Photovoltaic potential assessment on direct and diffusive radiation conditions in Albania

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Abstract

By data extracted from survey stations installed throughout the Albanian territory and time series for 30 years, which are dispersed throughout the country, is clearly expressed solar energy property all year, despite growing differences between daily, monthly and annual average values of the energy. In setting survey points is generally observed such a spatial diffusion, which creates an opportunity for a more realistic assessment of solar radiation. In these conditions will be treated the annual and monthly average values of direct and distribute radiation in the fixed plan and in real weather. Generally, our country has a tremendous potential solar radiation, because in one year are recorded over 280 days of sunshine, which provides more than 3700Wh/m^2 at a 40^o angle from the south, according to data at the point of observation of Tirana.

Keywords*: Station, Energy, Diffusion, Radiation, Observation*

Introduction

Data extracted from survey stations throughout Albania territory are used to see the difference between daily, monthly and yearly average values of solar energy: Calculation of annual and monthly average values. There's made a comparison with direct and distribute radiation in fixed plan and a real weather. Also is made a comparison with direct and distribute radiation in 2-axis plan and a real weather.

1. The Average of annual solar radiation in two axes plan

With very particular importance are presented average values of solar radiation in mobile plan with two axes, which are generally 23% higher than the average in fixed plan, regardless of Western Lowland they build up to 25% of this value. In these circumstances our country takes the average 4800W/m² every year from solar radiation, characterized both by an apparent local distribution. Larger quantities of radiation takes the annual average in Western Lowlands (Shkodra 5287W/m², Lezha 5123W/m², Durres 5388W/m², Lushnja 5270W/m², Fier 5329W/m², Vlora 5228W/m²). Then comes the part of the SE province of Central Highlands (Korça 5245W/m², Bilisht 5114W/m², Erseka 4984W/m², Pogradec 4935W/m². Lesser amount of the country takes part in Kukes VL 4631W/m² and B. Curri with 4491W/m². In general, such a distribution of average solar radiation, appears to seasonal values, which shows up the summer season with 1762W/m², representing 35% of the annual amount, then 27% in spring, autumn and winter 24% to 14% of this amount. So monthly changes are presented with different values, in particular the relatively small values of the transition between seasons (3%) from fall to spring, rise to 10% between autumn and winter, spring and summer have a change of 8 % for the account of the summer. These changes are closely related two predominant types of weather in our country, which determine both the number of clear days and those cloudy Difference between summer and winter reaches on average 38 % of annual amount for the account of the summer. Another phenomenon of the annual average radiation in a mobile plan with two axes is the local distribution of its values, so large amounts of this radiation takes the Western Lowlands, as Shkodra 1847W/m², Lezha 1831W/m², Durres 1885W/m², Lushnja 1856W/m², Fier 1874W/m², Vlora 1872W/m², Kuçova 1807W/m², Tirana 1829W/m². It is followed by the SE part of the Central Highlands province, which takes over 1700W/m², such as Erseka 1745W/m², Korça 1778W/m², Bilishti 1781W/m², Pogradec 1733W/m², while the southern hill and NE part of the North take on the 1600W/m², as Gjirokastra 1687W/m², Saranda 1637W/m², Berat 1681W/m², Permeti 1744W/m², Kukes 1616W/m² and B. Curri 1507W/m². The same zonality appears in the distribution of values of solar radiation in three other seasons, so larger quantities of distributet radiation are the regions mentioned above. There's presented a particularly important quantity of monthly solar radiation and differences between them, which are conditioned mainly by weather features and relief. Throughout our country, august takes the largest amount of solar radiation with an average value of 580W/m², representing 12% of annual amount and 32% of the summer season. Larger quantities

of this radiation, meet in the Western Lowland Shkodra as 630W/m², Lezha 622W/m², Tirana 619W/m², Lushnje 626W/m², Fier 633W/m, Durres 638W/m². Relatively small values meet in the Central Highlands province and NE part of Northern province, such as Korca 604W/m², Bilisht 601W/m², Erseka 586W/m², Pogradec 585W/m², Permeti 591W/m², Gjirokastra 576W/m², Saranda 564W/m², Kukes 520W/m², B.Curri 550W/m², Peshkopia 586W/m². Relatively significant quantities of radiation, also are presented in August during the western part of Central Highlands province of Burrel Basin 622W/m², Elbasan area 611W/m², Krujë 585W/m^2 etc. Smaller quantities of solar radiation, meet in December with an average value of about 170W/m^2, representing 3.5% of annual amount. Greater amount of radiation during December takes Shkodra 204W/m^2, Durres 203W/m², Fier 195W/m², Lushnja 190W/m², Tirana 189W/m², Vlora 194W/m², Elbasan 195W/m^2 etc. Is worth noted that larger values belong to the months from October to March, which reach 34% between October and November. The frame time of these changes relates to the complete dominance of a cyclonic weather and the start of that uncyclonic, and its full impact is reflected to much smaller intermonth changes during the period from April to October with 1-15%, especially between the months of summer. In very small size of these changes characterize the average annual amount of radiation dispersed on a mobile plan in two axes, which is 8.5% greater than in a fixed plan, reaching average 134W/m². Biggest dispersed radiation changes are those between the period from October to March and the April-September, representing respectively 34% and 66% of the total amount of this radiation. With the changes expressed in dispersed radiation is presented its seasonal distribution, particularly between winter and summer, which directly conditioned by the two individual types of weather. Quite characteristic also shows the change of dispersed radiation values between spring, autumn and winter, which reach respectively 30%, 22% and 14% of the annual amount of this radiation, having a difference 8%, so twice the difference between winter and summer. Another phenomenon of this radiation is relatively small seasonal change of seasonal values between all points of observation, especially the winter, during which the difference between the smallest (Berat and Kukes 212W/m²) and the largest (Vlora 252W/m^2) amounts to 40W/m², while the season of summer, autumn and spring respectively reach 58W/m², 63W/m^2 and 55W/m² between these points. Regarding the regional distribution of seasonal values of the radiation, we note that the largest amount has the Mountainous Region. In summer arrives Vlora 576W/m², Fier 567W/m², Lushnje 557W/m², in spring arrives South 511W/m², Fier 506W/m², Lushnje 500W/m², autumn in South 372W/m², Lushnje 365W/m², Fier 368W/m, Durres 360W/m². During the winter season arrives in Vlora 252W/m^2, Durres 246W/m², Lushnja 246W/m^2 etc. Approximate values appear also part of the SE Hill Central, such as Korca 240W/m², Bilisht 242W/m², Erseka 237W/m². But to the northern part of this region differes Burrel 234W/m², B.Curri 244W/m², Peshkopia 229W/m^2 etc. Monthly performance of the reflected radiation, looks generally similar to yearly seasonal changes observed, especially between two periods of the year. In the reflected radiation, the most value for all points of observation, is June, which reaches an

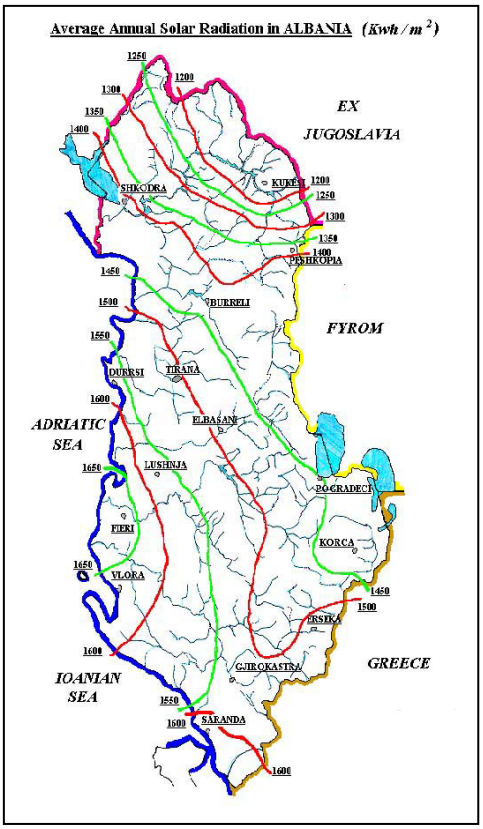

Fig. 1 Average annual solar radiation in Albania

average of 190W/m², representing 12% of the annual amount. Greater amount of this radiation has Mountainous (Vlora 200W/m², Lushnja 194W/m², Fier 197W/m^2, Durres 190W/m². Then comes the part of the hill Central JL (Korca 195W/m², Erseka 192W/m², Bilisht 195W/m²) and the Northern part (B.Curri 195W/m², Kukes 193W/m², Burreli191W/m², Peshkopia 189W/m²), etc. All data points of survey distinguish small changes this radiation. In contrast to the largest amount of reflected radiation, the minimum as regarded in month of December is with an average value of 60W/m², representing 3.7% of annual amount of this radiation and 32% of June, so the changes highlighted to June. Larger values are met in December, the Western Lowland, Vlora and Fier with 67W/m², Shkodra 64W/m², Tirana 63W/m², Lushnje 65W/m2, Durres 66W/m2, comparing those on the lower northern province of NE of Central part, Kruja 54W/m², Pogradec 56W/m², Kukes 53W/m². Regarding the differences between the amount of radiation in December with November and January, in contrast with those of May and July, we emphasize that they appear much larger, having a value of respectively 28% and 22%

smaller to them. Changes in these reflected proportions radiation, related to the fact that the action culminates in November cyclonic weather, so both the greatest number of days and reduction cloudy day. While in January begins the fall weather and the impact of this starts at the same time and duration of the day. In the context of photovoltaic energy, the largest amount of this energy constitutes average annual radiation in the blue sky for a mobile plan in two axes, which takes on average 28% - 31% more than he plans to rest in the same conditions of weather. Another phenomenon of this radiation is the large amount all year around, which is reflected in the approximate ratio between the above two periods of the year, so that from October to March the weather conditions and it cyclonic April to September with prevailing weather uncyclonic, which represent respectively 42% and 58% of the annual amount the general radiation. Besides the annual distribution, another indicator of the wealth of this radiation, are relatively small seasonal changes (1-5%) in comparison with the annual amount. Obviously, the zonal distribution of this radiation also observed significant changes which distinguish between the Western Lowlands, as Vlora 688W/m², Lushnja 676W/m², Fier 685W/m^2, Durres 675W/m², Shkodra 659W/m², Kuçova 651W/m², Tirana 656W/m². Immediately after it, comes the southern part of Central SE province Bilisht with 670W/m², Kora 659W/m², Erseka 649W/m², Pogradec 635W/m², northern Kukes 651W/m² , Burrel 663W/m², Peshkopia 651W/m². Maximum value of the annual change reaches between Vlora and Berat (581W/m² to 107W/m², representing 17% of the average monthly amount. Almost the same distribution of this radiation represents its annual amount, which stands Vlora with 8258W/m², Lushnja 8107W/m², Durres 8098W/m², while the difference between the smallest amount in Berat 6971W/m^2 with the largest amounts in Vlora 1287W/m², represent 17% of the annual average. In another part of distribution of this radiation, there is a direct link with two characteristic types of weather, such as the period from October to March and that April to September, where it gains 28% of radiation more. But in relation to the annual amount they represent respectively 43% and 57% of this amount reflecting primarily the direct impact of a weather conditions and uncyclonic conditiones. During the first period there's an average 3432W/m² of irradiation in clear sky on a mobile plan in two axes, and in the second period 4386W/m². Impact area is expressed in greater amount of radiation in the Western Lowland, as in Fier 4587W/m², Lushnje 4517W/m², Durres 4549W/m², South 4607W/m² etc. Then rankes southern part of the SE of hill Central as Erseka 4401W/m², Bilisht 4491W/m², Pogradec 4321W/m², Korça 4360W/m², etc., while in the NE of this region is distinguished Burrel with 4505W/m², Peshkopia 4447W/m², Kruja 4244W/m², Kukes 4650W/m², B.Curri 4183W/m^2 etc. Almost the same values also characterizes the zonal distribution of this radiation during the period from October to March, despite from the shortest amount of this radiation (43% of annual amount), then about 14% less than that from April to September, due to weather cyclonic dominance of this period. An approximate distribution of radiation represents seasonal average value summer 2235W/m², spring 2176W/m², fall 1805W/m² and winter 1539W/m², which distinguished the utmost two seasons, summer and winter so very different amount of this radiation. This phenomenon is highlighted by the fact that they constitute about 29% and 20% of the annual amount, whereas the ratio between them, winter represents 69% of the total summer radiation, so 31% less than this season. With less pronounced changes appear transitional seasons of spring and autumn, which constitute the averaged respectively 28% and 23% of the annual amount, whereas the ratio between them in this change is noted that the spring gets 5% more than autumn, whereas the latter 3% more than in winter. In these conditions there is a interseasoned reduction relatively small, especially between summer and spring with an average value of 1% more to the front, thanks to the influence of weather generally uncyclonic in these seasons. In general, seasonal changes of the radiation performance, as they have an annual regional character expressed in which separated Western Lowlands, where larger values of the radiation observed in Vlora 2351W/m², Lushnje 2301W/m², Fier 2337W/m², Durres 2319W/m², Kuçova 2244W/m², Lezha 2257W/m², Shkodra 2274W/m² etc. With relatively few changes appear SE and southern part of the Central Highlands province as Korçë 2283W/m², Heartland 2289W/m², Erseka 2124W/m², while in the northern part of NE of this region separated Kukes 2389W/m², Peshkopia 2266W/m², B.Curri 2129W/m², Burrel 2300W/m², Kruja 2163W/m² etc. Small changes between summer and spring worth on account of 2.3% in summer, characteristic of Shkodra, Permeti, Vlora, Tirana, Lushnjen, Fier, Durres and Saranda, so Western Lowland. But in all other points of observation, this difference amounts to 4-6%, influenced mainly by the conditions of relief, especially the extent and direction of slopes. Larger values of the difference between spring and autumn meet in Southern Highlands province, like in Permet 23%, 18% Gjirokastra Kruja 20%, 15% Berat, Saranda, 15% for the account of the former, then ranks the Central Highlands province of Kukes 19% B.Curri 17%, Peshkopia 16%, Burrel, 20% etc. But autumn takes a greater radiation then winter in the same zonal order, so by 17% in Gjirokastra, Saranda, Permet of up to 14-17% of survey points Peshkopi, Burrel, Kukes, Korce, Erseka, Bilisht etc. It is worth mentioning that the most significant changes to the amount of radiation between winter and summer meet almost all over the country and expressed the great values at all observation points, which amounts to 28-42% for the account of the summer, while average value amounts to 31%. Monthly performance of this radiation prevails December immediately with smaller quantity, which takes an average of 462W/m², representing 6% of annual amount and 10% of June with the largest amount of radiation, and in relation to energy in a fixed plan is 26% more than the same month. Naturally, smaller values of radiation during this month as noted above, is directly related to the peak of cyclonic action conditions, which entails both the

highest number of days cloudy (average 13 days). The difference between the minimum value in the December survey points Kruja 382W/m², Kukes 390W/m² and Lezha 378W/m² with Vlora 517W/m², Lushnja 507W/m², Fier 521W/m² and Durres 505W/m² averaging 395W/m², the character code indicating the extent of these values is treated as above. With no significant changes, appear in June values, which is the month with the largest amount of radiation across the country, being directly related to uncyclonic weather conditions. In these circumstances our country, during June, takes an average of 768W/m², which represents 10% of annual amount and 40% more than the month of December. These values indicate substantial amounts of radiation during this month thanks to the large number of brighter days and relatively small values of average relative air humidity (64%), ranking immediately after the July and August. In general, the amount of radiation changes of June, as noted above, not great value between points of observation, however, noted that the character of their area code is visible. One of the characteristic features of June is the highest value of solar energy in comparison with July and August, which amounts respectively 8% and 2% indicating the crucial role of an uncyclonic weather condition values this month. With special features also appears more pronounced change in the amount of solar radiation between November to December and February to March, which reaches respectively 10% and 18% different to that with a fixed plan, where the values are small (report 12% and 15%). From the above data clearly that the largest amount of photovoltaic power in our country achieved in terms of an uncyclonic clear weather for a mobile plan in two axes, which takes on average each year 27% more than for radiation a plan to rest in the same weather conditions. In the context of photovoltaic property, with particular importance distribution also shows the average daily total radiation, which serves both for a more rational use of its economy. Daily performance of this radiation is almost the same annual and monthly, despite some quantitative differences in different months of the year. This means that the months with the largest amount of general radiation have days during April-September, while those with smaller amount from October to March, distinguishing two year periods in direct relation to two types of weather. During the period from October to March our country takes on average 78 W/m² per day, whereas in the April-September 184 W/m² per day, representing respectively 15% and 12% of the annual average amount of this energy. Greater amount of radiation with average daily value of 100 KWh/m² per day was October and March, 28 KWh/m² during the first period, which are partly under the influence of an uncyclonic weather condition. But in the second, obviously the larger quantity has June and July with average values respectively 214 and 216 KWh/m², which is conditioned by the presence of peak action, that the prevalence of uncyclonic weather in these months. Approximate value of these months occures between May and August, respectively, 194 KWh/m² and 180 KWh/m² per day, representing June and July with 28% of the annual amount average of this radiation. On the distribution of average daily radiation values are also observed notable character codes, where larger quantities of this radiation takes Mountainous Shkodra as 130 KWh/m², Lezha 133 KWh/m², Tirana 134 KWh/m², Durres 137 KWh/m², Lushnja 136 KWh/m², Kucova 137 KWh/m², Fier 143 KWh/m², Vlora 141 KWh/m² etc. Approximate values to Southern Mountain Region is also presented with Gjirokastra 134 KWh/m², Saranda 138 KWh/m², Xara 140 KWh/m², followed by the southern part of the SE of the Central Mountain Region, as Erseka 134 KWh/m², 132 Pogradec KWh/m², Korça 131 KWh/m², Sheqerasi 133 KWh/m² northern part of the province such as Burreli 130 KWh/m², Peshkopia 127 KWh/m², Kukes 121 KWh/m² etc. The largest average daily value changes of solar radiation meet between March and April with a quantity 51 KWh/m², then it comes between August and September with 42 KWh/m², so the transitional seasons where the transition between two types of weather. Particularly important for evaluating the average daily solar radiation in the plan of fixed and movable in two axes, also represents the amount of this radiation with the increase from hour to hour for months reduction of radiation characteristic of each season, so January, April, July and October, adding both his annual values. From the data of stations of observation, highlighted immediately change expressed between hours growth (10^{30} - 12^{oo}) and a decrease to (15^{oo} - 17^{oo}) of this radiation, which is reflected in the fact that growth has different values between the radiation general and distributed. Average daily amount of total radiation on a fixed plan in normal weather conditions for growing hours of this radiation is 48% greater than that of hours decreased, having a fair value 605 KWh/m² and directly reflect the crucial role of uncyclonic and cyclonic weather to it. At smaller values appears simultaneously dispersed radiation daily average, which for hours with his growth is 24% more than during the hours with a drop of this radiation. With characteristic features appear simultaneously daily average values of radiation to a fixed plane in the cloudless sky in the early hours of increases radiation, which is 53% more than those in classes with his fall, saying the real value respectively 930 KWh/m² and 437 KWh/m², then twice of it. It is worth mentioning that the average daily values of radiation during his hours is increased in both plans, with significant changes occured between them. In these hours of increased radiation is observed the total of daily average radiation in distributed and portable plan. They are respectively 9% and 8% more than a static plan, the real value, so 194 KWh/m² and 1018 KWh/m² in terms of a clear weather. Daily average values of this radiation are known for major changes in both plans and simultaneously within the same plan, so that fixed and mobile. So the average daily amount of daily radiation in really weather conditions amounts to 318 KWh/m², while during a clear weather 437 KWh/m², while the hours with these increase values respectively reach 605 KWh/m² and 930 KWh/m², while distributed 137 KWh/m². Also are observed changes in average daily amount of radiation in mobile plan and

conditions of clear weather, which reach respectively 486 KWh/m² and 742 KWh/m², comprising 23% and 17% less than those with increasing radiation, whereas the amount of radiation dispersed in the same conditions amounts to 161 KWh/m². From the above treatment is clarified the fact that the most pronounced changes of the average daily values of solar radiation are those between the increase and decrease hours with the amount of this radiation, then comes the differences between a fixed plan and a mobile one to the account of the last. In these conditions the decisive role in the amount of photovoltaic system, plays the hours with maximum values of solar radiation, which are closely related and directly with uncyclonic weather conditions, stating quite well in most daily amount for July and April, at the peak of action of this weather. Obviously, the character code of the distribution of average daily quantity of solar radiation, as it's next month's annual season, highlighted by the fact that the Western Lowlands is characterized by larger values of this radiation as Fier 632 KWh/m², Lezha, Tirana and Shkodra 612 KWh/m², Durres 614 KWh/m², Lushnja and Vlora 608 KWh/m². At relatively small values appear SE of southern part of the Central Mountain Region as Bilisht, Korça and Erseka with 604 KWh/m², Pogradec 599 KWh/m².

In northern continuation ranks this with Kruja 613 KWh/m², Burrel 608 KWh/m², Peshkopia 594 KWh/m² and finally as the Southern Mountain Region Gjirokastra 574 KWh/m², Saranda 572 KWh/m², Permeti 585 KWh/m² etc. A particularly important trend presents average daily values during the transitional seasons of spring and fall for a fixed and mobile plan, which lie exactly on the borders of two weather types mentioned above. Data from the surveys, point that average daily radiation amounts are 13% -16% higher during the spring season than to fall for both plans. The most pronounced differences between these two seasons are observed in particular to deliver average daily radiation, which is 25% greater in spring to a fixed plan and 27% in a mobile plan to autumn, indicating the real values respectively 143 KWh/m² and 161 KWh/m², while in autumn 108 KWh/m² and 117 KWh/m². Naturally, larger values of average daily radiation are characteristic for the sobering days in a fixed plan and in particular that in mobile with two axes, which reach respectively 519 KWh/m² and 716 KWh/m², for the spring season, and 451 KWh/m² and 604 KWh/m² in autumn. In daily average radiation, a significance present also the values of the intensity of direct and spread radiation around true solar midday (TSM), which account for hours 9³º -15³º, culminating at 12³º. Generally observed that the intensity values of these two components for 9³º and 15³º are the same. However it must be said that the changes more pronounced intensity average annual meet for radiation directly between the hours of 9³º and 15³º with 12³º, which reaches respectively 70 W/m² at a minimum in December to 521 W/m² to a maximum of July, so seven times greater. But the intensity of dispersed radiation varies day to 72 W/m² in December to 366 W/m² to month in May, having a value five times greater between the aforementioned hours. On the distribution of intensity day directly observed the changes more pronounced between the hours of 9³º and 15³º to noon true solar (12ºº -12³º) observed in the days of the months November, December and January with values respectively 27 W/m², 9 W/m² and 13 W/m², comprising an amount of radiation respectively 5, 8.7 and 9.7 times smaller than the TSM. But small changes partein days from March to October 1.5 -2.2 times smaller than to TSM, which correlate with the prevalence of an uncyclonic weather. In such conditions of weather, the largest amount of daily radiation intensity directly TSM, meet during the month of July with 522 W/m^2, then comes June with 503 W/m^2, while smaller values belong to the December and January, respectively 150 W/m² and 196 W/m^2, so 2.6 times smaller. Very small in size changes occur daily average intensity of dispersed radiation between 9³º and 15³º , which have a quantity 1.3-2.6 times smaller TSM. Obviously the smallest amount of this radiation was December and February respectively, values 72 W/m² and 83 W/m², so 2.6-2.3 times less than the TSM, and the largest amount for the days of April 238 W/m², and May and June with 252 W/m² or 1.4 times smaller. With significant changes occur the days TSM values of different months of the year, where larger quantities of this radiation meet during April to September totaling over 300 W/m².

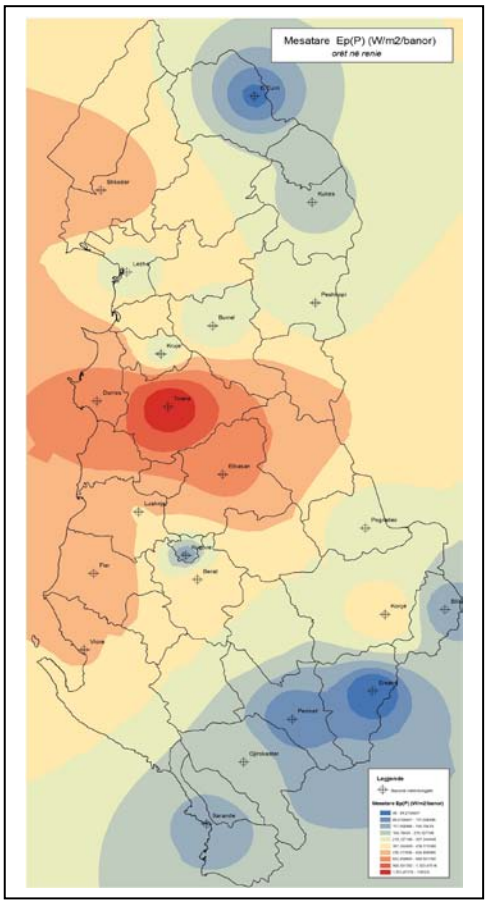

Fig. 2 of solar energy per capita, in decreasing hours of solar radiation (period 2001-2010) for 22 stationes.

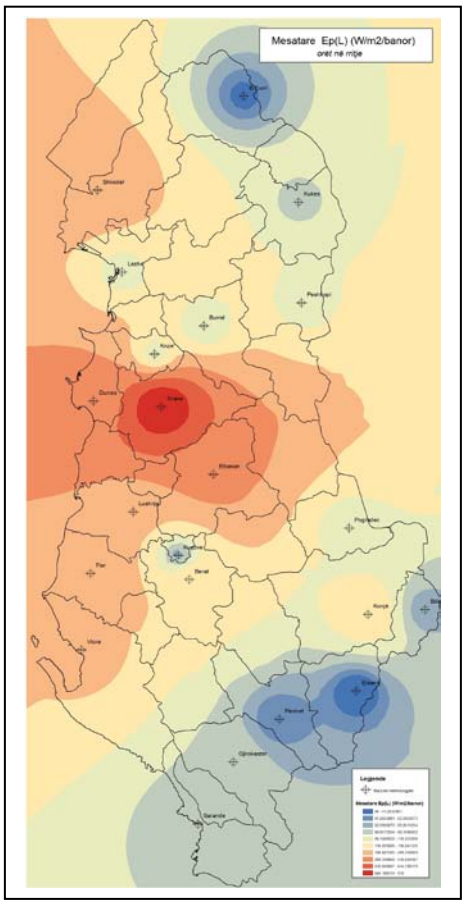

Fig. 3 Annual amount average of solar energy per capita, in increasing hours of solar radiation (period 2001-2010) for 22 stationes.

While in the months from October to March meet quantities less of this radiation, particularly from November to February, which have respectively the values 97 W/m², 72W/m² and 83 W/m^2 during the hours 9^{30} and 15^{30}, representing 2-2.6 times less than the TSM. From the above data is shown that the highest values of intensity of the components of solar wave radiation, actually achieved around solar noon (TSM). The highest amount of dispersed radiation intensity is achieved during the month of May with 372 W/m², that of direct radiation on horizontal surface meets in July 523 W/m², while smaller values for the two components during the year are in December, so 190 W/m² and 70 W/m², which means 2.7 and 5.3 times smaller than those of TSM. In the context of solar energy and assessing its potential, also appears important long-term distribution and monthly amounts of photosynthetic active radiation (PHAR), especially for Western Lowland (Fig.1). Photovoltaic active radiation increased significantly by decade of first to third in all months of the year, but larger values of this growth, meet in the decades of the months October to March.

During the Western plains, between Shkodra and Vlora, are noted that smaller quantities belong to PHAR's decades of months from October to March predominantly cyclonic weather conditions, which vary from 14848.34 Wh/m^2 during the first decade of October to 13408.08 Wh/m² in the March. It seemes rather peculiar fact that during October and November, the PHAR's quantities increase from the first decades of value to third, respectively 6-10% and 7-17%, but the biggest changes, 10% and 17% meet between decade before and the second of these months. With less pronounced changes occur three decades in December (3-6%), and to those of January, February and March, rather, there is a noticeable increase of PHAR values respectively 10-15% and 4-7%, indicating to unstable weather during these months. Months from April to September generally distinguished for relatively small changes in the values of the long-term PHAR's, which moved up to 2-9%, especially during summer months, a complete dominance of an uncyclonic weather.

2. Conclusion

By data extracted from surveys conducted stations installed throughout the Albanian territory and time series for 30 years, which are dispersed throughout the country, is clearly expressed solar energy property all year, despite growing differences between the average daily values, the monthly and annual energy. In setting survey points is generally observed such a spatial distribution, which creates an opportunity for a more realistic assessment of solar radiation. A particularly important analysis represents the average annual radiation values, which are characterized by a spatially explicit distribution, being divided into two periods characteristic such as that from October to March and April to September. Regarding the monthly distribution of average radiation in cloudless sky in August, we must emphasize that the country receives the largest amount of this radiation 530W/m^2, representing 9.5% of annual amount. December, stands for the smallest quantity of solar radiation value 345W/m², representing 1.5 times less than that of August and 6% of annual amount. In seasonal distribution of this radiation in terms of a clear weather, are seen changes much smaller than those in terms of a real weather, even the most characteristic phenomenon is, that the spring season takes on average 2% more power than the summer.

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