

ANEXO 1. Recopilación de los resultados de las ubicaciones.

En este anexo se muestran los resultados de todas las ubicaciones. La irradiación se muestra en unidades de “kWh/m²/(mes, trimestre o año)”, la temperatura en “°C” y el viento en “m/s”.

A1.1 Ampara, SriLanka

| | NASA POWER | | | PVGis-SARAH | | | Renewables.ninja-MERRA-2 | | | |
|---------------------|------------|--------|-------|-------------|--------|-------|--------------------------|--------|-------|-----|
| | Gi | T2m | WS10m | Gi | T2m | WS10m | Gi | T2m | WS10m | |
| PROMEDIO ANUAL | 2015 | 1790.4 | 27.1 | 3.4 | 2108.0 | 26.8 | 2.0 | 1530.4 | 26.8 | 3.4 |
| | 2014 | 1775.8 | 27.5 | 3.6 | 2099.5 | 26.8 | 2.1 | 1561.5 | 27.3 | 3.6 |
| | 2013 | 1761.3 | 27.1 | 3.6 | 2073.4 | 26.7 | 2.2 | 1559.3 | 26.9 | 3.6 |
| | 2012 | 1857.7 | 27.2 | 3.5 | 2146.9 | 26.7 | 2.2 | 1619.1 | 27.0 | 3.5 |
| | 2011 | 1812.9 | 26.9 | 3.4 | 2058.2 | 26.5 | 2.3 | 1501.4 | 26.7 | 3.5 |
| | 2010 | 1797.4 | 27.1 | 3.3 | 2079.7 | 26.8 | 2.3 | 1548.7 | 26.9 | 3.4 |
| PROMEDIO TRIMESTRAL | 1T | 424.9 | 24.6 | 3.5 | 518.7 | 25.1 | 2.7 | 396.2 | 25.7 | 3.5 |
| | 2T | 496.2 | 26.5 | 3.0 | 587.0 | 27.8 | 1.9 | 361.1 | 27.8 | 3.3 |
| | 3T | 500.8 | 26.6 | 3.6 | 583.1 | 28.6 | 2.1 | 322.9 | 27.9 | 4.0 |
| | 4T | 375.4 | 25.1 | 3.0 | 444.5 | 25.5 | 2.1 | 280.6 | 26.2 | 3.2 |
| PROMEDIO MENSUAL | ene | 120.0 | 25.2 | 4.2 | 149.2 | 24.4 | 3.1 | 140.2 | 24.9 | 4.1 |
| | feb | 130.5 | 25.8 | 3.8 | 171.9 | 24.9 | 2.7 | 152.8 | 25.5 | 3.5 |
| | mar | 174.4 | 27.0 | 3.0 | 197.6 | 25.9 | 2.2 | 169.0 | 26.7 | 2.9 |
| | abr | 168.6 | 27.9 | 2.3 | 200.5 | 26.7 | 1.7 | 137.8 | 27.7 | 2.3 |
| | may | 170.6 | 28.1 | 3.3 | 193.0 | 27.9 | 1.9 | 123.7 | 27.9 | 3.3 |
| | jun | 157.0 | 28.0 | 4.0 | 193.6 | 28.8 | 2.2 | 128.1 | 27.8 | 4.4 |
| | jul | 166.6 | 28.1 | 4.2 | 195.7 | 29.0 | 2.2 | 126.1 | 27.9 | 4.4 |
| | ago | 170.1 | 28.2 | 3.8 | 194.8 | 28.8 | 2.1 | 129.4 | 28.1 | 4.0 |
| | sep | 164.1 | 28.0 | 3.5 | 192.6 | 28.0 | 1.9 | 131.4 | 27.9 | 3.6 |
| | oct | 153.4 | 27.4 | 2.7 | 173.3 | 26.6 | 1.7 | 122.3 | 27.2 | 2.8 |
| | nov | 118.5 | 26.4 | 2.9 | 146.5 | 25.2 | 2.0 | 112.9 | 26.1 | 2.9 |
| | dic | 103.5 | 25.7 | 3.8 | 124.7 | 24.6 | 2.6 | 110.9 | 25.4 | 3.8 |

Tabla A 1 Recopilación de resultados de la ubicación de Ampara.

A1.2 Antsiranana, Madagascar

| | NASA POWER | | | PVGis-SARAH | | | PVGis-CMSAF | | | Renewables.ninja-MERRA-2 | | | |
|---------------------|------------|--------|-------|-------------|--------|-------|-------------|--------|-------|--------------------------|--------|-------|-----|
| | Gi | T2m | WS10m | Gi | T2m | WS10m | Gi | T2m | WS10m | Gi | T2m | WS10m | |
| PROMEDIO ANUAL | 2015 | 2116.7 | 26.2 | 7.0 | 2225.5 | 25.5 | 4.0 | 2357.5 | 25.5 | 4.0 | 1907.2 | 26.0 | 6.9 |
| | 2014 | 2084.2 | 26.1 | 6.8 | 2212.5 | 25.4 | 4.0 | 2355.6 | 25.4 | 4.0 | 1898.8 | 26.0 | 6.7 |
| | 2013 | 2167.3 | 26.1 | 7.0 | 2281.5 | 25.3 | 4.3 | 2406.1 | 25.3 | 4.3 | 1909.3 | 26.0 | 7.0 |
| | 2012 | 2083.3 | 25.8 | 6.7 | 2200.0 | 25.1 | 4.2 | 2324.8 | 25.1 | 4.2 | 1863.7 | 25.6 | 6.7 |
| | 2011 | 2108.1 | 26.0 | 6.4 | 2231.7 | 25.2 | 4.3 | 2335.2 | 25.2 | 4.3 | 1923.0 | 25.9 | 6.3 |
| | 2010 | 2141.3 | 26.3 | 7.2 | 2279.2 | 25.5 | 4.8 | 2371.5 | 25.5 | 4.8 | 1941.5 | 26.1 | 7.1 |
| PROMEDIO TRIMESTRAL | 1T | 505.1 | 27.1 | 4.9 | 551.2 | 25.7 | 2.9 | 551.2 | 25.7 | 2.9 | 410.1 | 26.9 | 4.9 |
| | 2T | 472.0 | 26.3 | 7.2 | 520.2 | 25.5 | 4.7 | 520.2 | 25.5 | 4.7 | 453.1 | 26.0 | 7.2 |
| | 3T | 523.7 | 24.3 | 8.9 | 565.7 | 24.1 | 5.6 | 565.7 | 24.1 | 5.6 | 507.2 | 24.1 | 8.8 |
| | 4T | 616.0 | 26.6 | 6.3 | 644.5 | 26.1 | 4.0 | 644.5 | 26.1 | 4.0 | 572.1 | 26.6 | 6.3 |
| PROMEDIO MENSUAL | ene | 169.9 | 27.1 | 5.2 | 177.2 | 25.6 | 3.1 | 177.2 | 25.6 | 3.1 | 141.9 | 27.0 | 5.2 |
| | feb | 158.4 | 27.1 | 4.4 | 183.6 | 25.6 | 2.5 | 183.6 | 25.6 | 2.5 | 130.8 | 26.9 | 4.4 |
| | mar | 176.9 | 27.1 | 5.0 | 190.4 | 26.0 | 3.1 | 190.4 | 26.0 | 3.1 | 137.5 | 26.9 | 5.0 |
| | abr | 168.6 | 27.2 | 6.1 | 188.2 | 26.2 | 4.0 | 188.2 | 26.2 | 4.0 | 155.6 | 27.0 | 6.1 |
| | may | 160.3 | 26.4 | 7.7 | 173.6 | 25.7 | 4.9 | 173.6 | 25.7 | 4.9 | 152.2 | 26.2 | 7.5 |
| | jun | 143.0 | 25.3 | 8.0 | 158.4 | 24.5 | 5.1 | 158.4 | 24.5 | 5.1 | 145.3 | 24.9 | 8.0 |
| | jul | 157.4 | 24.3 | 8.6 | 165.9 | 23.9 | 5.3 | 165.9 | 23.9 | 5.3 | 151.4 | 24.0 | 8.4 |
| | ago | 174.6 | 24.1 | 9.1 | 188.1 | 24.0 | 5.6 | 188.1 | 24.0 | 5.6 | 167.8 | 24.0 | 8.9 |
| | sep | 191.8 | 24.6 | 9.2 | 211.7 | 24.4 | 5.7 | 211.7 | 24.4 | 5.7 | 188.0 | 24.4 | 9.0 |
| | oct | 213.6 | 25.7 | 7.9 | 226.1 | 25.4 | 5.1 | 226.1 | 25.4 | 5.1 | 198.8 | 25.6 | 7.8 |
| | nov | 206.2 | 26.7 | 6.7 | 220.6 | 26.4 | 4.3 | 220.6 | 26.4 | 4.3 | 195.4 | 26.6 | 6.6 |
| | dic | 196.2 | 27.5 | 4.4 | 197.9 | 26.5 | 2.7 | 197.9 | 26.5 | 2.7 | 177.9 | 27.5 | 4.4 |

Tabla A 2 Recopilación de resultados de la ubicación de Antsiranana.

A1.3 Asmara, Eritrea

| | | NASA POWER | | | PVGis-SARAH | | | PVGis-CMSAF | | | Renewables.ninja-MERRA-2 | | |
|---------------------|------|------------|------|-------|-------------|------|-------|-------------|------|-------|--------------------------|------|-------|
| | | Gi | T2m | WS10m | Gi | T2m | WS10m | Gi | T2m | WS10m | Gi | T2m | WS10m |
| PROMEDIO ANUAL | 2015 | 2234.6 | 22.3 | 3.7 | 2224.0 | 16.0 | 2.3 | 2302.9 | 16.0 | 2.3 | 1987.0 | 23.7 | 3.6 |
| | 2014 | 2171.2 | 21.6 | 3.4 | 2178.1 | 15.2 | 2.2 | 2232.0 | 15.2 | 2.2 | 1956.7 | 23.1 | 3.4 |
| | 2013 | 2204.7 | 22.3 | 3.7 | 2206.0 | 15.3 | 2.4 | 2302.0 | 15.3 | 2.4 | 1955.8 | 23.7 | 3.6 |
| | 2012 | 2273.1 | 22.4 | 3.9 | 2243.6 | 15.6 | 2.4 | 2282.0 | 15.6 | 2.4 | 1949.1 | 23.9 | 3.7 |
| | 2011 | 2308.5 | 22.2 | 3.8 | 2221.3 | 15.1 | 2.4 | 2256.7 | 15.1 | 2.4 | 1941.5 | 23.6 | 3.7 |
| | 2010 | 2270.0 | 22.0 | 3.6 | 2176.5 | 15.2 | 2.4 | 2214.2 | 15.2 | 2.4 | 1893.3 | 23.5 | 3.6 |
| PROMEDIO TRIMESTRAL | 1T | 554.4 | 20.9 | 3.7 | 577.9 | 16.5 | 1.9 | 587.4 | 16.5 | 1.9 | 525.9 | 21.8 | 3.4 |
| | 2T | 624.5 | 25.2 | 3.6 | 610.7 | 16.6 | 2.9 | 629.4 | 16.6 | 2.9 | 547.9 | 26.5 | 3.4 |
| | 3T | 537.4 | 22.0 | 4.0 | 524.6 | 14.6 | 2.7 | 549.8 | 14.6 | 2.7 | 424.8 | 24.3 | 4.3 |
| | 4T | 527.4 | 20.4 | 3.5 | 538.5 | 14.1 | 1.8 | 543.0 | 14.1 | 1.8 | 488.0 | 21.8 | 3.3 |
| PROMEDIO MENSUAL | ene | 172.1 | 19.4 | 3.5 | 173.5 | 15.6 | 1.8 | 176.0 | 15.6 | 1.8 | 158.4 | 20.3 | 3.3 |
| | feb | 172.7 | 20.8 | 3.8 | 201.2 | 16.7 | 1.9 | 202.3 | 16.7 | 1.9 | 180.2 | 21.7 | 3.5 |
| | mar | 209.5 | 22.7 | 3.8 | 203.2 | 17.2 | 2.0 | 209.1 | 17.2 | 2.0 | 187.3 | 23.3 | 3.5 |
| | abr | 213.2 | 24.7 | 3.5 | 208.7 | 17.6 | 2.5 | 212.9 | 17.6 | 2.5 | 193.2 | 25.5 | 3.3 |
| | may | 216.3 | 25.7 | 3.2 | 209.2 | 16.6 | 3.0 | 213.4 | 16.6 | 3.0 | 184.9 | 26.9 | 3.0 |
| | jun | 194.9 | 25.1 | 4.0 | 192.8 | 15.5 | 3.2 | 203.1 | 15.5 | 3.2 | 169.9 | 27.0 | 4.1 |
| | jul | 181.9 | 22.2 | 5.2 | 163.3 | 14.7 | 3.1 | 173.2 | 14.7 | 3.1 | 142.3 | 24.6 | 5.6 |
| | ago | 164.7 | 21.4 | 4.0 | 160.1 | 14.5 | 2.7 | 170.8 | 14.5 | 2.7 | 128.2 | 23.7 | 4.4 |
| | sep | 190.9 | 22.5 | 2.9 | 201.2 | 14.5 | 2.4 | 205.9 | 14.5 | 2.4 | 154.4 | 24.5 | 3.0 |
| | oct | 193.1 | 21.6 | 3.6 | 199.7 | 13.9 | 2.0 | 199.8 | 13.9 | 2.0 | 172.9 | 23.3 | 3.4 |
| | nov | 169.3 | 20.6 | 3.3 | 172.9 | 13.9 | 1.8 | 175.9 | 13.9 | 1.8 | 160.5 | 21.9 | 3.2 |
| | dic | 165.0 | 18.9 | 3.5 | 165.9 | 14.5 | 1.7 | 167.2 | 14.5 | 1.7 | 154.6 | 20.1 | 3.3 |

Tabla A 3 Recopilación de resultados de la ubicación de Asmara.

A1.4 Bangkok, Thailandia

| | | NASA POWER | | | PVGis-SARAH | | | Renewables.ninja-MERRA-2 | | |
|---------------------|------|------------|------|-------|-------------|------|-------|--------------------------|------|-------|
| | | Gi | T2m | WS10m | Gi | T2m | WS10m | Gi | T2m | WS10m |
| PROMEDIO ANUAL | 2015 | 1930.8 | 28.4 | 3.1 | 1985.4 | 28.3 | 3.0 | 1603.5 | 28.5 | 3.2 |
| | 2014 | 1938.3 | 28.0 | 3.1 | 1985.4 | 27.8 | 3.0 | 1573.1 | 28.2 | 3.2 |
| | 2013 | 1838.6 | 27.7 | 3.0 | 1901.2 | 28.0 | 2.8 | 1549.5 | 27.9 | 3.1 |
| | 2012 | 1937.0 | 28.3 | 2.8 | 1888.9 | 28.2 | 2.7 | 1488.0 | 28.4 | 3.0 |
| | 2011 | 1942.9 | 26.9 | 3.1 | 1842.5 | 27.5 | 3.0 | 1511.1 | 27.1 | 3.3 |
| | 2010 | 2003.4 | 28.0 | 3.0 | 1908.7 | 28.5 | 3.1 | 1485.5 | 28.2 | 3.1 |
| PROMEDIO TRIMESTRAL | 1T | 505.0 | 28.0 | 3.0 | 523.1 | 27.8 | 3.0 | 436.0 | 28.2 | 3.2 |
| | 2T | 523.1 | 29.8 | 3.2 | 542.4 | 29.5 | 3.2 | 379.4 | 29.9 | 3.4 |
| | 3T | 460.5 | 27.6 | 3.1 | 455.9 | 27.8 | 3.1 | 361.1 | 27.8 | 3.3 |
| | 4T | 443.2 | 26.2 | 2.7 | 435.5 | 27.0 | 2.4 | 389.0 | 26.3 | 2.8 |
| PROMEDIO MENSUAL | ene | 160.8 | 25.8 | 2.8 | 158.3 | 26.4 | 2.4 | 140.2 | 26.0 | 2.9 |
| | feb | 159.8 | 28.6 | 3.0 | 180.2 | 28.1 | 3.2 | 148.1 | 28.8 | 3.2 |
| | mar | 184.4 | 29.7 | 3.4 | 184.6 | 28.8 | 3.5 | 147.7 | 29.8 | 3.5 |
| | abr | 187.9 | 30.4 | 3.1 | 197.1 | 29.8 | 3.2 | 137.6 | 30.6 | 3.2 |
| | may | 182.9 | 30.0 | 3.0 | 186.3 | 29.9 | 3.1 | 121.5 | 30.2 | 3.2 |
| | jun | 152.4 | 28.9 | 3.4 | 159.0 | 28.8 | 3.4 | 120.3 | 29.0 | 3.7 |
| | jul | 152.2 | 28.1 | 3.5 | 154.2 | 28.2 | 3.4 | 121.0 | 28.3 | 3.7 |
| | ago | 161.1 | 27.7 | 3.2 | 158.0 | 27.9 | 3.1 | 126.8 | 27.9 | 3.4 |
| | sep | 147.2 | 27.2 | 2.8 | 143.7 | 27.4 | 2.6 | 113.3 | 27.3 | 2.9 |
| | oct | 147.1 | 26.9 | 2.2 | 136.3 | 27.0 | 2.2 | 122.4 | 27.0 | 2.3 |
| | nov | 144.0 | 26.5 | 2.6 | 145.4 | 27.6 | 2.5 | 129.3 | 26.6 | 2.7 |
| | dic | 152.1 | 25.0 | 3.2 | 153.8 | 26.5 | 2.7 | 137.3 | 25.2 | 3.3 |

Tabla A 4 Recopilación de resultados de la ubicación de Bangkok.

A1.5 Berlín, Alemania

| | | NASA POWER | | | PVGis-CMSAF | | | PVGis-COSMO | | | PVGis-ERA5 | | | PVGis-SARAH | | | Renewables.ninja-MERRA-2 | | | Renewables.ninja-SARAH | | |
|---------------------|------|------------|------|-------|-------------|------|-------|-------------|------|-------|------------|------|-------|-------------|------|-------|--------------------------|------|-------|------------------------|------|-------|
| | | Gi | T2m | WS10m | Gi | T2m | WS10m | Gi | T2m | WS10m | Gi | T2m | WS10m | Gi | T2m | WS10m | Gi | T2m | WS10m | Gi | T2m | WS10m |
| PROMEDIO ANUAL | 2015 | 983.4 | 10.0 | 4.8 | 1166.1 | 10.5 | 3.9 | 1054.0 | 10.5 | 3.9 | 1113.2 | 10.5 | 3.9 | 1122.5 | 10.5 | 3.9 | 1107.1 | 10.3 | 4.7 | 1124.0 | 10.3 | 4.7 |
| | 2014 | 965.2 | 10.4 | 4.4 | 1117.4 | 10.7 | 3.6 | 1031.8 | 10.7 | 3.6 | 1090.4 | 10.7 | 3.6 | 1081.9 | 10.7 | 3.6 | 1077.2 | 10.6 | 4.4 | 1082.0 | 10.6 | 4.4 |
| | 2013 | 921.1 | 8.7 | 4.4 | 1070.5 | 9.2 | 3.7 | 1023.6 | 9.2 | 3.7 | 1043.3 | 9.2 | 3.7 | 994.7 | 9.2 | 3.7 | 1079.9 | 9.0 | 4.5 | 1012.2 | 9.0 | 4.5 |
| | 2012 | 1112.2 | 8.8 | 4.6 | 1142.5 | 9.5 | 3.8 | 1026.6 | 9.5 | 3.8 | 1081.7 | 9.5 | 3.8 | 1077.0 | 9.5 | 3.8 | 1083.1 | 9.1 | 4.6 | 1064.4 | 9.1 | 4.6 |
| | 2011 | 1156.7 | 9.2 | 4.7 | 1154.0 | 10.0 | 4.2 | 1045.5 | 10.0 | 4.2 | 1095.0 | 10.0 | 4.2 | 1136.3 | 10.0 | 4.2 | 1117.8 | 9.4 | 4.6 | 1097.8 | 9.4 | 4.6 |
| | 2010 | 1070.7 | 7.2 | 4.4 | 1058.5 | 8.3 | 4.2 | 1003.6 | 8.3 | 4.2 | 1036.2 | 8.3 | 4.2 | 1041.6 | 8.3 | 4.2 | 1056.5 | 7.3 | 4.4 | 996.5 | 7.3 | 4.4 |
| PROMEDIO TRIMESTRAL | 1T | 137.0 | 0.3 | 5.0 | 152.3 | 1.6 | 4.3 | 154.1 | 1.6 | 4.3 | 156.6 | 1.6 | 4.3 | 145.9 | 1.6 | 4.3 | 153.4 | 0.5 | 4.8 | 147.6 | 0.5 | 4.8 |
| | 2T | 420.9 | 13.1 | 4.3 | 471.3 | 13.4 | 3.7 | 439.4 | 13.4 | 3.7 | 452.6 | 13.4 | 3.7 | 443.6 | 13.4 | 3.7 | 455.1 | 13.4 | 4.4 | 444.8 | 13.4 | 4.4 |
| | 3T | 384.5 | 17.9 | 4.0 | 418.7 | 17.9 | 3.5 | 368.0 | 17.9 | 3.5 | 392.2 | 17.9 | 3.5 | 406.0 | 17.9 | 3.5 | 400.9 | 18.3 | 4.2 | 395.8 | 18.3 | 4.2 |
| | 4T | 92.4 | 4.8 | 4.8 | 98.4 | 5.9 | 4.1 | 90.7 | 5.9 | 4.1 | 96.4 | 5.9 | 4.1 | 101.2 | 5.9 | 4.1 | 98.8 | 4.9 | 4.7 | 96.2 | 4.9 | 4.7 |
| PROMEDIO MENSUAL | ene | 17.6 | -1.6 | 5.3 | 18.7 | 0.0 | 4.5 | 20.5 | 0.0 | 4.5 | 20.6 | 0.0 | 4.5 | 20.0 | 0.0 | 4.5 | 20.9 | -1.6 | 5.0 | 17.9 | -1.6 | 5.0 |
| | feb | 38.2 | -1.1 | 4.9 | 47.0 | 0.5 | 4.2 | 48.4 | 0.5 | 4.2 | 48.8 | 0.5 | 4.2 | 43.8 | 0.5 | 4.3 | 49.7 | -0.7 | 4.8 | 44.8 | -0.7 | 4.8 |
| | mar | 81.2 | 3.7 | 4.8 | 86.7 | 4.3 | 4.1 | 85.2 | 4.3 | 4.1 | 87.3 | 4.3 | 4.1 | 82.0 | 4.3 | 4.1 | 82.8 | 3.7 | 4.7 | 84.9 | 3.7 | 4.7 |
| | abr | 120.5 | 9.0 | 4.5 | 136.5 | 9.6 | 3.9 | 129.3 | 9.6 | 3.9 | 135.1 | 9.6 | 3.9 | 128.9 | 9.6 | 3.9 | 129.2 | 9.2 | 4.5 | 131.7 | 9.2 | 4.5 |
| | may | 141.9 | 13.2 | 4.3 | 154.6 | 13.6 | 3.8 | 145.9 | 13.6 | 3.8 | 150.5 | 13.6 | 3.8 | 144.5 | 13.6 | 3.8 | 155.0 | 13.5 | 4.4 | 144.9 | 13.5 | 4.4 |
| | jun | 158.5 | 17.0 | 4.1 | 180.3 | 17.0 | 3.5 | 164.1 | 17.0 | 3.5 | 167.0 | 17.0 | 3.5 | 170.1 | 17.0 | 3.5 | 170.8 | 17.4 | 4.2 | 168.2 | 17.4 | 4.2 |
| | jul | 159.1 | 20.2 | 4.1 | 174.6 | 20.1 | 3.5 | 154.2 | 20.1 | 3.5 | 161.2 | 20.1 | 3.5 | 166.7 | 20.1 | 3.5 | 163.0 | 20.7 | 4.3 | 162.1 | 20.7 | 4.3 |
| | ago | 134.4 | 19.0 | 3.8 | 145.0 | 19.0 | 3.3 | 126.3 | 19.0 | 3.3 | 138.7 | 19.0 | 3.3 | 142.2 | 19.0 | 3.3 | 136.5 | 19.4 | 4.1 | 137.3 | 19.4 | 4.1 |
| | sep | 91.0 | 14.5 | 4.2 | 99.1 | 14.6 | 3.6 | 87.5 | 14.6 | 3.6 | 92.2 | 14.6 | 3.6 | 97.1 | 14.6 | 3.6 | 101.4 | 14.6 | 4.3 | 96.4 | 14.6 | 4.3 |
| | oct | 56.2 | 9.3 | 4.3 | 57.8 | 10.1 | 3.7 | 53.0 | 10.1 | 3.7 | 55.6 | 10.1 | 3.7 | 58.2 | 10.1 | 3.7 | 59.1 | 9.4 | 4.4 | 57.5 | 9.4 | 4.4 |
| | nov | 23.1 | 4.6 | 4.5 | 25.9 | 5.5 | 3.9 | 23.0 | 5.5 | 3.9 | 25.1 | 5.5 | 3.9 | 26.0 | 5.5 | 3.9 | 25.4 | 4.5 | 4.6 | 25.6 | 4.5 | 4.6 |
| | dic | 13.1 | 0.7 | 5.6 | 14.7 | 2.2 | 4.7 | 14.8 | 2.2 | 4.7 | 15.7 | 2.2 | 4.7 | 17.1 | 2.2 | 4.7 | 14.3 | 0.7 | 5.2 | 13.2 | 0.7 | 5.2 |

Tabla A 5 Recopilación de resultados de la ubicación de Berlín.

A1.6 Budapest, Hungría

| | | NASA POWER | | | PVGis-CMSAF | | | PVGis-COSMO | | | PVGis-ERA5 | | | PVGis-SARAH | | | Renewables.ninja-MERRA-2 | | | Renewables.ninja-SARAH | | |
|---------------------|------|------------|------|-------|-------------|------|-------|-------------|------|-------|------------|------|-------|-------------|------|-------|--------------------------|------|-------|------------------------|------|-------|
| | | Gi | T2m | WS10m | Gi | T2m | WS10m | Gi | T2m | WS10m | Gi | T2m | WS10m | Gi | T2m | WS10m | Gi | T2m | WS10m | Gi | T2m | WS10m |
| PROMEDIO ANUAL | 2015 | 1207.9 | 11.7 | 3.6 | 1200.2 | 12.0 | 2.8 | 1198.1 | 12.0 | 2.8 | 1248.4 | 12.0 | 2.8 | 1292.8 | 12.0 | 2.8 | 1232.3 | 11.5 | 4.7 | 1313.9 | 11.5 | 4.7 |
| | 2014 | 1141.6 | 11.9 | 3.5 | 1129.5 | 12.1 | 2.7 | 1126.0 | 12.1 | 2.7 | 1211.1 | 12.1 | 2.7 | 1230.5 | 12.1 | 2.7 | 1184.2 | 11.6 | 4.6 | 1245.9 | 11.6 | 4.6 |
| | 2013 | 1164.9 | 11.1 | 3.6 | 1165.2 | 11.3 | 2.9 | 1170.5 | 11.3 | 2.9 | 1236.8 | 11.3 | 2.9 | 1225.9 | 11.3 | 2.9 | 1214.0 | 10.7 | 4.7 | 1245.0 | 10.7 | 4.7 |
| | 2012 | 1395.4 | 11.5 | 3.7 | 1294.9 | 12.0 | 3.1 | 1274.2 | 12.0 | 3.1 | 1344.0 | 12.0 | 3.1 | 1368.6 | 12.0 | 3.1 | 1306.3 | 11.4 | 4.8 | 1368.8 | 11.4 | 4.8 |
| | 2011 | 1376.0 | 11.0 | 3.4 | 1237.9 | 11.0 | 3.1 | 1238.3 | 11.0 | 3.1 | 1308.2 | 11.0 | 3.1 | 1335.6 | 11.0 | 3.1 | 1295.3 | 10.7 | 4.5 | 1318.9 | 10.7 | 4.5 |
| | 2010 | 1239.0 | 9.8 | 3.6 | 1104.9 | 10.1 | 3.3 | 1113.9 | 10.1 | 3.3 | 1201.0 | 10.1 | 3.3 | 1190.8 | 10.1 | 3.3 | 1198.5 | 9.4 | 4.7 | 1166.5 | 9.4 | 4.7 |
| PROMEDIO TRIMESTRAL | 1T | 184.7 | 1.6 | 4.0 | 175.0 | 2.5 | 3.2 | 192.3 | 2.5 | 3.2 | 197.5 | 2.5 | 3.2 | 186.2 | 2.5 | 3.2 | 200.1 | 1.4 | 5.1 | 202.3 | 0.5 | 4.8 |
| | 2T | 475.0 | 16.1 | 3.6 | 469.5 | 16.1 | 3.2 | 473.5 | 16.1 | 3.2 | 495.7 | 16.1 | 3.2 | 498.4 | 16.1 | 3.2 | 473.6 | 15.9 | 4.6 | 493.0 | 13.4 | 4.4 |
| | 3T | 459.1 | 21.5 | 3.2 | 444.5 | 20.8 | 2.9 | 423.1 | 20.8 | 2.9 | 454.1 | 20.8 | 2.9 | 476.9 | 20.8 | 2.9 | 440.0 | 21.0 | 4.3 | 461.3 | 18.3 | 4.2 |
| | 4T | 135.3 | 5.6 | 3.5 | 121.9 | 6.2 | 2.8 | 121.2 | 6.2 | 2.8 | 134.4 | 6.2 | 2.8 | 135.5 | 6.2 | 2.8 | 148.1 | 5.2 | 4.6 | 143.7 | 4.9 | 4.7 |
| PROMEDIO MENSUAL | ene | 32.1 | -0.7 | 3.9 | 26.8 | 0.4 | 3.0 | 31.1 | 0.4 | 3.0 | 32.1 | 0.4 | 3.0 | 30.6 | 0.4 | 3.0 | 33.7 | -1.0 | 5.0 | 34.5 | -1.0 | 5.0 |
| | feb | 50.3 | -0.3 | 3.9 | 50.8 | 0.9 | 3.1 | 57.0 | 0.9 | 3.1 | 59.1 | 0.9 | 3.1 | 52.4 | 0.9 | 3.1 | 63.1 | -0.2 | 5.0 | 57.8 | -0.2 | 5.0 |
| | mar | 102.3 | 5.7 | 4.2 | 97.4 | 6.2 | 3.4 | 104.2 | 6.2 | 3.4 | 106.3 | 6.2 | 3.4 | 103.2 | 6.2 | 3.4 | 103.3 | 5.4 | 5.2 | 109.9 | 5.4 | 5.2 |
| | abr | 137.2 | 11.5 | 3.9 | 137.2 | 11.9 | 3.3 | 143.5 | 11.9 | 3.3 | 150.7 | 11.9 | 3.3 | 144.7 | 11.9 | 3.3 | 140.0 | 11.4 | 4.9 | 147.9 | 11.4 | 4.9 |
| | may | 163.5 | 16.4 | 3.6 | 156.7 | 16.2 | 3.2 | 157.2 | 16.2 | 3.2 | 165.0 | 16.2 | 3.2 | 164.9 | 16.2 | 3.2 | 158.7 | 16.1 | 4.7 | 162.7 | 16.1 | 4.7 |
| | jun | 174.3 | 20.4 | 3.3 | 175.5 | 20.3 | 3.0 | 172.8 | 20.3 | 3.0 | 180.0 | 20.3 | 3.0 | 188.9 | 20.3 | 3.0 | 174.9 | 20.3 | 4.4 | 182.5 | 20.3 | 4.4 |
| | jul | 184.6 | 23.7 | 3.2 | 179.1 | 23.1 | 2.9 | 169.3 | 23.1 | 2.9 | 181.1 | 23.1 | 2.9 | 190.8 | 23.1 | 2.9 | 173.2 | 23.3 | 4.3 | 180.5 | 23.3 | 4.3 |
| | ago | 165.5 | 23.1 | 2.8 | 160.6 | 22.2 | 2.6 | 151.1 | 22.2 | 2.6 | 163.1 | 22.2 | 2.6 | 171.9 | 22.2 | 2.6 | 154.8 | 22.7 | 4.0 | 165.5 | 22.7 | 4.0 |
| | sep | 109.0 | 17.5 | 3.5 | 104.8 | 17.1 | 3.0 | 102.6 | 17.1 | 3.0 | 109.8 | 17.1 | 3.0 | 114.1 | 17.1 | 3.0 | 112.0 | 17.0 | 4.6 | 115.3 | 17.0 | 4.6 |
| | oct | 72.9 | 10.8 | 3.4 | 66.5 | 11.0 | 2.8 | 64.3 | 11.0 | 2.8 | 70.0 | 11.0 | 2.8 | 72.8 | 11.0 | 2.8 | 78.7 | 10.4 | 4.5 | 77.1 | 10.4 | 4.5 |
| | nov | 37.9 | 5.8 | 3.4 | 34.5 | 6.4 | 2.8 | 35.0 | 6.4 | 2.8 | 40.1 | 6.4 | 2.8 | 39.0 | 6.4 | 2.8 | 43.0 | 5.4 | 4.7 | 40.6 | 5.4 | 4.7 |
| | dic | 24.5 | 0.1 | 3.7 | 20.9 | 1.2 | 2.9 | 21.9 | 1.2 | 2.9 | 24.3 | 1.2 | 2.9 | 23.7 | 1.2 | 2.9 | 26.4 | -0.2 | 4.8 | 26.0 | -0.2 | 4.8 |

Tabla A 6 Recopilación de resultados de la ubicación de Budapest.

A1.7 Cà Mau, Vietnam

| | | NASA POWER | | | PVGis-SARAH | | | Renewables.ninja-MERRA-2 | | |
|---------------------|------|------------|------|-------|-------------|------|-------|--------------------------|------|-------|
| | | Gi | T2m | WS10m | Gi | T2m | WS10m | Gi | T2m | WS10m |
| PROMEDIO ANUAL | 2015 | 1890.1 | 27.9 | 4.5 | 1946.3 | 27.2 | 3.2 | 1552.8 | 27.9 | 4.7 |
| | 2014 | 1807.8 | 27.7 | 4.1 | 1870.5 | 26.9 | 2.9 | 1514.0 | 27.8 | 4.3 |
| | 2013 | 1717.3 | 27.6 | 4.4 | 1769.8 | 27.0 | 3.2 | 1412.1 | 27.7 | 4.6 |
| | 2012 | 1734.6 | 27.6 | 4.4 | 1815.6 | 26.9 | 3.2 | 1415.2 | 27.6 | 4.8 |
| | 2011 | 1763.5 | 27.2 | 4.7 | 1790.9 | 26.7 | 3.7 | 1461.4 | 27.3 | 4.9 |
| | 2010 | 1790.2 | 28.1 | 4.1 | 1844.7 | 27.3 | 3.3 | 1460.5 | 28.2 | 4.3 |
| PROMEDIO TRIMESTRAL | 1T | 510.2 | 27.4 | 5.0 | 539.2 | 26.6 | 4.0 | 471.2 | 27.5 | 5.2 |
| | 2T | 449.0 | 29.3 | 3.8 | 488.9 | 28.1 | 2.7 | 361.6 | 29.2 | 4.1 |
| | 3T | 401.1 | 27.4 | 4.4 | 425.6 | 26.9 | 3.1 | 323.2 | 27.4 | 4.7 |
| | 4T | 423.6 | 26.7 | 4.2 | 423.1 | 26.3 | 3.2 | 342.9 | 26.8 | 4.5 |
| PROMEDIO MENSUAL | ene | 153.3 | 26.0 | 4.9 | 151.0 | 25.5 | 3.9 | 140.7 | 26.1 | 5.1 |
| | feb | 162.8 | 27.3 | 5.1 | 187.7 | 26.5 | 4.1 | 164.7 | 27.5 | 5.2 |
| | mar | 194.1 | 29.0 | 5.1 | 200.5 | 27.9 | 4.0 | 165.9 | 29.1 | 5.2 |
| | abr | 174.8 | 29.8 | 3.9 | 194.5 | 28.4 | 2.8 | 150.4 | 29.8 | 4.0 |
| | may | 151.5 | 29.6 | 3.5 | 156.5 | 28.4 | 2.4 | 112.4 | 29.6 | 3.7 |
| | jun | 122.7 | 28.4 | 4.1 | 137.8 | 27.5 | 3.0 | 98.8 | 28.3 | 4.6 |
| | jul | 131.0 | 27.5 | 4.6 | 138.6 | 27.0 | 3.2 | 103.4 | 27.5 | 4.9 |
| | ago | 141.8 | 27.4 | 4.4 | 154.0 | 27.0 | 3.1 | 112.2 | 27.4 | 4.7 |
| | sep | 128.4 | 27.2 | 4.2 | 133.0 | 26.7 | 3.1 | 107.5 | 27.3 | 4.4 |
| | oct | 143.2 | 27.1 | 3.8 | 141.8 | 26.5 | 2.9 | 108.2 | 27.1 | 4.0 |
| | nov | 137.7 | 26.8 | 4.2 | 140.7 | 26.4 | 3.2 | 107.8 | 26.9 | 4.5 |
| | dic | 142.7 | 26.2 | 4.7 | 140.5 | 26.0 | 3.5 | 126.9 | 26.3 | 5.0 |

Tabla A 7 Recopilación de resultados de la ubicación de Cà Mau.

A1.8 Dublin, Irlanda

| | | NASA POWER | | | PVGis-CMSAF | | | PVGis-COSMO | | | PVGis-ERA5 | | | PVGis-SARAH | | | Renewables.ninja-MERRA-2 | | | Renewables.ninja-SARAH | | |
|---------------------|------|------------|------|-------|-------------|------|-------|-------------|------|-------|------------|------|-------|-------------|------|-------|--------------------------|------|-------|------------------------|------|-------|
| | | Gi | T2m | WS10m | Gi | T2m | WS10m | Gi | T2m | WS10m | Gi | T2m | WS10m | Gi | T2m | WS10m | Gi | T2m | VS10m | Gi | T2m | WS10m |
| PROMEDIO ANUAL | 2015 | 983.0 | 9.6 | 6.4 | 1136.0 | 10.3 | 4.6 | 1073.5 | 10.3 | 4.6 | 1045.5 | 10.3 | 4.6 | 1031.1 | 10.3 | 4.6 | 1106.1 | 9.6 | 7.2 | 954.3 | 9.6 | 7.2 |
| | 2014 | 959.2 | 10.2 | 6.0 | 1086.2 | 10.7 | 4.3 | 1003.6 | 10.7 | 4.3 | 1028.3 | 10.7 | 4.3 | 985.8 | 10.7 | 4.3 | 1093.4 | 10.3 | 6.8 | 912.9 | 10.3 | 6.8 |
| | 2013 | 997.2 | 9.4 | 6.0 | 1103.2 | 10.2 | 4.6 | 1014.4 | 10.2 | 4.6 | 1058.0 | 10.2 | 4.6 | 980.4 | 10.2 | 4.6 | 1129.4 | 9.5 | 6.9 | 916.9 | 9.5 | 6.9 |
| | 2012 | 1017.5 | 9.5 | 6.0 | 1068.5 | 10.1 | 4.5 | 925.6 | 10.1 | 4.5 | 994.4 | 10.1 | 4.5 | 939.2 | 10.1 | 4.5 | 1056.7 | 9.6 | 6.9 | 861.5 | 9.6 | 6.9 |
| | 2011 | 1020.3 | 10.0 | 6.1 | 1103.8 | 10.5 | 5.2 | 1025.1 | 10.5 | 5.2 | 1014.8 | 10.5 | 5.2 | 1022.6 | 10.5 | 5.2 | 1111.0 | 10.1 | 6.9 | 899.4 | 10.1 | 6.9 |
| | 2010 | 1065.6 | 8.9 | 5.3 | 1102.4 | 9.2 | 4.6 | 1039.2 | 9.2 | 4.6 | 1055.8 | 9.2 | 4.6 | 1026.1 | 9.2 | 4.6 | 1142.1 | 9.0 | 6.3 | 921.1 | 8.9 | 6.3 |
| PROMEDIO TRIMESTRAL | 1T | 134.2 | 5.4 | 6.5 | 158.0 | 6.1 | 4.9 | 156.1 | 6.1 | 4.9 | 152.4 | 6.1 | 4.9 | 141.9 | 6.1 | 4.9 | 148.8 | 5.4 | 7.2 | 130.1 | 5.4 | 7.2 |
| | 2T | 424.9 | 10.5 | 5.3 | 470.1 | 10.9 | 4.3 | 431.7 | 10.9 | 4.3 | 445.5 | 10.9 | 4.3 | 418.6 | 10.9 | 4.3 | 470.5 | 10.6 | 6.3 | 396.7 | 10.6 | 6.3 |
| | 3T | 355.2 | 14.1 | 5.1 | 389.7 | 14.7 | 4.2 | 348.1 | 14.7 | 4.2 | 358.8 | 14.7 | 4.2 | 360.9 | 14.7 | 4.2 | 410.8 | 14.2 | 6.2 | 322.8 | 14.2 | 6.2 |
| | 4T | 92.8 | 8.5 | 7.0 | 102.4 | 9.0 | 5.2 | 96.0 | 9.0 | 5.2 | 95.6 | 9.0 | 5.2 | 94.0 | 9.0 | 5.2 | 96.5 | 8.5 | 7.7 | 78.7 | 8.5 | 7.7 |
| PROMEDIO MENSUAL | ene | 20.5 | 5.0 | 7.1 | 24.0 | 5.7 | 5.3 | 22.4 | 5.7 | 5.3 | 22.3 | 5.7 | 5.3 | 21.5 | 5.7 | 5.3 | 19.7 | 5.0 | 7.8 | 18.2 | 5.0 | 7.8 |
| | feb | 36.8 | 5.1 | 6.6 | 47.7 | 5.8 | 4.9 | 46.9 | 5.8 | 4.9 | 46.3 | 5.8 | 4.9 | 42.8 | 5.8 | 4.9 | 44.6 | 5.2 | 7.2 | 39.1 | 5.2 | 7.2 |
| | mar | 76.9 | 5.9 | 5.7 | 86.3 | 6.6 | 4.5 | 86.7 | 6.6 | 4.5 | 83.8 | 6.6 | 4.5 | 77.6 | 6.6 | 4.5 | 84.4 | 6.0 | 6.6 | 72.8 | 6.0 | 6.6 |
| | abr | 125.3 | 8.1 | 5.3 | 138.3 | 8.6 | 4.3 | 132.7 | 8.6 | 4.3 | 132.3 | 8.6 | 4.3 | 124.8 | 8.6 | 4.3 | 132.5 | 8.2 | 6.3 | 119.1 | 8.2 | 6.3 |
| | may | 143.4 | 10.2 | 5.8 | 157.9 | 10.7 | 4.8 | 141.6 | 10.7 | 4.8 | 152.7 | 10.7 | 4.8 | 139.0 | 10.7 | 4.8 | 159.8 | 10.3 | 6.7 | 131.3 | 10.3 | 6.7 |
| | jun | 156.2 | 13.1 | 4.7 | 174.0 | 13.5 | 3.9 | 157.4 | 13.5 | 3.9 | 160.5 | 13.5 | 3.9 | 154.8 | 13.5 | 3.9 | 178.1 | 13.2 | 5.8 | 146.3 | 13.2 | 5.8 |
| | jul | 141.9 | 14.9 | 4.7 | 158.7 | 15.4 | 4.0 | 138.0 | 15.4 | 4.0 | 147.7 | 15.4 | 4.0 | 146.1 | 15.4 | 4.0 | 168.7 | 15.0 | 5.8 | 128.7 | 15.0 | 5.8 |
| | ago | 123.2 | 14.4 | 5.2 | 133.5 | 15.0 | 4.2 | 119.6 | 15.0 | 4.2 | 122.6 | 15.0 | 4.2 | 123.8 | 15.0 | 4.2 | 139.5 | 14.4 | 6.3 | 111.3 | 14.4 | 6.3 |
| | sep | 90.0 | 13.1 | 5.5 | 97.5 | 13.8 | 4.5 | 90.6 | 13.8 | 4.5 | 88.4 | 13.8 | 4.5 | 91.0 | 13.8 | 4.5 | 102.7 | 13.2 | 6.5 | 82.8 | 13.2 | 6.5 |
| | oct | 52.4 | 11.2 | 6.3 | 53.7 | 11.9 | 4.9 | 50.6 | 11.9 | 4.9 | 50.7 | 11.9 | 4.9 | 49.8 | 11.9 | 4.9 | 56.6 | 11.2 | 7.2 | 44.1 | 11.2 | 7.2 |
| | nov | 25.4 | 8.2 | 6.8 | 29.2 | 8.6 | 5.0 | 27.7 | 8.6 | 5.0 | 27.4 | 8.6 | 5.0 | 26.8 | 8.6 | 5.0 | 26.4 | 8.1 | 7.5 | 22.2 | 8.1 | 7.5 |
| | dic | 15.1 | 6.0 | 7.7 | 19.6 | 6.6 | 5.6 | 17.7 | 6.6 | 5.6 | 17.6 | 6.6 | 5.6 | 17.4 | 6.6 | 5.6 | 13.6 | 6.1 | 8.3 | 12.4 | 6.1 | 8.3 |

Tabla A 8 Recopilación de resultados de la ubicación de Dublín.

A1.9 El Cairo, Egipto

| | | NASA POWER | | | PVGis-CMSAF | | | PVGis-ERA5 | | | PVGis-SARAH | | | Renewables.ninja-MERRA- | | | Renewables.ninja-SARAH | | |
|---------------------|------|------------|------|-------|-------------|------|-------|------------|------|-------|-------------|------|-------|-------------------------|------|-------|------------------------|------|-------|
| | | Gi | T2m | WS10m | Gi | T2m | WS10m | Gi | T2m | WS10m | Gi | T2m | WS10m | Gi | T2m | WS10m | Gi | T2m | WS10m |
| PROMEDIO ANUAL | 2015 | 2026.3 | 22.1 | 4.0 | 2083.8 | 22.6 | 3.4 | 2108.5 | 22.6 | 3.4 | 2157.0 | 22.6 | 3.4 | 1888.4 | 22.0 | 5.5 | 1873.5 | 22.0 | 5.5 |
| | 2014 | 2071.7 | 22.3 | 3.7 | 2114.0 | 22.8 | 3.1 | 2121.1 | 22.8 | 3.1 | 2182.6 | 22.8 | 3.1 | 1909.9 | 22.2 | 5.3 | 1881.0 | 22.2 | 5.3 |
| | 2013 | 2091.7 | 22.0 | 4.0 | 2141.8 | 22.4 | 3.4 | 2159.3 | 22.4 | 3.4 | 2201.0 | 22.4 | 3.4 | 1941.4 | 21.9 | 5.5 | 1895.3 | 21.9 | 5.5 |
| | 2012 | 2119.1 | 21.8 | 3.9 | 2102.6 | 22.3 | 3.3 | 2133.4 | 22.3 | 3.3 | 2187.8 | 22.3 | 3.3 | 1908.4 | 21.8 | 5.4 | 1875.5 | 21.8 | 5.4 |
| | 2011 | 2115.1 | 21.4 | 3.8 | 2110.9 | 21.7 | 3.5 | 2099.1 | 21.7 | 3.5 | 2202.0 | 21.7 | 3.5 | 1930.1 | 21.2 | 5.4 | 1888.8 | 21.2 | 5.4 |
| | 2010 | 2157.9 | 23.3 | 4.0 | 2109.1 | 23.3 | 3.6 | 2160.4 | 23.3 | 3.6 | 2219.2 | 23.3 | 3.6 | 1903.4 | 23.2 | 5.5 | 1865.7 | 23.2 | 5.5 |
| PROMEDIO TRIMESTRAL | 1T | 400.6 | 14.8 | 3.9 | 423.2 | 16.4 | 3.5 | 437.2 | 16.4 | 3.5 | 434.4 | 16.4 | 3.5 | 405.0 | 14.7 | 5.4 | 393.8 | 14.7 | 5.4 |
| | 2T | 661.6 | 25.0 | 4.2 | 687.1 | 24.6 | 3.6 | 698.8 | 24.6 | 3.6 | 710.2 | 24.6 | 3.6 | 605.8 | 25.0 | 5.6 | 601.6 | 25.0 | 5.6 |
| | 3T | 665.4 | 29.4 | 3.8 | 661.2 | 28.7 | 3.3 | 658.6 | 28.7 | 3.3 | 693.8 | 28.7 | 3.3 | 582.4 | 29.2 | 5.3 | 574.3 | 29.2 | 5.3 |
| | 4T | 369.3 | 19.4 | 3.6 | 377.3 | 20.3 | 3.1 | 374.9 | 20.3 | 3.1 | 392.6 | 20.3 | 3.1 | 355.2 | 19.1 | 5.3 | 344.5 | 19.1 | 5.3 |
| PROMEDIO MENSUAL | ene | 106.8 | 13.0 | 3.7 | 107.2 | 14.7 | 3.2 | 113.2 | 14.7 | 3.2 | 112.7 | 14.7 | 3.2 | 108.2 | 12.7 | 5.2 | 105.0 | 12.7 | 5.2 |
| | feb | 119.4 | 14.3 | 3.8 | 136.2 | 16.1 | 3.5 | 141.9 | 16.1 | 3.5 | 139.3 | 16.1 | 3.5 | 130.8 | 14.2 | 5.4 | 126.7 | 14.2 | 5.4 |
| | mar | 174.5 | 17.3 | 4.3 | 179.8 | 18.4 | 3.9 | 182.1 | 18.4 | 3.9 | 182.4 | 18.4 | 3.9 | 166.0 | 17.2 | 5.8 | 162.1 | 17.2 | 5.8 |
| | abr | 198.8 | 21.1 | 4.1 | 210.1 | 21.5 | 3.6 | 216.0 | 21.5 | 3.6 | 216.0 | 21.5 | 3.6 | 191.1 | 21.1 | 5.6 | 187.6 | 21.1 | 5.6 |
| | may | 230.1 | 25.7 | 4.2 | 230.9 | 25.1 | 3.6 | 235.8 | 25.1 | 3.6 | 238.0 | 25.1 | 3.6 | 200.5 | 25.6 | 5.6 | 201.7 | 25.6 | 5.6 |
| | jun | 232.8 | 28.1 | 4.3 | 246.1 | 27.4 | 3.5 | 247.0 | 27.4 | 3.5 | 256.3 | 27.4 | 3.5 | 214.2 | 28.3 | 5.7 | 212.2 | 28.3 | 5.7 |
| | jul | 246.4 | 29.9 | 4.0 | 243.0 | 28.7 | 3.3 | 241.8 | 28.7 | 3.3 | 254.0 | 28.7 | 3.3 | 211.7 | 29.7 | 5.5 | 209.1 | 29.7 | 5.5 |
| | ago | 228.7 | 30.5 | 3.7 | 225.0 | 29.7 | 3.1 | 223.8 | 29.7 | 3.1 | 236.3 | 29.7 | 3.1 | 197.1 | 30.3 | 5.2 | 193.4 | 30.3 | 5.2 |
| | sep | 190.3 | 27.9 | 3.7 | 193.3 | 27.6 | 3.3 | 192.9 | 27.6 | 3.3 | 203.4 | 27.6 | 3.3 | 173.5 | 27.7 | 5.3 | 171.8 | 27.7 | 5.3 |
| | oct | 157.5 | 24.1 | 3.8 | 157.8 | 24.4 | 3.3 | 155.2 | 24.4 | 3.3 | 163.1 | 24.4 | 3.3 | 143.1 | 23.9 | 5.4 | 142.6 | 23.9 | 5.4 |
| | nov | 111.9 | 19.4 | 3.5 | 117.7 | 20.4 | 3.0 | 115.8 | 20.4 | 3.0 | 122.3 | 20.4 | 3.0 | 111.3 | 19.1 | 5.1 | 106.5 | 19.1 | 5.1 |
| | dic | 100.0 | 14.6 | 3.7 | 101.7 | 16.1 | 3.1 | 103.8 | 16.1 | 3.1 | 107.2 | 16.1 | 3.1 | 100.8 | 14.3 | 5.2 | 95.3 | 14.3 | 5.2 |

Tabla A 9 Recopilación de resultados de la ubicación de El Cairo.

A1.10 Fyn, Dinamarca

| | | NASA POWER | | | PVGis-CMSAF | | | PVGis-COSMO | | | PVGis-ERA5 | | | PVGis-SARAH | | | Renewables.ninja-MERRA-2 | | | Renewables.ninja-SARAH | | |
|---------------------|------|------------|------|-------|-------------|------|-------|-------------|------|-------|------------|------|-------|-------------|------|-------|--------------------------|------|-------|------------------------|------|-------|
| | | Gi | T2m | WS10m | Gi | T2m | WS10m | Gi | T2m | WS10m | Gi | T2m | WS10m | Gi | T2m | WS10m | Gi | T2m | WS10m | Gi | T2m | WS10m |
| PROMEDIO ANUAL | 2015 | 1022.1 | 9.3 | 6.3 | 1103.1 | 9.2 | 4.7 | 993.8 | 9.2 | 4.7 | 1129.5 | 9.2 | 4.7 | 1009.8 | 9.2 | 4.7 | 1033.0 | 9.4 | 6.2 | 1029.2 | 9.4 | 6.2 |
| | 2014 | 1051.4 | 10.1 | 6.0 | 1133.8 | 9.8 | 4.4 | 985.7 | 9.8 | 4.4 | 1123.1 | 9.8 | 4.4 | 1050.8 | 9.8 | 4.4 | 1022.5 | 10.2 | 5.9 | 1060.0 | 10.2 | 5.9 |
| | 2013 | 1051.6 | 8.5 | 5.8 | 1118.3 | 8.1 | 4.4 | 1045.4 | 8.1 | 4.4 | 1131.5 | 8.1 | 4.4 | 988.1 | 8.1 | 4.4 | 1068.5 | 8.5 | 5.8 | 1007.5 | 8.5 | 5.8 |
| | 2012 | 1124.6 | 8.3 | 6.0 | 1062.5 | 8.2 | 4.5 | 976.6 | 8.2 | 4.5 | 1118.1 | 8.2 | 4.5 | 990.0 | 8.2 | 4.5 | 1007.0 | 8.4 | 6.0 | 994.3 | 8.4 | 6.0 |
| | 2011 | 1146.9 | 8.9 | 6.1 | 1045.7 | 8.8 | 5.1 | 947.9 | 8.8 | 5.1 | 1100.1 | 8.8 | 5.1 | 1018.6 | 8.8 | 5.1 | 1021.0 | 8.9 | 6.0 | 986.7 | 8.9 | 6.0 |
| | 2010 | 1128.4 | 7.2 | 5.6 | 1012.7 | 7.1 | 4.8 | 991.4 | 7.1 | 4.8 | 1101.3 | 7.1 | 4.8 | 996.3 | 7.1 | 4.8 | 1010.9 | 7.3 | 5.7 | 959.3 | 7.3 | 5.7 |
| PROMEDIO TRIMESTRAL | 1T | 132.7 | 1.3 | 6.5 | 135.7 | 1.4 | 5.0 | 135.4 | 1.4 | 5.0 | 143.7 | 1.4 | 5.0 | 118.2 | 1.4 | 5.0 | 3.9 | 1.3 | 6.3 | 3.7 | 1.3 | 6.3 |
| | 2T | 472.9 | 10.9 | 5.4 | 484.3 | 10.9 | 4.3 | 444.5 | 10.9 | 4.3 | 499.5 | 10.9 | 4.3 | 445.7 | 10.9 | 4.3 | 14.8 | 10.9 | 5.5 | 14.8 | 10.9 | 5.5 |
| | 3T | 408.6 | 16.3 | 5.4 | 407.0 | 15.9 | 4.2 | 355.3 | 15.9 | 4.2 | 412.3 | 15.9 | 4.2 | 388.3 | 15.9 | 4.2 | 12.6 | 16.3 | 5.5 | 12.4 | 16.3 | 5.5 |
| | 4T | 73.3 | 6.5 | 6.6 | 73.2 | 6.0 | 5.0 | 73.8 | 6.0 | 5.0 | 83.2 | 6.0 | 5.0 | 75.4 | 6.0 | 5.0 | 2.5 | 6.4 | 6.4 | 2.2 | 6.4 | 6.4 |
| PROMEDIO MENSUAL | ene | 15.5 | 0.7 | 6.9 | 13.8 | 0.3 | 5.1 | 16.7 | 0.3 | 5.1 | 17.6 | 0.3 | 5.1 | 13.6 | 0.3 | 5.1 | 0.5 | 0.7 | 6.6 | 0.3 | 0.7 | 6.6 |
| | feb | 30.4 | 0.1 | 6.5 | 36.5 | 0.4 | 4.9 | 39.0 | 0.4 | 4.9 | 42.2 | 0.4 | 4.9 | 30.5 | 0.4 | 4.9 | 1.2 | 0.3 | 6.3 | 0.9 | 0.3 | 6.3 |
| | mar | 86.8 | 3.0 | 6.2 | 85.4 | 3.5 | 4.9 | 79.6 | 3.5 | 4.9 | 83.9 | 3.5 | 4.9 | 74.0 | 3.5 | 4.9 | 2.3 | 3.0 | 6.1 | 2.5 | 3.0 | 6.1 |
| | abr | 131.0 | 7.0 | 5.6 | 142.8 | 7.3 | 4.5 | 126.7 | 7.3 | 4.5 | 141.3 | 7.3 | 4.5 | 130.7 | 7.3 | 4.5 | 4.0 | 7.0 | 5.7 | 4.4 | 7.0 | 5.7 |
| | may | 164.3 | 11.1 | 5.4 | 161.8 | 11.2 | 4.4 | 148.5 | 11.2 | 4.4 | 169.0 | 11.2 | 4.4 | 147.4 | 11.2 | 4.4 | 5.0 | 11.1 | 5.5 | 4.9 | 11.1 | 5.5 |
| | jun | 177.6 | 14.5 | 5.1 | 179.7 | 14.2 | 4.1 | 169.2 | 14.2 | 4.1 | 189.1 | 14.2 | 4.1 | 167.6 | 14.2 | 4.1 | 5.8 | 14.5 | 5.3 | 5.5 | 14.5 | 5.3 |
| | jul | 173.7 | 17.7 | 5.0 | 174.9 | 17.6 | 4.0 | 153.3 | 17.6 | 4.0 | 179.3 | 17.6 | 4.0 | 166.8 | 17.6 | 4.0 | 5.3 | 17.7 | 5.2 | 5.3 | 17.7 | 5.2 |
| | ago | 138.9 | 17.1 | 5.3 | 137.8 | 16.6 | 4.2 | 119.6 | 16.6 | 4.2 | 141.3 | 16.6 | 4.2 | 132.4 | 16.6 | 4.2 | 4.2 | 17.1 | 5.5 | 4.2 | 17.1 | 5.5 |
| | sep | 96.0 | 14.0 | 5.9 | 94.3 | 13.3 | 4.5 | 82.4 | 13.3 | 4.5 | 91.8 | 13.3 | 4.5 | 89.1 | 13.3 | 4.5 | 3.0 | 14.0 | 5.9 | 2.9 | 14.0 | 5.9 |
| | oct | 45.7 | 10.4 | 6.2 | 50.4 | 9.9 | 4.8 | 45.2 | 9.9 | 4.8 | 49.4 | 9.9 | 4.8 | 46.7 | 9.9 | 4.8 | 1.6 | 10.4 | 6.1 | 1.5 | 10.4 | 6.1 |
| | nov | 17.3 | 6.4 | 6.4 | 14.7 | 5.8 | 4.8 | 17.4 | 5.8 | 4.8 | 20.8 | 5.8 | 4.8 | 18.1 | 5.8 | 4.8 | 0.6 | 6.3 | 6.3 | 0.5 | 6.3 | 6.3 |
| | dic | 10.4 | 2.6 | 7.2 | 8.0 | 2.3 | 5.3 | 11.2 | 2.3 | 5.3 | 13.0 | 2.3 | 5.3 | 10.5 | 2.3 | 5.3 | 0.3 | 2.6 | 6.8 | 0.2 | 2.6 | 6.8 |

Tabla A 10 Recopilación de resultados de la ubicación de Fyn.

A1.11 Hyderabad, India

| | | NASA POWER | | | PVGis-SARAH | | | Renewables.ninja-MERRA-2 | | |
|---------------------|------|------------|------|-------|-------------|------|-------|--------------------------|------|-------|
| | | Gi | T2m | WS10m | Gi | T2m | WS10m | Gi | T2m | WS10m |
| PROMEDIO ANUAL | 2015 | 1936.1 | 26.6 | 3.8 | 2125.1 | 26.5 | 3.1 | 1759.9 | 26.8 | 3.9 |
| | 2014 | 1932.5 | 25.9 | 3.8 | 2098.2 | 26.4 | 3.3 | 1759.2 | 26.0 | 3.9 |
| | 2013 | 1858.6 | 25.4 | 4.1 | 2037.3 | 25.9 | 3.5 | 1720.5 | 25.5 | 4.2 |
| | 2012 | 2002.5 | 26.2 | 3.9 | 2102.6 | 26.6 | 3.3 | 1757.1 | 26.4 | 4.0 |
| | 2011 | 2065.2 | 25.8 | 4.0 | 2116.1 | 25.9 | 3.6 | 1746.7 | 25.9 | 4.0 |
| | 2010 | 1954.6 | 26.2 | 3.7 | 1983.3 | 26.4 | 3.4 | 1665.2 | 26.3 | 3.8 |
| PROMEDIO TRIMESTRAL | 1T | 522.2 | 24.9 | 3.3 | 565.1 | 25.0 | 2.7 | 479.2 | 24.9 | 3.4 |
| | 2T | 555.5 | 31.0 | 4.3 | 595.9 | 30.4 | 3.6 | 464.7 | 31.3 | 4.4 |
| | 3T | 429.2 | 25.5 | 4.8 | 475.6 | 25.9 | 4.7 | 399.7 | 25.7 | 4.9 |
| | 4T | 451.3 | 22.7 | 3.1 | 481.7 | 23.8 | 2.6 | 425.3 | 22.8 | 3.2 |
| PROMEDIO MENSUAL | ene | 157.6 | 21.7 | 3.2 | 166.2 | 22.1 | 2.6 | 146.7 | 21.6 | 3.3 |
| | feb | 164.1 | 24.6 | 3.3 | 191.2 | 24.7 | 2.7 | 161.4 | 24.8 | 3.5 |
| | mar | 200.5 | 28.4 | 3.3 | 207.6 | 28.1 | 2.6 | 171.2 | 28.5 | 3.4 |
| | abr | 199.5 | 31.3 | 3.0 | 211.4 | 30.2 | 2.5 | 168.3 | 31.5 | 3.2 |
| | may | 204.2 | 33.2 | 3.9 | 209.7 | 32.3 | 3.1 | 160.2 | 33.4 | 4.1 |
| | jun | 151.9 | 28.5 | 5.8 | 174.8 | 28.7 | 5.3 | 136.3 | 28.9 | 5.9 |
| | jul | 132.5 | 26.1 | 6.1 | 151.7 | 26.1 | 5.9 | 131.5 | 26.3 | 6.1 |
| | ago | 145.6 | 25.5 | 4.7 | 157.1 | 25.8 | 4.7 | 131.5 | 25.7 | 4.8 |
| | sep | 151.1 | 24.8 | 3.6 | 166.8 | 25.7 | 3.6 | 136.6 | 25.0 | 3.7 |
| | oct | 158.7 | 24.2 | 2.9 | 167.3 | 25.5 | 2.6 | 145.7 | 24.4 | 3.1 |
| | nov | 143.3 | 22.7 | 3.3 | 156.4 | 23.7 | 2.6 | 139.8 | 22.8 | 3.3 |
| | dic | 149.2 | 21.2 | 3.1 | 158.0 | 22.2 | 2.5 | 139.8 | 21.2 | 3.2 |

Tabla A 11 Recopilación de resultados de la ubicación de Hyderabad.

A1.12 Maseru, Lesoto

| | NASA POWER | | | PVGis-CMSAF | | | PVGis-SARAH | | | Renewables.ninja-MERRA-2 | | | |
|---------------------|------------|--------|-------|-------------|--------|-------|-------------|--------|-------|--------------------------|--------|-------|-----|
| | Gi | T2m | WS10m | Gi | T2m | WS10m | Gi | T2m | WS10m | Gi | T2m | WS10m | |
| PROMEDIO ANUAL | 2015 | 2034.8 | 16.6 | 3.5 | 2136.6 | 15.6 | 2.6 | 2100.5 | 15.6 | 2.6 | 2009.3 | 16.1 | 3.5 |
| | 2014 | 1987.1 | 15.4 | 3.3 | 2061.8 | 14.2 | 2.3 | 2034.3 | 14.2 | 2.3 | 2004.3 | 14.9 | 3.3 |
| | 2013 | 2018.5 | 15.3 | 3.5 | 2098.2 | 14.7 | 2.5 | 2053.0 | 14.7 | 2.5 | 2048.6 | 14.8 | 3.5 |
| | 2012 | 1948.4 | 15.2 | 3.5 | 2006.4 | 14.6 | 2.5 | 1993.9 | 14.6 | 2.5 | 2004.8 | 14.7 | 3.5 |
| | 2011 | 1925.9 | 14.4 | 3.3 | 1973.3 | 13.3 | 2.8 | 1986.1 | 13.3 | 2.8 | 1992.0 | 13.9 | 3.3 |
| PROMEDIO TRIMESTRAL | 2010 | 1946.9 | 15.8 | 3.4 | 1962.7 | 15.1 | 2.8 | 1995.0 | 15.1 | 2.8 | 1960.3 | 15.4 | 3.4 |
| | 1T | 567.3 | 20.8 | 3.0 | 593.8 | 19.5 | 2.3 | 596.5 | 19.5 | 2.3 | 588.0 | 20.1 | 3.0 |
| | 2T | 362.7 | 10.9 | 3.1 | 377.3 | 10.0 | 2.2 | 381.9 | 10.0 | 2.2 | 385.9 | 10.5 | 3.1 |
| | 3T | 424.2 | 10.7 | 3.8 | 451.0 | 10.2 | 2.7 | 444.3 | 10.2 | 2.7 | 437.0 | 10.4 | 3.8 |
| PROMEDIO MENSUAL | 4T | 622.7 | 19.4 | 4.0 | 657.7 | 18.7 | 3.1 | 644.2 | 18.7 | 3.1 | 631.8 | 18.8 | 4.0 |
| | ene | 213.1 | 21.8 | 3.1 | 215.4 | 20.5 | 2.4 | 216.9 | 20.5 | 2.4 | 210.0 | 21.1 | 3.1 |
| | feb | 183.8 | 21.1 | 2.9 | 204.9 | 19.8 | 2.2 | 205.5 | 19.8 | 2.2 | 202.7 | 20.4 | 2.9 |
| | mar | 170.4 | 19.4 | 2.9 | 173.5 | 18.3 | 2.2 | 174.0 | 18.3 | 2.2 | 175.3 | 18.8 | 3.0 |
| | abr | 138.4 | 14.1 | 2.9 | 144.7 | 13.3 | 2.1 | 146.3 | 13.3 | 2.1 | 147.9 | 13.7 | 2.9 |
| | may | 121.6 | 11.7 | 2.9 | 123.2 | 10.7 | 2.1 | 125.4 | 10.7 | 2.1 | 124.2 | 11.3 | 2.9 |
| | jun | 102.7 | 7.0 | 3.4 | 109.4 | 5.9 | 2.4 | 110.2 | 5.9 | 2.4 | 113.8 | 6.7 | 3.4 |
| | jul | 115.3 | 7.3 | 3.3 | 116.6 | 6.3 | 2.3 | 119.2 | 6.3 | 2.3 | 120.8 | 7.1 | 3.3 |
| | ago | 140.0 | 10.1 | 3.8 | 148.6 | 9.6 | 2.8 | 143.7 | 9.6 | 2.8 | 143.0 | 9.8 | 3.8 |
| | sep | 168.9 | 14.6 | 4.1 | 185.8 | 14.8 | 3.0 | 181.3 | 14.8 | 3.0 | 173.2 | 14.2 | 4.1 |
| | oct | 197.8 | 18.0 | 4.1 | 211.3 | 17.6 | 3.2 | 203.8 | 17.6 | 3.2 | 199.8 | 17.5 | 4.1 |
| | nov | 211.2 | 19.2 | 4.2 | 228.3 | 18.6 | 3.2 | 223.7 | 18.6 | 3.2 | 216.5 | 18.6 | 4.2 |
| dic | 213.7 | 21.0 | 3.5 | 218.1 | 19.8 | 2.8 | 216.7 | 19.8 | 2.8 | 215.6 | 20.4 | 3.5 | |

Tabla A 12 Recopilación de resultados de la ubicación de Maseru.

A1.13 Merbok, Malasia

| | | NASA POWER | | | PVGis-SARAH | | | Renewables.ninja-MERRA-2 | | |
|---------------------|------|------------|------|-------|-------------|------|-------|--------------------------|------|-------|
| | | Gi | T2m | WS10m | Gi | T2m | WS10m | Gi | T2m | WS10m |
| PROMEDIO ANUAL | 2015 | 1772.8 | 27.7 | 2.3 | 2022.9 | 26.8 | 1.4 | 1518.3 | 27.1 | 1.6 |
| | 2014 | 1739.5 | 27.7 | 2.5 | 2004.1 | 26.9 | 1.5 | 1494.6 | 27.1 | 1.8 |
| | 2013 | 1693.4 | 27.5 | 2.6 | 1930.5 | 26.8 | 1.5 | 1439.6 | 26.9 | 1.8 |
| | 2012 | 1722.3 | 27.4 | 2.4 | 1984.1 | 26.6 | 1.4 | 1420.9 | 26.9 | 1.7 |
| | 2011 | 1714.8 | 27.3 | 2.5 | 1934.7 | 26.6 | 1.7 | 1501.5 | 26.7 | 1.8 |
| | 2010 | 1758.0 | 27.7 | 2.5 | 1973.1 | 27.0 | 1.6 | 1446.6 | 27.2 | 1.7 |
| PROMEDIO TRIMESTRAL | 1T | 474.8 | 27.2 | 2.8 | 550.7 | 26.9 | 1.7 | 457.1 | 26.7 | 1.9 |
| | 2T | 444.6 | 28.3 | 2.2 | 520.7 | 27.3 | 1.4 | 353.5 | 27.8 | 1.6 |
| | 3T | 424.1 | 27.6 | 2.4 | 486.2 | 26.7 | 1.5 | 339.1 | 27.0 | 1.7 |
| | 4T | 389.9 | 27.1 | 2.6 | 456.2 | 26.2 | 1.5 | 349.2 | 26.5 | 1.8 |
| PROMEDIO MENSUAL | ene | 150.4 | 26.6 | 3.1 | 167.8 | 26.4 | 2.0 | 145.4 | 25.9 | 2.1 |
| | feb | 155.7 | 27.2 | 2.7 | 191.4 | 27.1 | 1.7 | 158.9 | 26.7 | 1.8 |
| | mar | 168.7 | 27.9 | 2.4 | 191.5 | 27.3 | 1.5 | 152.8 | 27.3 | 1.7 |
| | abr | 155.9 | 28.2 | 2.0 | 180.2 | 27.0 | 1.3 | 126.1 | 27.7 | 1.5 |
| | may | 154.8 | 28.5 | 2.2 | 175.3 | 27.4 | 1.3 | 116.0 | 27.9 | 1.5 |
| | jun | 133.8 | 28.3 | 2.3 | 165.2 | 27.4 | 1.5 | 111.5 | 27.6 | 1.7 |
| | jul | 144.9 | 27.9 | 2.3 | 163.0 | 26.9 | 1.5 | 109.4 | 27.3 | 1.6 |
| | ago | 143.3 | 27.6 | 2.3 | 164.8 | 26.6 | 1.5 | 113.6 | 27.0 | 1.6 |
| | sep | 135.9 | 27.4 | 2.5 | 158.3 | 26.4 | 1.4 | 116.1 | 26.8 | 1.8 |
| | oct | 137.1 | 27.3 | 2.4 | 159.2 | 26.3 | 1.4 | 116.9 | 26.7 | 1.7 |
| | nov | 126.9 | 27.2 | 2.4 | 154.1 | 26.1 | 1.3 | 111.7 | 26.6 | 1.7 |
| | dic | 125.9 | 26.8 | 3.1 | 142.9 | 26.2 | 1.8 | 120.5 | 26.2 | 2.1 |

Tabla A 13 Recopilación de resultados de la ubicación de Merbok.

A1.14 Montevideo, Uruguay

| | | NASA POWER | | | PVGis-SARAH | | | Renewables.ninja-MERRA-2 | | |
|---------------------|------|------------|------|-------|-------------|------|-------|--------------------------|------|-------|
| | | Gi | T2m | WS10m | Gi | T2m | WS10m | Gi | T2m | WS10m |
| PROMEDIO ANUAL | 2015 | 1728.9 | 17.7 | 4.7 | 1626.6 | 17.3 | 6.2 | 1664.7 | 17.8 | 4.8 |
| | 2014 | 1673.4 | 17.1 | 4.7 | 1546.1 | 17.3 | 6.2 | 1644.9 | 17.2 | 4.9 |
| | 2013 | 1770.8 | 17.1 | 4.8 | 1633.7 | 16.6 | 6.3 | 1734.5 | 17.2 | 5.0 |
| | 2012 | 1699.4 | 17.5 | 4.8 | 1603.6 | 17.1 | 6.2 | 1667.3 | 17.5 | 4.9 |
| | 2011 | 1780.5 | 17.0 | 5.0 | 1716.4 | 16.5 | 6.6 | 1746.5 | 17.1 | 5.1 |
| | 2010 | 1741.6 | 17.0 | 4.8 | 1647.6 | 16.9 | 6.3 | 1722.1 | 17.1 | 4.9 |
| PROMEDIO TRIMESTRAL | 1T | 560.9 | 23.0 | 4.7 | 554.7 | 22.0 | 6.3 | 541.7 | 23.1 | 4.8 |
| | 2T | 268.1 | 14.3 | 4.5 | 255.6 | 15.3 | 6.0 | 283.5 | 14.3 | 4.7 |
| | 3T | 302.4 | 11.6 | 5.0 | 275.1 | 12.0 | 6.5 | 317.5 | 11.7 | 5.2 |
| | 4T | 601.1 | 20.1 | 5.0 | 574.1 | 18.5 | 6.4 | 586.0 | 20.2 | 5.1 |
| PROMEDIO MENSUAL | ene | 225.8 | 24.7 | 4.7 | 218.2 | 22.8 | 6.3 | 206.9 | 24.8 | 4.8 |
| | feb | 169.2 | 23.3 | 4.9 | 177.7 | 22.5 | 6.5 | 175.0 | 23.3 | 5.0 |
| | mar | 165.9 | 20.9 | 4.5 | 158.7 | 20.7 | 6.0 | 159.8 | 21.0 | 4.6 |
| | abr | 118.0 | 17.7 | 4.5 | 115.4 | 18.2 | 5.9 | 119.9 | 17.7 | 4.6 |
| | may | 83.2 | 14.4 | 4.4 | 75.1 | 15.5 | 5.6 | 87.6 | 14.5 | 4.6 |
| | jun | 66.9 | 10.9 | 4.7 | 65.0 | 12.4 | 6.3 | 75.9 | 10.8 | 4.9 |
| | jul | 76.6 | 9.6 | 4.8 | 70.2 | 10.7 | 6.2 | 80.8 | 9.7 | 5.0 |
| | ago | 97.5 | 11.5 | 4.9 | 83.2 | 11.8 | 6.4 | 101.5 | 11.6 | 5.1 |
| | sep | 128.3 | 13.7 | 5.3 | 121.8 | 13.5 | 6.9 | 135.1 | 13.8 | 5.4 |
| | oct | 167.8 | 16.5 | 5.2 | 154.5 | 15.5 | 6.5 | 172.4 | 16.7 | 5.3 |
| | nov | 198.4 | 20.1 | 5.0 | 195.8 | 18.4 | 6.5 | 199.9 | 20.3 | 5.1 |
| | dic | 234.8 | 23.6 | 4.8 | 223.8 | 21.5 | 6.1 | 213.6 | 23.7 | 4.9 |

Tabla A 14 Recopilación de resultados de la ubicación de Montevideo.

A1.15 Ometepe, Nicaragua

| | | NASA POWER | | | PVGis-NSRDB | | | Renewables.ninja-MERRA-2 | | |
|---------------------|------|------------|------|-------|-------------|------|-------|--------------------------|------|-------|
| | | Gi | T2m | WS10m | Gi | T2m | WS10m | Gi | T2m | WS10m |
| PROMEDIO ANUAL | 2015 | 1989.4 | 28.4 | 6.3 | 2032.2 | 26.3 | 8.0 | 1753.4 | 28.4 | 6.2 |
| | 2014 | 1933.7 | 27.8 | 5.9 | 1997.0 | 26.0 | 7.1 | 1767.0 | 27.9 | 5.9 |
| | 2013 | 1907.5 | 27.6 | 5.3 | 1964.4 | 25.7 | 6.8 | 1666.2 | 27.8 | 5.3 |
| | 2012 | 1931.9 | 27.5 | 5.7 | 1908.5 | 25.7 | 7.0 | 1691.0 | 27.7 | 5.6 |
| | 2011 | 1935.0 | 27.2 | 5.1 | 1951.1 | 25.4 | 6.3 | 1665.3 | 27.5 | 5.2 |
| | 2010 | 1939.6 | 27.4 | 5.0 | 1978.2 | 25.7 | 6.2 | 1662.7 | 27.6 | 5.1 |
| PROMEDIO TRIMESTRAL | 1T | 509.1 | 27.5 | 7.4 | 546.8 | 25.5 | 8.7 | 527.5 | 27.6 | 7.3 |
| | 2T | 511.0 | 28.9 | 5.3 | 541.0 | 26.5 | 6.4 | 443.8 | 28.9 | 5.1 |
| | 3T | 470.6 | 27.6 | 4.4 | 461.3 | 25.7 | 5.7 | 358.1 | 27.9 | 4.4 |
| | 4T | 448.8 | 26.4 | 5.2 | 462.3 | 25.5 | 6.8 | 404.6 | 26.9 | 5.3 |
| PROMEDIO MENSUAL | ene | 154.4 | 26.5 | 7.6 | 157.1 | 25.1 | 9.2 | 162.9 | 26.8 | 7.6 |
| | feb | 156.4 | 27.6 | 7.3 | 183.1 | 25.4 | 8.5 | 175.7 | 27.6 | 7.2 |
| | mar | 198.4 | 28.5 | 7.2 | 206.7 | 25.9 | 8.5 | 188.9 | 28.3 | 7.2 |
| | abr | 192.0 | 29.7 | 5.9 | 204.4 | 26.7 | 7.0 | 177.5 | 29.4 | 5.8 |
| | may | 178.0 | 29.1 | 5.1 | 180.7 | 26.6 | 6.3 | 153.0 | 29.2 | 5.1 |
| | jun | 141.0 | 28.0 | 4.7 | 156.0 | 26.2 | 6.0 | 113.3 | 28.2 | 4.4 |
| | jul | 148.8 | 27.7 | 5.4 | 148.9 | 25.8 | 7.1 | 119.0 | 27.9 | 5.4 |
| | ago | 166.3 | 27.9 | 4.3 | 160.4 | 25.8 | 5.3 | 126.3 | 28.1 | 4.3 |
| | sep | 155.5 | 27.3 | 3.6 | 152.0 | 25.7 | 4.5 | 112.8 | 27.7 | 3.6 |
| | oct | 152.5 | 26.9 | 3.7 | 154.6 | 25.6 | 4.9 | 115.9 | 27.3 | 3.8 |
| | nov | 147.2 | 26.3 | 5.3 | 154.1 | 25.6 | 7.0 | 138.6 | 26.9 | 5.6 |
| | dic | 149.0 | 26.1 | 6.5 | 153.6 | 25.4 | 8.5 | 150.1 | 26.6 | 6.6 |

Tabla A 15 Recopilación de resultados de la ubicación de Ometepe.

A1.16 Santos, Brasil

| | | NASA POWER | | | PVGis-NSRDB | | | Renewables.ninja-MERRA-2 | | |
|---------------------|------|------------|------|-------|-------------|------|-------|--------------------------|------|-------|
| | | Gi | T2m | WS10m | Gi | T2m | WS10m | Gi | T2m | WS10m |
| PROMEDIO ANUAL | 2015 | 1549.0 | 22.2 | 3.4 | 1528.7 | 22.6 | 3.5 | 1590.7 | 22.8 | 3.7 |
| | 2014 | 1730.0 | 22.1 | 3.6 | 1677.6 | 22.3 | 3.4 | 1741.4 | 22.7 | 3.8 |
| | 2013 | 1542.5 | 21.0 | 3.7 | 1492.2 | 21.5 | 3.7 | 1677.9 | 21.7 | 3.9 |
| | 2012 | 1714.1 | 21.6 | 3.6 | 1613.5 | 21.8 | 3.4 | 1692.2 | 22.2 | 3.7 |
| | 2011 | 1653.0 | 20.8 | 3.5 | 1516.5 | 21.3 | 3.5 | 1672.8 | 21.5 | 3.8 |
| | 2010 | 1670.4 | 20.9 | 3.7 | 1537.0 | 21.8 | 3.8 | 1643.6 | 21.7 | 3.9 |
| PROMEDIO TRIMESTRAL | 1T | 467.4 | 24.3 | 3.3 | 497.6 | 24.9 | 3.3 | 447.2 | 25.1 | 3.6 |
| | 2T | 327.9 | 20.0 | 3.6 | 315.4 | 21.0 | 3.3 | 349.2 | 21.0 | 3.8 |
| | 3T | 366.7 | 19.1 | 3.7 | 324.3 | 19.4 | 3.7 | 389.2 | 19.7 | 3.9 |
| | 4T | 481.1 | 22.3 | 3.8 | 453.5 | 22.3 | 3.9 | 517.2 | 22.7 | 3.9 |
| PROMEDIO MENSUAL | ene | 168.7 | 24.5 | 3.3 | 172.5 | 25.2 | 3.2 | 153.0 | 25.4 | 3.5 |
| | feb | 154.8 | 25.0 | 3.0 | 179.7 | 25.5 | 3.2 | 152.1 | 25.6 | 3.4 |
| | mar | 143.9 | 23.3 | 3.6 | 145.3 | 23.9 | 3.5 | 142.0 | 24.2 | 3.9 |
| | abr | 126.6 | 21.8 | 3.5 | 124.5 | 22.6 | 3.3 | 132.9 | 22.8 | 3.8 |
| | may | 108.6 | 19.6 | 3.6 | 103.3 | 20.7 | 3.3 | 115.0 | 20.8 | 3.9 |
| | jun | 92.7 | 18.6 | 3.6 | 87.6 | 19.7 | 3.3 | 101.2 | 19.6 | 3.8 |
| | jul | 102.5 | 18.2 | 3.6 | 92.5 | 19.0 | 3.5 | 106.4 | 19.1 | 3.8 |
| | ago | 130.5 | 18.8 | 3.7 | 116.4 | 19.1 | 3.6 | 132.8 | 19.5 | 3.9 |
| | sep | 133.7 | 20.3 | 3.8 | 115.3 | 20.1 | 4.0 | 150.0 | 20.6 | 4.0 |
| | oct | 156.3 | 21.3 | 3.9 | 134.9 | 21.1 | 4.0 | 168.2 | 21.5 | 4.0 |
| | nov | 152.5 | 21.8 | 3.9 | 151.0 | 21.9 | 4.1 | 177.0 | 22.2 | 4.1 |
| | dic | 172.3 | 23.8 | 3.6 | 167.6 | 24.0 | 3.5 | 172.0 | 24.3 | 3.7 |

Tabla A 16 Recopilación de resultados de la ubicación de Santos.

A1.17 Steinkjer, Noruega

| | | NASA POWER | | | PVGis-COSMO | | | PVGis-ERA5 | | | Renewables.ninja-MERRA-2 | | | Renewables.ninja-SARAH | | |
|---------------------|------|------------|------|-------|-------------|------|-------|------------|------|-------|--------------------------|------|-------|------------------------|------|-------|
| | | Gi | T2m | WS10m | Gi | T2m | WS10m | Gi | T2m | WS10m | Gi | T2m | WS10m | Gi | T2m | WS10m |
| PROMEDIO ANUAL | 2015 | 731.4 | 5.3 | 3.6 | 711.8 | 6.4 | 3.0 | 752.3 | 6.4 | 3.0 | 789.9 | 4.6 | 3.3 | 663.5 | 4.6 | 3.3 |
| | 2014 | 787.9 | 5.4 | 3.5 | 821.0 | 6.9 | 3.0 | 858.0 | 6.9 | 3.0 | 868.3 | 4.8 | 3.2 | 734.4 | 4.8 | 3.2 |
| | 2013 | 710.1 | 4.4 | 3.2 | 763.2 | 5.6 | 3.0 | 806.9 | 5.6 | 3.0 | 817.6 | 3.8 | 3.1 | 697.8 | 3.8 | 3.1 |
| | 2012 | 771.6 | 3.5 | 3.4 | 750.7 | 4.7 | 3.2 | 777.7 | 4.7 | 3.2 | 817.9 | 2.9 | 3.2 | 658.7 | 2.9 | 3.2 |
| | 2011 | 783.8 | 5.6 | 3.5 | 727.8 | 6.8 | 3.4 | 761.5 | 6.8 | 3.4 | 785.7 | 5.0 | 3.2 | 655.7 | 5.0 | 3.2 |
| | 2010 | 802.6 | 2.3 | 3.1 | 731.1 | 3.1 | 3.1 | 778.0 | 3.1 | 3.1 | 819.5 | 1.5 | 3.0 | 644.8 | 1.5 | 3.0 |
| PROMEDIO TRIMESTRAL | 1T | 63.7 | -2.8 | 4.4 | 79.8 | -1.8 | 3.7 | 80.6 | -1.8 | 3.7 | 69.7 | -3.8 | 4.3 | 55.0 | -3.8 | 4.3 |
| | 2T | 357.9 | 7.0 | 3.0 | 366.7 | 8.5 | 3.0 | 378.9 | 8.5 | 3.0 | 391.2 | 6.8 | 3.0 | 324.9 | 6.8 | 3.0 |
| | 3T | 312.2 | 12.4 | 2.5 | 284.3 | 13.9 | 2.5 | 307.9 | 13.9 | 2.5 | 335.9 | 12.2 | 2.2 | 285.6 | 12.2 | 2.2 |
| | 4T | 30.8 | 1.0 | 3.8 | 33.9 | 1.6 | 3.2 | 35.3 | 1.6 | 3.2 | 33.3 | -0.1 | 3.2 | 22.0 | -0.1 | 3.2 |
| PROMEDIO MENSUAL | ene | 1.9 | -4.5 | 4.5 | 4.2 | -3.9 | 3.6 | 4.2 | -3.9 | 3.6 | 2.9 | -5.9 | 4.3 | 0.7 | -5.9 | 4.3 |
| | feb | 14.6 | -3.5 | 4.5 | 21.6 | -2.1 | 3.7 | 22.2 | -2.1 | 3.7 | 19.7 | -4.3 | 4.4 | 12.0 | -4.3 | 4.4 |
| | mar | 47.2 | -0.3 | 4.3 | 54.0 | 0.7 | 3.7 | 54.2 | 0.7 | 3.7 | 47.2 | -1.2 | 4.2 | 42.4 | -1.2 | 4.2 |
| | abr | 86.9 | 3.0 | 3.4 | 100.0 | 4.3 | 3.2 | 100.4 | 4.3 | 3.2 | 95.7 | 2.4 | 3.6 | 84.5 | 2.4 | 3.6 |
| | may | 133.4 | 7.6 | 2.8 | 132.9 | 9.2 | 2.9 | 138.9 | 9.2 | 2.9 | 140.2 | 7.4 | 3.0 | 119.6 | 7.4 | 3.0 |
| | jun | 137.7 | 10.3 | 2.7 | 133.8 | 12.1 | 2.8 | 139.6 | 12.1 | 2.8 | 155.2 | 10.5 | 2.5 | 120.8 | 10.5 | 2.5 |
| | jul | 136.7 | 13.9 | 2.3 | 122.7 | 15.6 | 2.5 | 133.6 | 15.6 | 2.5 | 145.7 | 14.1 | 2.2 | 127.3 | 14.1 | 2.2 |
| | ago | 112.5 | 13.4 | 2.3 | 101.4 | 15.0 | 2.4 | 110.8 | 15.0 | 2.4 | 119.3 | 13.2 | 2.2 | 100.8 | 13.2 | 2.2 |
| | sep | 62.9 | 9.9 | 2.7 | 60.3 | 11.0 | 2.7 | 63.5 | 11.0 | 2.7 | 70.9 | 9.4 | 2.3 | 57.5 | 9.4 | 2.3 |
| | oct | 25.8 | 5.2 | 3.4 | 25.9 | 6.1 | 3.1 | 27.3 | 6.1 | 3.1 | 27.1 | 4.4 | 2.6 | 20.1 | 4.4 | 2.6 |
| | nov | 5.0 | 0.7 | 3.6 | 6.5 | 1.2 | 3.1 | 6.7 | 1.2 | 3.1 | 5.7 | -0.5 | 3.1 | 1.9 | -0.5 | 3.1 |
| | dic | 0.0 | -2.8 | 4.2 | 1.4 | -2.5 | 3.5 | 1.3 | -2.5 | 3.5 | 0.5 | -4.1 | 3.8 | 0.1 | -4.1 | 3.8 |

Tabla A 17 Recopilación de resultados de la ubicación de Steinkjer.

A1.18 Tshela, RD Congo

| | NASA POWER | | | PVGis-CMSAF | | | PVGis-SARAH | | | Renewables.ninja-MERRA-2 | | | |
|---------------------|------------|--------|-------|-------------|--------|-------|-------------|--------|-------|--------------------------|--------|-------|------|
| | Gi | T2m | WS10m | Gi | T2m | WS10m | Gi | T2m | WS10m | Gi | T2m | WS10m | |
| PROMEDIO ANUAL | 2015 | 1443.4 | 25.3 | 1.1 | 1554.3 | 24.0 | 1.5 | 1574.6 | 24.0 | 1.5 | 1563.4 | 25.2 | -1.1 |
| | 2014 | 1426.1 | 24.7 | 1.0 | 1556.1 | 24.1 | 1.6 | 1598.4 | 24.1 | 1.6 | 1525.6 | 24.6 | -1.2 |
| | 2013 | 1459.9 | 24.7 | 1.0 | 1588.4 | 24.0 | 1.6 | 1539.6 | 24.0 | 1.6 | 1509.6 | 24.6 | -1.2 |
| | 2012 | 1562.6 | 24.7 | 1.0 | 1578.3 | 23.9 | 1.6 | 1586.2 | 23.9 | 1.6 | 1504.2 | 24.5 | -1.2 |
| | 2011 | 1625.9 | 24.4 | 1.0 | 1512.3 | 23.8 | 1.7 | 1583.5 | 23.8 | 1.7 | 1501.9 | 24.4 | -1.2 |
| | 2010 | 1661.0 | 24.8 | 1.0 | 1552.6 | 24.4 | 1.7 | 2176.5 | 15.2 | 2.4 | 1553.6 | 24.8 | -1.2 |
| PROMEDIO TRIMESTRAL | 1T | 445.6 | 25.2 | 0.8 | 458.8 | 25.2 | 1.4 | 498.7 | 23.5 | 1.5 | 384.7 | 25.1 | -1.6 |
| | 2T | 369.5 | 24.7 | 0.8 | 379.0 | 24.4 | 1.5 | 415.6 | 23.2 | 1.6 | 374.1 | 24.5 | -1.6 |
| | 3T | 346.9 | 24.1 | 1.5 | 377.3 | 22.0 | 2.0 | 376.3 | 20.5 | 2.2 | 427.2 | 23.9 | -0.3 |
| | 4T | 367.9 | 25.1 | 1.0 | 373.1 | 24.6 | 1.6 | 419.9 | 22.8 | 1.7 | 370.2 | 25.1 | -1.3 |
| PROMEDIO MENSUAL | ene | 148.5 | 25.0 | 0.8 | 146.5 | 24.8 | 1.4 | 155.5 | 23.1 | 1.5 | 127.5 | 24.9 | -1.6 |
| | feb | 140.4 | 25.3 | 0.8 | 155.6 | 25.3 | 1.5 | 171.9 | 23.6 | 1.5 | 134.6 | 25.2 | -1.6 |
| | mar | 156.7 | 25.2 | 0.8 | 156.8 | 25.6 | 1.4 | 171.2 | 23.9 | 1.5 | 122.6 | 25.2 | -1.6 |
| | abr | 143.2 | 25.3 | 0.7 | 145.0 | 25.5 | 1.4 | 160.2 | 24.3 | 1.4 | 115.1 | 25.2 | -1.6 |
| | may | 123.5 | 25.1 | 0.8 | 120.5 | 25.0 | 1.4 | 133.3 | 23.7 | 1.5 | 122.4 | 25.0 | -1.6 |
| | jun | 102.8 | 23.6 | 1.0 | 113.6 | 22.7 | 1.7 | 122.1 | 21.8 | 1.9 | 136.7 | 23.4 | -1.5 |
| | jul | 116.4 | 22.9 | 1.2 | 127.1 | 21.3 | 1.9 | 122.5 | 19.8 | 2.1 | 138.6 | 22.8 | -0.8 |
| | ago | 121.3 | 23.9 | 1.6 | 136.3 | 21.6 | 2.1 | 128.6 | 20.2 | 2.2 | 145.4 | 23.7 | -0.1 |
| | sep | 109.1 | 25.5 | 1.6 | 113.9 | 23.0 | 2.0 | 125.2 | 21.5 | 2.2 | 143.2 | 25.3 | -0.1 |
| | oct | 113.2 | 26.0 | 1.2 | 112.0 | 24.4 | 1.9 | 131.3 | 22.8 | 2.0 | 133.5 | 25.9 | -0.7 |
| | nov | 124.7 | 24.8 | 0.9 | 131.4 | 24.8 | 1.6 | 147.0 | 23.0 | 1.6 | 117.0 | 24.8 | -1.5 |
| | dic | 129.9 | 24.6 | 0.8 | 129.7 | 24.6 | 1.4 | 141.6 | 22.7 | 1.4 | 119.7 | 24.6 | -1.6 |

Tabla A 18 Recopilación de resultados de la ubicación de Tshela

A1.19 Ujué, Navarra, España

| | | NASA POWER | | | PVGis-CMSAF | | | PVGis-COSMO | | | PVGis-ERA5 | | | PVGis-SARAH | | | Renewables.ninja-MERRA-2 | | | Renewables.ninja-SARAH | | |
|---------------------|------|------------|------|-------|-------------|------|-------|-------------|------|-------|------------|------|-------|-------------|------|-------|--------------------------|------|-------|------------------------|------|-------|
| | | Gi | T2m | WS10m | Gi | T2m | WS10m | Gi | T2m | WS10m | Gi | T2m | WS10m | Gi | T2m | WS10m | Gi | T2m | WS10m | Gi | T2m | WS10m |
| PROMEDIO ANUAL | 2015 | 1533.6 | 12.1 | 3.4 | 1634.2 | 10.7 | 3.6 | 1499.1 | 10.7 | 3.6 | 1519.0 | 10.7 | 3.6 | 1519.0 | 10.7 | 3.6 | 1462.7 | 12.5 | 4.6 | 1629.2 | 12.5 | 4.6 |
| | 2014 | 1495.3 | 12.3 | 3.5 | 1581.4 | 10.8 | 3.5 | 1468.7 | 10.8 | 3.5 | 1485.4 | 10.8 | 3.5 | 1485.4 | 10.8 | 3.5 | 1416.4 | 12.5 | 4.7 | 1569.9 | 12.5 | 4.7 |
| | 2013 | 1466.8 | 11.0 | 3.6 | 1555.3 | 9.5 | 3.8 | 1438.5 | 9.5 | 3.8 | 1456.9 | 9.5 | 3.8 | 1456.9 | 9.5 | 3.8 | 1416.7 | 11.1 | 4.7 | 1521.8 | 11.1 | 4.7 |
| | 2012 | 1574.6 | 11.7 | 3.4 | 1680.6 | 10.3 | 3.7 | 1536.9 | 10.3 | 3.7 | 1548.6 | 10.3 | 3.7 | 1548.6 | 10.3 | 3.7 | 1468.0 | 12.0 | 4.6 | 1643.8 | 12.0 | 4.6 |
| | 2011 | 1574.0 | 12.4 | 3.3 | 1662.5 | 10.8 | 3.9 | 1485.5 | 10.8 | 3.9 | 1515.6 | 10.8 | 3.9 | 1515.6 | 10.8 | 3.9 | 1479.0 | 12.6 | 4.6 | 1629.6 | 12.6 | 4.6 |
| | 2010 | 1510.3 | 10.7 | 3.5 | 1592.0 | 9.4 | 4.1 | 1472.1 | 9.4 | 4.1 | 1489.1 | 9.4 | 4.1 | 1489.1 | 9.4 | 4.1 | 1439.0 | 10.9 | 4.7 | 1567.2 | 10.9 | 4.7 |
| PROMEDIO TRIMESTRAL | 1T | 243.8 | 5.2 | 3.8 | 264.4 | 3.8 | 3.9 | 245.5 | 3.8 | 3.9 | 250.8 | 3.8 | 3.9 | 250.8 | 3.8 | 3.9 | 250.6 | 5.1 | 5.0 | 278.2 | 0.5 | 4.8 |
| | 2T | 533.6 | 13.6 | 3.4 | 589.1 | 12.0 | 3.9 | 541.6 | 12.0 | 3.9 | 542.0 | 12.0 | 3.9 | 542.0 | 12.0 | 3.9 | 513.5 | 14.1 | 4.6 | 563.7 | 13.4 | 4.4 |
| | 3T | 542.7 | 18.9 | 3.0 | 581.8 | 17.7 | 3.7 | 533.5 | 17.7 | 3.7 | 532.4 | 17.7 | 3.7 | 532.4 | 17.7 | 3.7 | 501.0 | 19.7 | 4.4 | 557.5 | 18.3 | 4.2 |
| | 4T | 205.7 | 9.1 | 3.6 | 210.5 | 7.6 | 3.6 | 188.8 | 7.6 | 3.6 | 203.4 | 7.6 | 3.6 | 203.4 | 7.6 | 3.6 | 207.7 | 8.9 | 4.7 | 221.6 | 4.9 | 4.7 |
| PROMEDIO MENSUAL | ene | 53.7 | 4.4 | 3.5 | 54.4 | 3.1 | 3.5 | 48.6 | 3.1 | 3.5 | 51.3 | 3.1 | 3.5 | 51.3 | 3.1 | 3.5 | 52.9 | 4.0 | 4.7 | 62.2 | 4.0 | 4.7 |
| | feb | 72.3 | 3.8 | 4.2 | 84.4 | 2.4 | 4.2 | 78.7 | 2.4 | 4.2 | 79.5 | 2.4 | 4.2 | 79.5 | 2.4 | 4.2 | 80.9 | 3.7 | 5.3 | 89.6 | 3.7 | 5.3 |
| | mar | 117.8 | 7.5 | 3.8 | 125.6 | 5.7 | 3.9 | 118.2 | 5.7 | 3.9 | 120.0 | 5.7 | 3.9 | 120.0 | 5.7 | 3.9 | 116.7 | 7.5 | 5.0 | 126.5 | 7.5 | 5.0 |
| | abr | 151.4 | 10.8 | 3.4 | 166.1 | 8.9 | 3.6 | 153.6 | 8.9 | 3.6 | 155.8 | 8.9 | 3.6 | 155.8 | 8.9 | 3.6 | 148.6 | 11.0 | 4.6 | 163.7 | 11.0 | 4.6 |
| | may | 181.7 | 13.1 | 3.6 | 200.2 | 11.3 | 4.2 | 184.7 | 11.3 | 4.2 | 182.6 | 11.3 | 4.2 | 182.6 | 11.3 | 4.2 | 175.5 | 13.5 | 4.9 | 191.3 | 13.5 | 4.9 |
| | jun | 200.5 | 16.9 | 3.2 | 222.8 | 15.6 | 3.9 | 203.3 | 15.6 | 3.9 | 203.6 | 15.6 | 3.9 | 203.6 | 15.6 | 3.9 | 189.4 | 17.8 | 4.5 | 208.8 | 17.8 | 4.5 |
| | jul | 213.9 | 19.4 | 3.1 | 229.2 | 18.3 | 4.0 | 208.7 | 18.3 | 4.0 | 205.3 | 18.3 | 4.0 | 205.3 | 18.3 | 4.0 | 193.9 | 20.4 | 4.5 | 215.9 | 20.4 | 4.5 |
| | ago | 189.5 | 19.9 | 2.9 | 200.9 | 19.0 | 3.7 | 185.3 | 19.0 | 3.7 | 185.3 | 19.0 | 3.7 | 185.3 | 19.0 | 3.7 | 172.3 | 20.9 | 4.3 | 191.4 | 20.9 | 4.3 |
| | sep | 139.3 | 17.3 | 2.9 | 151.7 | 15.8 | 3.5 | 139.4 | 15.8 | 3.5 | 141.7 | 15.8 | 3.5 | 141.7 | 15.8 | 3.5 | 134.9 | 17.7 | 4.3 | 150.2 | 17.7 | 4.3 |
| | oct | 98.8 | 13.6 | 3.3 | 101.2 | 12.0 | 3.6 | 91.8 | 12.0 | 3.6 | 97.8 | 12.0 | 3.6 | 97.8 | 12.0 | 3.6 | 97.3 | 13.6 | 4.5 | 103.0 | 13.6 | 4.5 |
| | nov | 57.5 | 8.7 | 3.8 | 59.8 | 6.8 | 3.7 | 52.0 | 6.8 | 3.7 | 58.0 | 6.8 | 3.7 | 58.0 | 6.8 | 3.7 | 60.6 | 8.2 | 4.9 | 65.0 | 8.2 | 4.9 |
| | dic | 49.3 | 5.2 | 3.6 | 49.6 | 4.0 | 3.4 | 45.0 | 4.0 | 3.4 | 47.6 | 4.0 | 3.4 | 47.6 | 4.0 | 3.4 | 49.8 | 4.8 | 4.7 | 53.5 | 4.8 | 4.7 |

Tabla A 19 Recopilación de resultados de la ubicación de Ujué.

A1.20 Vaasa, Finlandia

| | | NASA POWER | | | PVGis-COSMO | | | PVGis-ERA5 | | | Renewables.ninja-MERRA-2 | | | Renewables.ninja-SARAH | | |
|---------------------|------|------------|------|-------|-------------|------|-------|------------|------|-------|--------------------------|------|-------|------------------------|------|-------|
| | | Gi | T2m | WS10m | Gi | T2m | WS10m | Gi | T2m | WS10m | Gi | T2m | WS10m | Gi | T2m | WS10m |
| PROMEDIO ANUAL | 2015 | 873.9 | 5.7 | 4.0 | 854.1 | 6.1 | 3.6 | 921.5 | 6.1 | 3.6 | 907.0 | 5.8 | 4.0 | 819.6 | 5.8 | 4.0 |
| | 2014 | 928.8 | 5.4 | 3.7 | 912.9 | 5.9 | 3.2 | 964.3 | 5.9 | 3.2 | 955.0 | 5.5 | 3.8 | 861.2 | 5.5 | 3.8 |
| | 2013 | 896.4 | 4.8 | 3.7 | 896.7 | 5.1 | 3.4 | 979.6 | 5.1 | 3.4 | 973.4 | 5.0 | 3.8 | 851.2 | 5.0 | 3.8 |
| | 2012 | 939.0 | 3.7 | 3.8 | 815.0 | 4.5 | 3.4 | 904.0 | 4.5 | 3.4 | 902.2 | 3.9 | 3.8 | 751.7 | 3.9 | 3.8 |
| | 2011 | 970.3 | 4.8 | 3.7 | 884.4 | 5.1 | 3.7 | 939.2 | 5.1 | 3.7 | 944.7 | 5.1 | 3.8 | 805.7 | 5.1 | 3.8 |
| | 2010 | 952.5 | 2.5 | 3.5 | 896.6 | 3.1 | 3.6 | 944.9 | 3.1 | 3.6 | 936.9 | 2.7 | 3.7 | 805.2 | 2.7 | 3.7 |
| PROMEDIO TRIMESTRAL | 1T | 80.6 | -5.4 | 4.1 | 95.0 | -4.8 | 3.6 | 98.3 | -4.8 | 3.6 | 91.3 | -5.1 | 4.2 | 72.9 | -5.1 | 4.2 |
| | 2T | 440.3 | 7.1 | 3.3 | 432.1 | 8.6 | 3.5 | 456.7 | 8.6 | 3.5 | 444.0 | 7.5 | 3.5 | 405.9 | 7.5 | 3.5 |
| | 3T | 369.8 | 14.5 | 3.2 | 324.9 | 14.8 | 3.1 | 362.2 | 14.8 | 3.1 | 376.5 | 14.5 | 3.4 | 322.2 | 14.5 | 3.4 |
| | 4T | 36.0 | 1.7 | 4.4 | 38.8 | 1.2 | 3.7 | 40.2 | 1.2 | 3.7 | 38.9 | 1.6 | 4.2 | 27.0 | 1.6 | 4.2 |
| PROMEDIO MENSUAL | ene | 2.7 | -6.6 | 4.1 | 5.5 | -6.6 | 3.5 | 5.0 | -6.6 | 3.5 | 3.6 | -6.6 | 4.3 | 0.8 | -6.6 | 4.3 |
| | feb | 16.8 | -6.7 | 4.1 | 22.9 | -5.6 | 3.6 | 23.2 | -5.6 | 3.6 | 20.9 | -6.1 | 4.3 | 12.3 | -6.1 | 4.3 |
| | mar | 61.1 | -2.7 | 4.0 | 66.7 | -2.2 | 3.8 | 70.1 | -2.2 | 3.8 | 66.8 | -2.5 | 4.2 | 59.8 | -2.5 | 4.2 |
| | abr | 107.2 | 2.0 | 3.5 | 113.4 | 3.0 | 3.5 | 118.4 | 3.0 | 3.5 | 111.4 | 2.4 | 3.7 | 100.2 | 2.4 | 3.7 |
| | may | 159.2 | 7.6 | 3.3 | 151.3 | 9.6 | 3.6 | 158.7 | 9.6 | 3.6 | 153.3 | 8.0 | 3.5 | 142.8 | 8.0 | 3.5 |
| | jun | 173.9 | 11.7 | 3.1 | 167.4 | 13.4 | 3.3 | 179.6 | 13.4 | 3.3 | 179.3 | 12.3 | 3.2 | 162.9 | 12.3 | 3.2 |
| | jul | 168.8 | 16.4 | 3.0 | 149.8 | 17.5 | 3.1 | 168.9 | 17.5 | 3.1 | 168.1 | 16.6 | 3.2 | 150.4 | 16.6 | 3.2 |
| | ago | 130.8 | 15.5 | 3.0 | 110.4 | 15.6 | 2.9 | 123.7 | 15.6 | 2.9 | 131.0 | 15.5 | 3.3 | 110.4 | 15.5 | 3.3 |
| | sep | 70.3 | 11.5 | 3.7 | 64.7 | 11.2 | 3.4 | 69.5 | 11.2 | 3.4 | 77.5 | 11.3 | 3.7 | 61.4 | 11.3 | 3.7 |
| | oct | 30.1 | 5.8 | 4.2 | 29.4 | 5.3 | 3.7 | 31.0 | 5.3 | 3.7 | 32.2 | 5.7 | 4.0 | 25.0 | 5.7 | 4.0 |
| | nov | 5.5 | 2.0 | 4.2 | 7.2 | 1.5 | 3.5 | 7.0 | 1.5 | 3.5 | 5.7 | 1.8 | 4.1 | 1.9 | 1.8 | 4.1 |
| | dic | 0.4 | -2.6 | 4.7 | 2.2 | -3.3 | 3.9 | 2.1 | -3.3 | 3.9 | 1.0 | -2.7 | 4.5 | 0.1 | -2.7 | 4.5 |

Tabla A 20 Recopilación de resultados de la ubicación de Vaasa.

ANEXO 2. Irradiación utilizada por iHoga

A2.1 Irradiación diaria promedio mensual para el Caso 1

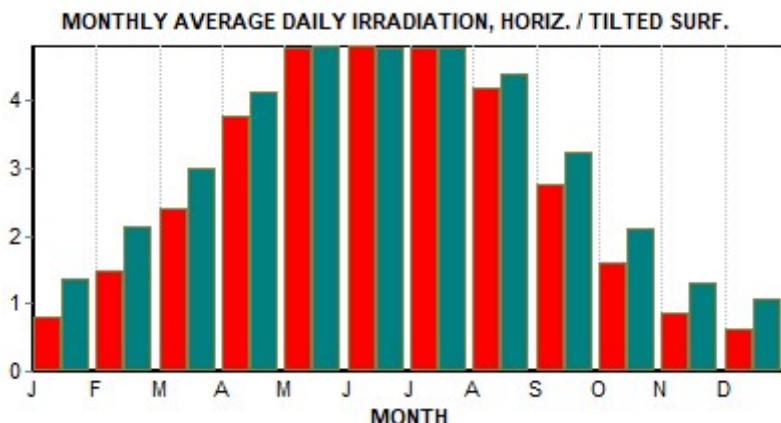


Ilustración A 1 Irradiación promedio diaria por mes descargada por iHoga desde NASA POWER para Berlín.

A2.2 Irradiación diaria promedio mensual para el Caso 2

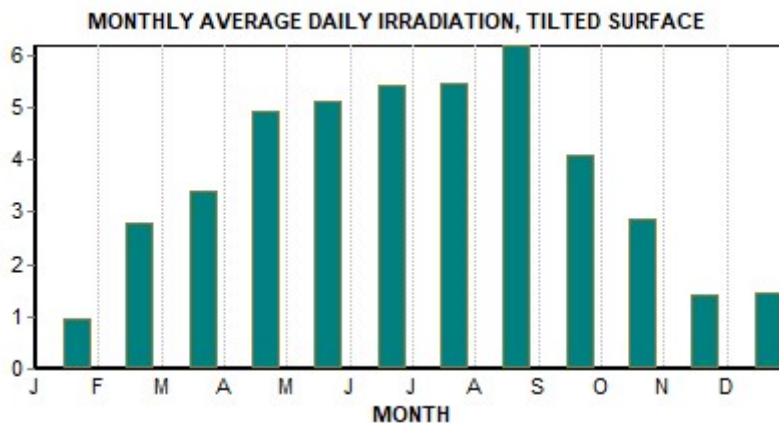


Ilustración A 2 Irradiación promedio diaria por mes descargada por iHoga desde PVGIS para Berlín.

A2.3 Irradiación diaria promedio mensual para el Caso 3

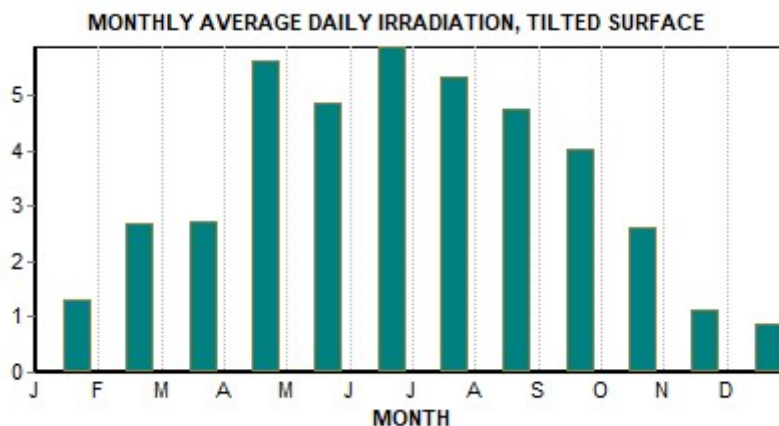


Ilustración A 3 Irradiación promedio diaria por mes descargada por iHoga desde Renewables.ninja para Berlín.

A2.4 Irradiación diaria promedio mensual para el Caso 4

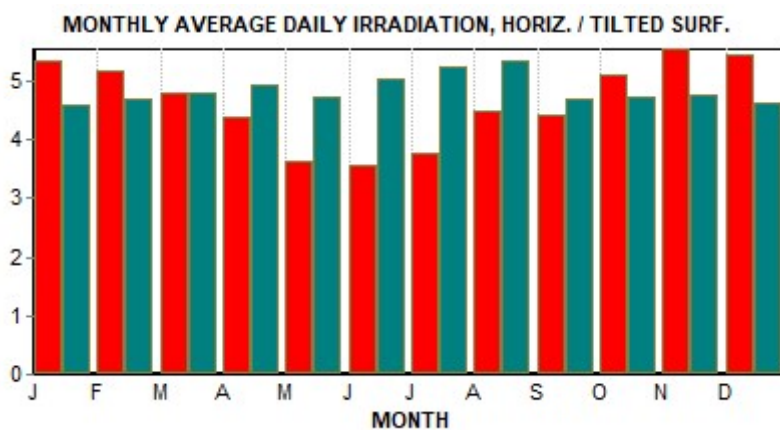


Ilustración A 4 Irradiación promedio diaria por mes descargada por iHoga desde NASA POWER para Santos.

A2.5 Irradiación diaria promedio mensual para el Caso 5

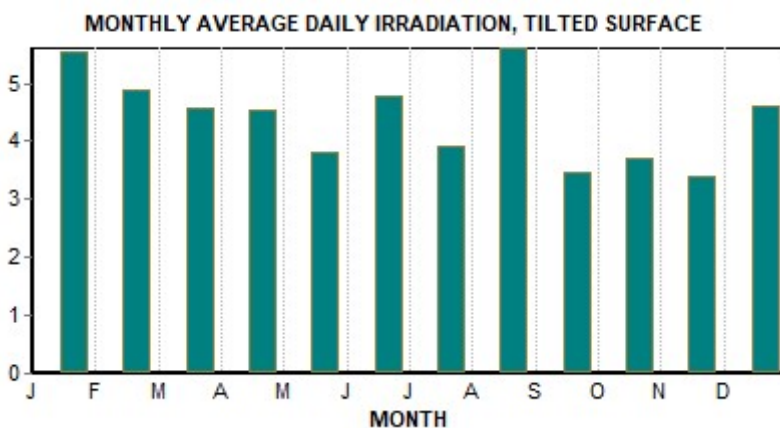


Ilustración A 5 Irradiación promedio diaria por mes descargada por iHoga desde PVGIS para Santos.

A2.6 Irradiación diaria promedio mensual para el Caso 6

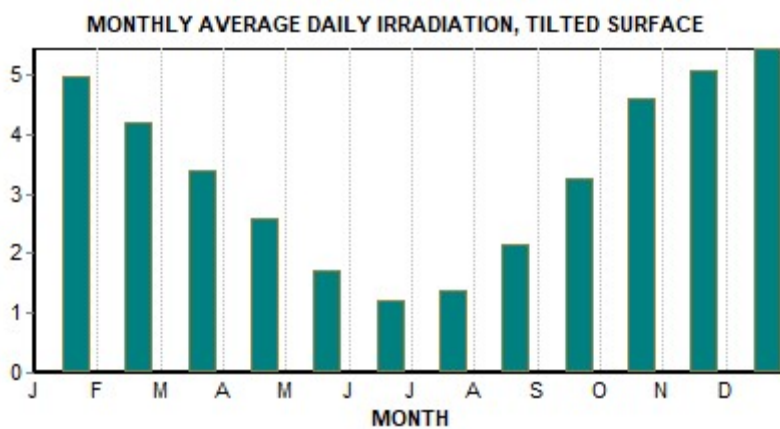


Ilustración A 6 Irradiación promedio diaria por mes descargada por iHoga desde PVGIS para Santos.

A2.7 Irradiación diaria promedio mensual para el Caso 7

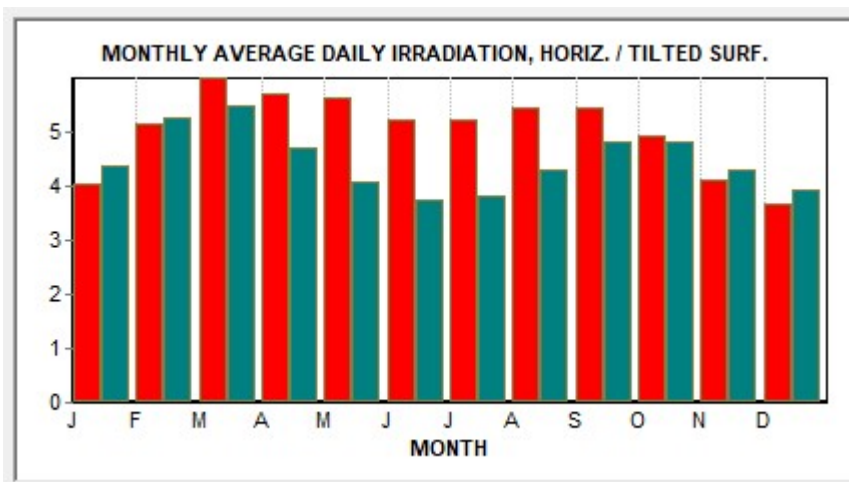


Ilustración A 7 Irradiación promedio diaria por mes descargada por iHoga desde NASA POWER para Ampara.

A2.8 Irradiación diaria promedio mensual para el Caso 8

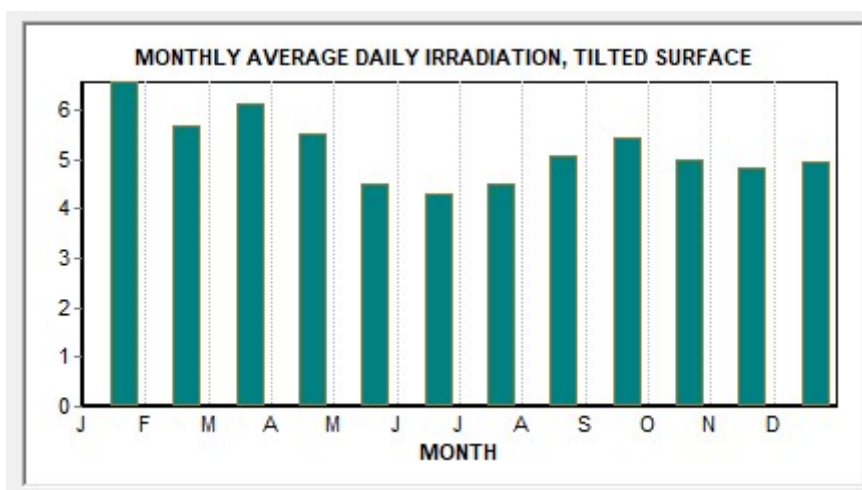


Ilustración A 8 Irradiación promedio diaria por mes descargada por iHoga desde PVGIS para Ampara.

A2.9 Irradiación diaria promedio mensual para el Caso 9

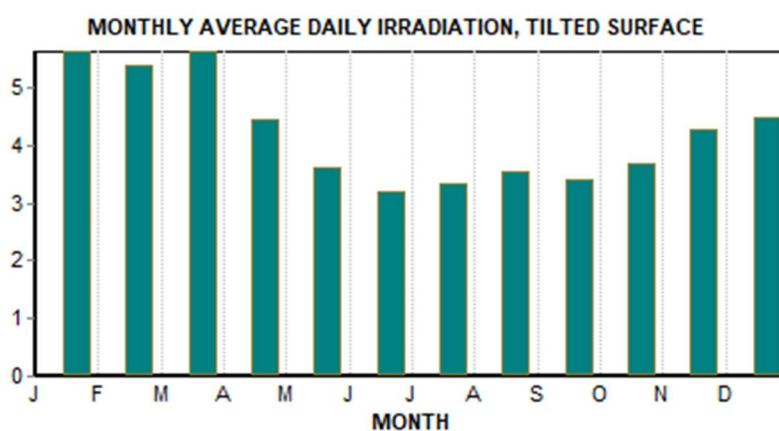


Ilustración A 9 Irradiación promedio diaria por mes descargada por iHoga desde Renewables.ninja para Ampara.

A2.10 Irradiación diaria promedio mensual para el Caso 10

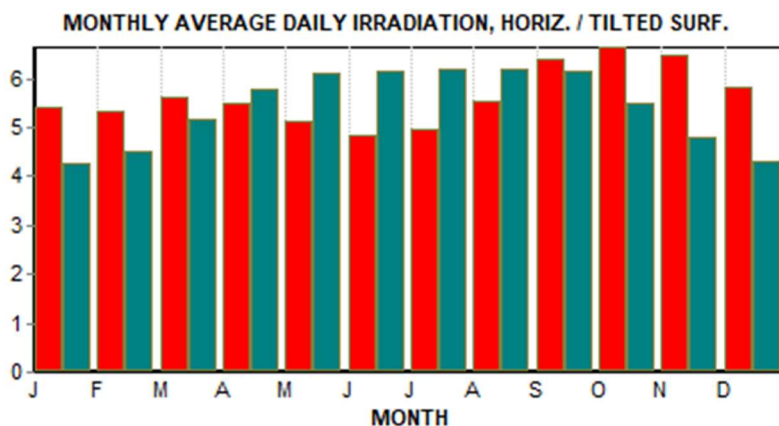


Ilustración A 10 Irradiación promedio diaria por mes descargada por iHoga desde NASA POWER para Antsiranana.

A2.11 Irradiación diaria promedio mensual para el Caso 11

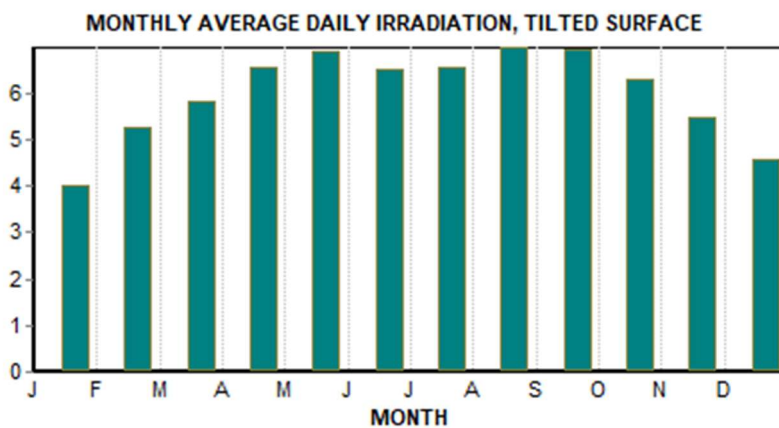


Ilustración A 11 Irradiación promedio diaria por mes descargada por iHoga desde PVGIS para Antsiranana.

A2.12 Irradiación diaria promedio mensual para el Caso 12

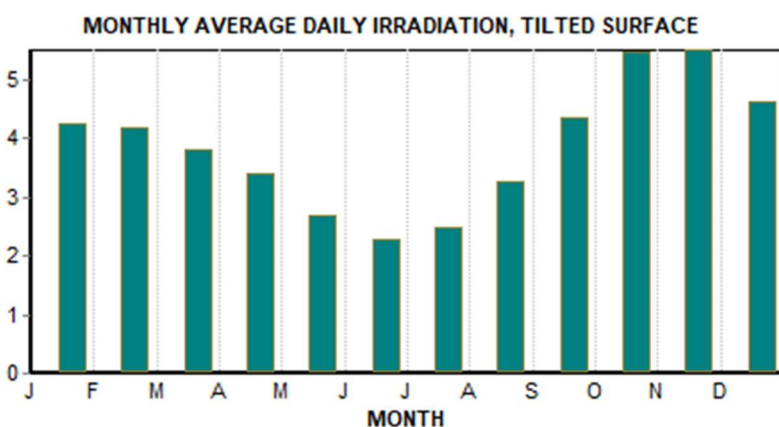


Ilustración A 12 Irradiación promedio diaria por mes descargada por iHoga desde Renewables.ninja para Antsiranana.

ANEXO 3. Informes generados tras las simulaciones con iHoga

A3.1 Informe de Berlín obtenido a partir de los datos de NASA POWER

PROJECT: C:\Users\Inlira\Desktop\Pr1.hoga. BEST SOLUTION FOUND

DC Voltage: 48 V. AC: 230 V.

COMPONENTS

PV pan. aSi12-Schott: ASI100, 4x14x100 Wp. P total = 5.6 kWp (100% PV#1)

Batt. OPZS-Hawker: TLS-3, 24x1x180 Ah. E total = 8.64 kWh (1.4 d.aut)

Without Wind Turbines

Without Hydro Turbine

1 x AC Gen. Diesel 1.9kVA, 1x1900 kVA

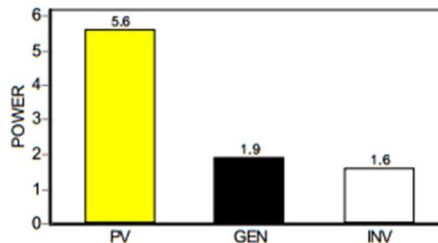
Without Fuel Cell

Without Electrolyzer

Inverter STECA: XPC 1600-48, 1600W

PV Battery charge controller STECA: P TAROM 4140 of 149 A

Battery charger (AC/DC converter) included in bi-di inverter



CONTROL STRATEGY

LOAD FOLLOWING. SOC min. batteries = 20 %

IF THE POWER PRODUCED BY THE RENEWABLE SOURCES IS HIGHER THAN LOAD: CHARGE

The Batteries are charged with the spare power from renewable

IF THE POWER PRODUCED BY THE RENEWABLE SOURCES IS LESS THAN LOAD: DISCHARGE

The power not supplied to meet the load will be supplied by the Batteries (if they cannot supply the whole, the rest will be supplied by the AC Generator).

$P_{gen} = INF W$

There is no Fuel Cell

AC Generator Minimum Power : 570 W

When power to be supplied by AC Gen. is < $P_{critical_gen} = 0 W$, AC gen. runs at full power (without excess), charging the Batt. (this hour and the next hours) until 20 % SOC is reached

Initial Investment: 14236.3 €. Loan: 80 %, int. 7% in 10 years, annual quota: 1621.5 €. Cost AC gen. fuel, 1st. year: 33.4 €

NPC OF THE SYSTEM (25 years lifetime): (comparing to only AC grid, 1499kWh/yr, NPC=9930.1 €)

Total System Costs (NPC): 26778.9 €. Levelized cost of energy: 0.92 €/kWh

PV Generator Costs (NPC): 8152.7 €

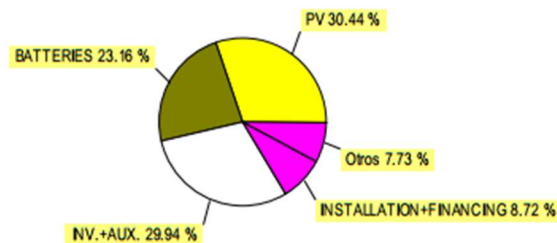
Battery bank Costs (NPC): 6201.2 €

AC Generator Costs (NPC): 1122.9 €

Auxiliary Components Costs (NPC): 4859.6 €

Inverter Costs (NPC): 3159.3 €

AC Generator Fuel Costs (NPC): 946.8 €



ENERGY BALANCE DURING 1 YEAR (kWh/year):

Overall Load Energy: 1498.7 kWh/yr. From Renewable: 96%

Unmet load: 10.6 kWh/yr (0.71 % load)

Export Energy: 2237.5 kWh/yr

Energy delivered by PV generator: 4118.3 kWh/yr

Energy delivered by Wind Turbines: 0 kWh/yr

Energy delivered by Hydro Turbine: 0 kWh/yr

Energy delivered by AC Generator: 49.6 kWh/yr

Hours eq. of AC Generator operation: 117.6 h/yr

Energy delivered by Fuel Cell: 0 kWh/yr

Hours of Fuel Cell operation: 0 h/yr

Energy at Electrolyzer: 0 kWh/yr

Hours of Electrolyzer operation: 0 h/yr

Energy charged by Batteries: 934.9 kWh/yr

Energy discharged by Batteries: 800.5 kWh/yr

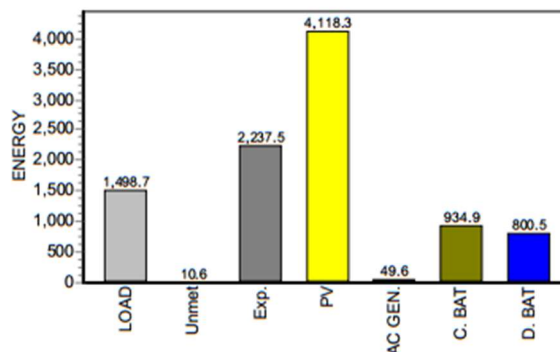
Batteries Lifetime: 12.16 years

E. sold to AC grid: 0 kWh/yr

E. Purchased from AC grid: 0 kWh/yr

Total CO2 emissions: 312.9kgCO2/yr; Emissions of AC generator (due to consumption of 25.692 litre/yr): 89.92 kgCO2/yr

H2 sold in one year: 0 kg H2/yr // HDI: 0.5251. Jobs created during system lifetime: 0.0168



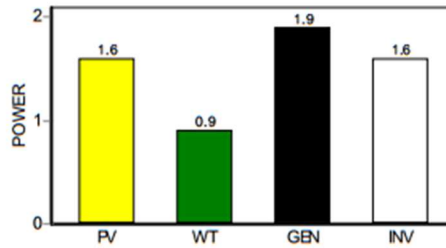
A3.2 Informe de Berlín obtenido a partir de los datos de PVGIS

PROJECT: C:\Users\nlira\Desktop\Pr1.hoga. OPTIMAL SOLUTION

DC Voltage: 48 V. AC: 230 V.

COMPONENTS

PV pan. aSi12-Schott: ASI100, 4x4x100 Wp. P total = 1.6 kWp (100% PV#1)
 Batt. OPZS-Hawker: TLS-3, 24x1x180 Ah. E total = 8.64 kWh (1.4 d.aut)
 1 Wind T. Southwest: Whisper100, 1x925 W (@14m/s). P. total 0.925 kW
 Without Hydro Turbine
 1 x AC Gen. Diesel 1.9kVA, 1x1900 kVA
 Without Fuel Cell
 Without Electrolyzer
 Inverter STECA: XPC 1600-48, 1600W
 PV Battery charge controller STECA: TAROM 440 of 40 A
 Battery charger (AC/DC converter) included in bi-di inverter



CONTROL STRATEGY

LOAD FOLLOWING. SOC min. batteries = 20 %

IF THE POWER PRODUCED BY THE RENEWABLE SOURCES IS HIGHER THAN LOAD: CHARGE

The Batteries are charged with the spare power from renewable

IF THE POWER PRODUCED BY THE RENEWABLE SOURCES IS LESS THAN LOAD: DISCHARGE

The power not supplied to meet the load will be supplied by the Batteries (if they cannot supply the whole, the rest will be supplied by the AC Generator).

P1gen = INF W

There is no Fuel Cell

AC Generator Minimum Power : 570 W

When power to be supplied by AC Gen. is < Pcritical_gen = 0 W, AC gen. runs at full power (without excess), charging the Batt. (this hour and the next hours) until 20 % SOC is reached

Initial Investment: 10715.2 €. Loan: 80 %, int. 7% in 10 years, annual quota: 1220.5 €. Cost AC gen. fuel, 1st. year: 194.8 €

NPC OF THE SYSTEM (25 years lifetime): (comparing to only AC grid, 1499kWh/yr, NPC=9930.1 €)

Total System Costs (NPC): 29129.7 €. Levelized cost of energy: 1 €/kWh

PV Generator Costs (NPC): 2889.7 €

Battery bank Costs (NPC): 6523.9 €

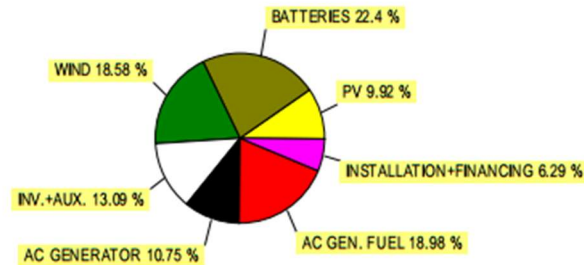
Wind turbines Costs (NPC): 5412.6 €

AC Generator Costs (NPC): 3130.8 €

Auxiliary Components Costs (NPC): 653.8 €

Inverter Costs (NPC): 3159.3 €

AC Generator Fuel Costs (NPC): 5528.3 €



ENERGY BALANCE DURING 1 YEAR (kWh/year):

Overall Load Energy: 1498.7 kWh/yr. From Renewable: 79.7%

Unmet load: 14.7 kWh/yr (0.98 % load)

Export Energy: 275.5 kWh/yr

Energy delivered by PV generator: 1402.4 kWh/yr

Energy delivered by Wind Turbines: 487.9 kWh/yr

Energy delivered by Hydro Turbine: 0 kWh/yr

Energy delivered by AC Generator: 289.6 kWh/yr

Hours eq. of AC Generator operation: 680.41 h/yr

Energy delivered by Fuel Cell: 0 kWh/yr

Hours of Fuel Cell operation: 0 h/yr

Energy at Electrolyzer: 0 kWh/yr

Hours of Electrolyzer operation: 0 h/yr

Energy charged by Batteries: 835.5 kWh/yr

Energy discharged by Batteries: 715.9 kWh/yr

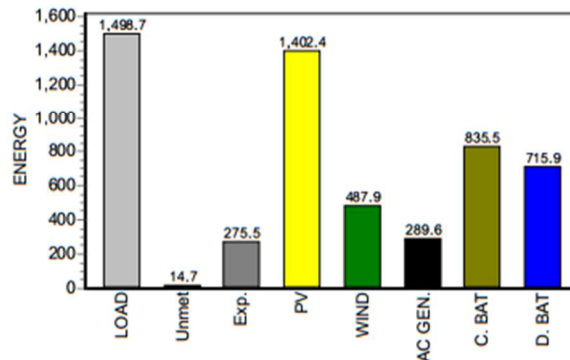
Batteries Lifetime: 11.07 years

E. sold to AC grid: 0 kWh/yr

E. Purchased from AC grid: 0 kWh/yr

Total CO2 emissions: 689.7kgCO2/yr; Emissions of AC generator (due to consumption of 149.846 litre/yr): 524.46 kgCO2/yr

H2 sold in one year: 0 kg H2/yr // HDI: 0.5249. Jobs created during system lifetime: 0.005



A3.3 Informe de Berlín obtenido a partir de los datos de Renewables.ninja

PROJECT: C:\Users\nlira\Desktop\Pr1.hoga. OPTIMAL SOLUTION

DC Voltage: 48 V. AC: 230 V.

COMPONENTS

PV pan. aSi12-Schott: ASI100, 4x11x100 Wp. P total = 4.4 kWp (100% PV#1)

Batt. OPZS-Hawker: TLS-3, 24x1x180 Ah. E total = 8.64 kWh (1.4 d.aut)

Without Wind Turbines

Without Hydro Turbine

1 x AC Gen. Diesel 1.9kVA, 1x1900 kVA

Without Fuel Cell

Without Electrolyzer

Inverter STECA: XPC 1600-48, 1600W

PV Battery charge controller STECA: P TAROM 4140 of 149 A

Battery charger (AC/DC converter) included in bi-di inverter

CONTROL STRATEGY

LOAD FOLLOWING. SOC min. batteries = 20 %

IF THE POWER PRODUCED BY THE RENEWABLE SOURCES IS HIGHER THAN LOAD: CHARGE

The Batteries are charged with the spare power from renewable

IF THE POWER PRODUCED BY THE RENEWABLE SOURCES IS LESS THAN LOAD: DISCHARGE

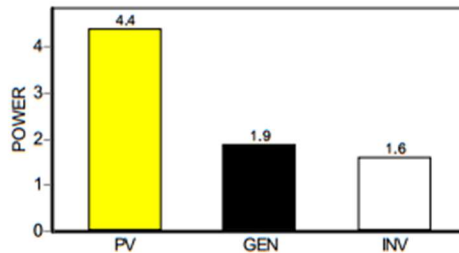
The power not supplied to meet the load will be supplied by the Batteries (if they cannot supply the whole, the rest will be supplied by the AC Generator).

P1gen = INF W

There is no Fuel Cell

AC Generator Minimum Power : 570 W

When power to be supplied by AC Gen. is < Pcritical_gen = 0 W, AC gen. runs at full power (without excess), charging the Batt. (this hour and the next hours) until 20 % SOC is reached



Initial Investment: 12889.9 €. Loan: 80 %, int. 7% in 10 years, annual quota: 1468.2 €. Cost AC gen. fuel, 1st. year: 137.3 €

NPC OF THE SYSTEM (25 years lifetime): (comparing to only AC grid, 1499kWh/yr, NPC=9930.1 €)

Total System Costs (NPC): 29748.1 €. Levelized cost of energy: 1.02 €/kWh

PV Generator Costs (NPC): 6573.8 €

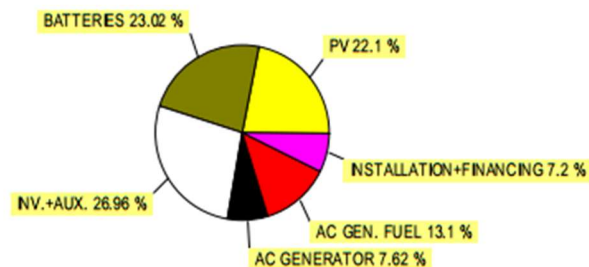
Battery bank Costs (NPC): 6848.6 €

AC Generator Costs (NPC): 2267.5 €

Auxiliary Components Costs (NPC): 4859.6 €

Inverter Costs (NPC): 3159.3 €

AC Generator Fuel Costs (NPC): 3896 €



ENERGY BALANCE DURING 1 YEAR (kWh/year):

Overall Load Energy: 1498.7 kWh/yr. From Renewable: 85.5%

Unmet load: 13.7 kWh/yr (0.91 % load)

Export Energy: 1913.2 kWh/yr

Energy delivered by PV generator: 3635.8 kWh/yr

Energy delivered by Wind Turbines: 0 kWh/yr

Energy delivered by Hydro Turbine: 0 kWh/yr

Energy delivered by AC Generator: 204.1 kWh/yr

Hours eq. of AC Generator operation: 480.2 h/yr

Energy delivered by Fuel Cell: 0 kWh/yr

Hours of Fuel Cell operation: 0 h/yr

Energy at Electrolyzer: 0 kWh/yr

Hours of Electrolyzer operation: 0 h/yr

Energy charged by Batteries: 985.8 kWh/yr

Energy discharged by Batteries: 843.9 kWh/yr

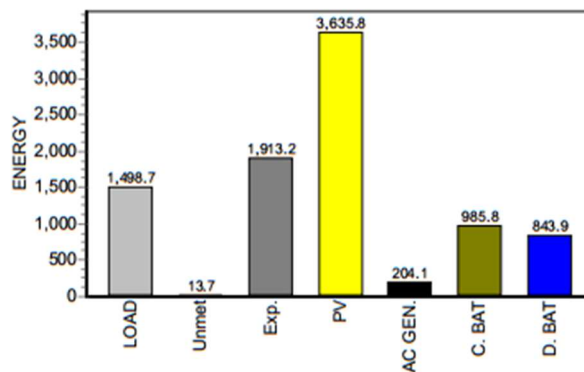
Batteries Lifetime: 10.26 years

E. sold to AC grid: 0 kWh/yr

E. Purchased from AC grid: 0 kWh/yr

Total CO2 emissions: 576.33kgCO2/yr; Emissions of AC generator (due to consumption of 105.615 litre/yr): 369.65 kgCO2/yr

H2 sold in one year: 0 kg H2/yr // HDI: 0.5249. Jobs created during system lifetime: 0.0132



A3.4 Informe de Santos obtenido a partir de los datos de NASA POWER

PROJECT: C:\Users\nlira\Desktop\Pr1.hoga. OPTIMAL SOLUTION

DC Voltage: 48 V. AC: 230 V.

COMPONENTS

PV pan. aSi12-Schott: ASI100, 4x5x100 Wp. P total = 2 kWp (100% PV#1)

Batt. OPZS-Hawker: TLS-3, 24x1x180 Ah. E total = 8.64 kWh (1.4 d.aut)

Without Wind Turbines

Without Hydro Turbine

1 x AC Gen. Gasoline 0.5kVA, 1x500 kVA

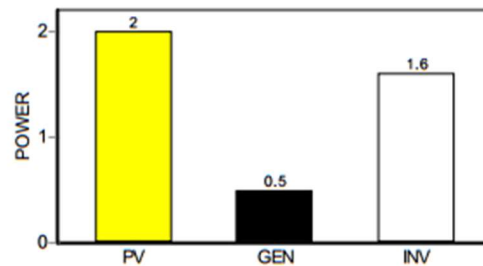
Without Fuel Cell

Without Electrolyzer

Inverter STECA: XPC 1600-48, 1600W

PV Battery charge controller STECA: P TAROM 4055 of 55 A

Without battery charger



CONTROL STRATEGY

LOAD FOLLOWING. SOC min. batteries = 20 %

IF THE POWER PRODUCED BY THE RENEWABLE SOURCES IS HIGHER THAN LOAD: CHARGE

The Batteries are charged with the spare power from renewable

IF THE POWER PRODUCED BY THE RENEWABLE SOURCES IS LESS THAN LOAD: DISCHARGE

The power not supplied to meet the load will be supplied by the Batteries (if they cannot supply the whole, the rest will be supplied by the AC Generator).

P1gen = INF W

There is no Fuel Cell

AC Generator Minimum Power : 150 W

When power to be supplied by AC Gen. is < Pcritical_gen = 0 W, AC gen. runs at full power (without excess), charging the Batt. (this hour and the next hours) until 20 % SOC is reached

Initial Investment: 8906.8 €. Loan: 80 %, int. 7% in 10 years, annual quota: 1014.5 €. Cost AC gen. fuel, 1st. year: 0 €

NPC OF THE SYSTEM (25 years lifetime): (comparing to only AC grid, 1499kWh/yr, NPC=9930.1 €)

Total System Costs (NPC): 18164.6 €. Levelized cost of energy: 0.62 €/kWh

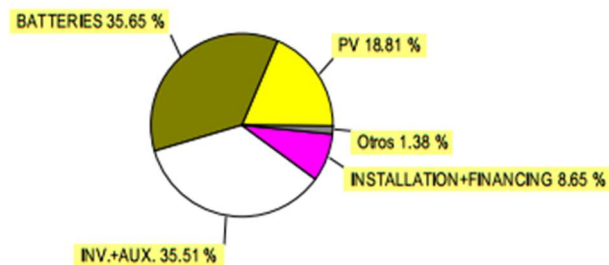
PV Generator Costs (NPC): 3416 €

Battery bank Costs (NPC): 6476.4 €

AC Generator Costs (NPC): 250 €

Auxiliary Components Costs (NPC): 3290.9 €

Inverter Costs (NPC): 3159.3 €



ENERGY BALANCE DURING 1 YEAR (kWh/year):

Overall Load Energy: 1498.7 kWh/yr. From Renewable: 100%

Unmet load: 0 kWh/yr (0 % load)

Export Energy: 317.8 kWh/yr

Energy delivered by PV generator: 2307.3 kWh/yr

Energy delivered by Wind Turbines: 0 kWh/yr

Energy delivered by Hydro Turbine: 0 kWh/yr

Energy delivered by AC Generator: 0 kWh/yr

Hours eq. of AC Generator operation: 0 h/yr

Energy delivered by Fuel Cell: 0 kWh/yr

Hours of Fuel Cell operation: 0 h/yr

Energy at Electrolyzer: 0 kWh/yr

Hours of Electrolyzer operation: 0 h/yr

Energy charged by Batteries: 1075.5 kWh/yr

Energy discharged by Batteries: 915.8 kWh/yr

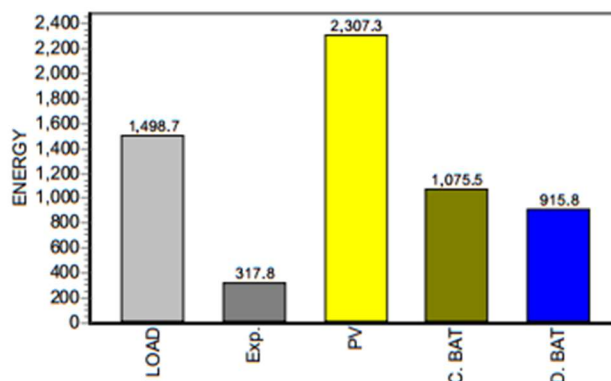
Batteries Lifetime: 11.42 years

E. sold to AC grid: 0 kWh/yr

E. Purchased from AC grid: 0 kWh/yr

Total CO2 emissions: 105.59kgCO2/yr; Emissions of AC generator (due to consumption of 0 litre/yr): 0 kgCO2/yr

H2 sold in one year: 0 kg H2/yr // HDI: 0.5258. Jobs created during system lifetime: 0.006



A3.5 Informe de Santos obtenido a partir de los datos de PVGIS

PROJECT: C:\Users\Inlira\Desktop\Pr1.hoga. OPTIMAL SOLUTION

DC Voltage: 48 V. AC: 230 V.

COMPONENTS

PV pan. aSi12-Schott: ASI100, 4x6x100 Wp. P total = 2.4 kWp (100% PV#1)

Batt. OPZS-Hawker: TLS-5, 24x1x270 Ah. E total = 12.96 kWh (2.2 d.aut)

Without Wind Turbines

Without Hydro Turbine

1 x AC Gen. Diesel 1.9kVA, 1x1900 kVA

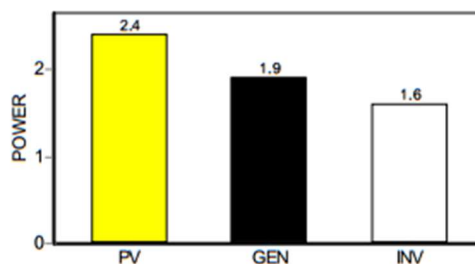
Without Fuel Cell

Without Electrolyzer

Inverter STECA: XPC 1600-48, 1600W

PV Battery charge controller STECA: P TAROM 4055 of 55 A

Battery charger (AC/DC converter) included in bi-di inverter



CONTROL STRATEGY

LOAD FOLLOWING. SOC min. batteries = 20 %

IF THE POWER PRODUCED BY THE RENEWABLE SOURCES IS HIGHER THAN LOAD: CHARGE

The Batteries are charged with the spare power from renewable

IF THE POWER PRODUCED BY THE RENEWABLE SOURCES IS LESS THAN LOAD: DISCHARGE

The power not supplied to meet the load will be supplied by the Batteries (if they cannot supply the whole, the rest will be supplied by the AC Generator).

P1gen = INF W

There is no Fuel Cell

AC Generator Minimum Power : 570 W

When power to be supplied by AC Gen. is < Pcritical_gen = 0 W, AC gen. runs at full power (without excess), charging the Batt. (this hour and the next hours) until 20 % SOC is reached

Initial investment: 11165 €. Loan: 80 %, int. 7% in 10 years, annual quota: 1271.7 €. Cost AC gen. fuel, 1st. year: 52.2 €

NPC OF THE SYSTEM (25 years lifetime): (comparing to only AC grid, 1499kWh/yr, NPC=9930.1 €)

Total System Costs (NPC): 22708.3 €. Levelized cost of energy: 0.78 €/kWh

PV Generator Costs (NPC): 3942.3 €

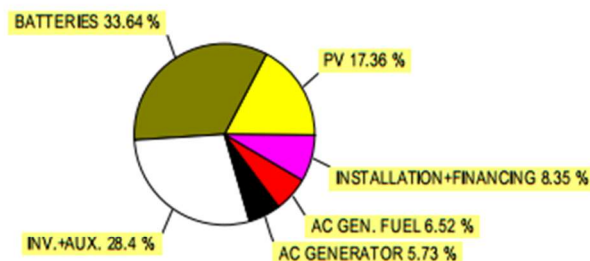
Battery bank Costs (NPC): 7638.7 €

AC Generator Costs (NPC): 1301.1 €

Auxiliary Components Costs (NPC): 3290.9 €

Inverter Costs (NPC): 3159.3 €

AC Generator Fuel Costs (NPC): 1480 €



ENERGY BALANCE DURING 1 YEAR (kWh/year):

Overall Load Energy: 1498.7 kWh/yr. From Renewable: 94.3%

Unmet load: 7.2 kWh/yr (0.48 % load)

Export Energy: 610.6 kWh/yr

Energy delivered by PV generator: 2513.6 kWh/yr

Energy delivered by Wind Turbines: 0 kWh/yr

Energy delivered by Hydro Turbine: 0 kWh/yr

Energy delivered by AC Generator: 77.5 kWh/yr

Hours eq. of AC Generator operation: 182.5 h/yr

Energy delivered by Fuel Cell: 0 kWh/yr

Hours of Fuel Cell operation: 0 h/yr

Energy at Electrolyzer: 0 kWh/yr

Hours of Electrolyzer operation: 0 h/yr

Energy charged by Batteries: 1151.6 kWh/yr

Energy discharged by Batteries: 980.4 kWh/yr

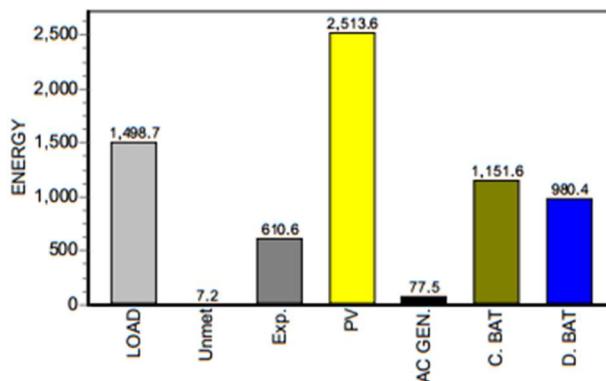
Batteries Lifetime: 14.89 years

E. sold to AC grid: 0 kWh/yr

E. Purchased from AC grid: 0 kWh/yr

Total CO2 emissions: 272.52kgCO2/yr; Emissions of AC generator (due to consumption of 40.154 litre/yr): 140.54 kgCO2/yr

H2 sold in one year: 0 kg H2/yr // HDI: 0.5254. Jobs created during system lifetime: 0.0072



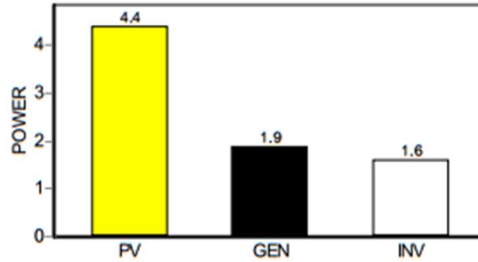
A3.6 Informe de Santos obtenido a partir de los datos de Renewables.ninja

PROJECT: C:\Users\nlira\Desktop\Pr1.hoga. OPTIMAL SOLUTION

DC Voltage: 48 V. AC: 230 V.

COMPONENTS

PV pan. aSi12-Schott: ASI100, 4x11x100 Wp. P total = 4.4 kWp (100% PV#1)
 Batt. OPZS-Hawker: TLS-3, 24x1x180 Ah. E total = 8.64 kWh (1.4 d.aut)
 Without Wind Turbines
 Without Hydro Turbine
 1 x AC Gen. Diesel 1.9kVA, 1x1900 kVA
 Without Fuel Cell
 Without Electrolyzer
 Inverter STECA: XPC 1600-48, 1600W
 PV Battery charge controller STECA: P TAROM 4140 of 149 A
 Battery charger (AC/DC converter) included in bi-di inverter



CONTROL STRATEGY

LOAD FOLLOWING. SOC min. batteries = 20 %

IF THE POWER PRODUCED BY THE RENEWABLE SOURCES IS HIGHER THAN LOAD: CHARGE

The Batteries are charged with the spare power from renewable

IF THE POWER PRODUCED BY THE RENEWABLE SOURCES IS LESS THAN LOAD: DISCHARGE

The power not supplied to meet the load will be supplied by the Batteries (if they cannot supply the whole, the rest will be supplied by the AC Generator).

P1gen = INF W

There is no Fuel Cell

AC Generator Minimum Power : 570 W

When power to be supplied by AC Gen. is < Pcritical_gen = 0 W, AC gen. runs at full power (without excess), charging the Batt. (this hour and the next hours) until 20 % SOC is reached

Initial Investment: 12889.9 €. Loan: 80 %, int. 7% in 10 years, annual quota: 1468.2 €. Cost AC gen. fuel, 1st. year: 56 €

NPC OF THE SYSTEM (25 years lifetime): (comparing to only AC grid, 1499kWh/yr, NPC=9930.1 €)

Total System Costs (NPC): 26167.4 €. Levelized cost of energy: 0.9 €/kWh

PV Generator Costs (NPC): 6573.8 €

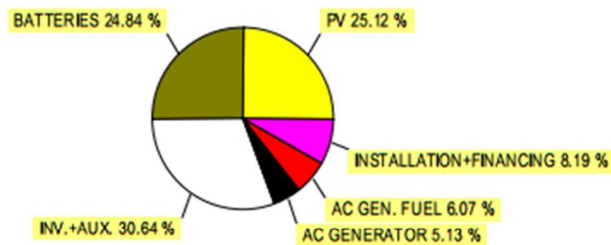
Battery bank Costs (NPC): 6500.2 €

AC Generator Costs (NPC): 1342.3 €

Auxiliary Components Costs (NPC): 4859.6 €

Inverter Costs (NPC): 3159.3 €

AC Generator Fuel Costs (NPC): 1588.8 €



ENERGY BALANCE DURING 1 YEAR (kWh/year):

Overall Load Energy: 1498.7 kWh/yr. From Renewable: 93.6%

Unmet load: 12.9 kWh/yr (0.86 % load)

Export Energy: 1621.6 kWh/yr

Energy delivered by PV generator: 3475.2 kWh/yr

Energy delivered by Wind Turbines: 0 kWh/yr

Energy delivered by Hydro Turbine: 0 kWh/yr

Energy delivered by AC Generator: 83.2 kWh/yr

Hours eq. of AC Generator operation: 197.5 h/yr

Energy delivered by Fuel Cell: 0 kWh/yr

Hours of Fuel Cell operation: 0 h/yr

Energy at Electrolyzer: 0 kWh/yr

Hours of Electrolyzer operation: 0 h/yr

Energy charged by Batteries: 993.9 kWh/yr

Energy discharged by Batteries: 845.9 kWh/yr

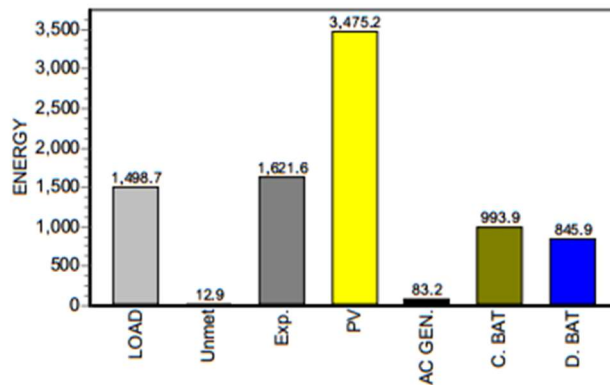
Batteries Lifetime: 11.24 years

E. sold to AC grid: 0 kWh/yr

E. Purchased from AC grid: 0 kWh/yr

Total CO2 emissions: 341.85kgCO2/yr; Emissions of AC generator (due to consumption of 43.077 litre/yr): 150.77 kgCO2/yr

H2 sold in one year: 0 kg H2/yr // HDI: 0.525. Jobs created during system lifetime: 0.0132



A3.7 Informe de Ampara obtenido a partir de los datos de NASA POWER

PROJECT: C:\Users\lira\Desktop\Pr1.hoga. OPTIMAL SOLUTION

DC Voltage: 48 V. AC: 230 V.

COMPONENTS

PV pan. aSi12-Schott: ASI100, 4x6x100 Wp. P total = 2.4 kWp (100% PV#1)

Batt. OPZS-Hawker: TLS-3, 24x1x180 Ah. E total = 8.64 kWh (1.4 d.aut)

Without Wind Turbines

Without Hydro Turbine

1 x AC Gen. Gasoline 0.5kVA, 1x500 kVA

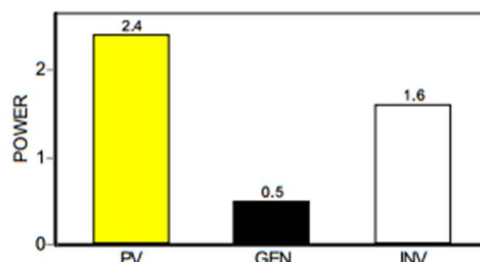
Without Fuel Cell

Without Electrolyzer

Inverter STECA: XPC 1600-48, 1600W

PV Battery charge controller STECA: P TAROM 4055 of 55 A

Without battery charger



CONTROL STRATEGY

LOAD FOLLOWING. SOC min. batteries = 20 %

IF THE POWER PRODUCED BY THE RENEWABLE SOURCES IS HIGHER THAN LOAD: CHARGE

The Batteries are charged with the spare power from renewable

IF THE POWER PRODUCED BY THE RENEWABLE SOURCES IS LESS THAN LOAD: DISCHARGE

The power not supplied to meet the load will be supplied by the Batteries (if they cannot supply the whole, the rest will be supplied by the AC Generator).

$P_{1gen} = INF W$

There is no Fuel Cell

AC Generator Minimum Power: 150 W

When power to be supplied by AC Gen. is < $P_{critical_gen} = 0 W$, AC gen. runs at full power (without excess), charging the Batt. (this hour and the next hours) until 20 % SOC is reached

Initial Investment: 9355.6 €. Loan: 80 %, int. 7% in 10 years, annual quota: 1065.6 €. Cost AC gen. fuel, 1st. year: 0 €

NPC OF THE SYSTEM (25 years lifetime): (comparing to only AC grid, 1499kWh/yr, NPC=9930.1 €)

Total System Costs (NPC): 18748.9 €. Levelized cost of energy: 0.64 €/kWh

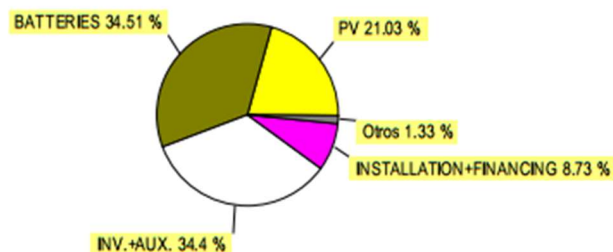
PV Generator Costs (NPC): 3942.3 €

Battery bank Costs (NPC): 6470 €

AC Generator Costs (NPC): 250 €

Auxiliary Components Costs (NPC): 3290.9 €

Inverter Costs (NPC): 3159.3 €



ENERGY BALANCE DURING 1 YEAR (kWh/year):

Overall Load Energy: 1498.7 kWh/yr. From Renewable: 100%

Unmet load: 0 kWh/yr (0 % load)

Export Energy: 554.8 kWh/yr

Energy delivered by PV generator: 2537.2 kWh/yr

Energy delivered by Wind Turbines: 0 kWh/yr

Energy delivered by Hydro Turbine: 0 kWh/yr

Energy delivered by AC Generator: 0 kWh/yr

Hours eq. of AC Generator operation: 0 h/yr

Energy delivered by Fuel Cell: 0 kWh/yr

Hours of Fuel Cell operation: 0 h/yr

Energy at Electrolyzer: 0 kWh/yr

Hours of Electrolyzer operation: 0 h/yr

Energy charged by Batteries: 1066.4 kWh/yr

Energy discharged by Batteries: 908.1 kWh/yr

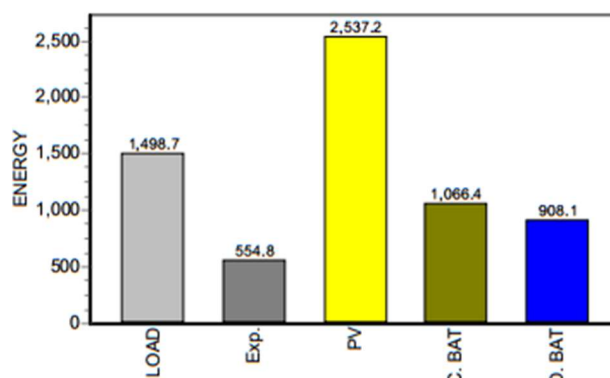
Batteries Lifetime: 11.47 years

E. sold to AC grid: 0 kWh/yr

E. Purchased from AC grid: 0 kWh/yr

Total CO2 emissions: 118.22kgCO2/yr; Emissions of AC generator (due to consumption of 0 litre/yr): 0 kgCO2/yr

H2 sold in one year: 0 kg H2/yr // HDI: 0.5258. Jobs created during system lifetime: 0.0072



A3.8 Informe de Ampara obtenido a partir de los datos de PVGIS

PROJECT: C:\Users\nlira\Desktop\Pr1.hoga. OPTIMAL SOLUTION

DC Voltage: 48 V. AC: 230 V.

COMPONENTS

PV pan. aSi12-Schott: ASI100, 4x4x100 Wp. P total = 1.6 kWp (100% PV#1)

Batt. OPZS-Hawker: TLS-3, 24x1x180 Ah. E total = 8.64 kWh (1.4 d.aut)

Without Wind Turbines

Without Hydro Turbine

1 x AC Gen. Diesel 1.9kVA, 1x1900 kVA

Without Fuel Cell

Without Electrolyzer

Inverter STECA: XPC 1600-48, 1600W

PV Battery charge controller STECA: TAROM 440 of 40 A

Battery charger (AC/DC converter) included in bi-di inverter

CONTROL STRATEGY

LOAD FOLLOWING. SOC min. batteries = 20 %

IF THE POWER PRODUCED BY THE RENEWABLE SOURCES IS HIGHER THAN LOAD: CHARGE

The Batteries are charged with the spare power from renewable

IF THE POWER PRODUCED BY THE RENEWABLE SOURCES IS LESS THAN LOAD: DISCHARGE

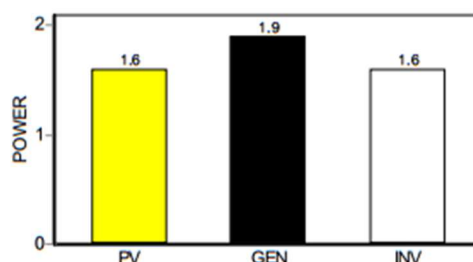
The power not supplied to meet the load will be supplied by the Batteries (if they cannot supply the whole, the rest will be supplied by the AC Generator).

P1gen = INF W

There is no Fuel Cell

AC Generator Minimum Power : 570 W

When power to be supplied by AC Gen. is < Pcritical_gen = 0 W, AC gen. runs at full power (without excess), charging the Batt. (this hour and the next hours) until % SOC is reached



Initial Investment: 7792.9 €. Loan: 80 %, int. 7% in 10 years, annual quota: 887.6 €. Cost AC gen. fuel, 1st. year: 68.3 €

NPC OF THE SYSTEM (25 years lifetime): (comparing to only AC grid, 1499kWh/yr, NPC=9930.1 €)

Total System Costs (NPC): 18218.7 €. Levelized cost of energy: 0.63 €/kWh

PV Generator Costs (NPC): 2889.7 €

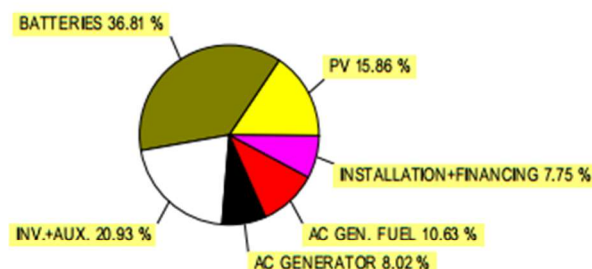
Battery bank Costs (NPC): 6706.2 €

AC Generator Costs (NPC): 1460.4 €

Auxiliary Components Costs (NPC): 653.8 €

Inverter Costs (NPC): 3159.3 €

AC Generator Fuel Costs (NPC): 1937.1 €



ENERGY BALANCE DURING 1 YEAR (kWh/year):

Overall Load Energy: 1498.7 kWh/yr. From Renewable: 92.3%

Unmet load: 13.4 kWh/yr (0.89 % load)

Export Energy: 140.7 kWh/yr

Energy delivered by PV generator: 1984.3 kWh/yr

Energy delivered by Wind Turbines: 0 kWh/yr

Energy delivered by Hydro Turbine: 0 kWh/yr

Energy delivered by AC Generator: 101.5 kWh/yr

Hours eq. of AC Generator operation: 240.52 h/yr

Energy delivered by Fuel Cell: 0 kWh/yr

Hours of Fuel Cell operation: 0 h/yr

Energy at Electrolyzer: 0 kWh/yr

Hours of Electrolyzer operation: 0 h/yr

Energy charged by Batteries: 1052.5 kWh/yr

Energy discharged by Batteries: 899.3 kWh/yr

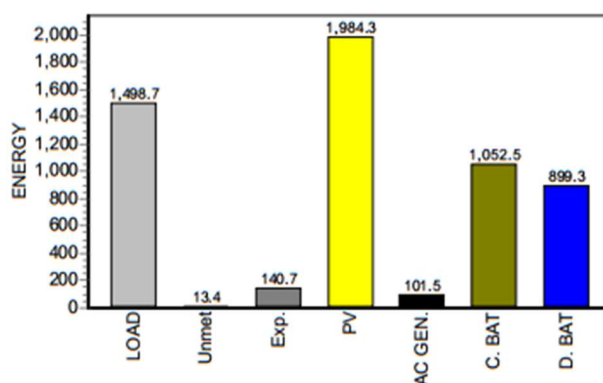
Batteries Lifetime: 10.83 years

E. sold to AC grid: 0 kWh/yr

E. Purchased from AC grid: 0 kWh/yr

Total CO2 emissions: 288.66kgCO2/yr; Emissions of AC generator (due to consumption of 52.538 litre/yr): 183.88 kgCO2/yr

H2 sold in one year: 0 kg H2/yr // HDI: 0.525. Jobs created during system lifetime: 0.0048



A3.9 Informe de Ampara obtenido a partir de los datos de Renewables.ninja

PROJECT: C:\Users\nlira\Desktop\Pr1.hoga. OPTIMAL SOLUTION

DC Voltage: 48 V. AC: 230 V.

COMPONENTS

PV pan. aSI12-Schott: ASI100, 4x6x100 Wp. P total = 2.4 kWp (100% PV#1)

Batt. OPZS-Hawker: TLS-3, 24x1x180 Ah. E total = 8.64 kWh (1.4 d.aut)

Without Wind Turbines

Without Hydro Turbine

1 x AC Gen. Diesel 1.9kVA, 1x1900 kVA

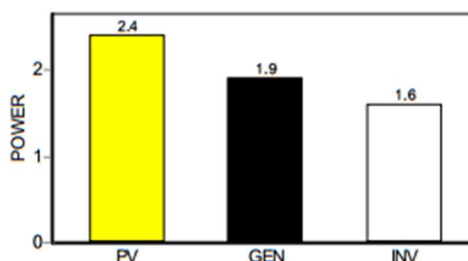
Without Fuel Cell

Without Electrolyzer

Inverter STECA: XPC 1600-48, 1600W

PV Battery charge controller STECA: P TAROM 4055 of 55 A

Battery charger (AC/DC converter) included in bi-di inverter



CONTROL STRATEGY

LOAD FOLLOWING. SOC min. batteries = 20 %

IF THE POWER PRODUCED BY THE RENEWABLE SOURCES IS HIGHER THAN LOAD: CHARGE

The Batteries are charged with the spare power from renewable

IF THE POWER PRODUCED BY THE RENEWABLE SOURCES IS LESS THAN LOAD: DISCHARGE

The power not supplied to meet the load will be supplied by the Batteries (if they cannot supply the whole, the rest will be supplied by the AC Generator).

P1gen = INF W

There is no Fuel Cell

AC Generator Minimum Power: 570 W

When power to be supplied by AC Gen. is < Poptical_gen = 0 W, AC gen. runs at full power (without excess), charging the Batt. (this hour and the next hours) until 20 % SOC is reached

Initial Investment: 9916.6 €. Loan: 80 %, int. 7% in 10 years, annual quota: 1129.5 €. Cost AC gen. fuel, 1st. year: 19.2 €

NPC OF THE SYSTEM (25 years lifetime): (comparing to only AC grid, 1499kWh/yr, NPC=9930.1 €)

Total System Costs (NPC): 20160.6 €. Levelized cost of energy: 0.69 €/kWh

PV Generator Costs (NPC): 3942.3 €

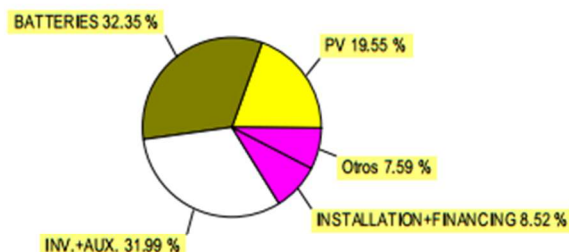
Battery bank Costs (NPC): 6521.6 €

AC Generator Costs (NPC): 985.6 €

Auxiliary Components Costs (NPC): 3290.9 €

Inverter Costs (NPC): 3159.3 €

AC Generator Fuel Costs (NPC): 544.1 €



ENERGY BALANCE DURING 1 YEAR (kWh/year):

Overall Load Energy: 1498.7 kWh/yr. From Renewable: 97.8%

Unmet load: 4.1 kWh/yr (0.27 % load)

Export Energy: 457.2 kWh/yr

Energy delivered by PV generator: 2401.7 kWh/yr

Energy delivered by Wind Turbines: 0 kWh/yr

Energy delivered by Hydro Turbine: 0 kWh/yr

Energy delivered by AC Generator: 28.5 kWh/yr

Hours eq. of AC Generator operation: 67.6 h/yr

Energy delivered by Fuel Cell: 0 kWh/yr

Hours of Fuel Cell operation: 0 h/yr

Energy at Electrolyzer: 0 kWh/yr

Hours of Electrolyzer operation: 0 h/yr

Energy charged by Batteries: 1090.8 kWh/yr

Energy discharged by Batteries: 929 kWh/yr

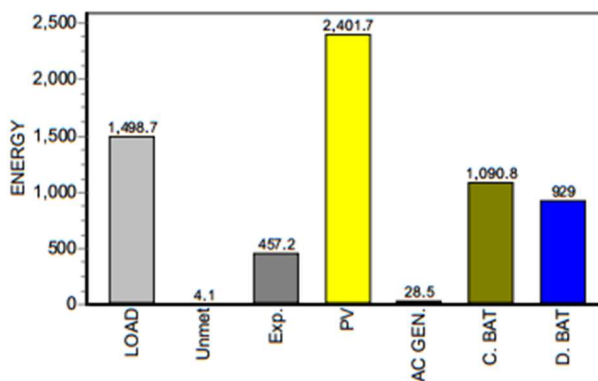
Batteries Lifetime: 11.09 years

E. sold to AC grid: 0 kWh/yr

E. Purchased from AC grid: 0 kWh/yr

Total CO2 emissions: 174.02kgCO2/yr; Emissions of AC generator (due to consumption of 14.769 litre/yr): 51.69 kgCO2/yr

H2 sold in one year: 0 kg H2/yr // HDI: 0.5256. Jobs created during system lifetime: 0.0072



A3.10 Informe de Antsiranana obtenido a partir de los datos de NASA POWER

PROJECT: C:\Users\nlira\Desktop\Pr1.hoga. OPTIMAL SOLUTION

DC Voltage: 48 V. AC: 230 V.

COMPONENTS

PV pan. aSi12-Schott: ASI100, 4x4x100 Wp. P total = 1.6 kWp (100% PV#1)

Batt. OPZS-Hawker: TLS-3, 24x1x180 Ah. E total = 8.64 kWh (1.4 d.aut)

Without Wind Turbines

Without Hydro Turbine

1 x AC Gen. Diesel 1.9kVA, 1x1900 kVA

Without Fuel Cell

Without Electrolyzer

Inverter STECA: XPC 1600-48, 1600W

PV Battery charge controller STECA: TAROM 440 of 40 A

Battery charger (AC/DC converter) included in bi-di inverter

CONTROL STRATEGY

LOAD FOLLOWING. SOC min. batteries = 20 %

IF THE POWER PRODUCED BY THE RENEWABLE SOURCES IS HIGHER THAN LOAD: CHARGE

The Batteries are charged with the spare power from renewable

IF THE POWER PRODUCED BY THE RENEWABLE SOURCES IS LESS THAN LOAD: DISCHARGE

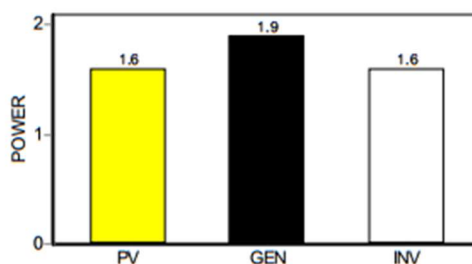
The power not supplied to meet the load will be supplied by the Batteries (if they cannot supply the whole, the rest will be supplied by the AC Generator).

$P_{gen} = INF W$

There is no Fuel Cell

AC Generator Minimum Power : 570 W

When power to be supplied by AC Gen. is < $P_{critical_gen} = 0 W$, AC gen. runs at full power (without excess), charging the Batt. (this hour and the next hours) until 20 % SOC is reached



Initial Investment: 7792.9 €. Loan: 80 %, int. 7% in 10 years, annual quota: 887.6 €. Cost AC gen. fuel, 1st. year: 44.1 €

NPC OF THE SYSTEM (25 years lifetime): (comparing to only AC grid, 1499kWh/yr, NPC=9930.1 €)

Total System Costs (NPC): 16990.3 €. Levelized cost of energy: 0.58 €/kWh

PV Generator Costs (NPC): 2889.7 €

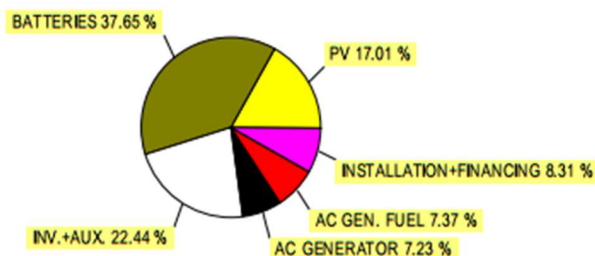
Battery bank Costs (NPC): 6396.2 €

AC Generator Costs (NPC): 1227.6 €

Auxiliary Components Costs (NPC): 653.8 €

Inverter Costs (NPC): 3159.3 €

AC Generator Fuel Costs (NPC): 1251.5 €



ENERGY BALANCE DURING 1 YEAR (kWh/year):

Overall Load Energy: 1498.7 kWh/yr. From Renewable: 94.9%

Unmet load: 10.3 kWh/yr (0.69 % load)

Export Energy: 179.2 kWh/yr

Energy delivered by PV generator: 2067.2 kWh/yr

Energy delivered by Wind Turbines: 0 kWh/yr

Energy delivered by Hydro Turbine: 0 kWh/yr

Energy delivered by AC Generator: 65.6 kWh/yr

Hours eq. of AC Generator operation: 155.72 h/yr

Energy delivered by Fuel Cell: 0 kWh/yr

Hours of Fuel Cell operation: 0 h/yr

Energy at Electrolyzer: 0 kWh/yr

Hours of Electrolyzer operation: 0 h/yr

Energy charged by Batteries: 1029.9 kWh/yr

Energy discharged by Batteries: 881.2 kWh/yr

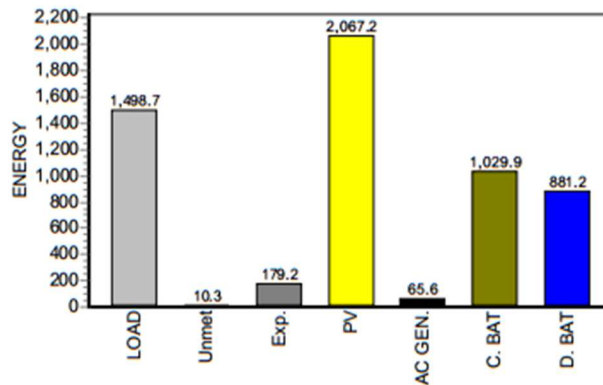
Batteries Lifetime: 11.67 years

E. sold to AC grid: 0 kWh/yr

E. Purchased from AC grid: 0 kWh/yr

Total CO2 emissions: 216.99kgCO2/yr; Emissions of AC generator (due to consumption of 33.923 litre/yr): 118.73 kgCO2/yr

H2 sold in one year: 0 kg H2/yr // HDI: 0.5252. Jobs created during system lifetime: 0.0048



A3.11 Informe de Antsiranana obtenido a partir de los datos de PVGIS

PROJECT: C:\Users\nlira\Desktop\Pr1.hoga. OPTIMAL SOLUTION

DC Voltage: 48 V. AC: 230 V.

COMPONENTS

PV pan. aSi12-Schott: ASI100, 4x4x100 Wp. P total = 1.6 kWp (100% PV#1)

Batt. OPZS-Hawker: TLS-3, 24x1x180 Ah. E total = 8.64 kWh (1.4 d.aut)

Without Wind Turbines

Without Hydro Turbine

1 x AC Gen. Diesel 1.9kVA, 1x1900 kVA

Without Fuel Cell

Without Electrolyzer

Inverter STECA: XPC 1600-48, 1600W

PV Battery charge controller STECA: TAROM 440 of 40 A

Battery charger (AC/DC converter) included in bi-di inverter

CONTROL STRATEGY

LOAD FOLLOWING. SOC min. batteries = 20 %

IF THE POWER PRODUCED BY THE RENEWABLE SOURCES IS HIGHER THAN LOAD: CHARGE

The Batteries are charged with the spare power from renewable

IF THE POWER PRODUCED BY THE RENEWABLE SOURCES IS LESS THAN LOAD: DISCHARGE

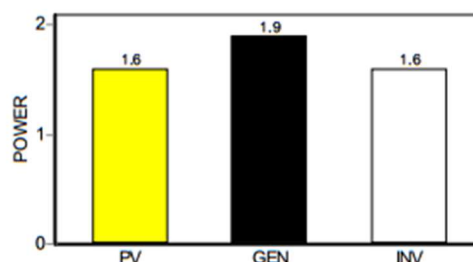
The power not supplied to meet the load will be supplied by the Batteries (if they cannot supply the whole, the rest will be supplied by the AC Generator).

P1gen = INF W

There is no Fuel Cell

AC Generator Minimum Power : 570 W

When power to be supplied by AC Gen. is < Pcritical_gen = 0 W, AC gen. runs at full power (without excess), charging the Batt. (this hour and the next hours) until % SOC is reached



Initial Investment: 7792.9 €. Loan: 80 %, int. 7% in 10 years, annual quota: 887.6 €. Cost AC gen. fuel, 1st. year: 38 €

NPC OF THE SYSTEM (25 years lifetime): (comparing to only AC grid, 1499kWh/yr, NPC=9930.1 €)

Total System Costs (NPC): 16853.3 €. Levelized cost of energy: 0.58 €/kWh

PV Generator Costs (NPC): 2889.7 €

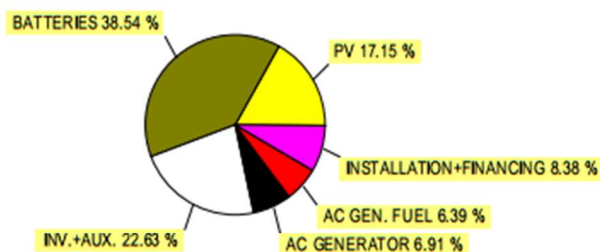
Battery bank Costs (NPC): 6495.8 €

AC Generator Costs (NPC): 1165.3 €

Auxiliary Components Costs (NPC): 653.8 €

Inverter Costs (NPC): 3159.3 €

AC Generator Fuel Costs (NPC): 1077.4 €



ENERGY BALANCE DURING 1 YEAR (kWh/year):

Overall Load Energy: 1498.7 kWh/yr. From Renewable: 95.8%

Unmet load: 6.1 kWh/yr (0.41 % load)

Export Energy: 380 kWh/yr

Energy delivered by PV generator: 2280.5 kWh/yr

Energy delivered by Wind Turbines: 0 kWh/yr

Energy delivered by Hydro Turbine: 0 kWh/yr

Energy delivered by AC Generator: 56.4 kWh/yr

Hours eq. of AC Generator operation: 133.02 h/yr

Energy delivered by Fuel Cell: 0 kWh/yr

Hours of Fuel Cell operation: 0 h/yr

Energy at Electrolyzer: 0 kWh/yr

Hours of Electrolyzer operation: 0 h/yr

Energy charged by Batteries: 1041.6 kWh/yr

Energy discharged by Batteries: 891.4 kWh/yr

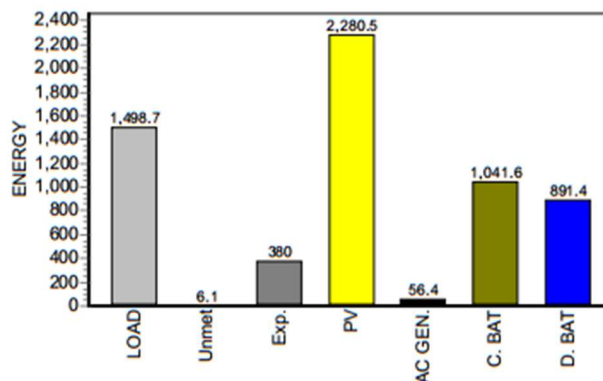
Batteries Lifetime: 11.28 years

E. sold to AC grid: 0 kWh/yr

E. Purchased from AC grid: 0 kWh/yr

Total CO2 emissions: 200.97kgCO2/yr; Emissions of AC generator (due to consumption of 29.231 litre/yr): 102.31 kgCO2/yr

H2 sold in one year: 0 kg H2/yr // HDI: 0.5254. Jobs created during system lifetime: 0.0048



A3.12 Informe de Antsiranana obtenido a partir de los datos de Renewables.ninja

PROJECT: C:\Users\nlira\Desktop\Pr1.hoga. OPTIMAL SOLUTION

DC Voltage: 48 V. AC: 230 V.

COMPONENTS

PV pan. aSi12-Schott: ASI100, 4x4x100 Wp. P total = 1.6 kWp (100% PV#1)

Batt. OPZS-Hawker: TLS-3, 24x1x180 Ah. E total = 8.64 kWh (1.4 d.aut)

1 Wind T. Southwest: AIR X, 1x547 W (@14m/s). P. total 0.547 kW

Without Hydro Turbine

1 x AC Gen. Diesel 1.9kVA, 1x1900 kVA

Without Fuel Cell

Without Electrolyzer

Inverter STECA: XPC 1600-48, 1600W

PV Battery charge controller STECA: TAROM 440 of 40 A

Battery charger (AC/DC converter) included in bi-di inverter

CONTROL STRATEGY

LOAD FOLLOWING. SOC min. batteries = 20 %

IF THE POWER PRODUCED BY THE RENEWABLE SOURCES IS HIGHER THAN LOAD: CHARGE

The Batteries are charged with the spare power from renewable

IF THE POWER PRODUCED BY THE RENEWABLE SOURCES IS LESS THAN LOAD: DISCHARGE

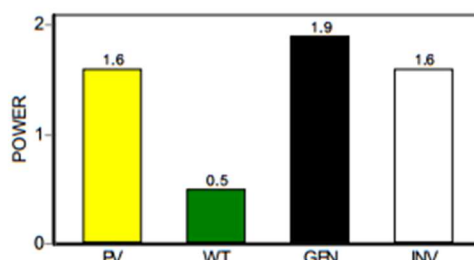
The power not supplied to meet the load will be supplied by the Batteries (if they cannot supply the whole, the rest will be supplied by the AC Generator).

$P_{1gen} = INF \text{ W}$

There is no Fuel Cell

AC Generator Minimum Power : 570 W

When power to be supplied by AC Gen. is < $P_{critical_gen} = 0 \text{ W}$, AC gen. runs at full power (without excess), charging the Batt. (this hour and the next hours) until 20 % SOC is reached



Initial Investment: 8756.8 €. Loan: 80 %, int. 7% in 10 years, annual quota: 997.4 €. Cost AC gen. fuel, 1st. year: 62.9 €

NPC OF THE SYSTEM (25 years lifetime): (comparing to only AC grid, 1499kWh/yr, NPC=9930.1 €)

Total System Costs (NPC): 19358.2 €. Levelized cost of energy: 0.66 €/kWh

PV Generator Costs (NPC): 2889.7 €

Battery bank Costs (NPC): 5460 €

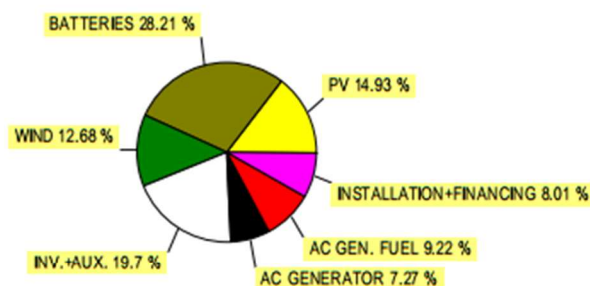
Wind turbines Costs (NPC): 2453.9 €

AC Generator Costs (NPC): 1406.4 €

Auxiliary Components Costs (NPC): 653.8 €

Inverter Costs (NPC): 3159.3 €

AC Generator Fuel Costs (NPC): 1784.7 €



ENERGY BALANCE DURING 1 YEAR (kWh/year):

Overall Load Energy: 1498.7 kWh/yr. From Renewable: 93%

Unmet load: 12.1 kWh/yr (0.81 % load)

Export Energy: 456.7 kWh/yr

Energy delivered by PV generator: 1468.6 kWh/yr

Energy delivered by Wind Turbines: 773.5 kWh/yr

Energy delivered by Hydro Turbine: 0 kWh/yr

Energy delivered by AC Generator: 93.5 kWh/yr

Hours eq. of AC Generator operation: 220.83 h/yr

Energy delivered by Fuel Cell: 0 kWh/yr

Hours of Fuel Cell operation: 0 h/yr

Energy at Electrolyzer: 0 kWh/yr

Hours of Electrolyzer operation: 0 h/yr

Energy charged by Batteries: 645.4 kWh/yr

Energy discharged by Batteries: 553.1 kWh/yr

Batteries Lifetime: 16.65 years

E. sold to AC grid: 0 kWh/yr

E. Purchased from AC grid: 0 kWh/yr

Total CO2 emissions: 293.07kgCO2/yr; Emissions of AC generator (due to consumption of 48.385 litre/yr): 169.35 kgCO2/yr

H2 sold in one year: 0 kg H2/yr // HDI: 0.5251. Jobs created during system lifetime: 0.0049

