Facebook Campaign

Greenpeace Media Backgrounder

Overview

Greenpeace launched the Cool IT Challenge in 2009 to call on Information Technology (IT) companies to power technological solutions needed to fight climate change.
The IT sector is uniquely positioned to help the world shift to a prosperous low-carbon economy, and Greenpeace is challenging global IT companies to apply their innovation to offer clean energy IT solutions, reduce their environmental footprint and use their significant political influence to drive policy changes in the mutual interest of business and the climate.

As IT companies rapidly increase their consumption of electricity they must implement policies to avoid increasing demand for coal and other dirty forms of energy. Burning coal is the number one contributor to climate change, which - according to a UN report issued by the Global Humanitarian Forum in 2009 - is now responsible for 300,000 global deaths[1] per year.
In the US, 24,000 premature deaths[2] a year are associated with aging coal-powered stations.

While the sector has broadly recognised that building more energy-efficient data centres is important to its bottom line and the environment, many leading IT brands have also begun to see access to renewable energy as critical to future growth. Those that have are now making significant clean energy investments, as well as using their political influence to push for cleaner sources of electricity.

Facebook, a transformational yet very young company which now connects nearly 600 million people around the world, has thus far failed to recognise the risk and responsibility of how it sources its electricity. Despite being one of the most innovative companies of the digital age, Facebook appears to lack the vision to become a company powered by clean energy, which would help it avoid an investment path that makes breaking our addiction to 19th century dirty coal-fired power even more difficult.

Greenpeace and over a half million Facebook users[3] are demanding more leadership from this innovative company, which is already playing a transformative role in bringing the world together. We want to see CEO Mark Zuckerberg commit to making Facebook coal free.

Making IT green

While the IT sector has significant potential to help reduce emissions across other sectors of the economy, the network of the digital age is also growing explosively at a time when reducing global warming emissions from energy use is of paramount concern. To satisfy our demand for content to be delivered to us in real time, virtual mountains of video, pictures and other data must be stored somewhere and be available for almost instantaneous access. That 'somewhere' is in data centres - massive storage facilities filled with computers that consume incredible amounts of energy.

As outlined in Greenpeace's *Make IT Green* report[4] (March 2010), the amount of electricity produced and consumed to power the Internet, not including the devices used to access it, was estimated to exceed 622 billion kilowatt hours in 2007. This would place it 5th if ranked among countries[5] by annual electricity consumption.

With the electricity demand of the Internet projected to triple in the next 10 years, this represents a tremendous increase in electricity consumption, and more than that of France, Germany, Canada and Brazil combined. Given this projected rise in energy use, and the danger of increasing demand for coal and other sources of dirty energy, it is essential that Facebook and others in the IT sector show leadership through their investments and political advocacy. These companies need to help fundamentally transform our production and use of electricity until it they can be supported almost entirely by clean renewable energy.

In the US alone, Facebook accounts for 9% of all Internet traffic, nearly as much as all of Google's online products (Gmail, YouTube, Search) combined, and Facebook reaches nearly 73% of US Internet users. In reaction to explosive growth, the company announced two half-billion dollar data centre investments in 2010 to help meet the needs of its nearly 600 million users, marking a shift to owning and operating its own data centres instead of renting data centre capacity. But whether for owned or leased data centres, Facebook buys electricity in bulk to service the demand of its network, which gives it the ability and standing to shape how electricity is contracted and ultimately generated in regions where it operates.

Bad choices: Investments in dirty power to feed Facebook's growth

Facebook made two major infrastructure investments in 2010, in two new data centres, each in excess of 300,000 square feet of space – three times the size of an average Walmart store.

(1) Prineville, Oregon

In January 2010: Facebook announced its plans for the first Facebook-owned and operated data centre. While Oregon has only one in-state coal power plant, PacificCorp, the electric utility that will provide power to the Facebook data centre, imports most of its power from coal plants outside the state (approximately 58% of generation in 2010 was from coal). Once completed, the Prineville facility will draw an expected power allocation of up to 30-40MW, giving Facebook the electricity purchasing power of 30,000-35,000 US homes.

(2) Forest City, North Carolina

In November 2010, Facebook disclosed its plans to invest $450 million in a second Facebook-run data centre facility near Forest City, North Carolina. This investment follows similar investments by several other Internet companies in western North Carolina, where Google[6] and Apple[7] have major facilities. Duke Energy, the local electric utility, relies on coal for over 50% of its generation mix, nuclear for 39%, and is currently building another large 800MW coal plant just 10 miles away in Cliffside, North Carolina.

Existing Facebook server operations (California, New Jersey and Virginia)

Facebook leases data centres on both coasts of the US from four large data centre operators: Digital Realty Trust, Coresite Realty, Fortune Data Centres and Dupont Fabros Technology. A recent Data Centre Knowledge[8] analysis of Facebook's operations indicates that the company is now paying about $50 million a year[9] to lease and power data centre space (not including the computers and software needed to operate them).

While Facebook does not disclose the energy or carbon footprint from its data centre operations, the table below summarises reported electricity consumption for Facebook servers and carbon intensity of the electricity supply of each location, based on the grid mix of the corresponding utility.

Facebook data centre location (leased from)	Size (sq ft)	Estimated power demand	Energy mix of utility	Electric utility	Status
Prineville, OR	307,000[10]	40MW	62% Coal 12% RE[11]	Pacific Power	Under construction
Forest City, NC	300,000[12]	30-40MW	62% Coal 30.9% Nuclear 2% RE[13]	Duke Energy	Under construction
San Jose (Fortune)	25,000[14]	5MW[15]	27% RE 20% Nuclear[16]	PG&E (w/Direct Access)	Active
Silicon Valley (Digital Realty Trust)	86,000[17]	NA	44% RE 25% Coal 1.6% Nuclear[18]	Silicon Valley Power	Active
Ashburn, VA (Digital Realty Trust)	86,000[19]	NA	46% Coal[20] 41% Nuclear 2% RE[21]	Dominion Resources	Active
Ashburn, VA (Dupont Fabros)	45,000[22]	8-9 MW	46% Coal[23] 41% Nuclear 2% RE[24]	Dominion Resources	Active
Santa Clara, CA (CoreSite Realty)	50,000[25]	8 MW	44% RE 25% Coal 1.6% Nuclear[26]	Silicon Valley Power	Active

Does energy efficiency equal green?

Facebook has sought to deflect criticism over its reliance on coal powered electricity by highlighting how energy efficient its data centre designs are. Yet Facebook's decision to build highly-efficient data centres that will be substantially powered by coal represents the relative priority for many cloud companies: near-term cost.

Server efficiency and an attempt to reduce its data centre infrastructure's energy footprint are to be commended. Of course, these measures have a positive impact on the company's bottom line as well. But efficiency by itself is not enough if the company is only working to maximise output from the dirtiest energy source available, which in the US is coal.

In response to criticism from Greenpeace and others over its recent data centre investments that will rely heavily on coal fired electricity, Facebook has claimed that beyond designing an efficient data centre, it is largely stuck with whatever electricity is provided by the utility.

Given such rapid growth in the IT sector, some IT companies recognise that the source of electricity is also an increasingly important consideration, and along with highly innovative energy efficient data centre designs, are factoring access to zero carbon sources of electricity into their infrastructure investments. Facebook needs to meet or exceed the actions of its competitors.

Getting to 'No Coal': 5 clean steps for Facebook

(1) Come clean: Disclosure of energy and carbon footprint

Energy consumption and performance data disclosure associated with data centre operations have not been easily available, due to purported concerns about the release of information that could be used by competitors.
This has begun to change; there is starting to be a stronger emphasis on energy efficient design, and an increasing number of companies are adopting public greenhouse gas (GHG) reduction targets. Many IT companies are now publically reporting their overall energy consumption, facility level GHG emissions, and percentage of renewable energy in their operations, or some combination of the three, through reporting frameworks such as the Carbon Disclosure Project[27].

Facebook, however, has yet to provide any data on its energy consumption or related GHG emissions at either a corporate or facility level, but instead wants to focus attention on the anticipated PUE (Power Usage Effectiveness) of the Prineville and Forest City data centres. Unfortunately, PUE is a broad efficiency metric for comparing total power consumption to computing power consumption, and does not provide any indication of the type of energy consumed, or measure the amount of carbon associated with its operations. A new metric, Carbon Usage Effectiveness[28], has been proposed, and would provide greater transparency and some basis of comparison for the carbon footprint of existing and planned data centres, but it has not yet been put into use.

Ultimately, Facebook and other major IT companies that are building digital networks should follow the lead of their peers both inside and outside the sector to provide greater transparency on their energy consumption and carbon footprint at the corporate and facility level. IBM, Microsoft, Cisco and Wipro have demonstrated much greater transparency with no negative commercial effects, and broader adoption of standard reporting and metrics is likely to increase environmental performance for the sector overall.

(2) Infrastructure siting policy

Many considerations go into deciding where to locate a new data centre, but the primary factors are the availability of a reliable and low-cost supply of energy and telecommunications infrastructure. Another factor, at least in the US, is the enticement of local tax incentives.

Given that Facebook has recently made what are likely the first two major investments in a series of large data centre infrastructure builds to support its rapid growth, the adoption of an investment and siting policy that factors in available renewable energy resources is critically important to achieving a coal-free Facebook.

Access to low-carbon renewable electricity is a long way down the list for many companies, but a growing number of them have adopted goals and investment policies designed to avoid investments that are tied to dirty sources. These policies have helped them make better choices about the sources of energy that power their data centres. Examples of siting policies by other major IT brands include:

- Yahoo! adopted a goal to reduce the carbon intensity[29] of its data centres 40% by 2014, to be accomplished by deploying high energy efficiency designs and locating its new facilities near renewable energy sources.

- Google places a priority on renewable sources of electricity for its data centres and employs a carbon shadow price when buying electricity to discriminate against coal and encourage the purchase of cleaner energy. (Google has significant room for improvement, however, with regard to reporting its emissions and energy consumption).

(3) Increase the supply of clean energy

For Facebook's existing and future facilities, including those under construction in Oregon and North Carolina, there are several choices the company can make to increase the availability of renewable energy and reduce its demand for coal power. The options, exemplified by peers of Facebook that have chosen to increase clean energy supply, include:

(A)   Clean energy procurement

Many IT companies have sought to increase the amount of clean energy supply through their local utility (or other electricity provider in a deregulated market). This can typically be done in one of two ways, and sometimes in combination.

- Directly: through power purchase agreements, which normally indicates that the renewable energy generated will be fed directly onto the part of the grid (or 'load centre') where it will be consumed by the company;
- Indirectly: most often through the sale of 'Green Tags' or Renewable Energy Certificates/Credits (RECs), which typically means that the customer agrees to pay the local utility or a renewable energy developer a premium for the renewable 'commodity' associated with renewable electricity production, while the actual electricity generated is not in close proximity to the purchaser of the Green Tags or RECs.

While direct procurement is straightforward and can provide tangible new clean energy investment, the indirect approach raises concerns about whether the premium paid leads to investment in additional renewable energy, or simply increases the profit margin for the energy traders. It does not guarantee that the increased electricity use for which the REC is purchased is not still increasing demand for dirty coal-fired electricity locally (e.g.: Wind Tags from Iowa for a facility in North Carolina do not supplant the burning of additional coal in North Carolina).

Those companies that lease their data centre space, and thus are not normally directly involved in the selection of the electricity supply, could establish a carbon-based procurement standard for co-location or rented facilities, which sets a minimum carbon performance threshold at a level that would largely eliminate reliance on electricity generated by coal.

There is at least one major data centre operator in California, Fortune, which has been granted the ability to give tenants of its new San Jose facility license to choose their energy supply[30], including sources that are higher in renewable energy content than the surrounding grid. Facebook is reported to be one of two major tenants at this facility.

Access to clean energy procurement directly depends on the location of the data centre and its proximity to renewable energy generation capacity. Key examples of data centre locations that enable clean energy procurement include:

- Columbia River Hydro: (Microsoft, Yahoo! and Google) The Columbia River's hydroelectric capacity has drawn a number of data centres to Oregon and Washington[31], which have purchased much of the extra generating capacity left in the void of heavy industry, such as aluminium production.
- Wyoming Wind Power: Greenhouse Data[32] has established an entirely wind powered data centre in Cheyenne, Wyoming, in the US, partnering with a 30MW wind generation site nearby.
- NY Hydropower: Verizon and Yahoo! have each focused on building new data centres on the shores of Lake Ontario, and have been successful in securing hydroelectric power from local utilities and regulators. The proposed Verizon investment is expected to be massive, as many as 900,000 square feet, and the company has already secured 25 MW of hydro.
- Iceland Geothermal: Verne Global[33] has recently begun construction on a 44 acre (18 hectare) data centre campus that will be entirely powered by Iceland's zero carbon geothermal resource.
- Google Energy: A strong indication that Google does not see itself as powerless in choosing its source of electricity is Google's recent creation of a subsidiary, Google Energy, which has been granted Federal approval in the US to buy and sell wholesale electricity. This could give Google greater flexibility and control over the generation mix of the electricity supply for its data centres, and allow it to contract directly with renewable energy developers and sell any excess capacity back to the grid.

Facebook has not announced whether it has chosen to buy renewable energy directly or indirectly for either of the facilities that are under construction, nor has a clean energy procurement standard been established with any of the four major data centre operators that Facebook currently rents from.

(B)   Clean energy investment

While renewable energy generation and energy efficient technologies continue to expand, there are significant gaps in the private sector financing required to bring their deployment to scale across many markets.

Companies should consider making direct clean energy investments (in addition to those made at their own operational sites) instead of managing their energy and emissions footprint indirectly through the purchase of RECs or carbon offsets, both of which amount to 'renting' the environmental contributions of others.

By providing much needed capital investment to local government or state-sanctioned programmes (such as a revolving loan programme that drives down the cost and speed of deployment of housing and building retrofits), Facebook and other IT companies can spur deeper cuts in existing electricity demand, which is particularly necessary in locations where they are increasing demand with data centre construction.

A clean energy investment strategy has not been demonstrated by any IT company to date, but this approach is far more transformative to the local community that hosts the data centre.

(C)   Renewable/clean energy self-generation

A number of IT companies have made investments in the installation of renewable energy technologies to generate power for their own operational facilities. Though in many places it may be difficult either technically or economically to fully power a large data centre with on-site renewables, many companies are making these investments out of environmental concern or regard for long-term energy security and electricity price volatility.

Examples of renewable installation and innovation include:

Solar Power: In 2006 Google installed what was the largest solar installation in the country (1.6 MW on top of the Googleplex in Mountainview, California). This has since been exceeded by 4.5 MW array on top of an I/O Data Centre in Phoenix[34].

Cow Power: Infinity One & HP[35] have shown that farm waste can be converted to support the power needs of data centre in the UK.

Fuel Cell: While fuel cells are likely to remain reliant on fossil fuels (through either natural gas or production of hydrogen), several IT companies, including Fujitsu and Verizon, have deployed fuel cells to power all or parts of their data centres. This may be a viable option for reducing the carbon footprint of data centres in areas where grid power is largely driven by high carbon coal.

(4) Clean energy advocacy

Ultimately, we need Facebook to work with Greenpeace and other corporate and public sector advocates to engage decision-makers in Oregon, North Carolina and elsewhere and push for policy changes that will rapidly move us off of coal and onto renewable energy. The world's top climate scientists have determined that we must achieve a global peak in emissions by 2015 if we are to avoid catastrophic climate change. If large companies do not make the right energy decisions or demand that we generate and manage our energy supply with clean sources of energy, this will not be possible.

Facebook and other large IT companies, such as Google, Yahoo! and Microsoft, have the power to make real changes to the grid mix at a much faster rate than the present. If Facebook and other cloud services want to provide a truly green and renewable Internet, they must use their power and influence, not to only drive investments near renewable energy sources, but also to help set the policies that will rapidly deploy renewable electricity economy-wide.

(5) Educate and engage Facebook members on clean energy

With the ability to reach a rapidly growing global membership of 600 million people personally, Facebook has a unique opportunity to educate its users and help empower them to make smarter energy choices. With its tremendous user base, Facebook can play a unique role in creating broad awareness and discussion about the need for a clean energy transformation.

More information about the Facebook Unfriend coal campaign can be found here:

www.greenpeace.org/unfriendcoal

[1] http://www.nytimes.com/2009/05/29/science/earth/29climate.html
[2] http://www.msnbc.msn.com/id/5174391/ns/us_news-environment/
[3] As of 3 February 2011, 591,700 have supported the campaign. This number refers to people who had joined one of several Facebook groups in English, Spanish, German, French and Dutch titled '*We want Facebook to use 100% renewable energy*', or had signed up for Facebook coal specific mailing lists operated by Greenpeace, or had joined the new '*Unfriend Coal*' Facebook page, which was started in 2011.
[4] http://www.greenpeace.org/international/en/publications/reports/make-it-green-cloud-computing/
[5] https://www.cia.gov/library/publications/the-world-factbook/rankorder/2042rank.html
[6] http://www.datacenterknowledge.com/archives/2007/01/19/google-picks-nc-for-600m-data-center/
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