

Project File – Mandatory attachment

Project Title: Yahoo! Compute Coop (YCC):A Next Generation Passive Cooling Design for Data Centers

NOTE: *The data contained in pages 2 through 10 of this application have been submitted in confidence and contain trade secrets or proprietary information, and such data shall be used or disclosed only for evaluation purposes, provided that if this applicant receives an award as a result of or in connection with the submission of this application, DOE shall have the right to use or disclose the data herein to the extent provided in the award. This restriction does not limit the government's right to use or disclose data obtained without restriction from any source, including the applicant.*

Summary:

The Yahoo! Compute Coop (YCC) project will consist of a greenfield construction of a 120,000 square foot, 9.0 MW critical load data center facility. The facility is designed for N+1 redundancy system with a line interactive UPS system utilizing kinetic stored energy. It will have a steel-framed pre-engineering building with a backup evaporative cooling system intended for use in the event of extremely high temperature and humidity. The integrated building design allows for use of free cooling 99 percent of the year via the unique building shape and orientation, as well as server alignment within the building. The relatively low initial cost to build, compatibility with current server and network models, and efficient use of power and water are all key features that make the YCC a highly compatible and implementable design innovation for the data center industry.

Objective

To design, build and deploy a cost effective data center that meets the needs of Yahoo!, while substantially reducing reliance on electricity, water, chemical usage and sewer discharge. The design must be simple to construct, operate and maintain and allow for lower capital and operating expenses than current industry best practices.

1: Technical Merit

Discuss how the proposed technology will address the technical area(s) of interest outlined in the announcement and its potential superiority over currently used technology/ies, if applicable.

The proposed technology directly addresses the considerable inefficiencies in server cooling that are present in current common practices for data center design. By eliminating the need for expensive, energy-intensive chiller systems and air handling equipment, and by reducing the power draw of fans, the YCC design ensures that the majority of power is allocated to providing useful compute work back to the Internet. Using free cooling and evaporative cooling for extreme summer conditions translates into fewer moving parts, lower water consumption, and

reductions in both capital and operating expenses.

The YCC design addresses a major challenge to reducing electricity consumption from data centers by significantly reducing cooling load.

Provide a thorough Statement of Project Objectives (SOPO) and anticipated outcome and results.

Statement of Project Objectives: To design, build and deploy a cost effective data center that meets the needs of Yahoo!, while substantially reducing reliance on electricity, water, chemical usage and sewer discharge. The design must be simple to construct, operate and maintain and allow for lower capital and operating expenses than current industry best practices.

Specifically:

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Discuss the feasibility of the proposed work and its technical innovation (scientific basis).

Technical innovation

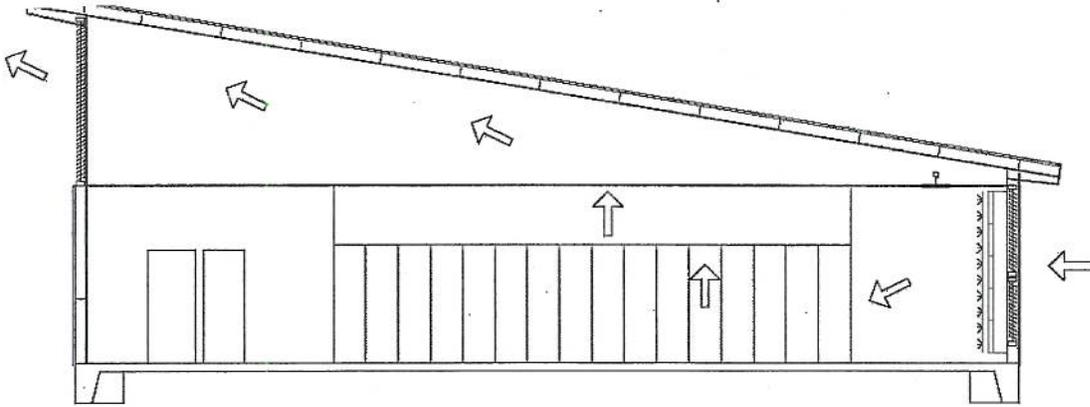
In a traditional data center, the cooling system is a supplemental (and highly expensive) feature of the facility. In the YCC design the building itself is the air handler, taking advantage of the natural movement of air to use less electricity and horsepower and eliminating the need for a traditional cooling system (other than the backup evaporative cooling).

Every aspect of the facility is designed to operate as an integrated part of the total cooling system. The high ceilings allow heat to rise via natural thermodynamics. The length of the building relative to its width provides easier access to outside air by increasing the area to volume ratio.

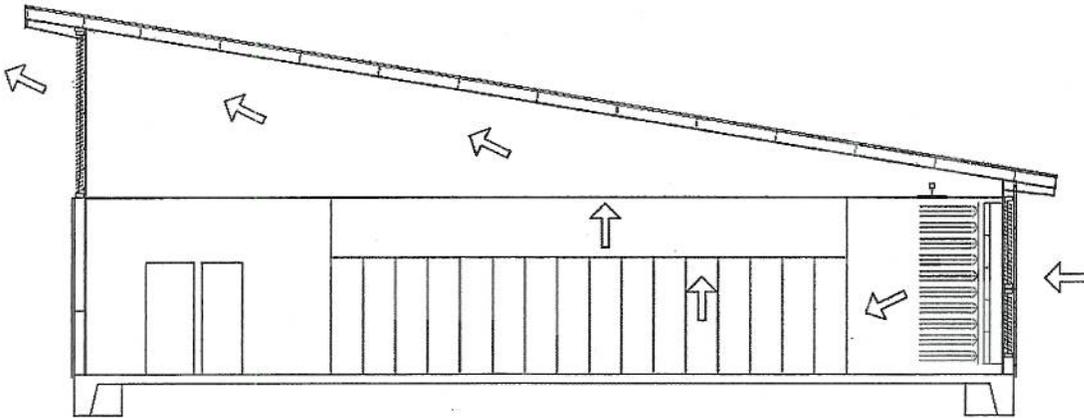
The location of Lockport, New York was specifically chosen for the ambient weather conditions

that are particularly favorable to free cooling. It is estimated that evaporative cooling will only be required for the 212 hours of the year that the outside air temperature is above 80 degrees, plus an additional estimated 34 hours when the outside air temperature exceeds 90 degrees (based on annualized average). For the remaining 8,500 hours per year, free cooling will be the standard.

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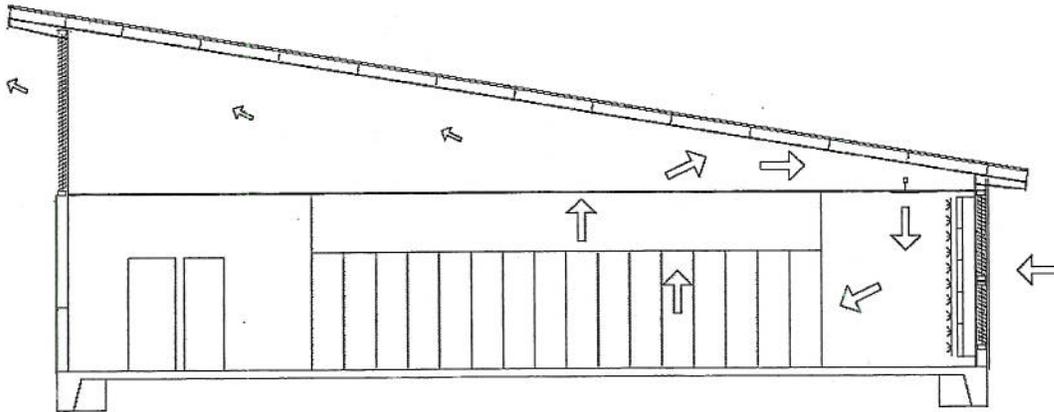


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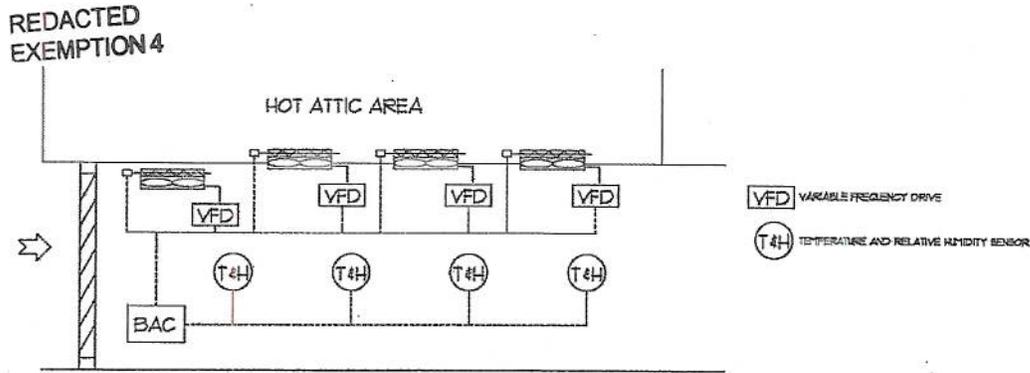
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The site also takes advantage of prevailing winds off of a nearby lake in both the orientation of the building and the asymmetrical design of the roof. This helps to reduce the power draw by fans that are required for the design by extracting natural wind power to remove heat from servers.

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Provide evidence of the “game changing” quality of the proposed technology.

Three major areas of data center design have been slow to adopt innovation due to the perception of increased risk. They are: (1) use of outside air for cooling; (2) concern about exceeding ASHRAE temperature standards for servers; and (3) eliminating large mechanical cooling systems entirely from design. The EPA’s 2007 *Report to Congress on Server and Data Center Energy Efficiency* noted that risk aversion was one of three major barriers to efficiency adoption in this industry (“Energy efficiency is perceived as a change that, although attractive in principle, is of uncertain value and therefore may not be worth the risk.” (p. 12)).

The lack of publicly available examples of these design innovations being used successfully has limited experimentation and aggressive adoption of such design practices. With its YCC design,

Yahoo! has addressed all three design innovations identified above and compiled evidence proving the effectiveness of the design..

Yahoo! expects this project will accelerate adoption of all three design practices both directly and indirectly. The actual design and execution of this project by Yahoo!, a leading, globally-recognized media and technology company that requires multiple, large data centers to run with an extremely high level of reliability will drive interest and adoption in the specific design. At the same time, this example will also reduce risk aversion within the data center industry for other innovations that relate to free cooling, chiller-free data centers, and higher temperature interior environments. It will also serve as a catalyst for experimenting with data center designs that pay closer attention to maximizing use of local climate conditions and geography. With demand for data center capacity continuing to accelerate worldwide, both the content and the timing of this project provide a unique game-changing opportunity.

2: Potential Benefits

The potential job creation opportunities of the project in the short-term (12 to 18 months) and of the technology over the long term are addressed later in the narrative discussion under "American Recovery and Reinvestment Act (ARRA) Information" and may just be referenced at this point in the narrative.

This specific project is expected to phase-in at least 75 full time jobs upon completion of the full deployment of the facility in 16-18 months. This project will also generate additional temporary jobs related to construction and ancillary activities within 12-18 month initial construction period. See below under *Recovery and Reinvestment Act (ARRA) Information* for more detail.

Discuss the potential economic benefits of the proposed technology over the current technology, and its initial capital cost advantage to stimulate demand for the technology.

The YCC design offers a simplified, whole-building approach to data center design vs. conventional "systems approach" to data center design. The YCC design has a lower initial cost to build compared to many high-efficiency systems (e.g., cooling towers, piping for water cooling, etc.). The initial capital cost advantage relies primarily upon use of a pre-engineered steel building and the elimination of raised floors.

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Lower capital cost means faster payback time and lower initial investment (which is particularly important in the current economic climate), and will likely accelerate adoption of this design compared to other, more expensive, chiller-free design solutions.

Provide estimated energy savings (in TBtu or kWh per year), with a minimum potential energy impact of 1 billion kWh per year across U.S. information and communication technology facilities.

For 9MW of critical load in the initial build-out of this facility, Yahoo! anticipates reduced energy consumption of 8.6 million kWh per year in comparison .

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Compared to an efficient, but conventional

collocated facility, we estimate a savings of 18.9 million kWh.

The carbon savings below assumes an average US carbon intensity of .56 tons CO₂/MWh. In reality, our carbon reductions will be much lower by virtue of how clean electricity is in all three sites (.31 tons/MWh for Santa Clara, close to zero for both WA state and upstate NY).

Site	REDACTED EXEMPTION 4	REDACTED EXEMPTION 4	YCC
DCiE	0.74	0.82	0.90
relative energy savings for a 9MW YCC plant (kWh/year)	18,939,120	8,584,800	-
Average annual carbon savings (tons CO ₂)	10,606	4,308	-

Figure 5: Energy and carbon savings of YCC compared to prior designs

A 2007 EPA study projected that data centers will consume 100 billion kWh of electricity by 2011. If only 476 MW of new capacity were to be built between 2007 and 2011 (less than 10% of the EPA’s forecasted need) using the YCC design rather than conventional design (at a respectable .74 DCiE), one billion kWh of savings could easily exceed this by several times.

Using the ICT benefits calculator and comparing our REDACTED EXEMPTION 4 to the YCC design, projected US energy savings from 45% market adoption for new data center capacity would be achieved. 190 million kWh in 2015 and just over 1 billion kWh in 2020 REDACTED EXEMPTION 4. If we instead assume an EPA-stated average of 50%DCiE, annual savings will be 670 million kWh in 2015 and 3.57 billion kWh in 2020 over current industry average (with a cumulative 195 billion kWh in 2040 at market saturation).

The ICT benefits calculator assumes a carbon intensity of .16tons CO₂e/MWh, which seems rather low. This would yield 30,000 metric tons CO₂ equivalent in 2015 and 160,000 in 2020. Assuming an average carbon intensity of 106,400 and 576,800 metric tons CO₂e for 2015 and 2020, respectively. In this case, assumptions re: carbon intensity of the electricity that is not consumed due to efficiency is a crucial factor. Further details can be seen in the attached pdf file entitled “ICT_benefits_Spreadsheetiv-complete“.

For demonstration projects: Provide evidence of the ability of the technology/ies and adopted best energy management practices to improve the existing Data Center infrastructure Efficiency (DCiE) to 0.80 or greater, and to improve the facility’s energy intensity performance (energy consumed for a given level of useful computational work) by more than 25 percent.

Note: Yahoo! reviewed DCPro tool as recommended for the purposes of calculating efficiency benefits of the YCC design. However, since the majority of inputs assume a centralized cooling system, we concluded that the tool was not appropriate for measuring our design. Consequently, we provide the alternative calculations below to explain expected efficiency gains.

See Figures 6 and 7 in the following pages for a breakdown of progression of cooling and

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electrical efficiency over time, with :

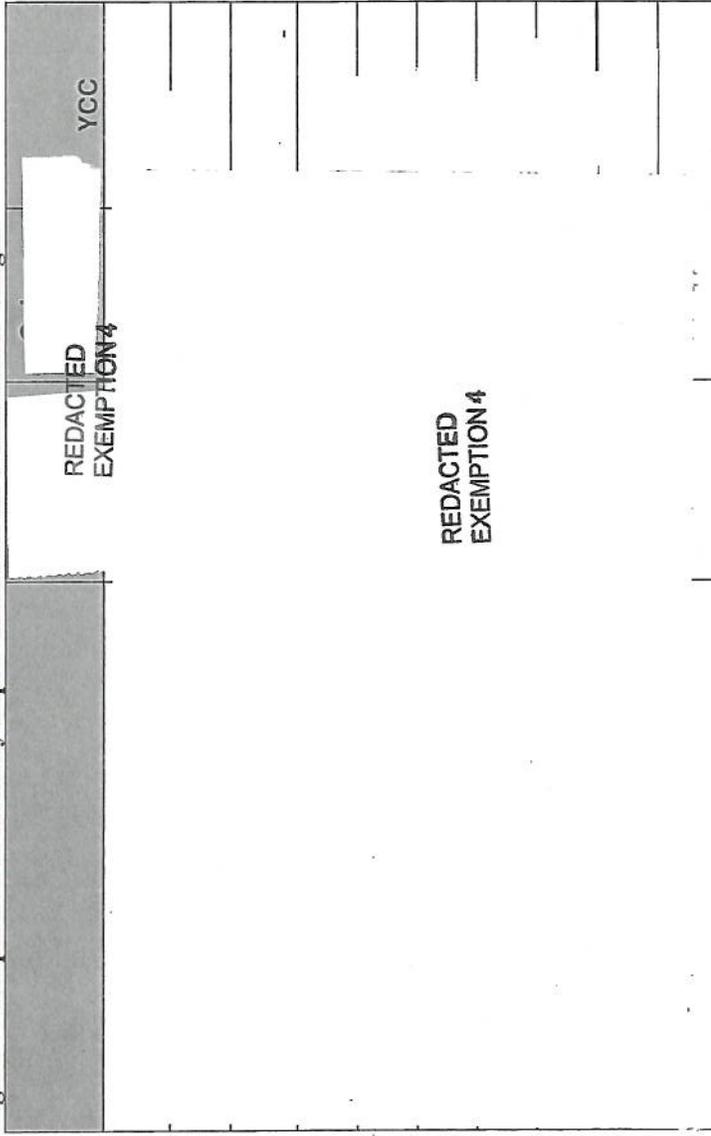
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However, we anticipate additional loads and inefficiencies will emerge in the prototype (lighting loads, etc.) so have chosen to model benefits based upon a DCIE of .90. We hope to exceed this in the final design.

Figure 6: Breakdown of cooling efficiency by data center design year

	2005	2006	2006	2007	2010
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REDACTED EXEMPTION 4					
% cost of cooling	53%	36%	26%	17%	
additional load (lights, PUE)	1.53	1.36	1.26	1.17	

Figure 7: comparison of intensity improvement across 3 data center designs



Discuss the potential of the proposed technology to reduce greenhouse gas emissions and other environmental emissions, in comparison to the technology/ies currently in commercial use. Complete and valid assumptions used in estimating the benefits ascribed to the technology should also be provided.

See above for estimated carbon savings. In addition, minimized use of evaporative cooling as compared to standard cooling methods is predicted to yield 99% reduction in water use at the facility (and a corresponding reduction in wastewater outflow).

3: Commercialization and Market Acceptance

Provide a commercialization strategy for the proposed technology and the intellectual property rights and/or institutional alliances required to execute the strategy. The responsible team members for this function must be clearly defined. The commercialization plan must be in alignment with the technical work plan, and must include a discussion of the Stage Gate process that will be used to plan the tasks, monitor the progress, and identify critical milestones.

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Yahoo! is ready to utilize the YCC technology within its data center designs that are slated for immediate and subsequent deployments at multiple sites around the globe. This willingness to accept the R&D risks and the recognition of the technology's operational advantages provides the seed for subsequent commercial opportunities.

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We are currently in the middle of Stage 4: Technology Development and Verification: Pilot scale development of technology or process; verification and documentation of

technical performance and validation of economic potential in field test(s). Because Yahoo! is developing YCC for full operational build-out and use in our new Lockport, New York data center where the field testing pursuant to this grant will be conducted, successfully meeting our benchmarks for cooling efficiency will mean that the technology is immediately ready for more widespread adoption. No further product development studies or scaling will be required. Thus, build-out of the Lockport YCC facility will represent completion of Stage 4, proof of technical feasibility, leading rapidly to Stage 5, Information Dissemination and Commercialization: All activities necessary for information delivery and commercial launch (production scale technology manufacture and installation; development of market infrastructure; demonstrated commercial operation).

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Yahoo! has already sought patent protection for the YCC design and related technology, having filed several United States patent applications.

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In connection with Quincy, Washington data center Yahoo! developed a patented targeted cooling solution (see, e.g., U.S. Patent No. 7,430,118 "Cold Row Encapsulation for Server Farm Cooling System").

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The GreenXchange (GX) is a standards-based system for patent licensing related to sustainability. Companies participating in the GX will be able to make selected patents available for broad use to achieve sustainability goals, while retaining essential rights like attribution and the right to collect fees for certain classes of users. Sustainability patent licenses are standardized licenses to specific patents, chosen by the participating companies, to encourage the use and widespread adoption of sustainable technologies. This license offers rights to use specific patents for practical applications, including some commercial uses. Users may be asked to pay a standard licensing fee, to cover costs of administration and patent maintenance as well as to provide public attribution when appropriate. While the GX may prove to be an expedient vehicle towards commercialization of YCC technology, the platform is still under development.

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A cross-functional team comprised of the following Yahoo! professionals will lead the YCC commercialization efforts, including:

- Scott Noteboom, Chief Data Center Designer
- Christina Page, Director for Climate & Energy Strategy
- Duane Valz, Associate General Counsel, Patents
- Allen Ng, Brand Marketing Manager

Resumes for all of the above (plus our engineering design team) are provided in the supplementary material.

Discuss the viability of the proposed technology to meet the needs of the target market in a cost effective manner considering potential technical, regulatory, economic, environmental, production or other issues.

The end user market for advanced data center development and utilization primarily consists of large organizations in the public and private sectors. Given the sizable investments required, such organizations typically are equipped to address and negotiate the technical, regulatory, economic, environmental, production and other issues commonly associated with installation of large data centers, either on their own or with the assistance of consultants. YCC, as designed to date, will not pose incremental burdens or hurdles in any of these respects. Accordingly, as long as end users are capable of navigating the existing terrain for installing a new data center, YCC will be an eminently viable solution to include in their data center goals. Indeed, given the mitigating impacts and efficiencies portended by YCC, its inclusion in proposed data center development project may actually help to reduce the number of such issues faced by target market end users.

YCC is designed to work with readily available, common computing hardware, including servers, storage devices, and network equipment. Customization of computing equipment is not necessary for deployment. YCC is designed to work within recommended temperature and humidity specifications for equipment from companies such as Hewlett Packard, Dell, Cisco and Netapp. Yahoo! believes that this inherent design flexibility will provide a significant advantage in regard to market adoption.

We assume that approximately ~~EXT~~ of new data center capacity in the United States would be a good candidate for YCC implementation. The remaining new capacity will not suit YCC, as designed to date, because such capacity is assumed to be located in the Southeast portion of the United States where temperature and humidity make YCC, as designed to date, a poor fit, or because the new capacity is too small-scale to warrant a full greenfield build-out.

Provide evidence of the corporate commitment to the proposed project from inception through commercialization.

Yahoo! data center engineers and professionals are constantly striving to exceed industry standard benchmarks for energy efficient data center operations. We also have a strong and demonstrated commitment to efficiency and sustainability. For example, in April 2007 Yahoo! began measuring its global carbon footprint. In December 2007 we opened the first data center we had designed and built from the ground up in Quincy, Washington, with a PUE of 1.23 running off of almost 100% renewable energy. In June 2009 we announced that we would focus upon lowering the carbon intensity of our data centers by 40%, on average, by 2014. The YCC design is a key part of our concerted effort to achieve our 2014 goals.

4: Technical Approach/ Project Management Plan

Discuss the validity and completeness of the proposed technical approach and likelihood of success based on the current status of the proposed technology.

NOTE: We are currently investigating whether Yahoo! qualifies for incentives under either NYSERDA, or for NYSTAR's 10% matching funds for ARRA projects. This is currently under review.

Based upon the testing described above, the use of existing/proven technologies for many of the design components, and previous experiences supporting the reliability and effectiveness of free cooling, Yahoo! anticipates an extremely high likelihood of success for the field testing of the full-size data center design and its subsequent deployment.

See attached Project Management Plan (pmp.doc) for further details.

Discuss the work and budget distribution among the team members to accomplish the stated objectives.

See Budget Justification for details.

5: Qualifications and Resources

Provide evidence of the capability and experience of organizational participants in

1) research, 2) manufacturing, 3) bringing the technology to the end user through sales and marketing, and 4) ability to serve as an end user of the technology NEED MORE DETAIL HERE.

For additional detail on resources for the project, see the attached resume file for team members.

Innovations in the data center industry are driven heavily by cross-pollination between a relatively small group of peers via informal communication and participation in formal network events (e.g., Uptime Institute, Data Center Dynamics, Green Grid, and Data Center Energy Forum). Organizational credibility is an important criteria. All members of the Yahoo! team have a proven ability to speak to the benefits of efficient data center design and are well-respected in the field.

As a provider of Internet services to over 500 million customers, Yahoo! is one of a handful of companies on the planet that relies upon hundreds of thousands of servers to execute its core business. As such, Yahoo! is one of the largest prospective end users for YCC as an innovative technology.

Provide evidence of organizational experience in similar projects which led to successful technology development and commercialization or technology transfer.

The Yahoo! team successfully designed and executed an earlier-generation free cooling data center in Quincy, Washington, which has been operating since December 2007. Team members have a proven record of design and execution of innovative and aggressive approaches to data center efficiency, including projects that focus on challenging cooling regimes.

Discuss the level of experience and availability of key personnel to complete the proposed project, including personnel involved in technical, commercialization and/or technology transfer.

The team has a keen focus on data center design and operation. The team collectively brings a total of approximately 140 years of data-center specific experience to the table, as well as experience drawn from other construction and engineering-related industries. See attached resumes for further detail.

Demonstrate the adequacy (quality, availability and appropriateness) of facilities and equipment to accommodate the proposed project.

The design relies upon conventional pre-fabricated steel building and will use existing commercial server, network and storage technology that is readily available. The land for the project has been secured from Lockport. Yahoo! anticipates minimal to no issues regarding quality or availability of project materials and labor.

American Recovery and Reinvestment Act (ARRA) Information:

This section should address how the project will promote and enhance the objectives of the American Recovery and Reinvestment Act of 2009, P.L. 111-5, especially job creation and/or preservation, and economic recovery in an expeditious manner. The response must include quantitative data (i.e. nature and type of position, duration of employment, and salary) supporting the number of jobs created and/or preserved, as well as data supporting any other direct economic recovery impacts attributable to the performance of the project

Construction of most data centers is a significant capital investment. The monies that would be invested by Yahoo! building in the Lockport, New York region would go towards job creation and will aid greatly in a region where economic recovery is much needed. Yahoo!'s projected initial investment is \$155 million. The prototype design build cost is estimated at \$55 million (of which \$25 million to \$30million is estimated for labor), and the remaining \$100 million consists of server, network and equipment purchases necessary to fit-out the data center for full operation.

While it is difficult to tie exact job numbers to adoption of YCC, it is reasonable to assume similar numbers of construction and permanent jobs would apply for similarly-sized data centers utilizing YCC.

Anticipated Jobs.

- Average demand for over 520,000 man hours of labor in YCC build (250 jobs)
- 80 percent of jobs to local state residents
- Average total wages of almost \$30 million
 - 56% electricians @ \$48/hour
 - 22% Sheet metal/Pipefitters/Welders @ \$53.50/hour
 - 22% other @ \$28/hour

Yahoo! chose a general contractor headquartered in New York for the Lockport project and expects that most labor will be drawn from the state (including senior management).

The shell for YCC design is a pre-constructed steel building. Yahoo's general contractor plans on using a United States-based steel company for the building. Yahoo! believes that broader market penetration of the YCC design could provide stimulus to the United States steel industry.

Permanent Jobs

- 75 full time jobs (or more)
- Salaries averaging \$60,000+/year
- full employee benefits
- 59 additional indirect jobs in the community (i.e. Security, Lawn care, Pest Control, Fuel delivery, etc.), approximately

Other direct benefits

- Increased sales tax revenue during construction (e.g. workforce use of restaurants, accommodations and consumable supplies.)
- Significant and consistent sales tax revenue from maintenance, utilities and other non-exempt purchases and on-going tax revenue from Yahoo's hardware suppliers. (This also should yield indirect jobs.)
- Network infrastructure build-out that makes the community and the area attractive to other high tech industries.

Sales tax revenue

- Examples from Yahoo!'s most recently completed data center in Quincy, Washington during construction:
 - City sales tax grew almost 700% in two years after remaining stagnant for over a decade (reporting to 2007 numbers). (*Source: City of Quincy*)
 - County sales tax grew 38% from 2006 to 2007-almost double the rate of the next highest county in the state. (*Source: Grant County Assessor's Office*)

Note: Since a Yahoo! competitor was building a similar-sized data center in the Quincy region during the same time period, not all benefits can be attributed solely to Yahoo!'s project, however, benefits were clearly significant and representative of the type of benefits that large data center construction projects yield.

Unemployment

The Lockport, New York regional economy is suffering the negative affects of a major employer in the area that is struggling due to the declining auto industry: Harrison Delphi, a major auto parts supplier. The City of Lockport has seen a two percent increase in unemployment in one year's time, with the trend line continuing through the first half of 2009, at least . The construction jobs and the subsequent permanent jobs that would be created by the Yahoo! Lockport data center construction project would help decrease local unemployment.

<i>New York Unemployment Rates</i>		
	Buffalo Niagara MSA	Lockport (City)
2008	6.0%	7.1%
2007	4.9%	5.4%
2006	5.1%	5.4%
2005	5.3%	5.8%
2004	5.8%	6.1%

2003	5.9%	6.6%
Source: New York State Department of Labor		

The above listed components of your Project Narrative combined, must be within the Narrative page limit specified above. Documents listed below may be included as clearly marked appendices to your Narrative and will not count towards the Project Narrative page limit. Please note that some of the required documents listed below may have their own page limits to which you must adhere.

Appendix A: Relevance to President's Carbon Reduction Goals and EPA Act 2005:
The Lockport data center project and utilization of the YCC design contributes to ITP's goal to drive a 25% reduction in U.S. industrial energy intensity by 2017 in support of EPA Act 2005 and the President's carbon reduction goals through voluntary partnerships with industry.

See above for details on the projected carbon reductions from market adoption of YCC design in the United States.

As noted above, Yahoo! has set a goal of 40% reduction in carbon intensity of its data centers (measured as grams CO₂ per watt-hour of useful compute power) by 2014. The YCC design represents a significant component of the overall strategy that Yahoo! is pursuing company-wide to reach this goal.



PROJECT SUMMARY

Project Name: Northeast Data Center Project
 Phase: 1 of 2
 Location: Town of Lockport, New York

Project No.: 10309
 Plan No.: 1
 Date: 07/20/09

CAPACITY DEMAND

Forecast Max Usage: 9 MW By: (Qtr-Yr) _____
 List of (3) Major Properties: _____ Max Usage: _____ Ramping Info

REAL ESTATE INFORMATION

Land Area: 30.5 acre 1,328,580 sf Building GFA: _____ sf
 Type of Soil: Clay Year Build: _____
 Geotechnical Report Available? Yes Date: 7/2/2009 Prepared By: GeoEmpire Engineering

DESIGN & ENGINEERING

Type of Build: Green Field
 Build Area: 120,000 sf of 190,000 sf

Civil, Structural & Architectural Design:

Type of Foundation: Deep Foundation
 Type of Structure: Steel
 Type of Shell: Metal
 Interior Finish: Low End

Mechanical Design:

Cooling Load: N/A Ton
 Redundancy: N+1
 Type of Cooling: Evaporative Cooling
 Economizer: Outside Air

Electrical Design:

Utility Power: 10 MW Rough PUE = 1.11
 Critical Power: 9 MW
 # of Line Up: 6
 Redundancy: N+1
 Type of Redundancy: Distributed

Special Design:

No raised floor
 Evaporative Cooling
 Water Spraying Technology
 Pre-Engineered / Pre-manufactured Building

PRELIMINARY BUDGET ESTIMATE

Site Selection & Soft Cost:	\$ _____		
Land & Building Cost:	\$ _____		
Construction Cost:	\$ _____	REDACTED	Total Managed by Dev Team: <u>REDACTED</u>
Fit Out Cost:	\$ _____	EXEMPTION 4	<u>EXEMPTION 4</u>
Network Cost:	\$ _____		Project Total:

PRELIMINARY SCHEDULE

Need By Date: <u>07/01/10</u>	Pre-Construction: <u>04/20/09</u>	To <u>08/15/09</u>
	Construction: <u>08/15/09</u>	To <u>06/25/10</u>

VENDORS

Estimated # of Vendors: 32
 Vendor Selection Schedule: 01/05/09 To 08/24/09 (Critical Date)
 Type of Vendors:
Design Consultant
General Contractor
Major Equipment Supplier

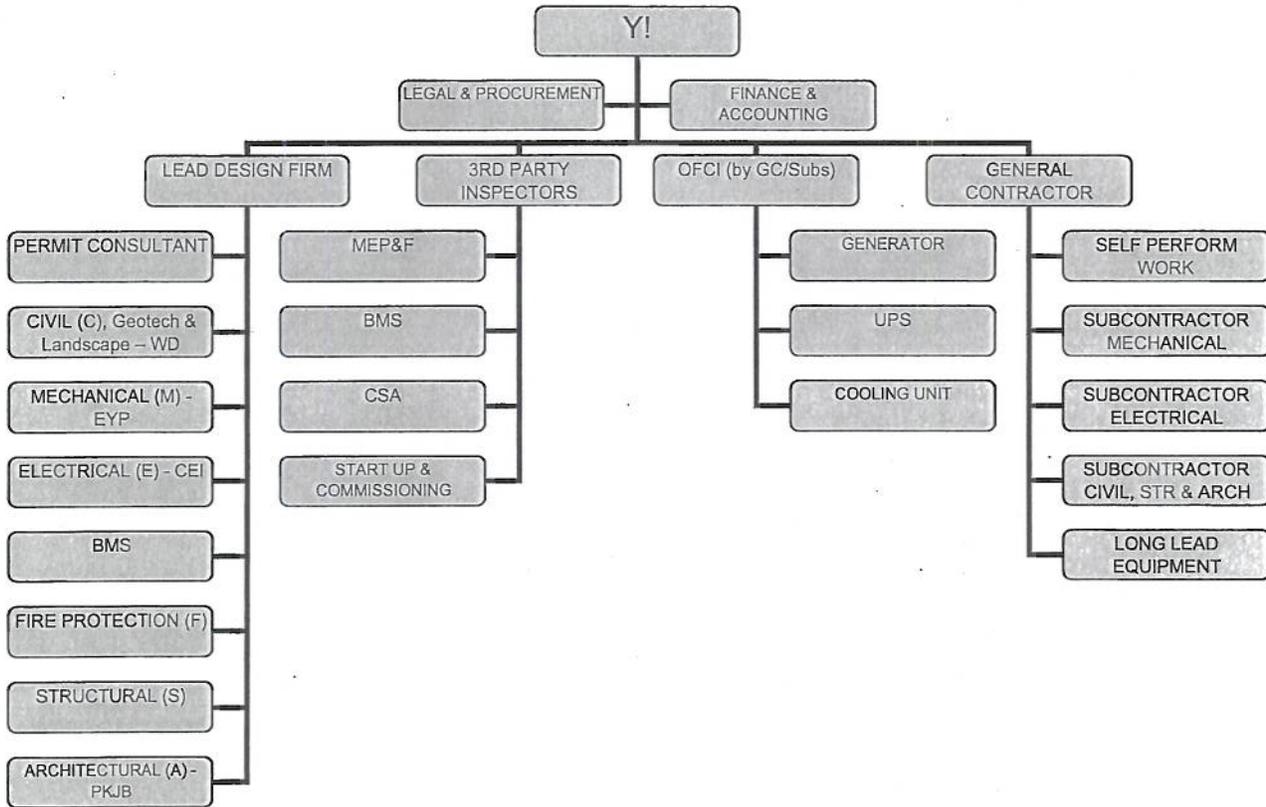
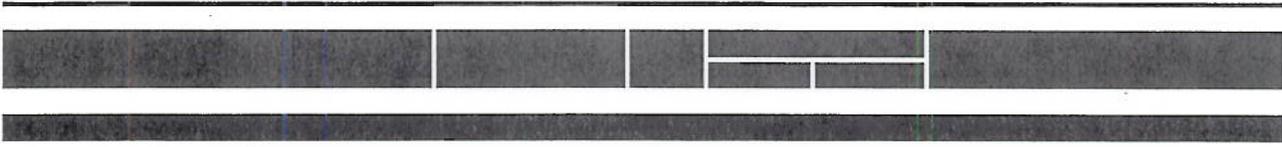
The following contains proprietary information that Yahoo! Inc. requests not be released to persons outside the Government, except for purposes of review and evaluation



PROJECT ORG CHART

Project Name: Northeast Data Center Project
 Phase: 1 of 2
 Location: Town of Lockport, New York

Project No.: 10309
 Plan No.: 1
 Date: 07/20/09



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July 21, 2009

Ms. Christina G. Page
Director, Climate and Energy Strategy
Yahoo! Inc.
701 First Avenue
Sunnyvale, California 94089

RE: Yahoo! Inc. Application to DE-FOA-0000107
Letter of Support

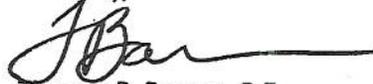
Dear Ms. Page:

The New York State Energy Research and Development Authority (NYSERDA) is a public benefit corporation created in 1975 with the mission to use innovation and technology to solve some of New York's most difficult energy and environmental problems in ways that improve the State's economy. NYSERDA is committed to supporting energy efficiency in the data center and telecommunications industries to achieve this mission. This letter is to express NYSERDA's strong support for the Yahoo! Inc. proposal to DOE under the Information and Communication Facility Energy Efficiency solicitation.

New York State's energy infrastructure and economic well-being are both tied to the successful resolution of the problems posed by the rapid growth of energy demand associated with telecommunications and data centers. As part of the Energy Efficiency Portfolio Standard (EEPS) and New York State's goals to reduce energy consumption by 15% by 2015, NYSERDA has an energy savings goal of 840,000 MWh for data centers, telecommunications, and industry. To deliver this energy savings, NYSERDA offers cost-sharing incentives through its Research and Development, Industrial and Process Efficiency, and New Construction Programs targeting data centers as an area of focus. Yahoo!'s proposed data center design includes renewable energy sources, on-site generation, advanced passive or "free" cooling technology, and green building design (LEED) concepts. This project will help New York State achieve its energy efficiency goals.

NYSERDA strongly supports the Yahoo! Inc. grant proposal. This is a unique opportunity for a federal, state and private sector partnership to demonstrate effective application of advanced energy efficiency in green data centers. NYSERDA believes that with joint support from New York State and DOE this proposal will help job creation, economic development and energy efficiency efforts in New York State, as well as be a highly visible model of energy efficient data centers across New York and the United States.

Sincerely,



Thomas R. Barone, P.E.

Director, Energy Efficiency Services

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Albany, NY 12203-6399
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Phone: (518) 862-1090
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Management Program
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726 Exchange Street, Suite 821
Buffalo, New York 14210
Phone: (716) 842-1522
Fax: (716) 842-0156

Empire State Development

July 21, 2009

Christina G. Page
Director, Climate and Energy Strategy
Yahoo! Inc.
701 First Avenue
Sunnyvale, CA 94089

RE: Yahoo! Inc. Application to DE-FOA-0000107
Letter of Support

Dear Ms. Page:

The Empire State Development Corporation is a public benefit corporation which provides the highest level of assistance and service to businesses in order to encourage economic investment and prosperity in New York State. We work closely with businesses to: identify creative solutions to challenging problems, generate enhanced opportunities for growth, and help them achieve their uniquely important, short- and long-term goals.

As ESDC's Regional Director for Western New York, I would like to take this opportunity to express ESDC's strong support for the Yahoo! Inc. proposal to DOE under the Information and Communication Facility Energy Efficiency solicitation.

From the beginning of this project, ESDC has been an integral part of the effort to bring Yahoo! to upstate New York. In this effort as well, we would like to wholeheartedly state our strong support for Yahoo! as they seek to grow in a manner that is friendly to the climate and reduce the amount of energy needed to provide their services world wide.

As part of the Energy Efficiency Portfolio Standard (EEPS) and New York State's goals to reduce energy consumption by 15% by 2015, NYSERDA has an energy savings goal of 840,000 MWh. Yahoo!'s proposed data center design includes renewable energy sources, on-site generation, advanced passive cooling technology, and green building design (LEED) concepts. This project will help New York State achieve its energy efficiency goals.

ESDC strongly supports the Yahoo! Inc. grant proposal. We welcome the opportunity to partner with, federal, and private sector organizations to employ advanced energy efficiency in Yahoo's green data centers. ESDC is certain that with support from both New York State and DOE this proposal will foster job creation, economic development and energy efficiency in New York State. There is no doubt that this project will prove to be a standard for energy efficient data centers in New York and across the United States.

Sincerely,



Christina P. Orsi
Regional Director, Western New York
Empire State Development Corporation

Empire State Development

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