

CONTRIBUTIONS TO A PHOTO DATABASE OF RENEWABLE ENERGY

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ABSTRACT

COST actions are European networks that provide opportunities for researchers and innovators to address scientific, technological and societal challenges (<https://www.cost.eu/>). COST TU1401 addressed the topic “Renewable energy and landscape quality”. In a search for documenting which characteristics of historic energy installations led to their romantic and rather positive visual impact on the landscape, visits were done to village museums in Bucharest and Sibiu in Romania. The renewable energy covered in this paper is related to water and wind energy.

Keywords: Vernacular architecture, Mills, Open air museum, Wind energy, Water energy

INTRODUCTION




The aim of the paper is to present entries to the photo database of the COST Action TU1401 “Renewable energy and landscape quality” (COST RELY) contributed by the author. A preliminary version has been published in “Urbanism. Architecture. Constructions” by Bostenaru (2018) and was also presented at the final conference of the COST action in Clermont-Ferrand and Mende by Bostenaru and Triboi (2018). An overview of the early entries, from which some were prize awarded by the COST? Action and of the late entries is provided in the mentioned documents. They include in situ timber mills, such as the ones from Nessebar, Bulgaria as well as from Belgium, windmills from the Netherlands and watermills from Esslingen am Neckar (Germany) and Eftimie Murgu (Romania). To be noted is that the historic mills in Germany (like the one from Ulm which was documented, part of the 10 years old cultural route in Upper Swabia) are masonry constructions, different from the timber mills (in situ) in Eftimie Murgu and the ones from the village museums in Romania. A scientific view on the relationship between mills and human influence, is presented in Konold et al. (2016). Afterward, more historical renewable energy installations have been investigated namely the wind and water mills in the village museums in Bucharest and Sibiu, a solar energy entry in the database documented on the IBA (Internationale Bauausstellung – International building exhibition) Emscher Park installation regarding the recent past. The IBA Emscher Park (Shaw, 2002) was a large-scale retrofit in the 1990s of a former coal-mining region and therefore the renewable energy there in the high tech industry buildings enjoys a special connotation. The buildings and free spaces remained in use after the end of the exhibition. The IBA Emscher Park, built 1990-2000, displays a positive way to deal with the impact of renewable energy on the landscape of the mills presented here.

Other database entries were on solar energy retrofits of buildings in the mountains in Sinaia in Romania and at a monastery in Érd, Hungary. The impact of historic renewable energy installations on the landscape (Brykała and Podgórski, 2020) can be

also seen in connection with geotourism and geoheritage, sometimes being encountered in areas connected to national parks (for example an entry on the Black Forest mountains and entries on the Iron Gate park). The impact is strongly connected with the topic of the COST action: to assess landscape quality and renewable energy. Moving from the small scale interventions before the industrial revolution as we see in the village museums (the ASTRA museum being a technical museum dedicated to crafts and thus a precursor for the industry) to large scale interventions today may have a significant impact on the landscape of today's windmills are on, or with contemporary large hydropower installations.

An (international) building exhibition such as IBA Emscher Park is displaying future technologies like the village museum is displaying traditional technologies. The materials and shape of the new energy installations are also less in accordance with the landscape and may have a negative impact. Therefore, ways for a positive integration have to be researched, and photography is a way to point out the visual characteristics as a method to analyze the landscape. The structure of the entries for the database will be presented and exemplified in selected examples (Table 1, 2). The photo database of the COST action TU1401 is further in work.

Table 1. Watermills in village museums, Small hydropower (photos: M. Bostenaru)

	<p>Romania, Horizontal waterwheel mill, 19th century, originally from Teregova, Caraş-Severin County. Reconstructed and presented at the Village Museum in Bucharest, similar location to the ones in Eftimie Murgu village presented on the place. More information is given on the webpage of the National Village Museum (2020)</p>
	<p>Romania, Watermill, 19th century, originally from Plavişeviţa, Mehedinţi County. Reconstructed and presented at the Village Museum in Bucharest. More information is given on the webpage of the National Village Museum (2020)</p>
	<p>Romania, water driven Hammer, originally from Rimetea, Alba County, reconstructed and presented in the ASTRA Museum, Sibiu, the work with the index MA107</p>



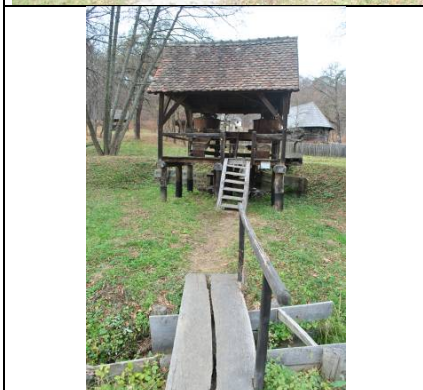
Romania, stamp mill for crushing Gold Ores and Toolroom, originally from Abrud, Alba County, reconstructed and presented in ASTRA Museum, Sibiu, as the work with the index MA109.



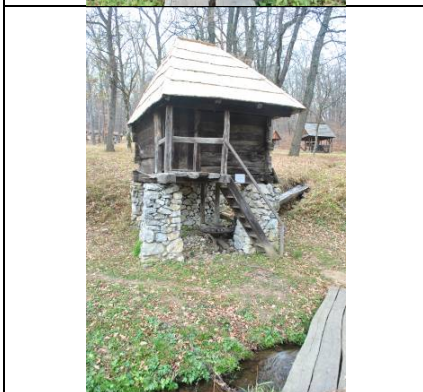
Romania, floating mill, originally from Lucăcești, Maramureș County, reconstructed and presented in ASTRA Museum, Sibiu, as the work with the index MA61.



Romania, Watermill with Three Horizontal Wheels, originally from Arcani, Gorj County, reconstructed and presented in ASTRA Museum, Sibiu as the work with the index MA54.



Romania, Water-mill with two horizontal wheels and gearing, originally from Râu de Mori, Hunedoara County, reconstructed and presented in ASTRA Museum, Sibiu, as the work with the index MA53a.



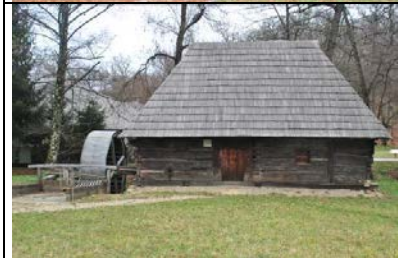
Romania, Watermill with Horizontal Wheel, originally from Topleț, Caraș-Severin County, reconstructed and presented in ASTRA Museum, Sibiu, as the work with the index MA52.



Romania, Water-mill with six horizontal wheels, originally from Găleşoia, Gorj County, reconstructed and presented in ASTRA Museum, Sibiu, as the work with the index MA54a.



Romania, Watermill, with Vertical Undershot Wheel, originally from Dăbâca, Hunedoara County, reconstructed and presented in ASTRA Museum, Sibiu, as the work with the index MA55.



Romania, Watermill, with Vertical Undershot Wheel, originally from Poienii de Jos, Bihor County, reconstructed and presented in ASTRA Museum, Sibiu, as the work with the index MA55a.



Romania, Watermill, with Vertical Overshot Wheel, originally from Orşova, Mureş County, reconstructed and presented in ASTRA Museum, Sibiu, as the work with the index MA56.



Romania, Watermill, with Vertical Overshot Wheel and Two Gear Transmission, originally from Rogojelu, Cluj County, reconstructed and presented in ASTRA Museum, Sibiu, as the work with the index MA57.



Romania, Watermill, with Two Vertical Wheels and Elevator, originally from Roşcani, Hunedoara County, reconstructed and presented in ASTRA Museum, Sibiu, as the work with the index MA60a.












	<p>Romania, Water mill with elevator, originally from Ciocmani, Sălaj County, reconstructed and presented in ASTRA Museum, Sibiu, as the work with the index MA60a.</p>
	<p>Romania, Water-mill with overshot wheel, originally from Almaş-Sălişte, Hunedoara County, reconstructed and presented in ASTRA Museum, Sibiu, as the work with the index MA58.</p>

Table 2. Windmills in village museums, Energy landscape, wind energy (photos M. Bostenaru)

	<p>Romania, Dobrogea, two storey Windmill, originally from Dunavăţ, Tulcea County, reconstructed and presented in ASTRA museum, Sibiu, as the work with the index MA64.</p>
	<p>Romania, Dobrogea, small Windmill, originally from Enisala, Tulcea Country, reconstructed and presented in ASTRA museum, Sibiu county, as the work with the index MA63.</p>

	<p>Romania, Dobrogea, Windmill with Sails, originally from Curcani, Constanța Country, reconstructed and presented in ASTRA Museum, Sibiu, as the work with the index MA66. This mill is part of the alley of ethnic minorities, funded through EEA grants.</p>
	<p>Romania, Dobrogea, two-story Windmill, originally from Frecăței, Tulcea County, reconstructed and presented in the Sibiu museum, as the work with the index MA65.</p>
	<p>Romania, Dobrogea, Hooded-mill, originally from Beștepe, Tulcea County, reconstructed and presented in the Sibiu museum, as the work with the index MA67.</p>
	<p>Romania, Dobrogea, Fishermen's homestead with wind-mill, originally from Mahmudia, Tulcea County, reconstructed and presented at Sibiu museum, as the work with the index MA10. This is part of the way of ethnic minorities, funded by EEA grants</p>
	<p>Romania, Dobrogea, originally Sarichioi Windmill, Tulcea Country, from the first half of the 19th century. Reconstructed and presented at the Village Museum in Bucharest. For more information check the webpage of the National Village Museum (2020)</p>

	<p>Romania, Dobrogea, originally Enisala Windmill, Tulcea County, from the first half of the 19th century. Reconstructed and presented at the Village Museum in Bucharest. For more information check the webpage of the National Village Museum (2020)</p>
	<p>Romania, Dobrogea, originally Nucarilor Valley Windmill, Tulcea, from the first half of the 19th century. Reconstructed and presented at the Village Museum in Bucharest. For more information check the webpage of the National Village Museum (2020).</p>

CONCLUSIONS

The Astra village museum in Sibiu is a museum of crafts, so technical buildings like those related to energy are well represented. The mills conserved in museums includes also hand and horse mills which can be compared to the in situ mills from former studies. In the National village museum in Bucharest, located on the shore of Herăstrău lake, the water mills were placed in the vicinity of the lake. The ASTRA museum (Sibiu county) also features a lake and the water mills are even better connected with the water. These mills present similarities to the in situ mills in Eftimie Murgu village, and some of the ones exposed in Sibiu, some of them being of provenance from the same geographic area. Other water mills observed in situ by the author are in Germany. The windmills instead are in their large majority from the Dobrukscha region of the country, where also today large contemporary windmill fields are built, one of them getting a prize at the photo competition of the COST action and another being featured in the entry in the book (Roth et al, 2018). Other historic small-scale windmills can be seen in the Danube Delta, UNESCO protected natural area. Such a house is featured in the ASTRA museum. Other wind mills observed in situ by the author are in Belgium (winning entry at the COST photo competition), Netherlands and Bulgaria. Franco et al. (2019) gave an overview of them in Europe focusing on examples from Italy, as Brykała and Podgórski (2020) presented the Polish ones in the European context. The mills presented in this paper are classified or assigned to the German type.

The items presented in village museums help to understand the technique of the early craft before industrial times in order to produce energy by means of wheels (Franco, 2019), which were either driven by water or by wind power.

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