

Wind/Diesel Corn Islands (Nicaragua) Project Update

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Wind/Diesel Systems Corn Islands Nicaragua

- financed by IADB
- executed by Meteotest (CH) and Factor 4 (GER)
- two Caribbean islands belonging to Nicaragua
- fishing industry, tourism
- poor state of electric services (Big Corn Island has 3 non-connected grids)

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First Results

- wind measuring started in December 2007
- wind resource 6 – 7 m/s (estimated)
- problem: electric grid situation
- system layout based on assumptions
- work in progress
- first quarter 2009 – results available



Big Corn Islands – Three Grids

| | ENEL | PASENIC | CAF | Total |
|-----------------------------|--------------|--------------|--------------|------------------|
| Installed Generators* | 540 | 520 | 680 | kW |
| | 500 | 500 | 320 | kW |
| | 500 | (180) | (320) | kW |
| | (320) | (125) | | kW |
| Total Power | 1,540 | 1,020 | 1,000 | 3,560 kW |
| minimum Load | 340 | 400 | 250 | 990 kW |
| maximum Load | 700 | 520 | 600 | 1820 kW |
| Load Factor** | 0.49 | 0.77 | 0.42 | 0.54 |
| Annual Production*** | 3,300 | 2,950 | 3,160 | 9,410 MWh |
| Average Load | 377 | 337 | 361 | 358 kW |

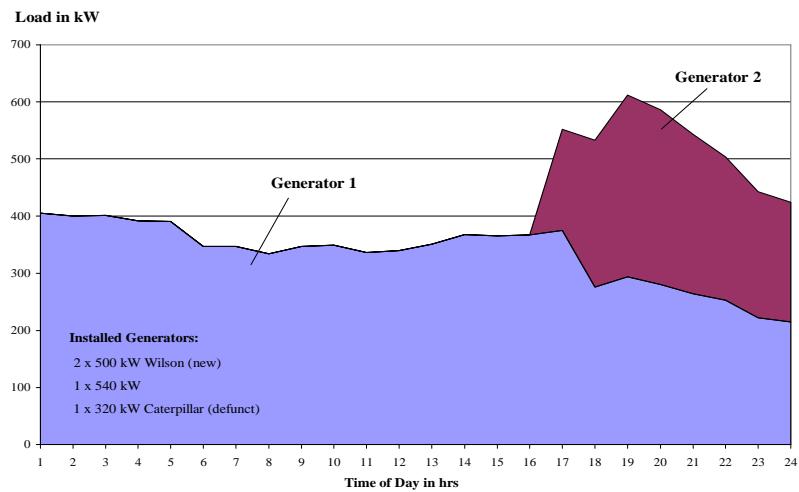
*) defunct units in brackets

**) load situation of PASENIC and CAF during fishing season

***) assumed technical availability ENEL 90 %, data for PASENIC and CAF 2006



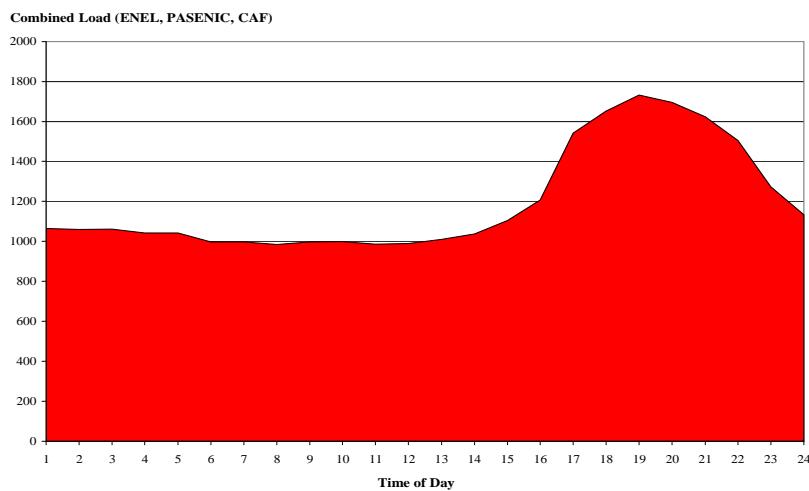
Load Curve Public Grid (ENEL)



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Load Curve Combined Grids



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Little Corn Island – System Layout (prelim)

| Little Corn Island | standard grid parallel | high parallel | wind/ diesel system |
|-----------------------------|---------------------------|------------------|------------------------|
| wind park size | 1 x 80 kW | 3 x 80 kW | 5 x 80 kW |
| alternative wind park size | | 1 x 250 kW | 2 x 250 kW |
| wind generation (theor.) | 210 MWh | 630 MWh | 10,500 MWh |
| annual energy need | 800 MWh | 800 MWh | 800 MWh |
| realistic penetration rate* | 20 % | 40 % | 70 % |



Big Corn Island – System Layout (prelim)

| Big Corn Island Combined Grid | standard grid parallel | high parallel | wind/ diesel system |
|---|---------------------------|--|------------------------|
| wind park size | 2 x 250 kW 6 x 80 kW | 4 x 250 kW (12 x 80 kW) (24 x 80 kW) | 8 x 250 kW |
| wind generation (theor.) | 4,400 MWh | 8,800 MWh | 17,600 MWh |
| annual energy need | 12,000 MWh | 12,000 MWh | 12,000 MWh |
| realistic penetration rate* | 30 % | 45 % | 80 % |

*) based on estimation only - data base not sufficient for simulation

