



**DEPARTMENT OF BUSINESS,  
ECONOMIC DEVELOPMENT & TOURISM**

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GOVERNOR

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DIRECTOR

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Statement of  
**RICHARD C. LIM**  
Director  
Department of Business, Economic Development, and Tourism  
Before the  
**HOUSE COMMITTEES ON ECONOMIC DEVELOPMENT AND BUSINESS**  
And  
**ENERGY & ENVIRONMENTAL PROTECTION**  
Thursday, February 6, 2014  
8:30 a.m.  
State Capitol, Conference Room 325  
in consideration of  
**HB 1997**  
**RELATING TO A DEPARTMENT OF ENERGY.**

Chairs Tsuji and Lee, Vice Chairs Ward and Thielen, and Members of the Committees.

The Department of Business, Economic Development, and Tourism respectfully offers comments on HB 1997, which establishes a Hawaii Department of Energy as a cabinet-level agency and moves the Energy Resources Coordinator responsibilities from DBEDT to this newly created agency.

DBEDT supports the intent of raising the profile of Hawaii's clean energy agenda, but notes that the measure contemplates the same sources and levels of funding, organizational structure, and statutory responsibilities as the existing State Energy Office, a division within DBEDT. This measure does not provide the necessary resources to effectuate the intent of the measure to raise the profile of the clean energy initiative in Hawaii.

We also note, that there is a benefit of having the Energy Program Administrator as a civil service position, instead of a political appointee; offers greater continuity and capacity to pursue long-term policies and initiatives to achieve energy independence and economic growth.

Thank you for the opportunity to provide comments on HB 1997.



Testimony to the House Committee on Economic Development and Business and  
Committee on Energy and Environmental Protection  
Thursday, February 6, 2014 at 8:30 a.m.  
State Capitol - Conference Room 325

RE: HOUSE BILL NO. 1997 RELATING TO A DEPARTMENT OF ENERGY

Chairs Tsuji and Lee, and Vice Chairs Ward and Thielen, and members of the committees:

The Chamber provides the following comments on H.B. No. 1997, which proposes to establish a department of energy. It proposes to transfer energy development and management functions of DBEDT to the new Department of Energy.

The Chamber is the largest business organization in Hawaii, representing more than 1,000 businesses. Approximately 80% of our members are small businesses with less than 20 employees. As the "Voice of Business" in Hawaii, the organization works on behalf of its members, which employ more than 200,000 individuals, to improve the state's economic climate and to foster positive action on issues of common concern.

The purpose of this Act is to create the Hawaii department of energy, which shall be a Cabinet-level agency with a focus on energy and security development. Thus, the State will be able to more efficiently achieve its goals and upgrade its infrastructure. The department of energy will then be able to work with outside entities on acquiring capital investments and technical assistance. Creation of the department of energy will further allow the other agencies to refine their respective scopes of operation.

We understand the recent focus on energy. With our dependence on fossil fuels, there is an upswing in discussion on energy as oil prices rise. Having the State of Hawaii provide better management and oversight of our energy issues should not be dependent on the creation of a new Department. We are also concerned about the overall expansion of government programs which require additional staff and resources. It is unclear from the bill how a new department will improve our existing energy programs. There needs to be some discussion on specific quantitative and qualitative measurements of improvements that will be achieved from creating a new department. Once these outcomes have been identified, the discussion can focus on what it will cost to create this new department, and if we, the tax payers, are willing to make that type of investment.

Thank you for the opportunity to express our views on this matter.

# BIA-HAWAII

BUILDING INDUSTRY ASSOCIATION

THE VOICE OF THE CONSTRUCTION INDUSTRY

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**Testimony to the House Committees on Economic Development &  
Business and  
Energy and Environmental Protection  
Thursday, February 6, 2014  
8:30 a.m.  
State Capitol - Conference Room 325**

**RE: H.B. 1997, RELATING TO THE ESTABLISHMENT OF A DEPARTMENT  
OF ENERGY**

Dear Chairs Tsuji and Lee, Vice-Chairs Ward and Thielen, and members of the Committees:

My name is Gladys Marrone, Government Relations Director for the Building Industry Association of Hawaii (BIA-Hawaii), the Voice of the Construction Industry. We promote our members through advocacy and education, and provide community outreach programs to enhance the quality of life for the people of Hawaii. BIA-Hawaii is a not-for-profit professional trade organization chartered in 1955, and affiliated with the National Association of Home Builders.

BIA-Hawaii provides the following comments on H.B. 1997, which proposes to establish a department of energy. It proposes to transfer energy development and management functions of DBEDT to the new Department of Energy.

The purpose of this Act is to create the Hawaii department of energy, which shall be a Cabinet-level agency with a focus on energy and security development, which would enable the State to more efficiently achieve its goals and upgrade its infrastructure. The department of energy will then be able to work with outside entities on acquiring capital investments and technical assistance. Creation of the department of energy will further allow the other agencies to refine their respective scopes of operation.

We understand the recent focus on energy, particularly as oil prices rise. However, the concerns of BIA-Hawaii include:

1) Having the State provide better management and oversight of our energy issues should not be dependent on the creation of a new department.

2) The overall expansion of government programs which require additional staff and resources. It is unclear from the bill how a new department will improve our existing energy programs.

3) At least some discussion should be had on specific quantitative and qualitative measurements of improvements that will be achieved from creating a new department. Once these outcomes have been identified, the discussion can then focus on the costs involved to create this new department, and whether we, the tax payers, are willing to make that investment.

Thank you for the opportunity to express our views on this matter.



**ward2-Robin**

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**From:** mailinglist@capitol.hawaii.gov  
**Sent:** Tuesday, February 04, 2014 10:50 AM  
**To:** edbtestimony  
**Cc:** carl.campagna@kamakagreen.com  
**Subject:** \*Submitted testimony for HB1997 on Feb 6, 2014 08:30AM\*

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**HB1997**

Submitted on: 2/4/2014

Testimony for EDB/EEP on Feb 6, 2014 08:30AM in Conference Room 325

<b>Submitted By</b>	<b>Organization</b>	<b>Testifier Position</b>	<b>Present at Hearing</b>
Carl	Individual	Support	No

**Comments:**

Please note that testimony submitted less than 24 hours prior to the hearing, improperly identified, or directed to the incorrect office, may not be posted online or distributed to the committee prior to the convening of the public hearing.

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**ward2-Robin**

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**From:** mailinglist@capitol.hawaii.gov  
**Sent:** Tuesday, February 04, 2014 1:35 PM  
**To:** edbtestimony  
**Cc:** mendezj@hawaii.edu  
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**HB1997**

Submitted on: 2/4/2014

Testimony for EDB/EEP on Feb 6, 2014 08:30AM in Conference Room 325

<b>Submitted By</b>	<b>Organization</b>	<b>Testifier Position</b>	<b>Present at Hearing</b>
Javier Mendez-Alvarez	Individual	Support	No

**Comments:**

Please note that testimony submitted less than 24 hours prior to the hearing, improperly identified, or directed to the incorrect office, may not be posted online or distributed to the committee prior to the convening of the public hearing.

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**HOUSE COMMITTEE ON ECONOMIC DEVELOPMENT & BUSINESS  
HOUSE COMMITTEE ON ENERGY & ENVIRONMENTAL PROTECTION**

February 6, 2014, 8:30 A.M.

Room 325

**(Testimony is 1 page long)**

**TESTIMONY IN SUPPORT OF HB 1997**

Chairs Tsuji and Lee and members of the committees:

The Blue Planet Foundation supports HB 1997, elevating the importance of our energy planning, governance, and oversight by establishing a Hawai'i Department of Energy.

With the quickly shifting energy landscape and the increasing economic and environmental need to wean Hawai'i from dirty, imported fossil fuel, it may be time to consider elevating the level of energy planning and implementation in Hawai'i. If we are serious about ending our addiction to fossil fuel and seek to be powered by 100% clean, renewable, and indigenous sources, the government office charged with guiding the transition deserves greater standing and funding within state government. We would support the creation of a state Hawai'i Department of Energy that would exist alongside the other state departments and be tasked with all aspects of planning, permitting, and implementation of Hawaii's clean energy future. Ideally, the new department would be funded through from a fee on all imported fossil fuels as well as federal grants and other appropriations as necessary. Given Hawaii's energy independence the status, funding, and prioritization it deserves would help ensure that we achieve our critical clean energy goals.

This is not the first time the legislature has considered establishing a department of energy. In 1978, Senator T.C. Yim's energy conservation and development package included a measure to create a state department of energy research and development.

Blue Planet believes that HB 1997 requires amendments to clarify the new department's role, functions, and structure. We are happy to work with the committees on language for this bill.

Mahalo for the opportunity to testify.

[info@blueplanetfoundation.org](mailto:info@blueplanetfoundation.org)

55 Merchant Street 17<sup>th</sup> Floor • Honolulu, Hawai'i 96813 • 808-954-6142 • [blueplanetfoundation.org](http://blueplanetfoundation.org)

# FAX COVER SHEET NO. 1 OF 10 SHEETS

FAX NUMBER: 808-586-6421

FROM: WENDELL LUM  
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TO: COMMITTEE ON ECONOMIC DEVELOPMENT BUSINESS  
COMMITTEE ON ENERGY & ENVIRONMENTAL PROTECTION

DATE: THURSDAY, FEBRUARY 06, 2014

TIME: 8:30 AM

PLACE: CONFERENCE ROOM 325  
STATE CAPITOL  
415 SOUTH BERETANIA STREET

HB 1997 Relating to a Department of Energy EDB/EEP, FIN  
Establishes a department of energy. Transfers energy  
development and management of DBEDT to the new department.



## Press Releases

December 11, 2013

Honda Center Debuts Bloom Energy Fuel Cells in Major Environmental Initiative

November 25, 2013

Bloom Energy Completes First International Project in Japan

November 21, 2013

Eggo® Waffles Iron Out Cleaner, Greener Energy Source

October 18, 2013

Macy's, Inc. Installs New Bloom Energy Server in Connecticut



# Bloom Energy Server

From Wikipedia, the free encyclopedia

The **Bloom Energy Server** (the **Bloom Box**) is a solid oxide fuel cell (SOFC) made by Bloom Energy, of Sunnyvale, California, that can use a wide variety of inputs (including liquid or gaseous hydrocarbons<sup>[1]</sup> produced from biological sources) to generate electricity on the site where it will be used.<sup>[2][3]</sup> It can withstand temperatures of up to 1,800 °F (980 °C), that would cause many other fuel cells to break down or require maintenance.<sup>[4]</sup> According to the company, a single cell (one 100 mm × 100 mm metal alloy plate between two ceramic layers) generates 25 watts.<sup>[5]</sup>

Bloom stated that two hundred servers have been deployed in California for corporations including eBay, Google, and Wal-Mart.<sup>[6]</sup>

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## Technology

The Bloom Energy Server uses thin white ceramic plates (100 × 100 mm)<sup>[7]</sup> that are made from "beach sand". Each plate is coated with a green nickel oxide-based ink on one side, forming the anode, and another black (probably Lanthanum strontium manganite) ink on the cathode side.<sup>[8][9]</sup> According to the *San Jose Mercury News*, "Bloom's secret technology apparently lies in the proprietary green ink that acts as the anode and the black ink that acts as the cathode..." but in fact these materials are widely known in the field of SOFCs, *Wired* reported that the secret ingredient may be yttria-stabilized zirconia based upon US patent (<http://worldwide.espacenet.com/textdoc?DB=EPODOC&IDX=US>) that was granted to Bloom in 2009; but this material is also one of the most common electrolyte materials in the field.<sup>[10]</sup> US patent 20080261099 (<http://worldwide.espacenet.com/textdoc?DB=EPODOC&IDX=US20080261099>), assigned to Bloom Energy Corporation, says that the "electrolyte includes yttria stabilized zirconia and a scandia-stabilized zirconia, such as a scandia ceria stabilized zirconia". ScSZ has a higher conductivity than YSZ at lower temperatures, which

provides greater efficiency and higher reliability when used as an electrolyte. Scandia is scandium oxide ( $\text{Sc}_3\text{O}_2$ ) which is a transition metal oxide that costs between US\$1400 to US\$2000 per kilogram in 99.9% pure form. Current annual world wide production of scandium is less than 2,000 kilograms. Most of the 5,000 kilograms used annually is sourced from Soviet era stockpiles.

To save money, the Bloom Energy Server uses inexpensive metal alloy plates for electric conductance between the two ceramic fast ion conductor plates. In competing lower temperature fuel cells, platinum is required at the cathode.<sup>[8]</sup>

## Bloom Energy

**Bloom Energy** is the company that develops, builds, and installs Bloom Energy Servers.<sup>[11]</sup> The company, started in 2002 by CEO K.R. Sridhar,<sup>[11]</sup> is one of 26 named a 2010 Tech Pioneer by the World Economic Forum.<sup>[12]</sup>

### History

In October 2001, CEO K.R Sridhar met with John Doerr from the venture capital firm Kleiner Perkins.<sup>[13]</sup> Sridhar asked for more than \$100 million to start the company. Bloom Energy eventually received \$400 million of start-up funding from venture capitalists, including Kleiner Perkins<sup>[8]</sup> and Vinod Khosla.<sup>[14]</sup>

The company, originally called Ion America, was renamed Bloom Energy in 2006.<sup>[15]</sup>

Sridhar credited his nine-year-old son for the name, saying that his son believed jobs, lives, environment, and children would bloom.<sup>[16]</sup> Michael R. Bloomberg appeared at the launch by video link.<sup>[17]</sup> Bloomberg's business news network covered the event, but attributed every statement to "Bloom Energy".<sup>[18]</sup>

The CEO gave a media interview (to *Fortune Magazine*) for the first time in 2010, eight years after founding the company, because of pressure from his customers.<sup>[11]</sup> A few days later he allowed Lesley Stahl of the CBS News program *60 Minutes* to see the factory.<sup>[19]</sup> On February 24, 2010, the company held its first press conference.<sup>[15]</sup>

Bloom Energy's well-known customers include Walmart, Staples, AT&T, Adobe, CocaCola, Ebay, Google, Bank of America, FedEx, Life Technologies,<sup>[20]</sup> and Safeway.

### Costs

### Installation

#### Bloom Energy

## Bloomenergy\*

<b>Type</b>	Privately held
<b>Predecessor(s)</b>	Ion America
<b>Founded</b>	2002
<b>Founder(s)</b>	K. R. Sridhar C.E.O , John Finn, Matthias Gottmann, James McElroy, Dien Nguyen
<b>Headquarters</b>	Sunnyvale, California, USA
<b>Key people</b>	K. R. Sridhar (founder, CEO)
<b>Products</b>	regenerative solid oxide fuel cells
<b>Net income</b>	85 Million loss (2008) <sup>[11]</sup>
<b>Owner(s)</b>	Kleiner Perkins (among others)
<b>Website</b>	<a href="http://www.bloomenergy.com/">http://www.bloomenergy.com/</a>

The current cost of each hand-made 100 kW Bloom Energy Server is \$7–800,000. The company announced plans for a smaller, home sized Bloom server priced under \$3,000.<sup>[8]</sup> Bloom estimated the size of a home-sized server at 1 kilowatt, although others recommended 5 kW.<sup>[21]</sup>

The capital cost is \$7–8 per watt.<sup>[22]</sup>

According to the New York Times (Green Blog), in early 2011 "... Bloom Energy ... unveiled a service to allow customers to buy the electricity generated by its fuel cells without incurring the capital costs of purchasing the six-figure devices.... Under the Bloom Electrons service, customers sign 10-year contracts to purchase the electricity generated by Bloom Energy Servers while the company retains ownership of the fuel cells and responsibility for their maintenance.... 'We're able to tell customers, 'You don't have to put any money up front, you pay only for the electrons you use and it's good for your pocketbook and good for planet,' ' [CEO K.R. Sridhar] said."<sup>[23]</sup>

## Usage

On 24 February 2010, Sridhar claimed that his devices were making electricity for 8–10 cents/kWh using natural gas, cheaper than today's electricity prices in some parts of the United States, such as California.<sup>[24][25]</sup> Twenty percent of the cost savings depend upon avoiding transfer losses that result from energy grid use.<sup>[21]</sup>

Bloom Energy claimed to be developing Power Purchase Agreements to sell electricity produced by the boxes, rather than selling the boxes themselves, in order to address customers' fears about box maintenance, reliability, and servicing costs.<sup>[19]</sup>

As of 2010, fifteen percent of the power at eBay was created with Bloom technology; after tax incentives that covered half the capital costs. eBay expects "a three-year payback period" for the remaining half, based on California's \$0.14/kWh cost of commercial electricity.<sup>[26]</sup>

## Installations

The company says that its first 100 kW Bloom Energy Servers were shipped to Google in July 2008.<sup>[27]</sup> Four such servers were installed at Google's headquarters, which became Bloom Energy's first customer.<sup>[19]</sup> Another installation of five boxes<sup>[1]</sup> produces up to 500 kW at eBay headquarters California.<sup>[19]</sup> Bloom Energy stated that their customers include Staples (300 kW - December 2008),<sup>[28]</sup> Walmart (800 kW - January 2010),<sup>[29]</sup> FedEx (500 kW),<sup>[30]</sup> The Coca-Cola Company (500 kW)<sup>[31]</sup> and Bank of America (500 kW).<sup>[32][33]</sup> Each of these installations were located in California.

## Portable units

Sridhar announced plans to install Bloom Energy Servers in third world nations.<sup>[17]</sup> Ex-Chairman of the Joint Chiefs of Staff, Colin Powell, now a Bloom Energy board member, said the Bloom Energy generators could be useful to the military because they are lighter, more efficient, and generate less heat than traditional generators.<sup>[34]</sup>

## Feasibility

Bloom Energy Server technology is based upon stacking small fuel cells which operate in concert.<sup>[7][15]</sup> Bloom Energy's approach of stacking fuel cells that enable



The chemical reaction used to create energy in Bloom Energy products

individual plates expand and contract at the same rate at high temperatures.<sup>[7]</sup> However, other solid oxide fuel cell producers have solved the problem of different expansion rates of cells in the past.<sup>[9]</sup> Scott Samuelsen of the University of California, Irvine National Fuel Cell Research Center questioned the operational life of Bloom Servers. "At this point, Bloom has excellent potential, but they have yet to demonstrate that they've met the bars of reliability."<sup>[15]</sup> Lawrence Berkeley National Laboratory expert Michael Tucker claimed, "Because they operate at high temperatures, they can accept other fuels like natural gas and methane, and that's an enormous advantage... The disadvantage is that they can shatter as they are heating or cooling."<sup>[15]</sup>

Venture capitalist John Doerr asserted that the Bloom Energy Server is cheaper and cleaner than the grid.<sup>[1][35]</sup> An expert at Gerson Lehrman Group wrote that, given today's electricity transmission losses of about 7% and utility-size gas-fired power stations efficiency of 33-48%, the Bloom Energy Server is up to twice as efficient as a gas-fired power station.<sup>[2]</sup> *Fortune* stated that "Bloom has still not released numbers about how much the Bloom Box costs to operate per kilowatt hour" and estimates that natural gas rather than bio-gas will be its primary fuel source.<sup>[36]</sup> AP reporter Jonathan Fahey in *Forbes* wrote: "Are we really falling for this again? Every clean tech company on the planet says it can produce clean energy cheaply, yet not a single one can. Government subsidies or mandates keep the entire worldwide industry afloat. Hand it to Bloom, the company has managed to tap into the hype machine like no other clean tech company in memory."<sup>[37]</sup>

## Efficiency

Bloom claims a conversion efficiency of around 50%.<sup>[38]</sup> A modern combined cycle gas turbine power plant (CCGT) can reach 60% overall efficiency, using a multi-step process. Sridhar stated that Bloom's products convert chemical energy to electrical energy in one step, are more fuel efficient than current gas-fired power stations and reduce transmission/distribution losses by producing power where it is used.<sup>[39]</sup>

Each Bloom Energy Server provides 100 kW of power, enough to meet the baseload needs of 100 average homes or a small office building.<sup>[40]</sup> The average monthly electricity consumption for a U.S. residential utility customer was 958 kWh per month during 2011.<sup>[41]</sup>

Sridhar said the boxes have a 10 year life span,<sup>[25]</sup> although that could include replacing the cells during that period. The CEO of eBay says Bloom Energy Servers have saved the company \$100,000 in electricity bills since they were installed in mid-2009,<sup>[8]</sup> Contributor at *Fortune Magazine* Paul Keegan calls that figure "meaningless without the details to see how he got there".<sup>[36]</sup>

## Long-term business case

Assuming a 50% future cost reduction, one could argue that the best case scenario for the 200 kW unit would be a capital (installed) cost comparable to today's 100 kW units, i.e., around \$800,000. Using average electricity (\$0.10/kWh) and natural gas (\$3/MMBtu) prices and assuming a 6% per year maintenance/operating cost apart from fuel, the break-even period for the device comes to over 8 years, based on published performance numbers.<sup>[42]</sup>

Parameter Name	Value	Unit / description
Fuel (natural gas) flow rate for 200 kW Bloom Energy Server	1.32	MMBtu/hr
Fuel energy in rate in kW (1 MMBTU/hr CH <sub>4</sub> = 293 kW)	386.76	kW
Fuel cost	\$3.96	per hour
Electric output rate	200	kW
System efficiency natural gas -> electricity	52%	percent conversion of natural gas energy to electrical energy
Electricity cost	\$0.10	per kWh
Electricity produced revenue	\$20.00	per hour
CO <sub>2</sub> produced	773	lb/MWh
Run cost savings per bloom box (electricity revenue less fuel cost)	\$16.04	per hour
Cost savings per year assuming 24X7 full load operation	\$140,510.40	per year
Capital cost (estimated minimum cost after projected reductions)	\$800,000.00	for each 200 kW unit
Annual maintenance / operation cost	6%	as a fraction of capital cost, per year
Cost savings after maintenance costs	\$92,510.40	per year
Break even period	8.6	years

These numbers mean that the total lifetime of these systems would need to exceed 15 – 20 years to make an argument for a viable long-term business case without subsidies. The analysis might be somewhat different if the systems are used mainly for peak (power) shaving when electricity costs can exceed \$0.15/kWh. However, the intermittent nature of such peak periods would likely reduce the overall impact on the estimated break-even period using average cost figures for electricity and natural gas. A reliable bio-derived source of fuel (bio-gas) would also tip the argument in a favorable direction, however such sources are not typically located near customer sites.<sup>[*citation needed*]</sup>

## Competition

A Gerson Lehrman Group analyst wrote that GE dismantled its fuel cell group five years ago and Siemens almost dismantled theirs.<sup>[2]</sup> United Technologies is the only large conglomerate that has competitive fuel cell technology.<sup>[2]</sup> Toshiba has technology to provide energy for a small device, not a neighborhood.<sup>[2]</sup>

Sprint owns 15 patents on hydrogen fuel cells and is using 250 fuel cells to provide backup power for its operations. Sprint has been using fuel cell power since 2005. In 2009, Sprint's fuel cell program received a grant of \$7.3 million from the United States Department of Energy to expand the hydrogen capacity of its fuel cell tanks from providing up to 15 hours of backup power, to 72 hours.<sup>[43]</sup> Sprint partnered with ReliOn and Alteryx for fuel cell manufacture, and with Air Products as a hydrogen supplier. German fuel cell firm P21 has been working on similar projects to supply backup power for cellular operations.<sup>[44]</sup> United Technologies makes fuel cells costing \$4,500 per kilowatt.



10. <sup>^ a b</sup> Kanellos, Michael (22 February 2010). "Bloom Box fuel cell launch" (<http://www.wired.com/epicenter/2010/02/is-bloom-energy%E2%80%99s-secret-ingredient-zirconia/>). Wired. Retrieved 24 February 2010.
11. <sup>^ a b c d 1, x</sup> (19 February 2010). "Is K.R. Sridhar's 'magic box' ready for prime time?" (<http://brainstormtech.blogs.fortune.cnn.com/2010/02/19/is-k-r-sridhars-magic-box-ready-for-prime-time/>). Fortune Magazine. Retrieved 26 February 2010.
12. <sup>^</sup> "Bloom Energy Shifts Power via Fuel Cells" ([http://www.businessweek.com/print/globalbiz/content/dec2009/gb2009127\\_746740.htm](http://www.businessweek.com/print/globalbiz/content/dec2009/gb2009127_746740.htm)). BusinessWeek. December 7, 2009. Retrieved 2010-02-22.
13. <sup>^</sup> "The Bloom Box: An Energy Breakthrough?" (<http://www.cbsnews.com/stories/2010/02/18/60minutes/main6221135.shtml>). CBS News. February 18, 2010. Retrieved 2010-02-24.
14. <sup>^</sup> Coursey, David (February 23, 2010). "Why I'm Bullish on Bloom Energy" ([http://www.pcworld.com/businesscenter/article/190058/why\\_im\\_bullish\\_on\\_bloom\\_energy.html](http://www.pcworld.com/businesscenter/article/190058/why_im_bullish_on_bloom_energy.html)). PC World. Retrieved 2010-02-24.
15. <sup>^ a b c d e</sup> "Bloom Energy unveils its 'Bloom Box' fuel cell" ([http://www.mercurynews.com/breaking-news/ci\\_14461347?nclink\\_check=1](http://www.mercurynews.com/breaking-news/ci_14461347?nclink_check=1)). San Jose Mercury News. February 24, 2010. Retrieved 2010-02-24.
16. <sup>^</sup> Gaylord, Chris (22 February 2010). "Bloom Box: What 60 Minutes left out" (<http://www.csmonitor.com/Innovation/Horizons/2010/0222/Bloom-Box-What-60-Minutes-left-out>). Christian Science Monitor. Retrieved 26 February 2010.
17. <sup>^ a b</sup> "Live from the Bloom Box press event" (<http://www.engadget.com/2010/02/24/live-from-the-bloom-box-press-event/>). Engadget. Retrieved 2010-02-24.
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