by the state Water Works during the project site inspection, please be aware of the following information recorded at the inspection minutes:

“During the inspection of the power plant building, several important findings were noted. There was a hazardous waste storage area, and wastewater from the personnel was collected in a sealed septic tank, which Besni Municipality maintained. Additionally, the facility had obtained a zero-waste certificate and had a waste management plan in place. The area was found to be inhabited by various bird and mammal species, including partridges, rabbits, wild goats, eagles, pigs, striped hyenas, and falcons. The presence of trees around the power plant building was also observed. It was confirmed that there were no transmission lines outside the facility that could damage the trees, and the facility had carried out landscaping and afforestation work. It was also noted that the afforestation along the canal had been affected by climatic conditions. Furthermore, a 12 MW hybrid solar power plant had been established within the allocated area, and no negative impact on the flora, fauna, or wildlife was identified.

### 2.4.1 Rare, Threatened, and Endangered Species

*Is the project located in or adjacent to habitats for rare, threatened, or endangered species?*

☐ Yes ☒ No

*If yes, list such species and habitats in the table below and provide evidence that the project will not adversely impact these areas.*

| Species and habitat | Demonstrate that the project will not adversely impact habitats and areas needed for habitat connectivity for rare, threatened, or endangered species. |
|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                       |                                                                                                      |
|---------------------------------------|------------------------------------------------------------------------------------------------------|
| Areas needed for habitat connectivity | <i>Demonstrate that the project will not adversely impact areas needed for habitat connectivity.</i> |
| ...                                   | ...                                                                                                  |

|                                                       | Risks identified   | Mitigation or preventative measure(s) taken                                       |
|-------------------------------------------------------|--------------------|-----------------------------------------------------------------------------------|
| Habitats for rare, threatened, and endangered species | No risk identified | Project activity is not affecting any rare habitat. It does not have a reservoir. |
| Areas for habitat connectivity                        | No risk identified | There is no habitat fragmentation caused by the project activity.                 |

## 2.4.2 Introduction of Species

Not Applicable , No risk identified

The project is a renewable energy project, two cascade type run-off river hydropower plants, and a supportive solar PV unit. There is no reservoir structure, and no aquatic or terrestrial species are involved as part of the project activity.

## 2.4.3 Ecosystem Conversion

N/A , No risk identified

The project is a renewable energy project, two cascade type run-off river hydropower plants, and a supportive solar PV unit. The project activity have no impact on ecosystems, and no ecosystem conversion was possible as part of the project activity.

## 3 APPLICATION OF METHODOLOGY

### 3.1 Title and Reference of Methodology

| Type (methodology, tool or module).                         | Reference ID, if applicable | Title                                                                                                                         | Version |
|-------------------------------------------------------------|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------|---------|
| The CDM approved baseline and monitoring methodology        | ACM0002                     | Consolidated baseline methodology for grid-connected electricity generation from renewable sources”                           | 22.0    |
| Tool to calculate emission factor for an electricity system | TOOL07                      | Tool for the demonstration and assessment of additionality                                                                    | 07.0.0  |
| Tool for the demonstration and assessment of additionality  | TOOL01                      | Tool for the demonstration and assessment of additionality                                                                    | 07.0.0  |
| Tool for the assessment of Crediting Period Renewal         | TOOL11                      | Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period | 03.0.1  |
| Guideline                                                   | EB 48 Report Annex 11       | Guidelines for the Reporting and Validation of Plant Load Factors                                                             | 01      |

### 3.2 Applicability of Methodology

| Methodology ID | Applicability condition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Justification of compliance                                                                                                                                                                                                                                                                                                                                                    |
|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ACM0002        | <p>This methodology is applicable to grid-connected renewable energy power generation project activities that:</p> <ul style="list-style-type: none"> <li>a) Install a Greenfield power plant;</li> <li>b) Involve a capacity addition to (an) existing plant(s);</li> <li>c) Involve a retrofit of (an) existing operating plant(s)/unit(s);</li> <li>d) Involve a rehabilitation of (an) existing plant(s)/unit(s); or</li> <li>e) Involve a replacement of (an) existing plant(s)/unit(s).</li> </ul> <p>(f) Install a Greenfield power plant together with a grid-connected Greenfield pumped storage power plant. The greenfield power plant may be directly connected to the PSP or connected to the PSP through the grid.</p> | <p>The project activity involves the installation of two Greenfield run-of-river hydroelectric power plant at the Göksu River flowing through Besni, Adiyaman in Turkey's South-eastern Region, with two power houses. At this site no renewable power plant was operated prior to the implementation of the project activity.</p> <p>Added auxiliary solar power resource</p> |
|                | <p><i>In case the project activity involves the integration of a BESS, the methodology is applicable to grid-connected renewable energy power generation project activities that:</i></p> <ul style="list-style-type: none"> <li><i>(a) Integrate BESS with a Greenfield power plant;</i></li> <li><i>(b) Integrate a BESS together with implementing a capacity addition to (an) existing solar photovoltaic<sup>1</sup> or wind power plant(s)/unit(s);</i></li> </ul>                                                                                                                                                                                                                                                             | <p>The project activity is the installation of a run-of-river hydro power plant.</p> <p>Added auxiliary solar power resource</p>                                                                                                                                                                                                                                               |

|  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                        |
|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p>(c) <i>Integrate a BESS to (an) existing solar photovoltaic or wind power plant(s)/unit(s) without implementing any other changes to the existing plant(s);</i> (d) <i>Integrate a BESS together with implementing a retrofit of (an) existing solar photovoltaic or wind power plant(s)/unit(s);</i></p> <p>(e) <i>Integrate a BESS together with a Greenfield power plant that is operating in coordination with a PSP. The BESS is located at site of the greenfield renewable power plant.</i></p>                                                                                                                                            |                                                                                                                                                                                                                                        |
|  | <p>(b) In the case of capacity additions, retrofits, rehabilitations or replacements (except for wind, solar, wave or tidal power capacity addition projects) the existing plant/unit must have started commercial operation prior to the start of a minimum historical reference period of five years. The reference period is used for the calculation of baseline emissions and defined in the baseline emission section. Furthermore, no capacity expansion, retrofit, or rehabilitation of the plant/unit has been undertaken between the start of this minimum historical reference period and the implementation of the project activity;</p> | <p>The project activity is the installation of a new hydropower plant. It is not included capacity additions, retrofits, rehabilitations or replacements of the existing plant.</p> <p><b>Added auxiliary solar power resource</b></p> |
|  | <p>In case of hydro power plants, one of the following conditions shall apply:</p> <p>(a) <i>The project activity is implemented in existing</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <p>This condition is not applicable to the project activity as it does not result in a new reservoir. However, the project does involve the</p>                                                                                        |

|  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                 |
|--|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p>single or multiple reservoirs, with no change in the volume of any of the reservoirs; or</p> <p>(b) The project activity is implemented in existing single or multiple reservoirs, where the volume of the reservoir(s) is increased and the power density, calculated using equation (7), is greater than 4 W/m<sup>2</sup>; or</p> <p>(c) The project activity results in new single or multiple reservoirs and the power density, calculated using equation (7), is greater than 4 W/m<sup>2</sup>; or</p> <p>(d) The project activity is an integrated hydro power project involving multiple reservoirs, where the power density for any of the reservoirs, calculated using equation (7), is lower than or equal to 4 W/m<sup>2</sup>, and all of the following conditions shall apply: (i) (ii) (iii) The power density calculated using the total installed capacity of the integrated project, as per equation (8), is greater than 4 W/m<sup>2</sup>; Water flow between reservoirs is not used by any other hydropower unit which is not a part of the project activity; Installed capacity of the power plant(s) with power density lower than or equal to 4 W/m<sup>2</sup> are:</p> <p>a. Lower than or equal to 15 MW; and</p> <p>b. Less than 10 per cent of the total installed capacity of integrated hydro power project.</p> | <p>construction of a regulation pond with a surface of 640,471.91 m<sup>2</sup>. Power density (PD) for this regulation pond is: PD= 35,478,000W/ 640,471.91 m<sup>2</sup>= 55.39 W/m<sup>2</sup> PD&gt; 4 W/m<sup>2</sup>. (see Figure 11)</p> |
|  | <p>In the case of integrated hydro power projects, project</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <p>This project activity is not an integrated hydropower</p>                                                                                                                                                                                    |

|  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                       |
|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
|  | <p>participants shall:</p> <p>(a) Demonstrate that water flow from upstream power plants/units spill directly to the downstream reservoir and that collectively constitute to the generation capacity of the integrated hydro power project; or</p> <p>(b) Provide an analysis of the water balance covering the water fed to power units, with all possible combinations of reservoirs and without the construction of reservoirs. The purpose of water balance is to demonstrate the requirement of specific combination of reservoirs constructed under CDM project activity for the optimization of power output. This demonstration has to be carried out in the specific scenario of water availability in different seasons to optimize the water flow at the inlet of power units. Therefore, this water balance will take into account seasonal flows from river, tributaries (if any), and rainfall for minimum of five years prior to the implementation of the CDM project activity.</p> | <p>plant.</p> <p>Added auxiliary solar power resource</p>                                                                             |
|  | <p>In the case of PSP, the project participants shall demonstrate in the PDD that the project is not using water which would have been used to generate electricity in the baseline.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <p>The project is not pumped storage project (PSP). The project activity is the installation of a run-of-river hydro power plant.</p> |
|  | <p>The methodology is not applicable to: (a) Project activities that involve switching from fossil fuels to</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <p>It is a renewable energy project with no fuel-switch and biomass fired power plant involved. The project</p>                       |

|  |                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                        |
|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | renewable energy sources at the site of the project activity, since in this case the baseline may be the continued use of fossil fuels at the site; (b) Biomass fired power plants/units.                                                                                                                                                                                                                                 | activity is a hydropower plant. Added auxiliary solar power resource.                                                                                                                  |
|  | In the case of retrofits, replacements, or capacity additions, this methodology is only applicable if the most plausible baseline scenario, as a result of the identification of baseline scenario, is “the continuation of the current situation, i.e. to use the power generation equipment that was already in use prior to the implementation of the project activity and undertaking business as usual maintenance”. | This condition is not applicable to the project activity as it does not involve a capacity addition, retrofit or replacement of existing grid-connected renewable power plant/unit(s). |

Please also refer to the following table for the applicability criteria of the tools:

| No | Applicability conditions to relevant tools                                                                                                                                                                                                                                                                                                                                                                                                                                             | Project Activity                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Criterion Met |
|----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| 1  | Tool for the demonstration and assessment of additionality” (Version 07.0.0)                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |               |
|    | <p>This tool provides for step-wise approach to demonstrate and assess additionality. These steps include:</p> <ul style="list-style-type: none"> <li>• Identification of alternatives to the project activity.</li> <li>• Investment analysis to determine that the proposed project activity is either: 1) not the most economically or financially attractive, or 2) not economically or financially feasible,</li> <li>• Barrier analysis, and Common practice analysis</li> </ul> | <p>In the absence of the proposed project activity, plausible and credible project activities to the proposed project activity are presented.</p> <p>Benchmark Analysis is selected as the analysis method and the Equity IRR is selected as the financial indicator for the demonstration of the additionality of the project. Without the VER revenue, the Internal Rate of Return of the project cannot get close to the benchmark of 15,38 %, with an equity internal rate of return of 10.73%. A fluctuation of <math>\pm 10\%</math> in the key parameters also does not make the project exceed this benchmark.</p> <p>It is also shown that the project activity is not a common practice.</p> | Yes           |
| 2  | Tool to calculate the emission factor for an electricity system” (Version 07.0).                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |               |
|    | <p>This tool may be applied to estimate the OM, BM and/or CM when calculating baseline emissions for a project activity that substitutes grid electricity that is where a project activity supplies electricity to a grid or a project activity that results in savings of electricity that would have been provided by the grid.</p> <p>Under this tool, the emission factor for the project electricity can be calculated either for</p>                                             | <p>Although UNFCCC ACM0002 Version 22.0 refers to “Tool to calculate the emission factor for an electricity system” (Version 07.0 is used as the most recently published <math>EF_{CM}</math> used this version), the host country (Turkey) published the combined margin, build margin and operational margin emission factors on an official</p>                                                                                                                                                                                                                                                                                                                                                     | Yes           |

|   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |     |
|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
|   | grid power plants only/or as an option can include off-grid power plants.                                                                                                                                                                                                                                                                                                                                                                                                                                  | publication dated 18.03.2024. by using "Tool to calculate the emission factor for an electricity system" (Version 07.0).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |     |
| 3 | Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period" (Version 03.0.1)                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |     |
|   | <p>This tool provides a stepwise procedure to assess the continued validity of the baseline and to update the baseline at the renewal of a crediting period, as required by paragraph 49(a) of the modalities and procedures of the CDM. provides an approach to evaluate whether the current baseline is still valid for the next crediting period. The second step provides an approach to update the baseline in case that the current baseline is not valid anymore for the next crediting period.</p> | <p>The current baseline scenario complies with all relevant mandatory national and or/sectoral policies. Thus, it can be concluded that the current baseline scenario is in compliance with relevant mandatory national and sectoral policies. The project received the production license from the Turkish Energy Market Regulatory Authority and this license ensures that the project complies with all national regulations. The term of the license is 49 years.</p> <p>There is no impact of circumstances existing at the time of requesting renewal of crediting period on the current baseline emissions for this project. The conditions used to determine the baseline emissions in the previous crediting period are still valid.</p> <p>The equipment and the technology of the project are still valid. Therefore this sub- step is not applicable for this project activity.</p> | Yes |

### 3.3 Project Boundary

| Source   |                                                                                                                                             | Gas              | Included? | Justification/Explanation                                                                                                                                                                                                |
|----------|---------------------------------------------------------------------------------------------------------------------------------------------|------------------|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Baseline | CO2 emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity hydro components | CO <sub>2</sub>  | Yes       | Main emission source                                                                                                                                                                                                     |
|          |                                                                                                                                             | CH <sub>4</sub>  | No        | Minor emission source                                                                                                                                                                                                    |
|          |                                                                                                                                             | N <sub>2</sub> O | No        | Minor emission source                                                                                                                                                                                                    |
|          |                                                                                                                                             | Other            | No        | N/A                                                                                                                                                                                                                      |
|          | CO2 emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity PV Components    | CO <sub>2</sub>  | Yes       | Main emission source                                                                                                                                                                                                     |
|          |                                                                                                                                             | CH <sub>4</sub>  | No        | Minor emission source                                                                                                                                                                                                    |
|          |                                                                                                                                             | N <sub>2</sub> O | No        | Minor emission source                                                                                                                                                                                                    |
|          |                                                                                                                                             | Other            | No        | N/A                                                                                                                                                                                                                      |
| Project  | For hydro power plants, emissions of CH4 from the reservoir                                                                                 | CO <sub>2</sub>  | No        | Minor emission source                                                                                                                                                                                                    |
|          |                                                                                                                                             | CH <sub>4</sub>  | No        | Conservative. The project activity does not result in a new reservoir. However, it does involve the construction of a regulation pond, with PD > 4 W/m <sup>2</sup> . Therefore, no CH4 emissions are expected to occur. |
|          |                                                                                                                                             | N <sub>2</sub> O | No        | Minor emission source                                                                                                                                                                                                    |
|          |                                                                                                                                             | Other            | N/A       | N/A                                                                                                                                                                                                                      |
|          | Solar Component                                                                                                                             | CO <sub>2</sub>  | No        | No- project is not solar thermal                                                                                                                                                                                         |
|          |                                                                                                                                             | CH <sub>4</sub>  | No        | N/A                                                                                                                                                                                                                      |
|          |                                                                                                                                             | N <sub>2</sub> O | No        | N/A                                                                                                                                                                                                                      |
|          |                                                                                                                                             | Other            | N/A       | N/A                                                                                                                                                                                                                      |

The project is connected to the national grid:

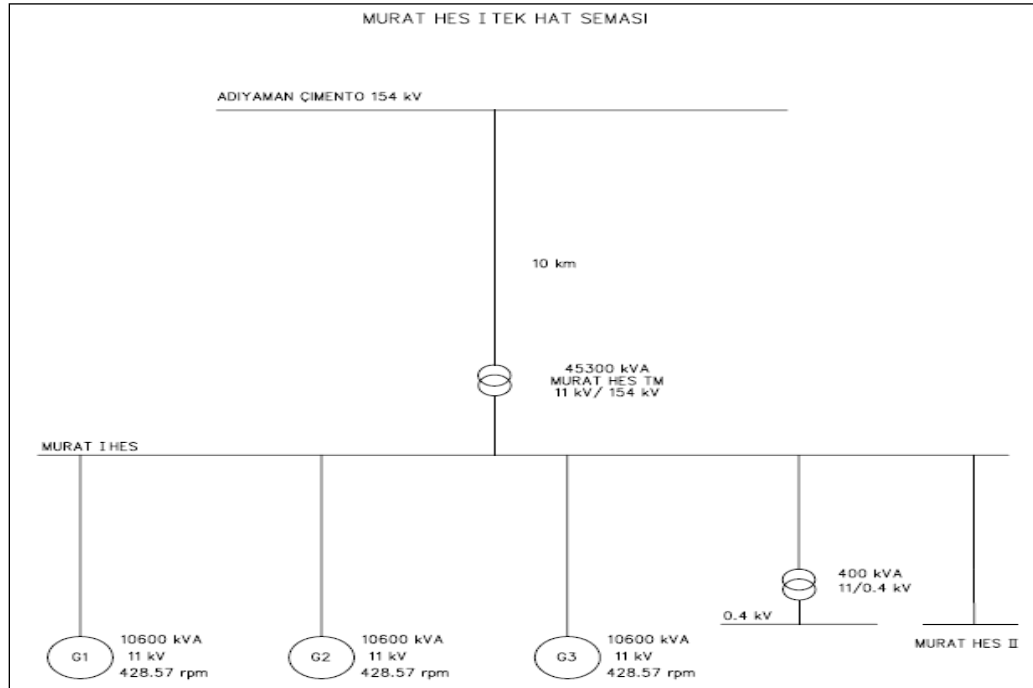


Figure 9 Murat I single-line diagram

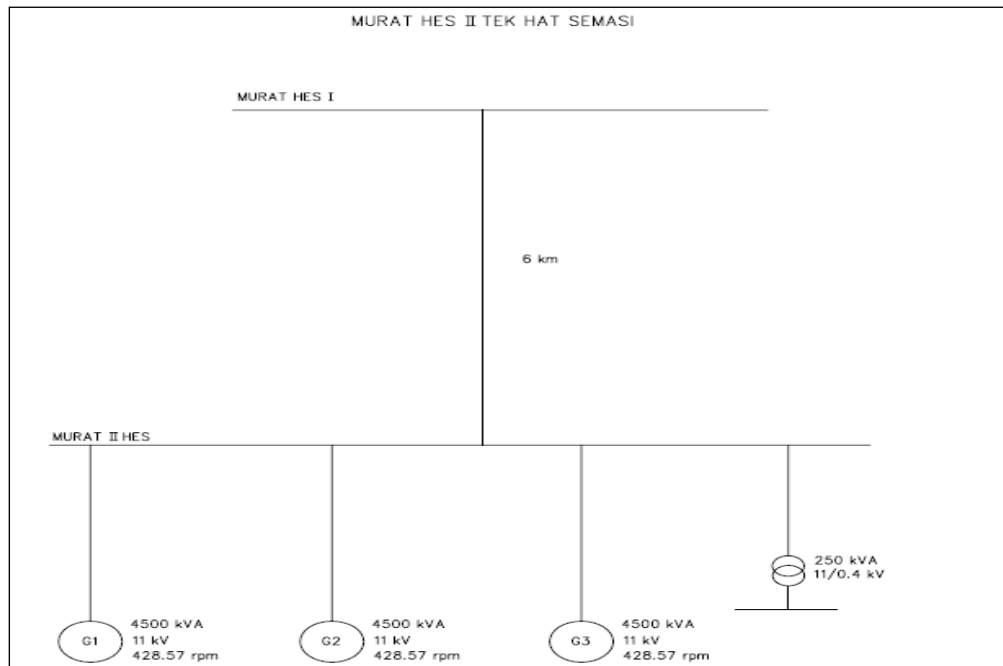


Figure 10 Murat II single-line diagram

### 3.4 Baseline Scenario

According to the approved consolidated methodology ACM0002 (Version 22.0), if the project activity is the installation of a new grid-connected renewable power plant/unit, the baseline is the following: “Electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources, as reflected in the combined margin (CM) calculations described in the Tool to calculate the emission factor for an electricity system”. Since the project activity involves the installation of two new grid-connected hydropower plants together with 12 MW auxiliary resources coming from solar PV, the baseline scenario is the same as described above. The combined margin for the Turkish grid has been calculated as per the “Tool to calculate the emission factor for an electricity system” (Version 3.0.0.)

#### 3.4.1 Additionality

The project's additionality has been demonstrated using the latest version of the “Tool for the demonstration and assessment of additionality” - Version 7.0.0. This tool equals “The Project test”, stated in the VCS Standard: VCS Version 3.4.

In this version of the PDD we will demonstrate that the addition of the new auxiliary power coming from solar PV has not effected the additionality.

#### 3.4.2 Regulatory Surplus

Is the project located in an UNFCCC Annex 1 or Non-Annex 1 country?

☒ Annex 1 country

☐ Non-Annex 1 country

Are the project activities mandated by any law, statute, or other regulatory framework?

☐ Yes

☒ No

If the project is located inside a Non-Annex 1 country and the project activities are mandated by a law, statute, or other regulatory framework, are such laws, statutes, or regulatory frameworks systematically enforced?

☐ Yes

☐ No

*If no, describe which mandated laws, statutes, or other regulatory frameworks require project activities and provide evidence of systematic non-enforcement to demonstrate regulatory surplus.*

### 3.4.3 Additionality Methods

The projects additionality has been demonstrated using the latest version of the “Tool for the demonstration and assessment of additionality”- Version 7.0.0. This tool equals “The Project test”, stated in the VCS Standard: VCS Version 3.4.

The following steps from the additionality tool are completed below not only considering the financial parameters from the first investment phase but also adding the investment parameters of the added auxiliary 12.006 MWm Solar Resource:

#### Step 1: Identification of alternatives to the project activity consistent with current laws and regulations

Alternative A, which is the implementation of the project without carbon revenue, is not financially attractive, as discussed in the investment analysis section below. Alternative B is the baseline scenario and implementation of the proposed project as a VER activity would be additional to this scenario. Alternative B does not seem like a realistic option due to the expected energy demand increase in Turkey. Energy demand of Turkey is expected to expand at an average of %6,3- %7 until 2018-<sup>19</sup>. In addition, Figure 6 below shows the energy demand projection (conservative scenario) between 2010 and 2019 prepared by TEİAŞ. Based on this fact, Turkey's electricity generation should be increased per the expected energy demand. Therefore, no action alternative is not a plausible option and HEPPs should be constructed to generate clean energy where applicable<sup>20</sup>.

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<sup>19</sup> E. Kavukçuoğlu, Türkiye Elektrik Enerjisi Piyasası 2010-2011, Deloitte Turkey

<sup>20</sup> Electrical Energy Production Planning Study on Turkey 2005-2010, TEİAŞ, [www.teias.gov.tr](http://www.teias.gov.tr)

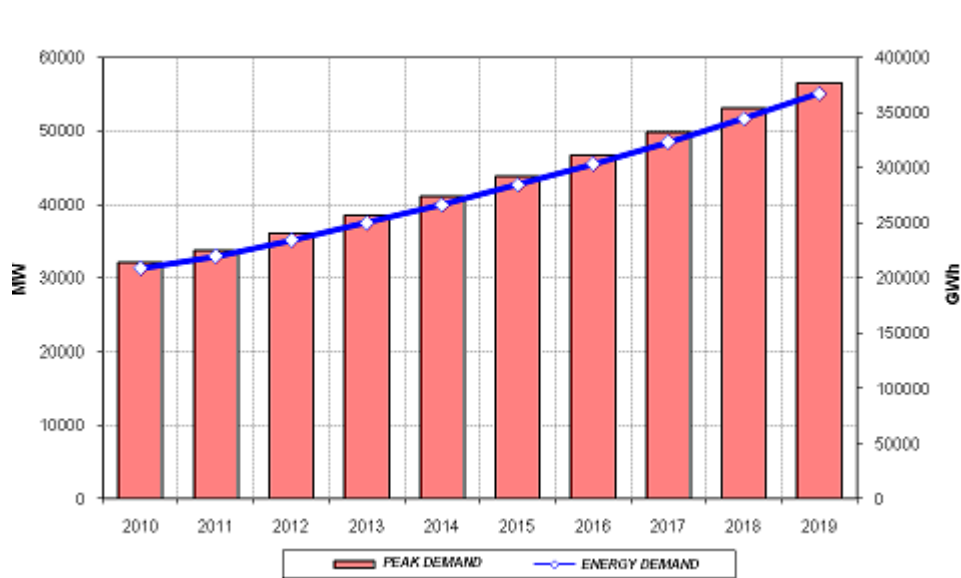


**Figure 11 The energy demand projection between 2010 and 2019(low demand)<sup>21</sup>**

The last alternative, Alternative C, is considered a significant alternative to the Project activity. The share of thermal plants in Turkey's installed capacity is considerably high, which corresponds to 32,278.5 MW of the total 49,524.1 MW installed capacity according to 2010 Turkish electrical statistics taken from TEIAS( Turkish Electricity Transmission Company)<sup>22</sup>.

<sup>21</sup> Retrieved from <http://www.teias.gov.tr/projeksiyon/KAPASITE%20PROJEKSIYONU%202010.pdf>, Page 14

<sup>22</sup> [http://www.teias.gov.tr/istatistik2010/front%20page%202010-çiçek%20kitap/kguc\(1-12\)/7.xls](http://www.teias.gov.tr/istatistik2010/front%20page%202010-çiçek%20kitap/kguc(1-12)/7.xls)

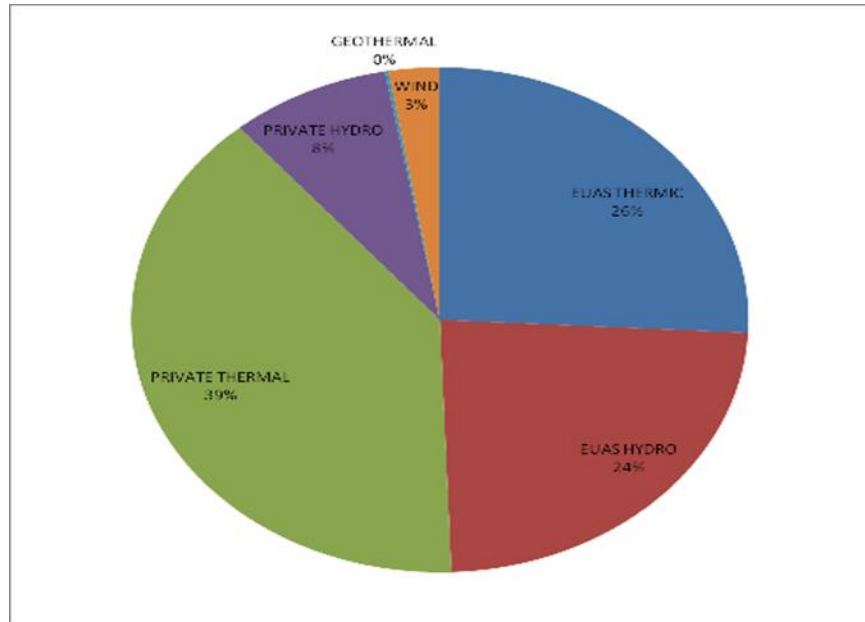


**Figure 12 Electricity generation by sources and ownership<sup>23</sup>**

#### Outcome of Step 1a

Above mentioned three alternatives are considered for the Project activity. However, Alternative B which is the continuation of the current situation is not considered as a realistic alternative due to increasing electricity demand therefore the Alternative A and C are to be evaluated.

This also explains the need to change the license regulation to allow the addition of auxiliary resources, yet note that this is not mandatory.

#### Sub-step 1b. Consistency with mandatory laws and regulation

The following applicable mandatory laws and regulations have been identified:

- i. Electricity Market Law<sup>24</sup>: It was enacted on March 3rd, 2001. This Law aims to ensure the development of a financially sound and transparent electricity market operating in a competitive environment under the provisions of civil law. It also underlines the need to produce sufficient, high-

<sup>23</sup> [http://www.teias.gov.tr/istatistik2010/front%20page%202010-çiçek%20kitap/kguc\(1-12\)/7.xls](http://www.teias.gov.tr/istatistik2010/front%20page%202010-çiçek%20kitap/kguc(1-12)/7.xls)

<sup>24</sup> Law Number: 4628 Ratification Date: 20.02.2001 Enactment Date: 03.03.2001

quality, low-cost, and environmentally friendly electricity for consumers. The text also provides guidelines to structure the autonomous regulation and supervision of the market.

ii. The Renewable Energy Law<sup>25</sup>: enacted on May 5th 2005; this law compels electricity selling companies to purchase from “Green” energy providers until 2011 at a defined ratio and price. This ratio is based on previous year sales over total energy sold in the country. The price is based on a yearly average wholesale purchase price predetermined by the Energy Market Regulatory Authority (TEIAS).

iii. Energy Efficiency Law<sup>26</sup>: The purpose of this Law is to increase efficiency in using energy sources and energy in order to use energy effectively, avoid waste, ease the burden of energy costs on the economy and protect the environment. It covers the principles and procedures applicable to increasing and promoting energy efficiency in energy generation, transmission, distribution and consumption phases at industrial establishments, buildings, power generation plants, transmission and distribution networks and transport, raising energy awareness in the general public, and utilizing renewable energy sources.

iv. The Forest Law<sup>27</sup>: This law defines the borders of “forest lands” and clarifies the legal details of how these areas shall be used and protected.

v. Environmental Law<sup>28</sup>: This law came into force in 1983; it considers the environment as a single domain, aiming not only to prevent and eliminate environmental pollution, but also to allow the management of land and natural resources in an integrated manner. According to its basic principles, and as also stated in the Constitution, citizens as well as the State bear responsibility for the environment protection. Furthermore, this law states that in all economic activities, every measure should be taken to minimize pollution.<sup>29</sup>

vi. Regulation on procedures and principles of signing the agreement of water resources utilization to generate electricity for the electricity market<sup>30</sup>.

vii. Regulation on Environmental Impact Assessment<sup>31</sup> The resultant alternatives to the project as outlined in Step (1a) are in compliance with the applicable laws and regulations.

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<sup>25</sup> Law Number: 5346 Ratification Date: 10.05.2005 Enactment Date: 18.05.2005

<sup>26</sup> Law Number: 5627 Ratification Date: 18.04.2007 Enactment Date: 02.05.2007

<sup>27</sup> Law Number 6831 Enactment Date: 31.08.1956

<sup>28</sup> Law Number 2872 Ratification Date: 09.08.1983 Enactment Date: 11.08.1983

<sup>29</sup> “Turkey’s Environment: a review and evaluation of Turkey’s environment and its stakeholders”, May 2002.  
<http://www.rec.org/REC/Programs/ExtensionToTurkey/TurkeysEnvironment.pdf>

<sup>30</sup> Official Gazette: #25150, on 26.06.2003

<sup>31</sup> Official Gazette: #26939, on 17.07.2008

viii. The Amended Electricity Market License Regulation entered into force. On March 8, 2020, amendments were made to the Electricity Market License Regulations<sup>32</sup> of the host Country (Republic of Turkey). These amendments included provisions for adding auxiliary resources to existing power plants. The addition of Solar PV components complies with this regulation.

#### Outcome of Step 1b

Mandatory legislation and regulations for each alternative are taken into account in sub-step 1b. Based on the above analysis, the proposed project activity is not the only alternative amongst the project participants that is in compliance with mandatory regulations. Therefore, the proposed VER project activity is considered as additional.

According to the methodology ACM0002 (Version22.0), the baseline scenario is Alternative 3: The equivalent electricity will be provided by the existing grid-connected power unit (i.e continuation of the current situation).

#### Step 2: Investment analysis

The purpose of the investment analysis is to determine whether the proposed project activity is not:

- a) The most economically or financially attractive; or
- b) Economically or financially feasible, without the revenue from the sale of certified emission reductions (VCS-VERs).

To conduct the investment analysis, the following Sub-steps were used and the added auxiliary power pa:

#### Sub-step 2a- Determine the appropriate analysis method.

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<sup>32</sup> Regulation on the amendment to the electricity market licence regulation, Published on the Official Gazette numbered 31062 On March 8th, 2020, entered into force upon publication.

The “Tool for the demonstration and assessment of additionality” (Version 7.0.0) recommends three analysis methods, namely simple cost analysis (Option I), investment comparison analysis (Option II) and benchmark analysis (Option III).

The proposed Project generates financial and economic benefits through the sales of electricity other than Voluntary Emissions Reduction (VCS-VER)- related income. Therefore, the simple cost analysis (Option I) cannot be used.

Investment comparison analysis (Option II) is only applicable to projects where alternatives should be similar investment projects. As it was stated in Step 1, the alternative baseline scenario of the proposed project is the continuation of the current situation, where the equivalent electricity will be provided by the existing power units connected to the national grid. Among the investment comparison analysis (Option II) and the benchmark analysis (Option III), the benchmark analysis (Option III) is preferred.

While implementing the benchmark analysis, the two phases of investments are reflected as changes in total investment costs and revenue onward from the 11<sup>th</sup> year, as shown below. Please also note that the Benchmark value for the two different dates of investment are very similar if not nearly the same.

#### Sub-step 2b- Option III. Apply benchmark analysis

Selecting or calculating a benchmark that is reliable and valid is very difficult due to the market volatility (government bond rates, etc.), it changes over time, and the project type has its own characteristics (supply, demand, price, etc.). Institutional capacity is necessary for these calculations. In this regard, the recognized and accepted widely the calculations (indicators) of international institutions (WB, IMF, UNCTAD, IFF, etc.) can be used as a benchmark. Equity IRR used by the World Bank (Sustainable Development Departments Turkey Country Unit) is 15% for small hydro at the time of investment decision date for the hydro components of the power plant (7.01.2010-Date of Financial Closure). This benchmark is found to be 15.38 % for the Solar PV at the time of this components investment decision date (20.08.2020-Pannel Supply Contract). This accepted benchmark IRR provides a more accurate and conservative view of the investment analysis effort. Eventually, the applied benchmark will be 15% for comparison with the equity IRR in this investment analysis of the Murat HEPP project<sup>33</sup>. As is known, there are also benchmarks for other countries in appendix of “Tool for the demonstration and assessment of additionality” version 05 for the investment analysis.

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<sup>33</sup> [http://www-wds.worldbank.org/external/default/WDSPContentServer/WDSP/IB/2009/05/11/000333037\\_20090511030724/Rendered/PDF/468080PADOP11\\_2101OfficialUseOnly1.pdf](http://www-wds.worldbank.org/external/default/WDSPContentServer/WDSP/IB/2009/05/11/000333037_20090511030724/Rendered/PDF/468080PADOP11_2101OfficialUseOnly1.pdf)

When it checked, the highest benchmark is %18 and the lowest benchmark is %10,5 among many countries. In this Tool, the benchmark IRR (The expected return on equity) is composed of four elements:

(a) a risk free rate of return; (b) an equity risk premium; (c) a risk premium for the host country; and (d) an adjustment factor to reflect the risk of projects in different sectoral scopes. All values are expressed in real terms. Equity IRR used by the World Bank is parallel to the range of IRR in the tool.

#### Sub-step 2c. Calculation and comparison of financial indicators

The parameters needed for calculation of key financial indicators are as follows:

|                                                      | Data                | Unit                 |
|------------------------------------------------------|---------------------|----------------------|
| Installed Power                                      | 35.478              | MWe                  |
| Plant load factor <sup>34</sup>                      | 54.0 <sup>35</sup>  | %                    |
| Operational hours                                    | 4.746               | h/year               |
| Estimation of annual grid-connected power generation | 168.39              | GWh                  |
| Total Investment Cost                                | 80,719,599          | USD                  |
| Equity                                               | 36,018,966          | USD                  |
| Debt                                                 | 44,700,632          | USD                  |
| Annual Operational Costs                             | 949,604             | USD                  |
| Electricity Selling Price                            | 0.062 <sup>36</sup> | USD/kWh              |
| VER selling Price                                    | 4 <sup>37</sup>     | USD/tCO <sub>2</sub> |
| Corporate tax rate                                   | %                   | 20                   |

**Table 4 Basic financial parameters of the proposed Project Parameter**

(i) The cash outflow and costs (investment costs & operation costs)

Total investment cost of Murat Weir and Hydroelectric Power Plant together with its auxiliary added solar component is 80,719,599USD and is itemized as follows;

| Expense items                | Value (USD) | Data source and date |
|------------------------------|-------------|----------------------|
| Construction site facilities | \$312,500   |                      |
| Road construction            | \$218,750   |                      |

<sup>34</sup> Calculated according to the PLF Guidance: chrome-extension://efaidnbmnnnibpcjpcglclefindmkaj/https://cdm.unfccc.int/EB/048/eb48\_repan11.pdf

<sup>35</sup> Murat HEPP Financial Analysis in Excell

<sup>36</sup> <https://www.epias.com.tr/tum-duyurular/piyasa-duyurulari/elektrik/kayit-ve-uzlastirma/01-07-2021-tarihinden-31-12-2030-tarihine-kadar-isletmeye-girecek-yek-belgeli-yenilenebilir-enerji-kaynaklarina-dayali-elektrik-uretim-tesisleri-icin-uygulanacak-fiyatlar-hk-4/>

<sup>37</sup> <https://app.hubspot.com/documents/3298623/view/251152947?accessId=fd91dd>

|                                               |              |                                                     |
|-----------------------------------------------|--------------|-----------------------------------------------------|
| Diversion Weir and Intake Structure           | \$8,979,360  | JUNE 2009<br>(From revised feasibility)             |
| Transmission Tunnel                           | \$16,198,143 |                                                     |
| Transmission Canal                            | \$13,734,994 |                                                     |
| Forebay                                       | \$6,318,172  |                                                     |
| Power House                                   | \$3,341,526  |                                                     |
| Penstock                                      | \$1,878,284  |                                                     |
| Turbine and Generator                         | \$8,460,000  |                                                     |
| Accessory Equipment                           | \$800,000    |                                                     |
| Other Equipment                               | \$400,000    |                                                     |
| Grid                                          | \$2,000,000  |                                                     |
| Energy Transmission Line                      | \$1,625,000  |                                                     |
| Unknown Construction costs (15%)              | \$8,041,026  |                                                     |
| Survey and Project Cost                       | \$1,849,436  |                                                     |
| Expropriation                                 | \$1,234,688  |                                                     |
| TOTAL                                         | \$75,391,877 |                                                     |
| PV Panel                                      | \$3,240,000  | 05.10.2020<br>ELİSS ENERJİ<br>EPC Contract          |
| Costruction Cost                              | \$2,076,000  |                                                     |
| Consulting Fee                                | \$11,722     | 01.06.2021<br>(CCT Enerji<br>consulting<br>company) |
| SOLAR INVESTMENT COST AFTER THE 10th YEAR     | \$5,327,722  |                                                     |
| TOTAL INVESTMENT COST FOR AFTER THE 10th YEAR | \$80,719,599 |                                                     |

**Table 5 Basic Parameters for Financial Analysis** <sup>38</sup>

#### Operational costs

The OPEX of the project (1,479,366 TL = 924,604 USD) has been taken from the table 9.1 of the feasibility report. As stated in the feasibility report 1USD equals 1,6 TL.

Solar Electricity plant operating costs of 25,000 USD has been taken from the table 9.1 of the feasibility report prepared by ELİSS Enerji for the Solar Component.

Total Operational Cost after the addition of the Solar Component sums up to 949,604 USD.

<sup>38</sup> Feasibility study Table 8.1 and the feasibility report of S

### The cash inflow or income stream

As of 01.08.2023, YEKDEM (Yenilenebilir Enerji Destekleme Mekanizması/ Renewable Energy Support Mechanism Price) for a run of River Type Hydroelectric Power Generation Plant is declared as : 168.83 (TL kr/kWh) where 1 USD equals 27.0219 TL for the same date. The price is stated on a declining basis and is equal to  $168.83 / 27.0219 = 6.24$  USD<sup>39</sup>. However, to be conservative, the price of the electricity generated in Murat HEPP has been taken as 6.2 USD cents per kWh for the calculation of sales revenues.

### Depreciation

Depreciation related to the project, which has been deducted in estimating gross earnings on which tax is calculated, added back to net profits in line with the suggestion in “Tool for the demonstration and assessment of additionality”.

We have depreciated the project's assets according to the Turkish Tax Regulation<sup>40</sup>.

### Interest Expenses and Financial structure

In this project finance, capital structure is 55% debt and 45% equity. \$44,700,632 is used as loan to finance this Project.

### Equity IRR, Project IRR, VER income and the Benchmark

As mentioned above, equity IRR has been calculated as 10.73% without considering the carbon revenue. When benchmark Equity IRR is taken as 15.38%, the Project is not financially attractive. We consider 4.00 USD VER Sales Unit Price. When we include the carbon revenues in the cash flows, equity IRR increases to nearly 11.03% The IRR even with VERs remains lower than the benchmark of 15.38%.

Based on the parameters above, the project IRR values, with and without the VCS-VERs sales revenue, are calculated to be below the benchmark as shown below:

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<sup>39</sup> <https://www.epias.com.tr/tum-duyurular/piyasa-duyurulari/elektrik/kayit-ve-uzlastirma/01-07-2021-tarihinden-31-12-2030-tarihine-kadar-isletmeye-girecek-yek-belgeli-yenilenebilir-enerji-kaynaklarina-dayali-elektrik-uretim-tesisleri-icin-uygulanacak-fiyatlar-hk-4/>

<sup>40</sup> [http://www.alomaliye.com/aralik\\_06/vuk\\_365.pdf](http://www.alomaliye.com/aralik_06/vuk_365.pdf) (item 45.1.2)

|                           | IRR    |
|---------------------------|--------|
| Without VCS-VERs revenues | 10.73% |
| With VCS-VERs revenues    | 11.03% |

**Table 6 Impact of VCS-VER revenues on the Proposed Project's Equity IRR.**

Table 6 shows that the IRR of the total investment of the proposed project without VCS-VERs sales revenue is 10.73%, lower than the benchmark IRR of 15.38 %, which means that the proposed project activity indeed faces significant financial barriers. Therefore, the project activity is not the most economically or financially attractive choice of investment.

#### Sub-step 2d. Sensitivity Analysis

The sensitivity analysis shall show whether the conclusion regarding the financial attractiveness is robust under reasonable variations in the critical assumptions. According to the additionality tool, only variables, including the initial investment cost, that constitute more than 20% of either total project costs or total project revenues should be subject to reasonable variation. For the proposed project, three basic parameters have been selected as sensitive factors to check out the financial attractiveness:

- Total investment
- Annual operational costs
- Electricity selling revenue

The following table shows the variation of IRR when the three parameters fluctuate from -10% to +10%.

|                                    | -10%   | -5%    | 0%     | 5%     | 10%    |
|------------------------------------|--------|--------|--------|--------|--------|
| <b>Total Investment</b>            | 12.56% | 11.57% | 10.73% | 10.00% | 9.35%  |
| <b>Annual operational cost</b>     | 10.77% | 10.75% | 10.73% | 10.71% | 10.69% |
| <b>Electricity Selling Revenue</b> | 10.22% | 10.48% | 10.73% | 10.97% | 11.19% |

**Table 7 IRR fluctuation**

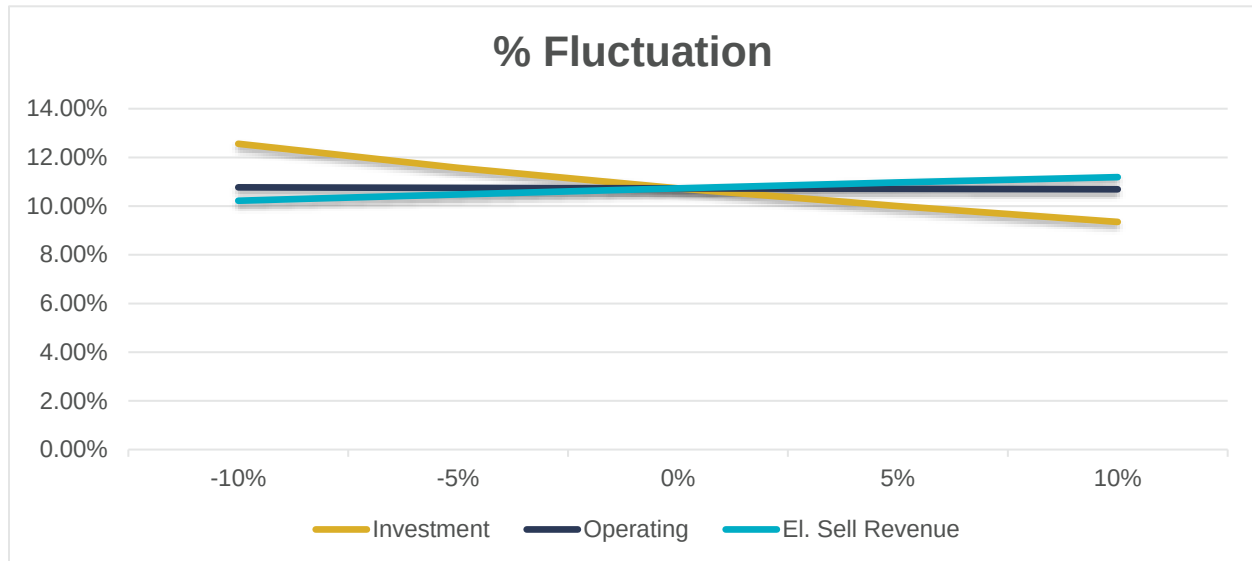
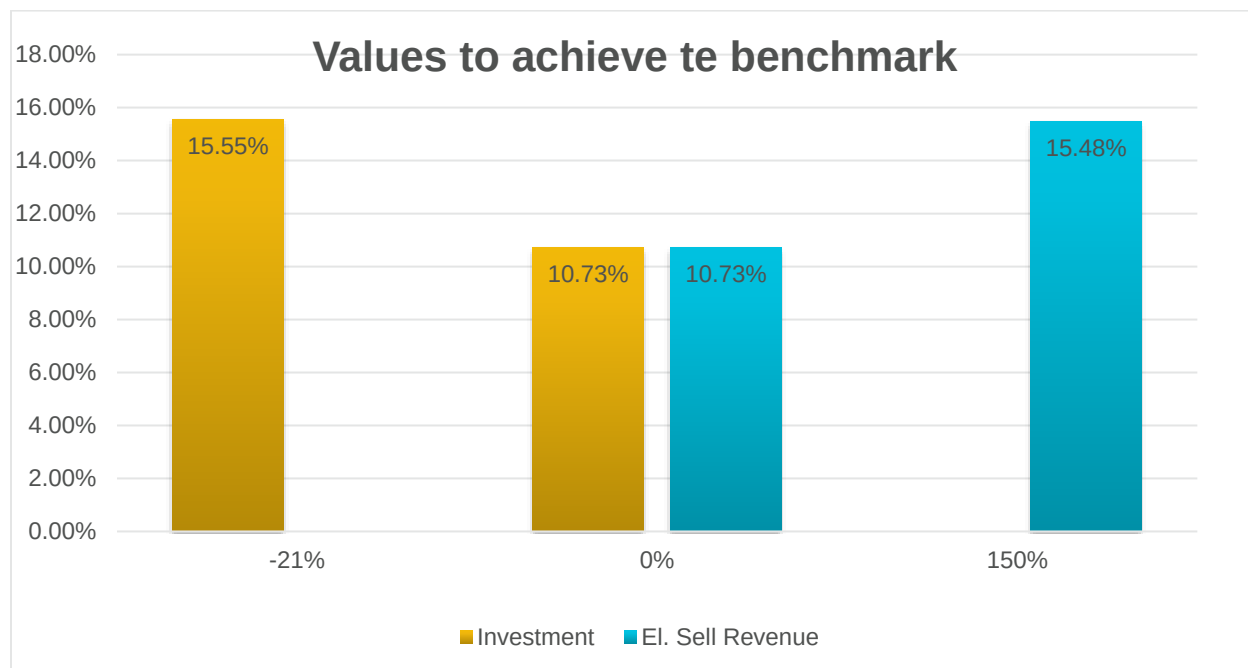


**Figure 13 IRR fluctuation**

Sensitivity analysis has been carried out for the stated costs and assumptions. It shows that under none of those scenarios that change the parameters by up to  $\pm 20\%$  the IRR of the project exceeds the Benchmark.

We observe the following when we compare these values to see what it takes to achieve the benchmark value:



- Investment cost the scenario of a -%21 decrease.

As was indicated in the PDD that was registered at the first crediting period, The investment cost was estimated based on the feasibility study. However, the construction contract has already been signed, and costs were expected to increase rather than decrease due to unexpected events during construction. Indeed, there have been some changes in the scheduled construction costs that occurred after the construction started, such as tunnel construction and expropriation costs.

In this crediting period renewal, we are re-addressing financial additionality to showcase that the addition of a solar power array has not changed the financial additionality and as such we are able to see the values that are available from over the contracts and the investment cost is very unlikely to go down by not even a mere 1 % especially in the inflationist environment of the post-Covid period of the host country.

- Electricity selling revenue:

The electricity selling revenue can increase either by increasing the electricity production or by increasing the electricity selling price. The electricity production value we have used in the financial analysis is certainly the upper limits of this facility that is under the stress of water shortage and

climate change. This being said when we assume an extreme increase in electricity selling prices we observed that we need a 150% increase in the electricity selling price per kWh:

| Electricity selling price (\$/kWh) |                     |       |
|------------------------------------|---------------------|-------|
| Scenario                           | \$ cent             | IRR   |
| Price By Law                       | 0,062 <sup>41</sup> | 10.73 |
| 100% increase in price             | 0,124               | 14.28 |
| 150% increase in price             | 0.155               | 15.48 |

**Table 8 Electricity selling price**

Electricity selling prices tend to decrease rather than increase due to recent policies and explanations from the government regarding a transition to nuclear energy investments. Those recent scenarios show that the current selling prices will be decreased in the future<sup>42</sup>. This fact can also be seen from the World Bank Report: Project Appraisal Document on Proposed Loan From Clean Technology Fund (for Turkey)<sup>43</sup> On page 63 para 5, the electricity market price for hydropower has been taken as 8 Cent USD per kWh; however the current tariff by the legislation is 7,3 Cent USD<sup>44</sup> for first 10 years. Second 10 years the current tariff by the legislation is 6,2 Cent USD<sup>45</sup>. The electricity generated from the solar source is measured and provided to the grid by the same means of connection with the hydro that it is evaluated as if it was produced by the main resource that is hydro. (The license regulation emphasizes that, in case of addition of an auxiliary power resource, the particular resource cannot behave as he main resource.)

Electricity production solely depends on water flow, thus changes in rainfall and also uncertainty of the effects of global warming are key factors that affect it. Since Turkey is located in the Mediterranean macroclimate region in the sub-tropical zone, great rainfall variations can be seen between the years.

<sup>41</sup> <https://www.epias.com.tr/tum-duyurular/piyasa-duyurulari/elektrik/kayit-ve-uzlastirma/01-07-2021-tarihinden-31-12-2030-tarihine-kadar-isletmeye-girecek-yek-belgeli-yenilenebilir-enerji-kaynaklarina-dayali-elektrik-uretim-tesisleri-icin-uygulanacak-fiyatlar-hk-2/>

<sup>42</sup> <http://www.epdk.gov.tr/documents/10157/beb57880-96f4-4cbf-a781-e75239c52c9f>

<sup>43</sup> [http://www.wds.worldbank.org/external/default/WDSPContentServer/WDSP/IB/2009/05/11/000333037\\_20090511030724/Rendered/PDF/468080PAD0P1121010OfficialUseOnly1.pdf](http://www.wds.worldbank.org/external/default/WDSPContentServer/WDSP/IB/2009/05/11/000333037_20090511030724/Rendered/PDF/468080PAD0P1121010OfficialUseOnly1.pdf)

<sup>44</sup> <http://www.tbmm.gov.tr/kanunlar/k6094.html>

<sup>45</sup> <https://www.epias.com.tr/tum-duyurular/piyasa-duyurulari/elektrik/kayit-ve-uzlastirma/01-07-2021-tarihinden-31-12-2030-tarihine-kadar-isletmeye-girecek-yek-belgeli-yenilenebilir-enerji-kaynaklarina-dayali-elektrik-uretim-tesisleri-icin-uygulanacak-fiyatlar-hk-4/>

This causes regional and widespread droughts in various intensities. Thus, drought is one of the main problems for the project location region of Turkey<sup>46</sup>

The following map shows that river flows are decreasing according to the long-term average at the project's location:

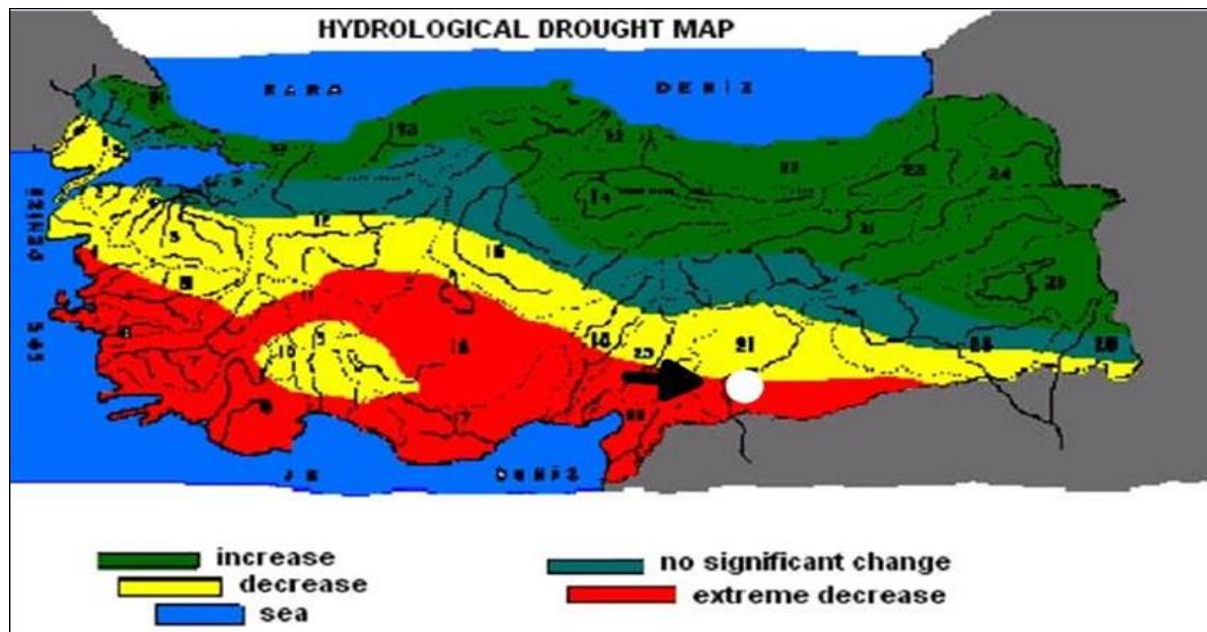


Figure 14 Hydrological drought map of Turkey<sup>47</sup>

Thus, it is very unlikely that the electricity generation will increase. Increasing ambient temperatures also effect the efficiency of the solar units negatively, together with the dusting problem that further reduces the efficiencies of the solar PV panels.

Moreover, the electricity selling price is also unlikely to increase. In fact, since April 2011 electricity prices declined. This occurred because the country was in the election process, and the negative impact of the high electricity prices on consumers led such a decline. Therefore, it is foreseen that the electricity prices will only increase to the same value as before April 2011, which is the one used in the investment analysis.

<sup>46</sup> <https://www.bordatc.lautre.net/turquie.htm> (Please scroll down in the linked page)

<sup>47</sup> [http://www.wmo.int/pages/publications/meteoworld/archive/june09/turkey\\_en.html](http://www.wmo.int/pages/publications/meteoworld/archive/june09/turkey_en.html)

Outcome of Step 2: The above analysis has demonstrated that the project activity is not the most economically or financially attractive choice of investment.<sup>48</sup> Even if the IRR with carbon credits revenue does not overcome the IRR benchmark, the project developer has chosen to develop the project considering carbon credits because of the social benefits that it will bring to the area. Indeed, the project owner, Mehmet Güneş, is aware of local necessities. Therefore, he decided to develop this project since the carbon revenue helps to increase the IRR.

It is worth mentioning that in Turkey there are limited incentives to renewable energy investments. In fact, the only incentive is carbon revenue.

The actual investment cost that is realized above the estimated cost due to an unaccounted for cost of a tunnel construction, and the actually decreasing nature of the electricity prices, and the drought conditions induced by climate change leading to conditions that is very likely to surpass the maximum electricity production values also clearly suggest that the project activity is very unlikely to surpass the 15% Benchmark values.

### STEP 3 – Barrier analysis

The barrier analysis step has not been applied for the proposed project.

### STEP 4 – Common practice analysis

Murat HEPP is a privately developed and owned hydro energy power production plant project with the installed power of 35.478 MWe. It is a channel type hydro power plant having two separate power production centers Murat I and Murat II downstream the same diversion weir which share the same EMRA license and the project start date is November 2009. In Common practice analysis the added auxiliary solar power capacity is not considered as this is not allowed to be included to the electric capacity.

Capacity Range to be Considered:

According to the latest guideline (EB 65 Report Annex 21"Tool for the demonstration and assessment of additionality" ) for common practice analysis, we took the following values to determine the NAI ; The

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<sup>48</sup> All financial data and calculations will be provided to the DOE.

project boundary is the whole country, Turkey, within this boundary the power production units that are having installed power within the range of 17,739 MWe – 53,217 MWe (+/- 50%)

The Annex-1 (EK-1) of TURKISH ELECTRICAL ENERGY 10-YEAR GENERATION CAPACITY

PROJECTION (2010 – 2019) REPORT<sup>49</sup> pages 85-97 gives the breakdown of the Turkish Electricity Generation Plants by plant type, fuel type and ownership as of 2009 year end, and there have been in total 447 power production plants in Turkey.

After studying this document, we found that in the attached Excel table<sup>50</sup>, all the plants that fall into the given interval count NALL =64 plants (the plants that are CDM registered have been excluded; the list of these plants is in the attached lists <sup>51, 52</sup>). Further study of these 64 plants showed us that only 15 plants have a private energy production license and use hydropower technology.

| NO | PLANT NAME                      | INSTALLED POWER MW | Owner        | Fuel Type |
|----|---------------------------------|--------------------|--------------|-----------|
| 1  | HOPA                            | 50,00              | EÜAŞ         | F.OIL     |
| 2  | SOMA A                          | 44,00              | EÜAŞ+PARTNER | LIGNITE   |
| 3  | ALMUS                           | 27,00              | EÜAŞ         | HYDRO     |
| 4  | ÇAMLIGÖZE                       | 32,00              | EÜAŞ         | HYDRO     |
| 5  | KAPULUKAYA                      | 54,00              | EÜAŞ         | HYDRO     |
| 6  | KARACAÖREN-1                    | 32,00              | EÜAŞ         | HYDRO     |
| 7  | KARACAÖREN II                   | 46,40              | EÜAŞ         | HYDRO     |
| 8  | KEMER                           | 48,00              | EÜAŞ         | HYDRO     |
| 9  | MANAVGAT                        | 48,00              | EÜAŞ         | HYDRO     |
| 10 | TORTUM                          | 26,20              | EÜAŞ         | HYDRO     |
| 11 | YENİCE                          | 37,90              | EÜAŞ         | HYDRO     |
| 12 | KEPEZ I-II                      | 32,40              | EÜAŞ         | HYDRO     |
| 13 | ŞANLI URFA                      | 51,80              | EÜAŞ         | HYDRO     |
| 14 | HAZAR 1-2                       | 30,10              | TOR          | HYDRO     |
| 15 | AKDENİZ SEKA (Siliçke)          | 20,00              | AUTOPRODUCER | F.OIL     |
| 16 | MOPAK (Dalaman)                 | 26,20              | AUTOPRODUCER | F.OIL     |
| 17 | SÜPER FİLM (G.Antep)            | 25,30              | AUTOPRODUCER | F.OIL     |
| 18 | TÜPRAŞ İZMİR (ALİAĞA RAF.)      | 44,00              | AUTOPRODUCER | F.OIL     |
| 19 | TÜPRAŞ (Orta Anadolu-Kırıkkale) | 34,00              | AUTOPRODUCER | F.OIL     |
| 20 | KARDEMİR                        | 35,00              | AUTOPRODUCER | COAL      |

<sup>49</sup> <http://www.teias.gov.tr/projeksiyon/KAPASITE%20PROJEKSİYONU%202010.pdf>

<sup>50</sup> MURAT HEPP Common Practice analysis.xls

<sup>51</sup> VCS database report-TURKEY

<sup>52</sup> GS database report-TURKEY

|    |                                        |       |                  |        |
|----|----------------------------------------|-------|------------------|--------|
| 21 | MENDERES TEKS. (AKÇA ENERJİ)           | 18,70 | AUTOPRODUCER     | NAPHTA |
| 22 | KALESERAMİK<br>(Çan.seramik+Kalebodur) | 21,60 | AUTOPRODUCER     | N.GAS  |
| 23 | KARTONSAN (İzmit)                      | 24,00 | AUTOPRODUCER     | N.GAS  |
| 24 | MARMARA PAMUK                          | 43,70 | AUTOPRODUCER     | N.GAS  |
| 25 | TÜPRAŞ ALİAĞA                          | 24,70 | AUTOPRODUCER     | N.GAS  |
| 26 | YILDIZ SUNTA (Köseköy)                 | 27,80 | AUTOPRODUCER     | N.GAS  |
| 27 | BATIÇİM ENERJİ (AK ENERJİ)             | 45,00 | PRIVATE PRODUCER | N.GAS  |
| 28 | ALİAĞA Çakmaktepe Enerji               | 34,80 | PRIVATE PRODUCER | N.GAS  |
| 29 | AYEN OSTİM                             | 41,00 | PRIVATE PRODUCER | N.GAS  |
| 30 | BİL ENERJİ (Ankara)                    | 36,60 | PRIVATE PRODUCER | N.GAS  |
| 31 | CAM İŞ ELEKTRİK<br>(B.Karıştıran)      | 32,90 | PRIVATE PRODUCER | N.GAS  |
| 32 | ÇERKEZKÖY ENERJİ                       | 49,20 | PRIVATE PRODUCER | N.GAS  |
| 33 | GLOBAL ENERJİ (PELİTLİK)               | 20,30 | PRIVATE PRODUCER | N.GAS  |
| 34 | GÜL ENERJİ                             | 24,30 | PRIVATE PRODUCER | N.GAS  |
| 35 | KEN KİPAŞ KAREN ELEKTRİK               | 41,80 | PRIVATE PRODUCER | N.GAS  |
| 36 | KAREGE ARGES                           | 43,60 | PRIVATE PRODUCER | N.GAS  |
| 37 | NUH ENERJİ 1 (Nuh Çimento)             | 38,00 | PRIVATE PRODUCER | N.GAS  |
| 38 | SÖNMEZ ELEKTRİK                        | 34,90 | PRIVATE PRODUCER | N.GAS  |
| 39 | ŞAHİNLER<br>ENERJİ(ÇORLU/TEKİRDAĞ)     | 26,00 | PRIVATE PRODUCER | N.GAS  |
| 40 | ZORLU ENERJİ (Sincan)                  | 50,30 | PRIVATE PRODUCER | N.GAS  |
| 41 | AKSA ENERJİ (Hakkari)                  | 24,00 | PRIVATE PRODUCER | F.OIL  |
| 42 | HABAŞ (İzmir)                          | 36,00 | PRIVATE PRODUCER | F.OIL  |
| 43 | KIZILTEPE                              | 34,10 | PRIVATE PRODUCER | F.OIL  |
| 44 | PS3-A -2 (İDİL)                        | 24,40 | PRIVATE PRODUCER | F.OIL  |
| 45 | SİLOPİ ELEKT.ÜRETİM<br>ESENBOĞA        | 44,80 | PRIVATE PRODUCER | F.OIL  |
| 46 | SİİRT                                  | 25,60 | PRIVATE PRODUCER | F.OIL  |
| 47 | AKÇAY                                  | 28,80 | PRIVATE PRODUCER | HYDRO  |

|    |                                        |       |                  |            |
|----|----------------------------------------|-------|------------------|------------|
| 48 | BEREKET ( DALAMAN)                     | 37,50 | PRIVATE PRODUCER | HYDRO      |
| 49 | BEREKET (MENTAI)                       | 39,90 | PRIVATE PRODUCER | HYDRO      |
| 50 | ÇİNDERE DENİZLİ                        | 19,10 | PRIVATE PRODUCER | HYDRO      |
| 51 | DAREN HES (SEYRANTEPE BARAJI)          | 49,70 | PRIVATE PRODUCER | HYDRO      |
| 52 | ENERJİ-SA BİRKAPILI                    | 48,50 | PRIVATE PRODUCER | HYDRO      |
| 53 | EŞEN-II (GÖLTAŞ)                       | 43,40 | PRIVATE PRODUCER | HYDRO      |
| 54 | HİDRO KONTROL YUKARI MANAHOZ           | 22,40 | PRIVATE PRODUCER | HYDRO      |
| 55 | KALEN ENER. (KALEN I-II)               | 31,30 | PRIVATE PRODUCER | HYDRO      |
| 56 | PAMUK (Toroslar)                       | 23,30 | PRIVATE PRODUCER | HYDRO      |
| 57 | SARMAŞIK I HES (FETAŞ FETHİYE ENERJİ)  | 21,00 | PRIVATE PRODUCER | HYDRO      |
| 58 | SARMAŞIK II HES (FETAŞ FETHİYE ENERJİ) | 21,60 | PRIVATE PRODUCER | HYDRO      |
| 59 | TÜM EN. PINAR                          | 30,10 | PRIVATE PRODUCER | HYDRO      |
| 60 | KUZGUN ZORLU                           | 20,90 | PRIVATE PRODUCER | HYDRO      |
| 61 | MERCAN ZORLU                           | 20,40 | PRIVATE PRODUCER | HYDRO      |
| 62 | ALİZE ENERJİ (SARIKAYA ŞARKÖY)         | 28,80 | PRIVATE PRODUCER | WIND       |
| 63 | BORASKO BANDIRMA                       | 45,00 | PRIVATE PRODUCER | WIND       |
| 64 | GÜRMAT EN.                             | 47,40 | PRIVATE PRODUCER | GEOTHERMAL |

**Table 9 N all plants**

Among these 15 privately owned hydro plants 2 of them have been built by the government and then been sold out to a private company under privatization process, 6 of them have been built under Auto producer agreement and then converted to private production license, 1 of them has been developed by a government entity "State Hydraulic Works (DSİ) " and then sold out to private company with a bidding process.

| PROJECT DEVELOPMENT ENTITY |            |                    |           |       |              |                      |             |                  |
|----------------------------|------------|--------------------|-----------|-------|--------------|----------------------|-------------|------------------|
| NR                         | PLANT NAME | Installed Power MW | Fuel Type | Owner | Project Type | JUSTIFICATION SOURCE | ENTITY TYPE | Similarity check |

|    |                                       |       |           |                     |                   |                                                                                                                                                                                                                                        |                      |   |
|----|---------------------------------------|-------|-----------|---------------------|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|---|
| 1  | AKÇAY                                 | 28,80 | HYDR<br>O | PRIVATE<br>PRODUCER | Energy+Irrigation | <a href="http://www2.dsi.gov.tr/skatablo/Ta_blo1.htm">http://www2.dsi.gov.tr/skatablo/Ta_blo1.htm</a>                                                                                                                                  | AUTOP<br>RODUC<br>ER | N |
| 2  | BEREKET (DALAMAN)                     | 37,50 | HYDR<br>O | PRIVATE<br>PRODUCER | Energy            | <a href="http://www2.dsi.gov.tr/skatablo/Ta_blo1.htm">http://www2.dsi.gov.tr/skatablo/Ta_blo1.htm</a>                                                                                                                                  | AUTOP<br>RODUC<br>ER | N |
| 3  | BEREKET (MENTAŞ)                      | 39,90 | HYDR<br>O | PRIVATE<br>PRODUCER | Energy            | <a href="http://www2.dsi.gov.tr/skatablo/Ta_blo1.htm">http://www2.dsi.gov.tr/skatablo/Ta_blo1.htm</a>                                                                                                                                  | AUTOP<br>RODUC<br>ER | N |
| 4  | CİNDERE<br>DENİZLİ                    | 19,10 | HYDR<br>O | PRIVATE<br>PRODUCER | Energy+Irrigation | <a href="http://www2.dsi.gov.tr/skatablo/Ta_blo4.htm">http://www2.dsi.gov.tr/skatablo/Ta_blo4.htm</a> ,<br><a href="http://www2.dsi.gov.tr/bolge/dsi21/denizli.htm#cindere">http://www2.dsi.gov.tr/bolge/dsi21/denizli.htm#cindere</a> | DSİ<br>(gov.)        | N |
| 5  | DAREN HES<br>(SEYRANTEPE BARAJI)      | 49,70 | HYDR<br>O | PRIVATE<br>PRODUCER | Energy            | <a href="http://www2.dsi.gov.tr/skatablo/Ta_blo1.htm">http://www2.dsi.gov.tr/skatablo/Ta_blo1.htm</a>                                                                                                                                  | AUTOP<br>RODUC<br>ER | N |
| 6  | ENERJİ-SA<br>BİRKAPILI                | 48,50 | HYDR<br>O | PRIVATE<br>PRODUCER | Energy            | <a href="http://www2.dsi.gov.tr/skatablo/Ta_blo1.htm">http://www2.dsi.gov.tr/skatablo/Ta_blo1.htm</a>                                                                                                                                  | AUTOP<br>RODUC<br>ER | N |
| 7  | EŞEN-II<br>(GÖLTAŞ)                   | 43,40 | HYDR<br>O | PRIVATE<br>PRODUCER | Energy            | <a href="http://www2.dsi.gov.tr/skatablo/Ta_blo1.htm">http://www2.dsi.gov.tr/skatablo/Ta_blo1.htm</a>                                                                                                                                  | AUTOP<br>RODUC<br>ER | N |
| 8  | HİDRO<br>KONTROL<br>YUKARI<br>MANAHOZ | 22,40 | HYDR<br>O | PRIVATE<br>PRODUCER | Energy            | <a href="http://www2.dsi.gov.tr/skatablo/Ta_blo3.htm">http://www2.dsi.gov.tr/skatablo/Ta_blo3.htm</a>                                                                                                                                  | PRIVAT<br>E          | Y |
| 9  | KALEN<br>ENER.<br>(KALEN I-II)        | 31,30 | HYDR<br>O | PRIVATE<br>PRODUCER | Energy            | <a href="http://www2.dsi.gov.tr/skatablo/Ta_blo3.htm">http://www2.dsi.gov.tr/skatablo/Ta_blo3.htm</a>                                                                                                                                  | PRIVAT<br>E          | Y |
| 10 | PAMUK<br>(Toroslar)                   | 23,30 | HYDR<br>O | PRIVATE<br>PRODUCER | Energy            | <a href="http://www2.dsi.gov.tr/skatablo/Ta_blo1.htm">http://www2.dsi.gov.tr/skatablo/Ta_blo1.htm</a>                                                                                                                                  | PRIVAT<br>E          | Y |

|    |                                       |       |        |                  |                   |                                                                                                                           |                 |   |
|----|---------------------------------------|-------|--------|------------------|-------------------|---------------------------------------------------------------------------------------------------------------------------|-----------------|---|
| 11 | SARMAŞIK I HES (FETAŞ FETHİYE ENERJİ) | 21,00 | HYDR O | PRIVATE PRODUCER | Energy            | <a href="http://www2.dsi.gov.tr/skatablo/Ta_blo3.htm">http://www2.dsi.gov.tr/skatablo/Ta_blo3.htm</a>                     | PRIVAT E        | Y |
| 12 | SARMAŞIK II                           | 21,60 | HYDR O | PRIVATE PRODUCER | Energy            | <a href="http://www2.dsi.gov.tr/skatablo/Ta_blo3.htm">http://www2.dsi.gov.tr/skatablo/Ta_blo3.htm</a>                     | PRIVAT E        | Y |
|    | HES (FETAŞ FETHİYE ENERJİ)            |       | O      | PRODUCER         |                   | <a href="http://www2.dsi.gov.tr/skatablo/Ta_blo3.htm">http://www2.dsi.gov.tr/skatablo/Ta_blo3.htm</a>                     | E               |   |
| 13 | ÜMEN. PINAR                           | 30,10 | HYDR O | PRIVATE PRODUCER | Energy            | <a href="http://www2.dsi.gov.tr/skatablo/Ta_blo3.htm">http://www2.dsi.gov.tr/skatablo/Ta_blo3.htm</a>                     | PRIVAT E        | Y |
| 14 | KUZGUN ZORLU                          | 20,90 | HYDR O | PRIVATE PRODUCER | Energy+Irrigation | <a href="http://www2.dsi.gov.tr/skatablo/Ta_blo1.htm">http://www2.dsi.gov.tr/skatablo/Ta_blo1.htm</a>                     | PRIVAT IZATIO N | N |
| 15 | MERCAN ZORLU                          | 20,40 | HYDR O | PRIVATE PRODUCER | Energy+Irrigation | <a href="http://www.oib.gov.tr/tedas/ankara_dogal_electric.htm">http://www.oib.gov.tr/tedas/ankara_dogal_electric.htm</a> | PRIVAT IZATIO N | N |

**Table 10 Similar Projects**

So ;  $2+6+1=9$  and  $15-9=6$ . Thus only 6 units among 15 units are similar to the proposed project activity MURAT HEPP, by being privately owned and having a capacity within the range of common practice analysis.

After the above analysis, we are left with  $64-6=58$  units among 64 are different than MURAT HEPP by technology, ownership, fuel type, legal origin, and project development entity (government support). That is ;  $N_{diff} = 58$

Applying the common practice analysis formulation which was given in the above-mentioned tool as follows;

Calculate factor  $F=1-N_{diff}/N_{all}$  representing the share of plants using technology similar to the technology used in the proposed project activity in all plants that deliver the same output or capacity as the proposed project activity. The proposed project activity is a common practice within a sector in the applicable geographical area if both the following conditions are fulfilled:

- (a) the factor  $F$  is greater than 0.2, and
- (b)  $N_{all}-N_{diff}$  is greater than 3.

$$F = 1 - (N_{diff} / N_{all}) \Rightarrow F = 1 - (58/64) \Rightarrow F = 1 - 0,91 \Rightarrow F = 0,09$$

0,09 is not greater than 0,2

So MURAT HEPP project is not a common practice

#### Impact of VCS-VER income

This section has clearly explained how the approval of the project as a VCS activity, and the attendant benefits and incentives derived from the project activity, will alleviate the barriers illustrated above, and thus enable the project to be undertaken.

As explained before, the financial benefit from the revenue obtained by selling the CO2 emissions reductions, together with the social benefits derived from the project has been one of the key issues encouraging investment in the proposed project activity.

### 3.5 Methodology Deviations

N/A The ACM0002 (Version 22.0) Methodology has been implemented without any change.

## 4.1 Baseline Emissions

This tool provides procedures to determine the following parameters:

| Parameter   | Unit     | Description                                                                       |
|-------------|----------|-----------------------------------------------------------------------------------|
| EFgrid,CM,y | tCO2/MWh | Combined margin CO2 emission factor for the project electricity system in year y  |
| EFgrid,BM,y | tCO2/MWh | Build margin CO2 emission factor for the project electricity system in year y     |
| EFgrid,OM,y | tCO2/MWh | Operating margin CO2 emission factor for the project electricity system in year y |

<sup>53</sup>[https://enerji.gov.tr//Media/Dizin/EVCED/tr/%C3%87evreVe%C4%B0klim/%C4%B0klimDe%C4%9Fi%C5%9Fikli%C4%9Fi/TUESEmisvonFktr/Belgeler/TUESEF\\_Bilgi\\_Formu.pdf](https://enerji.gov.tr//Media/Dizin/EVCED/tr/%C3%87evreVe%C4%B0klim/%C4%B0klimDe%C4%9Fi%C5%9Fikli%C4%9Fi/TUESEmisvonFktr/Belgeler/TUESEF_Bilgi_Formu.pdf)

factor data are separately specified by the Turkish Ministry of Energy and Natural Resources; corresponding to steps 4 and 5 of the Tool. The document in which this data is written separately has been shared with the validated DOE. Data is as follows:

The operating margin emission factor:  $EF_{grid,OM,y} = 0.7279 \text{ tCO}_2/\text{MWh}$

And build margin emission factor:  $EF_{grid,BM,y} = 0.3541 \text{ tCO}_2/\text{MWh}$

Step 6: The combined emission factor is calculated as follows:

$$EF_{grid,CM,y} = EF_{grid,OM,y} \times W_{OM} + EF_{grid,BM,y} \times W_{BM} \quad [\text{Equation 16}]$$

Where:

$W_{OM}$ : Weighting of OM emission factor (%)

$W_{BM}$ : Weighting of BM emission factor (%)

and

$$EF_{grid,CM,y} = EF_{grid,OM,y} \times W_{OM} + EF_{grid,BM,y} \times W_{BM}$$

$EF_{grid,BM,y}$  Build margin CO2 Mission factor in year y ( $\text{tCO}_2/\text{MWh}$ )

$EF_{grid,OM,y}$  Operating margin CO2 Mission factor in year y ( $\text{tCO}_2/\text{MWh}$ )

$W_{OM}$  Weighting of operating margin emission factor (%)

$W_{BM}$  Weighting of operating margin emission factor (%)

According to Version 07.0 of "Tool to calculate the emission factor for an electricity system", the methodology referred the following default values have to be used for crediting period renewal:

$$W_{OM} = 0.25 \text{ and } W_{BM} = 0.75$$

So, since this is the renewal of the period, the CM emissions factor is as follows:

$$EF_{grid, CM,y} = 0.25 \times 0.7279 + 0.75 \times 0.3541 = 0.44755 \text{ tCO}_2/\text{MWh}$$

## Project emissions

According to the methodology, the project emissions shall be accounted using the following equation:

$$PE_y = PEEF_{y,y} + PEGP_{y,y} + PEHP_{y,y}$$

Where:

$PE_y$  Project emissions in year y (tCO<sub>2</sub>e/yr)

$PEEF_{y,y}$  Project emissions from fossil fuel consumption in year y (tCO<sub>2</sub>/yr)

$PEGP_{y,y}$  Project emissions from the operation of geothermal power plants due to the release of non-condensable gases in year y (tCO<sub>2</sub>e/yr)

$PEHP_{y,y}$  Project emissions from water reservoirs of hydro power plants in year y (tCO<sub>2</sub>e/yr)

## Emission Reductions

Last, according to the methodology Emission Reductions are calculated as follows:

$$ER_y = BE_y - PE_y - LE_y$$

Where:

$ER_y$  : Emission reductions in year y (tCO<sub>2</sub>e/yr)  $BE_y$  : Baseline Emissions in year y (tCO<sub>2</sub>e/yr)  $PE_y$  : Project Emissions in year y (tCO<sub>2</sub>e/yr)  $LE_y$  : Leakage Emissions in year y (tCO<sub>2</sub>e/yr)

As demonstrated above,  $PE_y$  and  $LE_y$  values are “0” for the proposed project activity. Therefore  $ER_y$  is equal to  $BE_y$ .

As a result;

$$ER_y = BE_y, \text{ and } BE_y = EG_{facility} \times EF_{grid, CM,y} \text{ so, } ER_y = 168.390 \text{ (MWh/yr)} \times 0.44755 \text{ (tCO}_2\text{e/MWh)}$$

$$ER_y = 75,363 \text{ tCO}_2\text{e/yr}$$

## 4.2 Project Emissions

According to the methodology, the project emissions shall be accounted using the following equation:

$$PE_y = PEEF_y + PEGP_y + PEHP_y$$

Where:

$PE_y$  Project emissions in year  $y$  (tCO<sub>2</sub>e/yr)

$PEEF_y$  Project emissions from fossil fuel consumption in year  $y$  (tCO<sub>2</sub>/yr)

$PEGP_y$  Project emissions from the operation of geothermal power plants due to the release of non-condensable gases in year  $y$  (tCO<sub>2</sub>e/yr)

$PEHP_y$  Project emissions from water reservoirs of hydro power plants in year  $y$  (tCO<sub>2</sub>e/yr)

$PEEF_y$  and  $PEGP_y$  are both irrelevant with the project activity and therefore assumed “0” as the proposed project activity is a new grid-connected run-off-river hydro power plant.

Fossil fuel consumption ( $PEEF_y$ )

The project internal electricity consumption is satisfied from the self electricity generation when the project components are in operation or from the grid when none of the components are operational. However, this will rarely occur. In addition as mentioned in paragraph 41 of the methodology ACM0002 version 22 “For all renewable energy power generation project activities, emissions due to the use of fossil fuels for the backup generator can be neglected.” Therefore:  $PEEF_y = 0$

According to the methodology, the project emissions shall be accounted using the following equation:

$$PE_y = PEEF_y + PEGP_y + PEHP_y$$

Where:

$PE_y$  Project emissions in year  $y$  (tCO<sub>2</sub>e/yr)

$PEEF_y$  Project emissions from fossil fuel consumption in year  $y$  (tCO<sub>2</sub>/yr)

$PEGP_y$  Project emissions from the operation of geothermal power plants due to the release of non-condensable gases in year  $y$  (tCO<sub>2</sub>e/yr)

$PEHP_y$  Project emissions from water reservoirs of hydropower plants in year  $y$  (tCO<sub>2</sub>e/yr)

Emissions of non-condensable gases from the operation of geothermal power plants (PEGP,y)

Since the project activity does not involve the operation of a geothermal power plant, PEGP,y= 0

Emissions from water reservoirs of hydro power plants (PEHP,y)

For hydro power project activities that result in new single or multiple reservoirs and hydro power project activities that result in the increase of single or multiple existing reservoirs, project proponents shall account for CH<sub>4</sub> and CO<sub>2</sub> emissions from the reservoirs, estimated as follows:

(a) If the power density of the single or multiple reservoirs (PD) is greater than 4 W/m<sup>2</sup> and less than or equal to 10 W/m<sup>2</sup>

$$PE_{HP,y} = \frac{EF_{Res} \cdot TEG_y}{1000}$$

or equal to 10 W/m<sup>2</sup>

**(a)** If the power density of the project activity (PD) is greater than 10 W/m<sup>2</sup> : PEHP,y = 0

The power density of the project activity (PD) is calculated as follows:

$$PD = \frac{Cap_{PJ} - Cap_{BL}}{A_{PJ} - A_{BL}}$$

Where:

- PD = Power density of the project activity (W/m<sup>2</sup>)
- Cap<sub>PJ</sub> = Installed capacity of the hydro power plant after the implementation of the project activity (W)
- Cap<sub>BL</sub> = Installed capacity of the hydro power plant before the implementation of the project activity (W). For new hydro power plants, this value is zero
- A<sub>PJ</sub> = Area of the single or multiple reservoirs measured in the surface of the water, after the implementation of the project activity, when the reservoir is full (m<sup>2</sup>)
- A<sub>BL</sub> = Area of the single or multiple reservoirs measured in the surface of the water, before the implementation of the project activity, when the reservoir is full (m<sup>2</sup>). For new reservoirs, this value is zero

For the proposed project activity;

The project activity is a Greenfield run-of-river hydropower project. The water is diverted using a diversion wall structure to power canal and then to the powerhouse. The water will be fed back to river through the tailrace canal. The diversion structure results in a regulation pond with a surface area of 640,471.91 m<sup>2</sup>.

$$Cap_{PJ} = 35,478,000 \text{ W}$$

$$Cap_{BL} = 0 \text{ (The project is a new hydro power plant)}$$

$$A_{PJ} = 640,471.91 \text{ m}^2$$

$$A_{BL} = 0 \text{ (The project is a new hydro power plant)}$$

$$PD = (35,478,000 - 0) / (640,471.91 - 0) = 55.39 \text{ W/m}^2$$

Therefore;

Since the Power Density of the Project is greater than 10 W/m<sup>2</sup> P<sub>Eq</sub> is assumed to be 0 as suggested in ACM0002 / Version 22.0

Hence option **(b)** above should be applied and **PEHP,y = 0**

As a result, the project emissions for MURAT HEPP is determined as zero.

### Baseline emissions

Baseline emissions include only CO<sub>2</sub> emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity. The methodology assumes that all project electricity generation above baseline levels would have been generated by existing grid-connected power plants and the addition of new grid-connected power plants. The baseline emissions are to be calculated as follows:

$$BE_y = EG_{PJ,y} \times EF_{grid,CM,y}$$

Where:

- $BE_y$  = Baseline emissions in year  $y$  ( $tCO_2/yr$ )
- $EG_{PJ,y}$  = Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year  $y$  (MWh/yr)
- $EF_{grid,CM,y}$  = Combined margin  $CO_2$  emission factor for grid connected power generation in year  $y$  calculated using the latest version of the "Tool to calculate the emission factor for an electricity system" ( $tCO_2/MWh$ )

Calculation of  $EG_{PJ,y}$

The calculation of  $EG_{PJ,y}$  is different for:

- (a) greenfield plants,
- (b) retrofits and replacements; and
- (c) capacity additions.

Since Murat HEPP is a greenfield project we consider only option (a) and the calculation is as follows.

Greenfield renewable energy power plants If the project activity is the installation of a new grid-connected renewable power plant/unit at a site where no renewable power plant was operated prior to the implementation of the project activity, then:

$$EG_{PJ,y} = EG_{facility}$$

Where:

- $EG_{PJ,y}$  = Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year  $y$  (MWh/yr)
- $EG_{facility}$  = Quantity of net electricity generation supplied by the project plant/unit to the grid in year  $y$  (MWh/yr)

Therefore, the expected baseline emission for the full year production of the project is:

$$BE_y = 0.44755 (tCO_2/MWh) \times (168.390 (MWh/yr) - 0) = 75,363 (tCO_2/yr)$$



**PD > 10 W/m<sup>2</sup>.**

$$[PE]_{(HP,y)=0}$$

Equation (10)

PE=0

### 4.3 Leakage Emissions

86

plant construction and upstream emissions from fossil fuel use (e.g. extraction, processing and transport). These emissions sources are neglected.

#### 4.4 Estimated GHG Emission Reductions and Carbon Dioxide Removals

| Vintage period                      | Estimated baseline emissions (tCO <sub>2</sub> e) | Estimated project emissions (tCO <sub>2</sub> e) | Estimated leakage emissions (tCO <sub>2</sub> e) | Estimated reduction VCU (tCO <sub>2</sub> e) | Estimated removal VCU (tCO <sub>2</sub> e) | Estimated total VCUs (tCO <sub>2</sub> e) |
|-------------------------------------|---------------------------------------------------|--------------------------------------------------|--------------------------------------------------|----------------------------------------------|--------------------------------------------|-------------------------------------------|
| 05-October-2022 – 31-December-2022  | 18,169                                            | 0                                                | 0                                                | 18,169                                       | 0                                          | 18,169                                    |
| 01-January-2023 to 31-December-2023 | 75,362                                            | 0                                                | 0                                                | 75,362                                       | 0                                          | 75,362                                    |
| 01-January-2024 to 31-December-2024 | 75,362                                            | 0                                                | 0                                                | 75,362                                       | 0                                          | 75,362                                    |
| 01-January-2025 to 31-December-2025 | 75,362                                            | 0                                                | 0                                                | 75,362                                       | 0                                          | 75,362                                    |
| 01-January-2026 to 31-December-2026 | 75,362                                            | 0                                                | 0                                                | 75,362                                       | 0                                          | 75,362                                    |

|                                     |                |          |          |                |          |                |
|-------------------------------------|----------------|----------|----------|----------------|----------|----------------|
| 01-January-2027 to 31-December-2027 | 75,362         | 0        | 0        | 75,362         | 0        | 75,362         |
| 01-January-2028 to 31-December-2028 | 75,362         | 0        | 0        | 75,362         | 0        | 75,362         |
| 01-January-2029 to 31-December-2029 | 75,362         | 0        | 0        | 75,362         | 0        | 75,362         |
| 01-January-2030 to 31-December-2030 | 75,362         | 0        | 0        | 75,362         | 0        | 75,362         |
| 01-January-2031 to 31-December-2031 | 75,362         | 0        | 0        | 75,362         | 0        | 75,362         |
| 01-January-2032 to 04-October-2032  | 57,193         | 0        | 0        | 57,193         | 0        | 57,193         |
| <b>Total</b>                        | <b>753,620</b> | <b>0</b> | <b>0</b> | <b>753,620</b> | <b>0</b> | <b>753,620</b> |

For projects required to assess permanence risk:

The tables below are not Applicable as the project is a non-AFOLU Renewable Energy Project, but they are left as they are to preserve the integrity of the Template.

i) Provide the requested information using the table below:

|                                                                                                      |                                                                                           |
|------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
| State the non-permanence risk rating (%)                                                             | Example: 20%                                                                              |
| Has the non-permanence risk report been attached as either an appendix or a separate document?       | <input type="checkbox"/> Yes <input type="checkbox"/> No                                  |
| For ARR and IFM projects with harvesting, state, in tCO <sub>2</sub> e, the Long-term Average (LTA). |                                                                                           |
| Has the LTA been updated based on monitored data, if applicable?                                     | <input type="checkbox"/> Yes <input type="checkbox"/> No<br>If no, provide justification. |
| State, in tCO <sub>2</sub> e, the expected total GHG benefit to date.                                |                                                                                           |
| Is the number of GHG credits issued below the LTA?                                                   | <input type="checkbox"/> Yes <input type="checkbox"/> No<br>If no, provide justification. |

ii) Complete the table below for the project crediting period. Note that the buffer pool allocation is split proportionally between the estimated reductions and removals. (For example, if a project is estimated to achieve 20,000 tCO<sub>2</sub>e removals and 80,000 tCO<sub>2</sub>e reductions and has a buffer contribution of 20%, or 20,000, the estimated removal VCUs would be 16,000 and reduction VCUs would be 64,000).

| Vintage period                            | Estimated baseline emissions (tCO <sub>2</sub> e) | Estimated project emissions (tCO <sub>2</sub> e) | Estimated leakage emissions (tCO <sub>2</sub> e) | Estimated buffer pool allocation (tCO <sub>2</sub> e) | Estimated reduction VCUs (tCO <sub>2</sub> e) | Estimated removal VCUs (tCO <sub>2</sub> e) | Estimated total VCU issuance (tCO <sub>2</sub> e) |
|-------------------------------------------|---------------------------------------------------|--------------------------------------------------|--------------------------------------------------|-------------------------------------------------------|-----------------------------------------------|---------------------------------------------|---------------------------------------------------|
| DD-<br>MMM-<br>YYYY to<br>31-Dec-<br>YYYY | Example:<br>50,000                                | Example:<br>20,000                               | Example:<br>10,000                               | Example:<br>4,000                                     | Example:<br>8,000                             | Example:<br>8,000                           | Example:<br>16,000                                |

|                                           |  |  |  |  |  |  |  |
|-------------------------------------------|--|--|--|--|--|--|--|
| 01-Jan-<br>YYYY to<br>31-Dec-<br>YYYY     |  |  |  |  |  |  |  |
| 01-Jan-<br>YYYY to<br>DD-<br>MMM-<br>YYYY |  |  |  |  |  |  |  |
| <b>Total</b>                              |  |  |  |  |  |  |  |

### 5.1 Data and Parameters Available at Validation

54 [https://enerji.gov.tr//Media/Dizin/EVCED/tr/%C3%87evreVe%C4%B0klim/%C4%B0klimDe%C4%9Fi%C5%9Fikli%C4%9Fi/TUESEmisyonFktr/BelgeIer/2019 Sebeke EF.pdf](https://enerji.gov.tr//Media/Dizin/EVCED/tr/%C3%87evreVe%C4%B0klim/%C4%B0klimDe%C4%9Fi%C5%9Fikli%C4%9Fi/TUESEmisyonFktr/BelgeIer/2019%20Sebeke%20EF.pdf)

|                                                                                              |                                                                                                                                                                                                                                                                               |
|----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Data / Parameter                                                                             | $EF_{grid,BM,y}$                                                                                                                                                                                                                                                              |
| Data unit                                                                                    | tCO <sub>2</sub> /MWh                                                                                                                                                                                                                                                         |
|                                                                                              | Build operating margin CO2 emission factor of the grid in year y                                                                                                                                                                                                              |
| Source of data                                                                               | Calculated value as per “Tool to calculate the emission factor for an electricity system” (Version 7.0.0)                                                                                                                                                                     |
| Value applied                                                                                | 0.3541                                                                                                                                                                                                                                                                        |
| Justification of choice of data or description of measurement methods and procedures applied | Calculated <sup>55</sup> value as per “Tool to calculate the emission factor for an electricity system” (Version 7.0.0) by the Ministry of Energy and Natural Resources.                                                                                                      |
| Purpose of data                                                                              | Indicate one of the following: <ul style="list-style-type: none"> <li>• Determination of baseline scenario (AFOLU projects only)</li> <li>• <b>Calculation of baseline emissions</b></li> <li>• Calculation of project emissions</li> <li>• Calculation of leakage</li> </ul> |
| Comments                                                                                     |                                                                                                                                                                                                                                                                               |

<sup>55</sup>[https://enerji.gov.tr/Media/Dizin/EVCED/tr/%C3%87evreVe%C4%B0klm/%C4%B0klmDe%C4%9Fi%C5%9Fikli%C4%9Fi/TUESEmisyonFktr/BelgeIer/2019\\_Sebeke\\_EF.pdf](https://enerji.gov.tr/Media/Dizin/EVCED/tr/%C3%87evreVe%C4%B0klm/%C4%B0klmDe%C4%9Fi%C5%9Fikli%C4%9Fi/TUESEmisyonFktr/BelgeIer/2019_Sebeke_EF.pdf)

|                                                                                              |                                                                                                                                                                                                                                                                               |
|----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Data / Parameter                                                                             | $EF_{grid,CM,y}$                                                                                                                                                                                                                                                              |
| Data unit                                                                                    | tCO <sub>2</sub> /MWh                                                                                                                                                                                                                                                         |
|                                                                                              | Combined margin CO <sub>2</sub> emission factor in year y                                                                                                                                                                                                                     |
| Source of data                                                                               | Calculated data applied to the equation 5                                                                                                                                                                                                                                     |
| Value applied                                                                                | 0.44755                                                                                                                                                                                                                                                                       |
| Justification of choice of data or description of measurement methods and procedures applied | Calculated <sup>56</sup> value as per “Tool to calculate the emission factor for an electricity system” (Version 7.0.0) by the Ministry of Energy and Natural Resources.                                                                                                      |
| Purpose of data                                                                              | Indicate one of the following: <ul style="list-style-type: none"> <li>• Determination of baseline scenario (AFOLU projects only)</li> <li>• <b>Calculation of baseline emissions</b></li> <li>• Calculation of project emissions</li> <li>• Calculation of leakage</li> </ul> |
| Comments                                                                                     | Weighted averages of $EF_{grid,BM,y}$ and $EF_{grid,OM,y}$ according to following formula suitable for the crediting period renewal:<br>$EF_{grid,CM,y} = (EF_{grid,OM,y} \times 0.25) + (EF_{grid,BM,y} \times 0.75)$                                                        |

<sup>56</sup>[https://enerji.gov.tr/Media/Dizin/EVCED/tr/%C3%87evreVe%C4%B0klim/%C4%B0klimDe%C4%9Fi%C5%9Fikli%C4%9Fi/TUESEmisyonFktr/BelgeIer/2019\\_Sebeke\\_EF.pdf](https://enerji.gov.tr/Media/Dizin/EVCED/tr/%C3%87evreVe%C4%B0klim/%C4%B0klimDe%C4%9Fi%C5%9Fikli%C4%9Fi/TUESEmisyonFktr/BelgeIer/2019_Sebeke_EF.pdf)

## 5.2 Data and Parameters Monitored

|                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|-----------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Data / Parameter                                                | EG <sub>PJ,y</sub>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Data unit                                                       | MWh                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Description                                                     | Net electricity generated and delivered to the grid by MURAT HEPP in year y                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Source of data                                                  | As per readings from electricity meters                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Description of measurement methods and procedures to be applied | Monitored continuously using electricity meters.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Frequency of monitoring/recording                               | Hourly measurement and monthly recording                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Value applied                                                   | 168,390 MWh/year                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Monitoring equipment                                            | Main Electricity meter (EMH LZQJ-XC 9798700)<br>Spare Electricity meter (EMH LZQJ-XC 9798701)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| QA/QC procedures to be applied                                  | <p>Two calibrated electricity meters (ammeters) will act as back-up for each other.</p> <p>Maintenance/calibration of the metering devices will be made by TEIAS periodically.</p> <p>If the difference between the readings of two devices exceeds 0.2%, maintenance will be done before waiting for periodical maintenance.</p> <p>According to the relevant national regulation : Measurement Equipment Inspection Regulation (<a href="http://www.mevzuat.adalet.gov.tr/html/21179.html">http://www.mevzuat.adalet.gov.tr/html/21179.html</a>) article 9 (b) says that the mandatory periodical inspection frequency of ; electricity , water and gas measuring instruments (meters) are 10 years”<br/><a href="https://urunkurallari.ticaret.gov.tr/en/sectoral-guide/measuring-instruments/legislation">https://urunkurallari.ticaret.gov.tr/en/sectoral-guide/measuring-instruments/legislation</a></p> |

|                    |                                                                                                                                                                                                                  |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Purpose of data    | <p>Indicate one of the following:</p> <ul style="list-style-type: none"> <li>• <b>Calculation of baseline emissions</b></li> <li>• Calculation of project emissions</li> <li>• Calculation of leakage</li> </ul> |
| Calculation method | N/A                                                                                                                                                                                                              |
| Comments           | <i>The electricity meters are in a sealed box. Only authorized GRID OPERATOR (TEIAS)'s staff has the right to open and test and replace them if necessary.</i>                                                   |

|                                                                 |                                                                                                                                         |
|-----------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| Data / Parameter                                                | Cap <sub>PJ</sub>                                                                                                                       |
| Data unit                                                       | MWe                                                                                                                                     |
| Description                                                     | Installed Capacity of the hydropower plant after the implementation of the project activity                                             |
| Source of data                                                  | Name plates of the hydromechanics equipment sets of the project.                                                                        |
| Description of measurement methods and procedures to be applied | Aggregation of the capacities of each turbine generator sets that are installed in the project powerhouse(s) for electricity generation |
| Frequency of monitoring/recording                               | Annually                                                                                                                                |
| Value applied                                                   | 35.478 Mwe                                                                                                                              |
| Monitoring equipment                                            | N/A                                                                                                                                     |
| QA/QC procedures to be applied                                  | N/A                                                                                                                                     |

|                    |                                       |
|--------------------|---------------------------------------|
| Purpose of data    | To calculate project's energy density |
| Calculation method | Summation of the plate values         |
| Comments           |                                       |

|                                                                 |                                                                                                                                                                                                                                                                                                       |
|-----------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Data / Parameter                                                | A <sub>PJ</sub>                                                                                                                                                                                                                                                                                       |
| Data unit                                                       | m                                                                                                                                                                                                                                                                                                     |
| Description                                                     | Reservoir water surface area                                                                                                                                                                                                                                                                          |
| Source of data                                                  | Water level measurement in the reservoir by means of gauge equipment. And will be monitored by the cam system will set.                                                                                                                                                                               |
| Description of measurement methods and procedures to be applied | Surface area based on the operational water level of the reservoir is 640,471.91 m <sup>2</sup> for the elevation of 522,80 m above sea level. Instead of the surface area measurement, reservoir water level will be measured by the gauge equipment and the measured water level will be monitored. |
| Frequency of monitoring/recording                               | Annually                                                                                                                                                                                                                                                                                              |
| Value applied                                                   | Measured indirectly by correlating to water level at the reservoir                                                                                                                                                                                                                                    |
| Monitoring equipment                                            |                                                                                                                                                                                                                                                                                                       |
| QA/QC procedures to be applied                                  | N/A                                                                                                                                                                                                                                                                                                   |

|                    |                                                                                             |
|--------------------|---------------------------------------------------------------------------------------------|
| Purpose of data    | Calculating energy density to indicate that there is no reservoir related project emission. |
| Calculation method | N/A                                                                                         |
| Comments           |                                                                                             |

### 5.3 Monitoring Plan

The purpose of the monitoring plan is to ensure that the monitoring and calculation of emission reductions of the proposed Project within the crediting period is complete, consistent, clear and accurate.

The monitoring will be performed in-house by the project proponent:

All relevant key emission factors are predefined. Therefore, three data sets will be monitored during the project activity.

The first of these is the amount of electricity generated and fed to the grid. The electricity meter installation plan is already in place to provide TEIAS with the data required by the monthly billing process. Murat HEPP is a new electricity generation unit that does not replace the fossil fuel power plant in the project site.

The monthly reported meter readings by the main meter with serial number 9798700 will be cross-checked against the backup meter that has serial number 9798701. If the reading difference is less than  $\pm 0.2\%$ , the meter readings are considered to be OK; if not, the meters will be checked. Murat HES Enerji will be responsible for providing OSF<sup>57</sup> records showing the company's monthly electricity production. In addition to the measurement system, Murat HEPP production will be cross-checked from EPIAS/TEIAS-approved records.

| Meter              | Serial Number | Calibration Done On | Valid Until <sup>58</sup> | Type         |
|--------------------|---------------|---------------------|---------------------------|--------------|
| Main Meter (Old)   | 424740        | 2012                | 2022                      | Elster A1500 |
| Spare Meter (Old)  | 424741        | 2012                | 2022                      | Elster A1500 |
| Main Meter (New)   | 9798700       | 2020                | 2030                      | EMH LZQJ-XC  |
| Backup Meter (New) | 9798701       | 2020                | 2030                      | EMH LZQJ-XC  |

**Table 11 Information About Meters**

<sup>57</sup> The OSF Records are the Forms titled "TEİAŞ G.D.A. YÜK TEVZİ İŞLETME MÜDÜRLÜĞÜ BÖLGESİNDEKİ SANTRALLERİN AYLIK ÜRETİM, PUANT VE ÇALIŞMA SAATİ BİLGİLERİ" meaning "MONTHLY GENERATION, PEAK AND WORKING HOURS OF THE POWER PLANTS IN THE REGION OF TEİAŞ G.D.A. LOAD DISPATCH OPERATION DIRECTORATE" This is the official form of agreement related to net electricity generation between the project proponent and grid operator represented as TEİAŞ or EPIAŞ .

<sup>58</sup> Within the scope of the regulation in Turkey (<https://www.mevzuat.gov.tr/mevzuat?MevzuatNo=6381&MevzuatTur=7&MevzuatTertip=5>), the stamp year is taken as basis year and the year it is stamped is counted as the first year, regardless of the date and the remaining period is calculated from the year it was stamped.

Both meters were changed on 26.09.2020. These meters are valid for 10 years by Turkish regulations. All meters are in compliance with the host country calibration regulations . They have an accuracy class of Class 002 indicating an accuracy range of 0.2%. Meters are factory batch calibrated and sealed.

The purpose of the monitoring plan is to ensure that the monitoring and calculation of emission reductions of the proposed Project within the crediting period is complete, consistent, clear and accurate. The project is operated by Murat HEPP Energy which ensures the overall site management in accordance with Turkish Laws and technology providers' guidelines. The major quality assurance of the monitoring relies on the reporting system that has been regularly checked by the Board of Murat HEPP Energy Electricity Generation and Trade Inc.

**VER monitoring team members:**

General Manager: Responsible for the general aspects of the plant and VER monitoring plan. General Manager is responsible for the control of the electricity supplied to the grid and imported from the grid together with TEIAS. The electricity measurements are made by TEIAS remotely and the plant engineer is informed by TEIAS by e-mail regarding the electricity measurements by an e-mail each month. (An excel sheet called "OSF Form – Dengeleme Birimi Sayaç Değerleri Formu" (balancing unit energy meter readings table) which includes the hourly electricity supply and consumption values of the project is sent to the plant engineer from TEIAS.) The plant engineer checks these electricity readings records and reports to the Operations Manager of the plant. He is also the VER coordinator. They are in charge of:

- a. Ensuring that instrumentations and devices are available and adequately suited to perform efficiently the monitoring.
- b. Communicating and coordinating the monitoring tasks of all business units.
- c. Developing, executing, analyzing, and improving the VER Monitoring/Reporting Procedures. This includes cross-checking and consolidating (with multiple sources whenever possible) the data obtained from the electrical engineers and the accounting manager. He also recorded this operation correctly to be able to provide it to the VVB during the verification process.
- d. Calculating and reporting of the emission reductions,

Operating Engineer: Responsible for the electrical matters and from the recording and monitoring of relevant data. Ensure that all the instrumentations and devices are working correctly. Operating engineers ensure that all the instrumentations and devices used to monitor are working correctly. Responsible for keeping data used on electricity sales, invoicing and purchasing.

Carbon consultant: Responsible for emission reduction calculations, preparation of the monitoring report and management of the monitoring report verification process.

The carbon consultant will prepare the Monitoring Report to verify the emission reduction units produced, including the following key points:

.Monitoring period

- Net electricity provided to the grid by the project activity (in MWh)
- Annual gross electricity production (in MWh) (indicated as “Kayıplı Veriş” in TEIAS/EPIAS approved records )
- Annual electricity internal consumption (in MWh)(indicated as “Kayıplı Çekiş” in approved records)
- Calculation of emission reductions: Annual ERs generated from project activities (in tCO<sub>2</sub>e/year)

Each monitoring report will be submitted to VVB for verification. The report includes monitoring of grid-connected energy production, control report; report on calculation of emission reductions and records of monitoring device repair and calibration, etc. Data will be recorded for each crediting period and retained for at least 2 years after its end. The company will establish a dedicated maintenance system to ensure data availability for the required period.

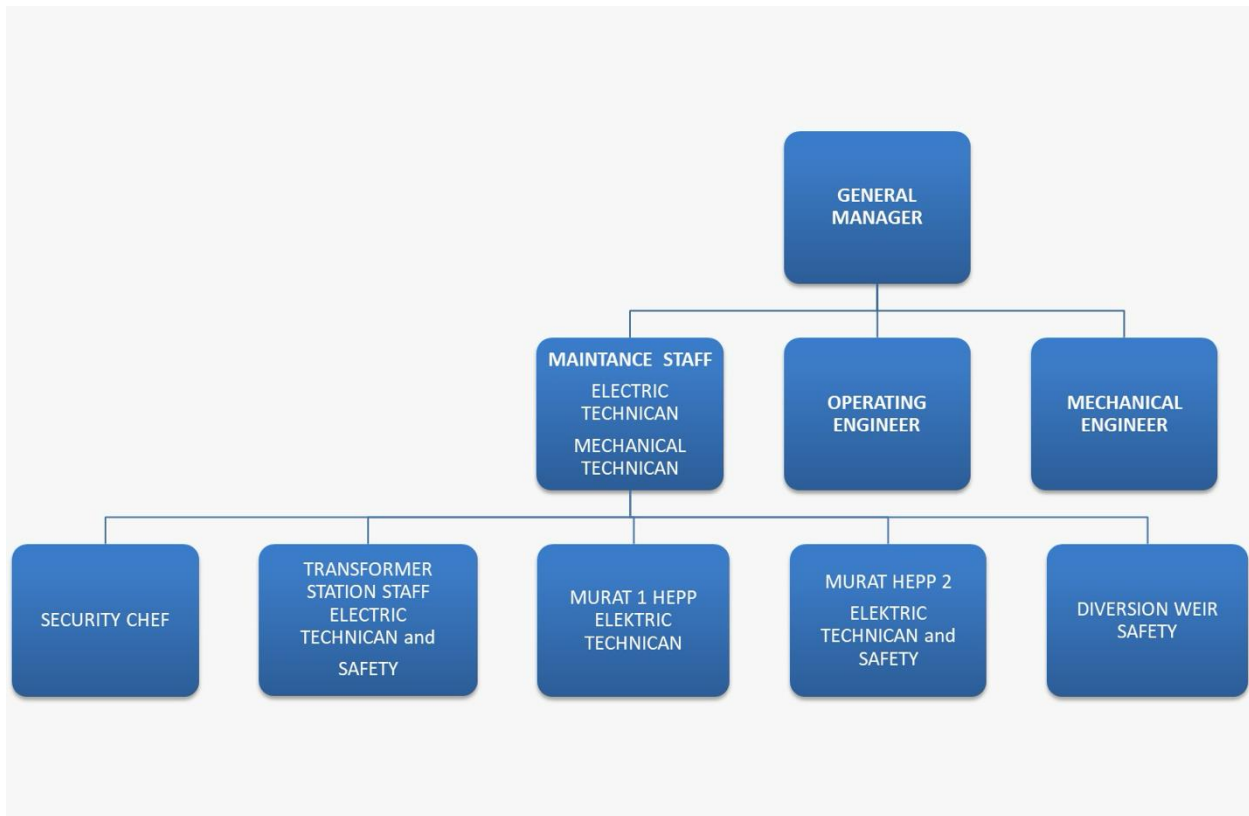


**Figure 16 Site Organizational Chart**

#### Measurements:

In the power plant, there are two electricity meters used to accurately measure the produced electricity. One is the main meter for measurement, and the other is the check meter for control. All meters used in the project site are factory calibrated and sealed. Both meters measure the energy in two directions (import and export) and are connected online to TEIAS via a GSM line. If there is a difference in measurements between these two meters and one of the parties (TEIAS or the company) requests calibration of the meters, the meters will be tested without waiting for the end of the calibration period. periodic calibration date, and replaced with factory calibrated meters if need be (This is defined by TEIAS System Usage Agreement, Art 3, B./2./b). The testing process is done by another third party under the control and approval of TEIAS. The company is not responsible for calibration of the meters in Turkey according to the local practices. The meters are not only tested in case of in accordance in measurements but they are also periodically tested in general at least biannually.

Initially at the close to the date of commissioning, the meters are first hand and the supplier company undertakes that these meters fully comply with or exceed all relevant IEC standards, including those relating to electronic measuring equipment for class 002 equipment. Additionally, the company had the meters tested by a third party (Kesir Müh. Elekt) on December 21, 2011, to verify whether the meters measured electricity production correctly. The results show that the meters measure electricity within the expected range with an error of 0.268%. There is no possibility of human error in measuring electricity. All measurements and calculations are made through the tested meters.

For this reason, net electricity production figures announced and approved by EPIAŞ /TEİAŞ are used in emission calculation figures. The energy produced and supplied is continuously monitored, recorded daily and collected in monthly totals.

The second data to be monitored is the installed power of the project activity. Installed power changes only when the project design changes. If there is any change in the installed capacity of the project, this change must be notified to EMRA. The mechanical and electrical powers written on the plates of the turbine - generator equipment will be checked and photographed during monitoring periods. The facility manager will be responsible for providing the data. The installed capacity of the project is 35.478 MWe.

The third data to monitor is the reservoir area. This data is calculated from coordinate readings. Data is collected by the project owner during periods when water flow is high. However, since it is difficult to determine the maximum water level, to be cautious, this parameter will be measured from the technical drawings of the project. The technical drawing of the regulator area, obtained from the final design of the project, was made in computer environment and the potential lake area (maximum possible water level) for flood discharge was projected. When the reservoir reaches full capacity, the reservoir area is calculated as 640,471.91 m<sup>2</sup>. The drawing was taken from the project plan prepared by Doğru Mühendislik, which is the survey and design consultant of this project.

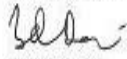
## APPENDIX 1: EIA EXEMPTION CERTIFICATES

T.C.  
ADIYAMAN VALİLİĞİ  
İL ÇEVRE VE ORMAN MÜDÜRLÜĞÜ

Karar Tarihi : 22/04/2009  
Karar No : 29

**ÇED GEREKLİ DEĞİLDİR BELGESİ**

**16 Aralık 2003 tarih ve 25318 sayılı Resmi Gazete'de yayımlanarak yürürlüğe giren Çevresel Etki Değerlendirmesi Yönetmeliği'nin Ek-II listesinde yer alan "Murat HES1(24,08 MW) ve Murat HES2(13,14 MW) Hidroelektrik Santrali " Projesi ile ilgili olarak inceleme değerlendirme yapılmış ve Proje Tanıtım Dosyasında çevresel etkilere karşı alınması öngörülen önlemler yeterli görülmüştür. Ayrıca ÇED Raporu hazırlanmasına gerek bulunmadığı tespit edilmiş olup, söz konusu projeye ÇED Yönetmeliğinin 17. Maddesi gereğince Valiliğimizce "Çevresel Etki Değerlendirilmesi Gerekli Değildir Kararı" verilmiştir.**

  
**Aydın BÖRÜ**  
**Vali a.**  
**Vali Yardımcısı**

**Proje Sahibi :** Murat HES Enerji Elektrik Üretim ve Tic.Ltd.Şti.  
**Projenin Yeri:** Adıyaman İli Merkez İlçesi Yonıköy köyünden başlayıp Besni İlçesi umutlu köyüne kadar Göksu çayı üzerinde  
( Regülatör: Y:416500 X:4176000 )  
( Murat HES1: Y:419700 X:4165400 )  
( Murat HES2: Y:423000 X:4158500 )



T.C.  
**ÇEVRE ve ŞEHİRCİLİK BAKANLIĞI**  
Çevresel Etki Değerlendirmesi, İzin ve Denetim Genel Müdürlüğü

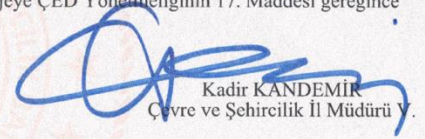


T.C.  
**ADİYAMAN VALİLİĞİ**  
ÇEVRE ve ŞEHİRCİLİK İL MÜDÜRLÜĞÜ

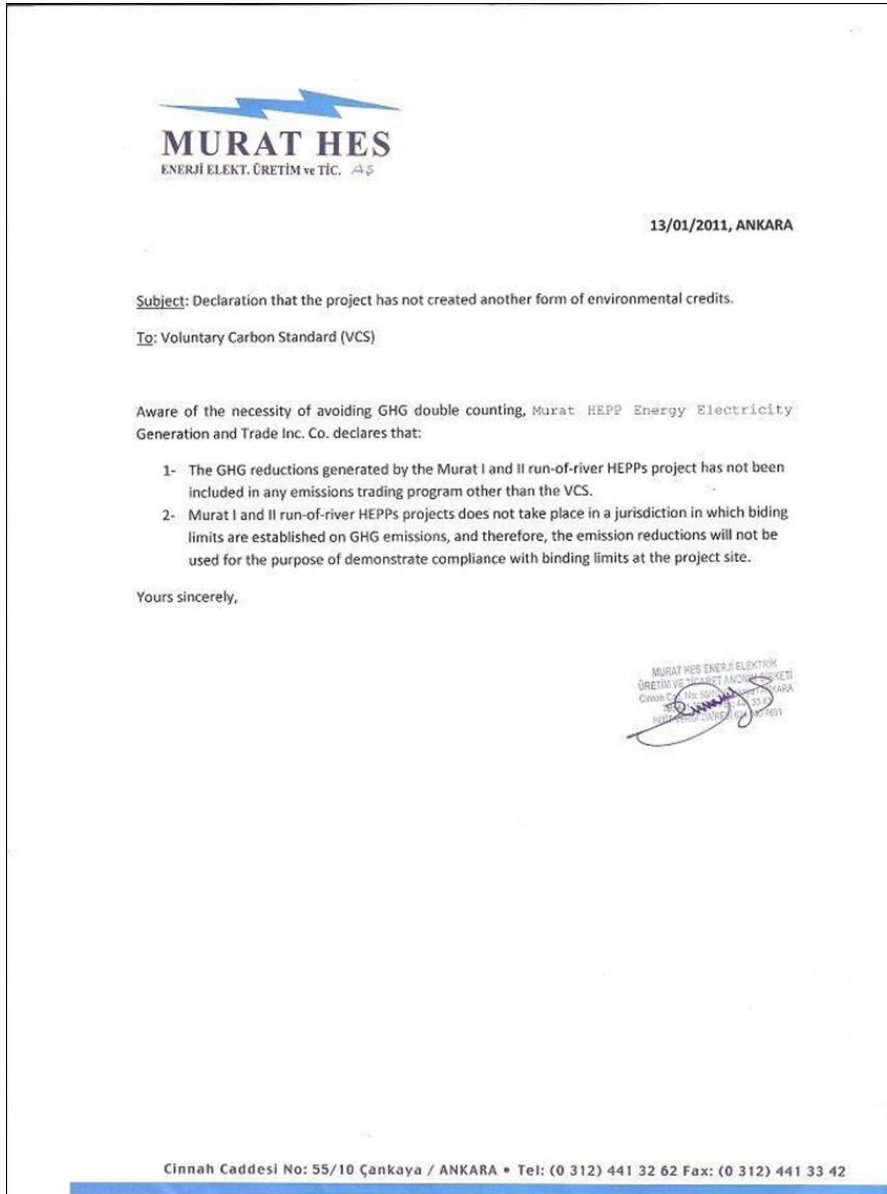
Karar Tarihi : 29-09-2021  
Karar No : 16244257 220-02 E-2021138

**ÇEVRESEL ETKİ DEĞERLENDİRME BELGESİ**

25.11.2014 tarih ve 29186 sayılı Resmi Gazete'de yayımlanarak yürürlüğe giren Çevresel Etki Değerlendirmesi Yönetmeliği'nin Ek-II listesinde yer alan 'MURAT HES YARDIMCI KAYNAK GÜNEŞ ENERJİ SANTRALİ (KURULU GÜÇ:12,006,40 kWp / 9,990 kWp)' projesi ile ilgili olarak inceleme-değerlendirme yapılmış ve Proje Tanıtım Dosyasında çevresel etkilere karşı alınması öngörülen önlemler yeterli görülmüştür. Ayrıca ÇED Raporu hazırlanmasına gerek bulunmadığı tespit edilmiş olup, söz konusu projeye ÇED Yönetmeliğinin 17. Maddesi gereğince Valiliğimizce "Çevresel Etki Değerlendirmesi Gerekli Değildir" kararı verilmiştir.

  
Kadir KANDEMİR  
Çevre ve Şehircilik İl Müdürü V.

Proje Sahibi : MURAT HES ENERJİ ELEKTRİK ÜRETİM VE TİC. A.Ş.  
Proje Yeri : Adıyaman İli, Besni İlçesi, BAŞLI KÖYÜ  
Kapasite : 12,006,40 kWp / 9,990 kWp  
Not : Koordinatlar Ektedir.



## APPENDIX 3: ADDITIONAL INFORMATION ON LOCAL STAKEHOLDERS' INFORMATION

Sayfa 1 / 2

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**Serkan BAYBO**

**Kimden:** "Sevda ÖZCAN" <sevda@suenltd.com>  
**Kime:** <info@cdmgoldstandard.com>  
**Bilgi:** "Serkan BAYBO" <serkan@suenltd.com>  
**Gönderme tarihi:** 10 Mayıs 2010 Pazartesi 17:04  
**Ek:** MURAT II non tech summary eng.docx  
**Konu:** MURAT II HEPP Stakeholder Invitation/TURKIYE  
 To Whom It May Concern,

We take pleasure in inviting you to attend to a stakeholder consultation meeting to be held on 28th May 2010 at 02.00 pm at Yayla Cafe in Sambayat Town, Besni, Adıyaman Province, TURKIYE in order to discuss Murat II Hydroelectric Power Plant Project located on the Göksu Stream, Besni Town, Adıyaman Province. We hereby cordially invite you to share your views about the environmental and socio economic benefits and possible impacts of the project. If you have any concern or questions about the proposed establishments in the projects, please attend the meeting in person or please do not hesitate to send your views to the addresses of SUEN Ltd. given below or deliver it by hand at the meeting hall. We also would like to hear your any recommendations in order to assist the contribution to improve the living of the local community.

Murat II Hydroelectric Power Plant Project will be carried out by Murat Hepp Energy Generation and Trade Ltd. We want to ensure that the project is sustainably implemented to the highest standards in relation to social and ecological aspects. Therefore, we have chosen to develop the project in accordance with international climate change rules and United Nations CDM (Clean Development Mechanism) Principles. As part of this process we are consulting with you to ensure that we have taken into account all relevant social and environmental impacts.

**SUEN ENGINEERING AND CONSULTANCY Ltd.**  
**Aynur SEZER – Project Coordinator**

Adress: Fener Mah. 1964 Sk. Gazez Apt. K:3 D:10 Antalya / TÜRKİYE  
 Tel. no.: 0242 324 79 60 – 61  
 Fax no.: 0242 324 79 62  
[info@suenltd.com](mailto:info@suenltd.com)

**Project Participant:**  
 MURAT HEPP ENERGY GENERATION AND TRADE CO.LTD.

**\*The non technical summary of the project can be seen in the attachment.**

\_\_\_\_\_ ESET NOD32 Antivirus Akıllı Güvenlik tarafından sağlanan bilgiler, virüs imza veritabanı sürümü: 5101 (20100510) \_\_\_\_\_

İleti ESET NOD32 Antivirus Akıllı Güvenlik tarafından denetlendi.

<http://www.nod32.com.tr>

12.05.2010

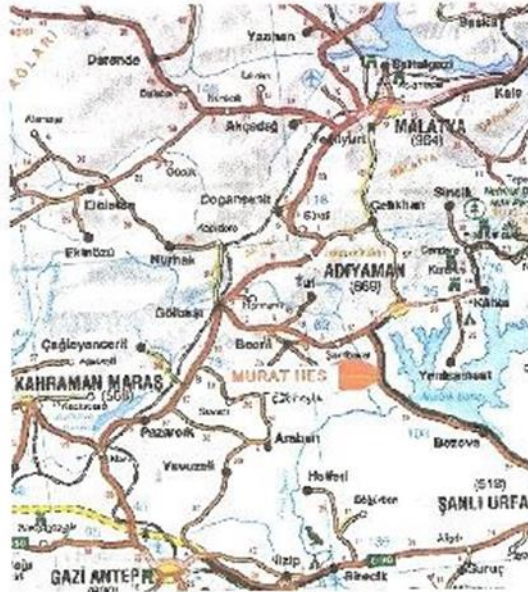
Figure 17 Sample of the invitation letter sent to the stakeholders

## MURAT I ve MURAT II HİDROELEKTRİK SANTRALLERİ (HES) PROJESİ

### TEKNİK OLMAYAN PROJE TASARIM ÖZETİ

| ÖZET BİLGİ                       |                                                    |                     |
|----------------------------------|----------------------------------------------------|---------------------|
| Proje sahibi                     | Murat HES Enerji Elektrik Üretim ve Tic. Ltd. Şti. |                     |
| Proje Adı                        | Murat I ve II Hidroelektrik Santralleri            |                     |
| Yeri                             | Besni, Adıyaman                                    |                     |
| İnşaatın Başlama Tarihi          | 2010 ikinci çeyreği                                |                     |
| Hedeflenen Toplam Enerji Üretimi | 150,38 GWh                                         |                     |
|                                  | <b>MURAT HES I</b>                                 | <b>MURAT HES II</b> |
| Kurulu Güç                       | 27,00 MW                                           | 10,44 MW            |
| Toplam Enerji Üretimi            | 106,42 GWh                                         | 43,96 GWh           |
| Enerji Nakil Hattı Uzunluğu      | 10 km                                              | 6 km                |
| Brüt Dışlı                       | 58,55 m                                            | 24,81 m             |

Murat HES Projesi, Güneydoğu Anadolu Bölgesi'nde, Adıyaman İli, Besni İlçesi, Göksu Çayı üzerinde yer almaktadır. Göksu Nehri, Nurhak Dağları'ndan doğar ve geniş bir alandan beslenerek bölgenin en önemli akarsuyu Fırat Nehri'ne katılır. Nehrin uzunluğu 150 km'yi bulmaktadır.



Proje kapsamında yapımı önerilen tesisler; regülatör ve çökeltim havuzu, iletim kanalı 1, yükleme havuzu 1, cebri boru 1, Murat HES I santral binası ile iletim kanalı 2, yükleme havuzu 2, cebri boru2, Murat HES 2 santral binası, kuyruksuyu kanalı ve salt suhisidir. Göksu Çayı üzerinde 516.00 m talveg kotunda Murat Regülatörü ile toplanan suyun toplam 15002.00 m uzunluğundaki iletim kanalı ile bir

yükleme havuzuna iletilmesi ve yüklem havuzundan, 135.00 m uzunluğundaki cebri boru ile 454,93 m kuyruksuyu kotunda bulunan Murat HES I santral binasına alınması planlanmaktadır. Santral binasından sonra, toplam 5709.00 m uzunluğundaki iletim kanalı ile yüklem havuzuna aktarılması ve ardından 125.00 m uzunluğundaki cebri boru ile 427,57 m kuyruksuyu kotunda bulunan Murat HES II santral binasına alınması proje kapsamındadır. Bu tesislerle birlikte santralde üretilen elektrik taşımak amacıyla Enerji Nakil Hattı da yapılacaktır.

Kurulu gücün, Murat I Santralinde 27.00 MW, Murat II Santralinde ise 10,44 MW olarak planlandığı projede, yıllık enerji üretimi toplam 150,38 GWh olarak hedeflenmiştir. Çeviren su, yaklaşık 135m ve 125 m uzunluğundaki boru hatları ile ilerilecek, türbinlerden geçirilerek potansiyel enerji, elektrik enerjisine dönüştürülecektir. 2010'da başlayacak inşaat çalışmalarının, 2012'de tamamlanması hedeflenmektedir.

İnşaat esnasında ve işletme süresince, iş gücü ihtiyacı, öncelikle bölgeden karşılanacaktır. Böylelikle, bölge için yeni iş imkânları oluşacaktır. Projenin inşaatı esnasında da malzeme, cihaz, gıda ve konaklama gibi ihtiyaçlardan hizmet talebi doğacaktır. Aynı zamanda, proje yüzünden halkın yeniden iskânı gerekmeyecektir.

Murat HES 1 ve HES 2, su gücü ile enerji üreteceği için; kömür veya doğalgaz gibi fosil yakıt kullanılarak üretilen enerjilerin aksine, atmosfere karbondioksit salımlarına yol açmaz; zararlı sera gazları üretmeyerek hava, toprak, su, başka bir deyişle tüm ekosistem kalitesinin gelişimine katkıda bulunur. Bu, insan sağlığı ve de gelecek nesiller için bir hayati bir katkıdır. Hedeflenen yıllık üretim ile sağlayacağı CO<sub>2</sub> azaltımı, yaklaşık 92.000 tondur. Proje, Türk yasaları, ilgili Çevre Düzenlemeleri ve CDM (Temiz Kalkınma Mekanizması) ilkeleri ile uyumludur. Tüm ilgili lisanslar için başvurular yapılmıştır. Proje, yeni kaynaklar kullanılması ile aynı zamanda, dış bağımlılığı da azaltmış olacaktır.

#### 1. Sosyal – Ekonomik Katkısı:

- Proje, inşaat ve işletme esnasında yeni iş imkânları yaratacaktır.
- Proje aynı zamanda, inşaat esnasında malzeme, cihaz, gıda ve konaklama gibi diğer hizmetler için talep oluşturmaktadır.
- Murat I ve II HES Projelerine yöre halkına fayda sağlayabilecek herhangi bir konuda, birden fazla sayıda sosyal sorumluluk projesi de dâhil edilebilir. Toplantı esnasında, en fazla faydayı sağlayabileceğini düşündüğünüz sosyal sorumluluk projesi önerilerini sizden bekliyoruz. Bu konuda, yöre ve yöre halkının ihtiyaçları doğrultusunda bize fikir vermeniz, en uygun projeyi seçmemiz açısından faydalı olacaktır. Bu projeler ile ilgili kararlar alındığında duyuruları yapılacaktır.

- Proje, elektrik santrallerinde kullanılan diğer kaynaklardan biri olan ve yurt dışından satın aldığımız fosil yakıt tüketiminin azalmasına katkıda bulunarak Türkiye'nin ödemeler dengesini geliştirecek ve ülke için enerji güvenesi yaratacaktır.

## 2. Çevresel Katkıları:

- Hidroelektrik santralleri, elektriği su enerjisi ile ürettiğinden dolayı, yaşadığımız yöreye ve dünyamıza zarar veren sera gazlarının hiçbirini üretmez ve zararlı atık içermez; bu sayede hava, su ve toprak kalitesinin gelişimine olumlu katkı sağlar.
- Proje, Türk Yasaları, ilgili çevre düzenlemeleri ve CDM (Birleşmiş Milletler Temiz Kalkınma Mekanizması) kriterleri doğrultusunda yapılmaktadır ve çevre dostudur. Tüm ilgili ruhsatlara başvurular yapılmıştır. İlgili evraklar toplantıda incelenebilir.

## 3. Diğer Olası Etkiler:

- Hidroelektrik santrallerinde suyu hapseden bir baraj yapısının olmaması sayesinde sadece su alma ve verme noktaları arasında su seviyesi değişikliği yaşanır. Bağlı olduğumuz yasalara göre, bu iki nokta arasında, nehir ekosistemine etki etmeyecek yeterlilikte su geri bırakılacaktır. Akarsuyun hiçbir noktasının kurumasına izin verilmeyecektir.
- İnşaat sırasındaki kazı ve dolgu çalışmaları ile arazi ıslahı sebebi ile mevcut arazinin topografik yapısında değişiklikler olabilir. Kazılardan çıkan artık malzeme, uygun biçimde depolanarak toprağın nehre akmasını engellemek için toprak tutma çalışmalarında veya proje alanında ya da civardaki yolların iyileştirilmesinde kullanılacaktır. Etkilenen alanlar hakkında daha detaylı bilgi toplantıda verilecektir.

Figure 18 Non-technical summary (in original language)

The non-technical summary was sent to the stakeholders together with the invitation letters. Hard copies were also handed out to each participant during the meeting. Please refer to **Annex 4** to find a copy in its original language (Turkish). The English version of the non-technical summary is as follows:

#### MURAT I-II HYDROELECTRIC POWER PLANT PROJECT NON-TECHNICAL SUMMARY

| BRIEF SUMMARY                                |                                                         |           |
|----------------------------------------------|---------------------------------------------------------|-----------|
| Project Owner                                | Murat HEPP Energy Electricity Production Trade Ltd. Co. |           |
| Project name                                 | Murat HEPP                                              |           |
| Location                                     | Göksu River, Besni Town, Adıyaman Province, Turkey      |           |
| Starting date of construction                | Second quarter 2010                                     |           |
| Total expected annual electricity production | 150.30 GWh                                              |           |
|                                              | MURAT I                                                 | MURAT II  |
| Installed capacity                           | 27.00 MW                                                | 10.44 MW  |
| Total electricity generation                 | 106.42 GWh                                              | 43.96 GWh |
| Electricity Transmission Line                | 10 km                                                   | 6 km      |
| Gross Head                                   | 58.55 m                                                 | 24.81 m   |

The Murat HEPP Project is located on the Göksu River flowing through Besni, Adıyaman in the Southeastern Region of Turkey. The Göksu River starts from the Nurhak Mountains and by being fed in a large area, it joins the Fırat River, the most considerable river in the region. The length of the Göksu River is roughly 150 km.

The proposed establishments for Murat I are a diversion weir and a sedimentation pool, conveyance canal, fore-bay, penstock, and Murat I HEPP building. The proposed establishments for Murat II are conveyance canal fore-bay, penstock, tail-water canal, power house and Murat II HEPP building.

Water on the river will be diverted by a diversion weir then it will be carried by a 15,002m conveyance canal to a fore-bay. Accumulated water in the fore-bay will be released through 135 m penstock to turbines and therefore electricity will be generated at Murat I HEPP.

Murat I HEPP's tail-water will be carried to a fore-bay through 5,709 m long conveyance canal. Then accumulated water in the fore-bay will be released through 125 m penstock to turbines and therefore electricity will be generated at Murat II HEPP.

Ultimately water will be released to the riverbed.

Generated electricity at both plants will be transmitted to national grid through an energy transmission line.

Murat HEPP Project will not produce any greenhouse gas emissions contributing to air, soil and water quality which is vital for the whole ecosystem and next generations. The estimated total emission reduction amount is approximately 75,363, tonnes CO<sub>2</sub>. The Project is in compliance with Turkish Laws, Environmental Regulations and United Nations CDM (Clean Development Mechanism) Principles. All the applications have been completed for the licenses. Moreover contribution of renewable energy by

Murat HEPPs to Turkish National Grid will help decrease dependency on foreign countries due to petrol importation.

### **1. Socio-economic Development**

- No negative socio-economic impacts are expected.
- New employment opportunities and demand for other services such as provision of equipment, food and accommodation will be created during the construction and operation phases.
- The standards of living of the local people will increase due to donations that the company will make in order to improve local facilities.
- A reduction in the importation of fossil fuels will improve the balance of payments for Turkey and improve the energy security of the country.
- The access to electricity for local communities will be improved.
- No resettlements are required as the project is run-of-river type.

### **2. Environmental Benefits**

- Project will not produce any greenhouse gas emissions. Thus, it will contribute to improve the air quality.
- The Project is in compliance with the Turkish Law, Environmental Regulations and United Nations CDM (Clean Development Mechanism). All the applications have been completed for the relevant licenses.

### **3. Other Possible Impacts**

- Changes in water levels in the river: Water levels will only change between the water intake and water outlet points in the river as this is a run-of-river Project and no dams are involved. By law we are required to maintain sufficient levels of water between these two points to ensure that there is no impact on the river ecosystems. At no point will the river be allowed to run dry. In other words, the wild life will have been preserved.
- Changes in the topographical structure due to excavations, fillings, levelling, material removal and reclamation during the construction: During Project implementation, the materials removed from the diggings will be carefully stored and then reused to avoid local

waterways being polluted by runoff. Further details about the affected areas will be provided at the meeting.

- The most considerable negative impact of the HEPP projects is the need to cut down trees. However, regarding the physical characteristics of the region there is no need to cut down any.

All the materials from the excavation area will be used either for landscaping or for improving the local roads.

**It is necessary for us to share your opinions in order to increase the contribution to the local community. We will be pleased to supply further information in this regard.**

MURAT II HİDROELEKTRİK SANTRALİ PROJESİ  
 PAZARLAMA TOPLANTISI  
 KATILIMCI LİSTESİ  
 Tarih: 28/05/2010  
 Yer: Samboyat / Adıyaman

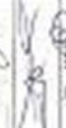
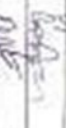
| Adı/Soyadı     | Meslek     | Toplumsal Pozisyon | Bay/Bayan | Tel. No.       | İmza   |
|----------------|------------|--------------------|-----------|----------------|--------|
| Mahmut Sinirli | Elektrikçi |                    | Erkek     | 0336 523 14 01 | [İmza] |
| Yasas Orluc    | makineci   |                    | Erkek     | 0544 552 3632  | [İmza] |
| Etili Deniz    | Makineci   |                    | Erkek     | 0532 555 747   | [İmza] |
| Osman Bekir    | Yatırımcı  |                    | Erkek     | 0572 670 69 50 | [İmza] |
| Mutlucan Akte  | Yatırımcı  |                    | Erkek     |                | [İmza] |
| Fahri Kulu     | Çiftçi     |                    |           |                | [İmza] |
| İzzet Doğru    | Çiftçi     |                    |           |                | [İmza] |
| Mustafa Akte   | Yatırımcı  |                    | Erkek     | 0533 251 0321  | [İmza] |
| Yusuf Akte     | Yatırımcı  |                    | Erkek     | 0532 530 2964  | [İmza] |
| Yakup Akte     | Yatırımcı  |                    | Erkek     | 0416 346 5002  | [İmza] |

MURAT İVE MURAT İ HİDROELEKTRİK SANTRALLERİ PROJESİ  
PAYDAŞLAR TOPLANTISI

KATILIMCILISTESİ

Tarih: 28/05/2020 14:30

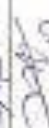
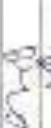
ve Sanayiet-İADIRANAK

| Adı/Soyadı      | Meslek<br>Toplumsal Pozisyon | Bay/Bayan | Tel. No.       | İmza                                                                                |
|-----------------|------------------------------|-----------|----------------|-------------------------------------------------------------------------------------|
| Habib Yılmaz    | Soğuk                        | Erkek     | 0542 760928    |  |
| H.A. Kılıç      | Soğuk                        | =         | 0337 3471168   |  |
| Zekeriyaoglu    | Soğuk                        | Erkek     | 0548 935744    |  |
| Ali Özalp       | Usta (30 Yıl)                | =         | 0539 5607175   |  |
| Kenan Duran     | Soğuk                        | =         | 0544 437 6936  |  |
| Michael Pınar   | Çiftçi                       | =         | 0505 840 1381  |  |
| Canal Mısıroğlu | Çiftçi                       | =         | 0542 734 16 14 |  |
| Abdülrazzoğlu   | E. Çiftçi                    | =         | 0538 605 3234  |  |
| Kadir Yılmaz    | Soğuk                        | =         | 0512 414 5239  |  |
| Uğur Özdemir    | Çiftçi                       | =         | 0544 614 3535  |  |

**MURAT I VE MURAT II HEDRELİ ELEKTRİK SANTRALLERİ PROJESİ**
**PAYDAŞLAR TOPLANTISI**
**KATILIMCI LİSTESİ**

Tarih: 28/05/2016 14:20

Yer: Sanayiye / Adıyaman

| Adı/Soyadı       | Meslek<br>Toplumsal Pozisyon | Bab/Bayan | Tel. No.      | İmza                                                                                |
|------------------|------------------------------|-----------|---------------|-------------------------------------------------------------------------------------|
| Turgut Aksoy     | Koşu                         | Çokel     | 0506 357 9424 |  |
| Habib Doğan      | Öğretmen                     | =         | 0531 561 7045 |  |
| Emet Aydın       | Çiftçi                       | =         | 0542 320 8833 |  |
| Haydar Döğen     | Emekçi                       | =         | 0544 860 0661 |  |
| M. Ali Şimşek    | Çiftçi                       | =         | 0542 414 8603 |  |
| Mehmet Akçelik   | Çiftçi                       | =         | 0948 716 1140 |  |
| Süleyman Aydın   | Çiftçi                       | =         | =             |  |
| Bedrettin Yılmaz | Çiftçi                       | =         | 0935 548 5233 |  |
| Başar Akçelik    | Çiftçi                       | =         | 0513 284 4753 |  |
| Bayram Güler     | Ateşçi                       | =         | 0544 846 5830 |  |

NUJBAT I VE NUJBAT II MICROELEKTRIK SANTRALLERINI PROJEESI  
PARDAQLAR TOPLANTISI

KATILMCI LISTESI

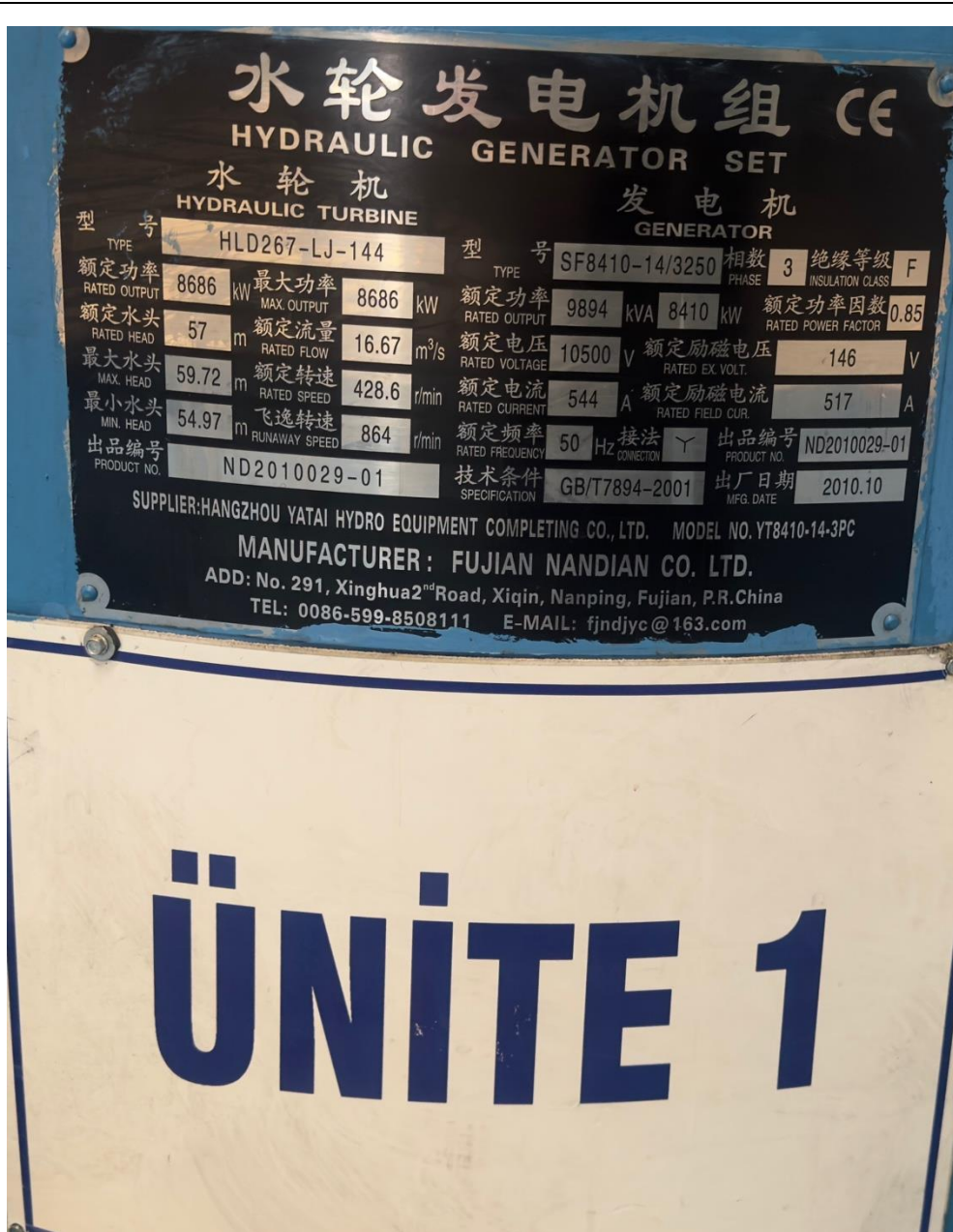
Tarix/Say: 23/05/2010 14 23

Yer: Samkayot / ABLAYMAN

| Adi / Soyadi  | Mestlek<br>Toplumsal Pozitsiya | Bay/Bayan | Tel. No.      | Imza                                                                                |
|---------------|--------------------------------|-----------|---------------|-------------------------------------------------------------------------------------|
| Erol Agicany  | İşçi                           | Bay       | 05427852065   |  |
| Felimi Əskany | Əməkdaş                        | Bay       | 0305 3026592  |  |
| Musibəfərgany | Əməkdaş                        | Bay       | 052223910200  |  |
| Mikail Kərdəh | Əməkdaş                        | =         | 0305 801 6062 |  |
| Eylül Əskany  | Əməkdaş                        | =         | 0544 776 6162 |  |
| Məhrib Əskany | Proqramçılar                   | Bay       | 0305 3026592  |  |
| Səkin Baylar  | Dənizman                       | Bay       | 542 392 1816  |  |
| Ayqul Əskany  | Dənizman                       | Bayan     | 0305 3026592  |  |

## APPENDIX 4:

# NAMEPLATES OF THE GENERATORS



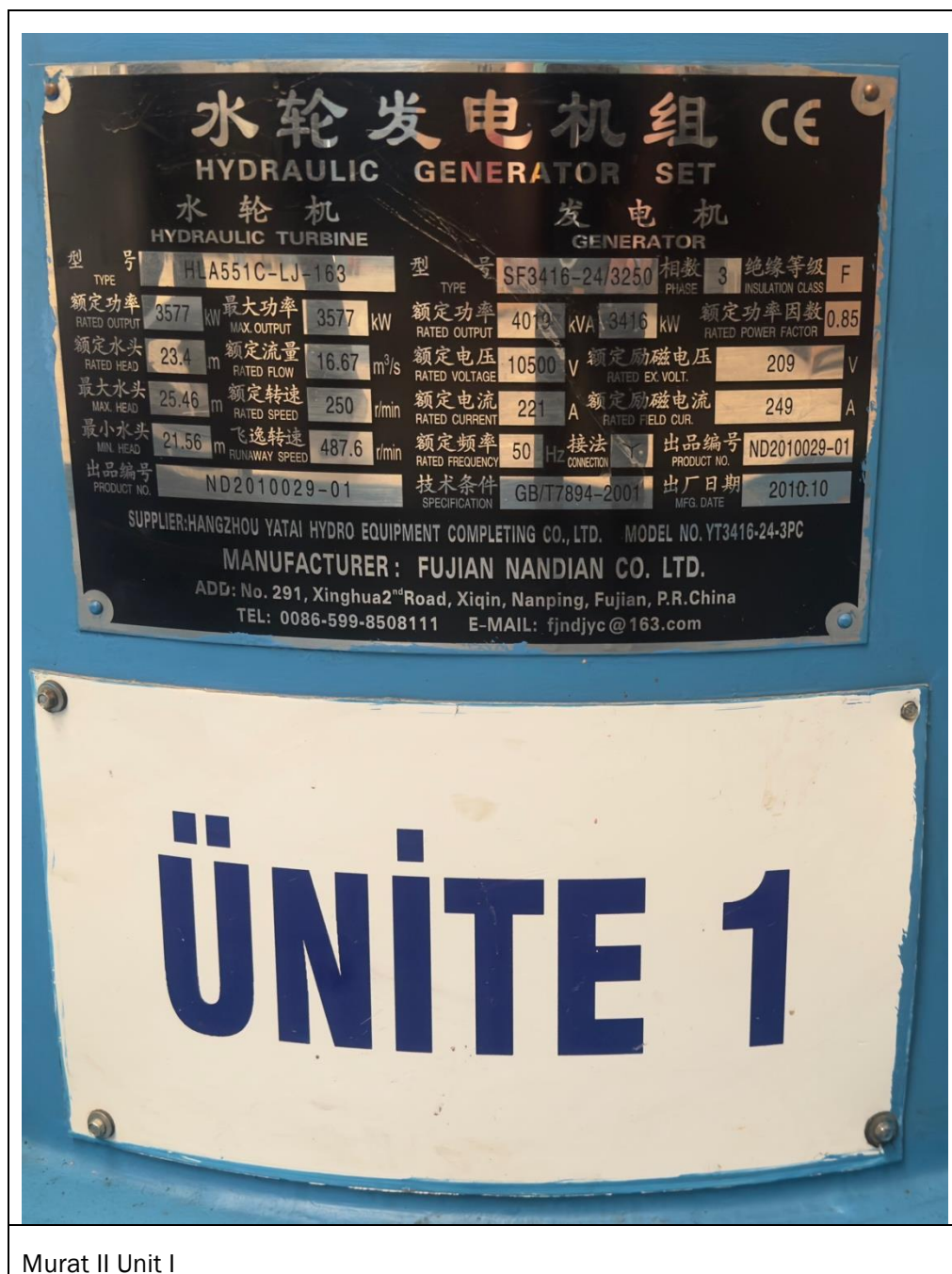
Murat I Unit I



Murat I Unit II



Murat I Unit III



Murat II Unit I



Murat II Unit II



Murat II Unit III