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Base load power plant

From Wikipedia, the free encyclopedia
(Redirected from Baseload power)

Baseload (also **base load**, or **baseload demand**) is the minimum amount of power that a utility or distribution company must make available to its customers, or the amount of power required to meet minimum demands based on reasonable expectations of customer requirements. Baseload values typically vary from hour to hour in most commercial and industrial areas.[1]

Contents

Description

Baseload plant, (also **baseload power plant** or **base load power station**) is an energy plant devoted to the production of baseload supply. Baseload plants are the production facilities used to meet some or all of a given region's continuous energy demand, and produce energy at a constant rate, usually at a low cost relative to other production facilities available to the system.[2] Examples of baseload plants using nonrenewable fuels include nuclear and coal-fired plants. Among the renewable energy sources, hydroelectric, geothermal,[3] biogas, biomass, solar thermal with storage and ocean thermal energy conversion can provide baseload power. Baseload plants typically run at all times through the year except in the case of repairs or scheduled maintenance. Hydroelectric power also has the desirable attribute of dispatchability, but a hydroelectric plant may run low on its fuel (water at the reservoir elevation) if a long drought occurs over its drainage basin.

Each baseload power plant on a grid is allotted a specific amount of the baseload power demand to handle. The base load power is determined by the load duration curve of the system. For a typical power system, the rule of thumb is that the base load power is usually 35-40% of the maximum load during the year.[4]

Peaks or spikes in customer power demand are handled by smaller and more responsive types of power plants called peaking power plants, typically powered with gas turbines.[*citation needed*]

Whilst historically large power grids have had base load power plant to exclusively meet the base load, there is no specific technical requirement for this to be so. The baseload can equally well be met by the appropriate quantity of intermittent power sources and peaking power plant.[*citation needed*]

Economics

Power plants are designated *baseload* based on their low cost generation, efficiency and safety at rated output power levels. Baseload power plants do not change production to match power consumption demands since it is

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more economical to operate them at constant production levels. Use of higher cost combined-cycle plants or combustion turbines is thus minimized, and these plants can be cycled up and down to match more rapid fluctuations in consumption. Baseload generators, such as nuclear and coal, often have very high fixed costs, high plant load factor and very low marginal costs. On the other hand, peak load generators, such as natural gas, have low fixed costs, low plant load factor and high marginal costs.[5] Typically baseload plants are large and provide a majority of the power used by a grid. Thus, they are more effective when used continuously to cover the power baseload required by the grid.

Base load power plant usage

Nuclear and coal power plants may take many hours, if not days, to achieve a steady state power output.[*citation needed*] On the other hand, they have low fuel costs.[6] Because they require a long period of time to heat up to operating temperature, these plants typically handle large amounts of baseload demand. Different plants and technologies may have differing capacities to increase or decrease output on demand: nuclear plants are generally run at close to peak output continuously (apart from maintenance, refueling and periodic refurbishment), while coal-fired plants may be cycled over the course of a day to meet demand.[*citation needed*] Plants with multiple generating units may be used as a group to improve the "fit" with demand, by operating each unit as close to peak efficiency as possible.

See also

- Capacity factor
- Energy demand management
- Grid energy storage
- Load balancing (electrical power)
- Smart grid

References

1. ^ "Energy Dictionary - Baseload, base load, baseload demand" (http://www.energyvortex.com/energydictionary/baseload__base_load__baseload_demand.html) . EnergyVortex.com. http://www.energyvortex.com/energydictionary/baseload__base_load__baseload_demand.html. Retrieved 2008-08-03.
2. ^ "Energy Dictionary - Baseload plant" (http://www.energyvortex.com/energydictionary/baseload_plant.html) . EnergyVortex.com. http://www.energyvortex.com/energydictionary/baseload_plant.html. Retrieved 2008-08-03.
3. ^ "Scaling Geothermal for Reliable Baseload Power" (http://www.renewableenergyworld.com/rea/news/story?id=50159) . renewableenergyworld.com. 2007-10-05. http://www.renewableenergyworld.com/rea/news/story?id=50159. Retrieved 2008-08-03.
4. ^ Understanding Base Load Power. What it is and Why it Matters. October 7, 2008. Published by Dr. Matthew Cordaro in conjunction with New York Affordable Reliable Electricity Alliance (New York AREA) (http://www.area-alliance.org/documents/base%2520load%2520power.pdf) Quote: "...For a typical power system, the rule of thumb is that base load power is usually 35–40 percent of the maximum load during the year...."
5. ^ Ronald J. Daniels (1996). *Ontario Hydro at the Millennium: Has Monopoly's Moment Passed?* (http://books.google.com/books?id=aF7lWf14H2EC&pg=PA77&lpg=PA77&dq=hydro+base+load&source=web&ots=qAfGeztoow&sig=9ZbHwDwDOUmzcBhXyZdmp7SU3bw&hl=en&sa=X&oi=book_result&resnum=3&ct=result) . Montreal and Kingston: McGill-Queen's University Press. http://books.google.com/books?id=aF7lWf14H2EC&pg=PA77&lpg=PA77&dq=hydro+base+load&source=web&ots=qAfGeztoow&sig=9ZbHwDwDOUmzcBhXyZdmp7SU3bw&hl=en&sa=X&oi=book_result&resnum=3&ct=result. Retrieved 2008-08-03.
6. ^ http://www.osti.gov/bridge/servlets/purl/840500-YJxBpR/native/840500.pdf

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External links

- Base Load Power Plants - Fundamentals of Electricity (http://cipco.apogee.net/foe/fgdlbl.asp)
- Levelized Costs of Electricity Production by Technology (http://www.energyalmanac.ca.gov/electricity/levelized_costs.html)
- The Energy Resources and Economics Workbook (.doc) (http://www.asktheenergydoctor.com/images/X7-Capacity.doc)

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