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OMB Number: 4040-0004
Expiration Date: 01/31/2009

Application for Federal Assistance SF-424

Version 02

* 1. Type of Submission:
- [ ] Preapplication
- [x] Application
- [ ] Changed/Corrected Application

* 2. Type of Application:
- [x] New
- [ ] Continuation
- [ ] Revision

* If Revision, select appropriate letter(s):

* Other (Specify)

* 3. Date Received: 07/21/2009

4. Applicant Identifier:

5a. Federal Entity Identifier:

* 5b. Federal Award Identifier:

State Use Only:

6. Date Received by State:

7. State Application Identifier:

8. APPLICANT INFORMATION:

* a. Legal Name: Christina Page

* b. Employer/Taxpayer Identification Number (EIN/TIN): REDACTED EXEMPTION 4

* c. Organizational DUNS: 884364530

d. Address:

* Street1: 701 First Avenue
Street2:
* City: Sunnyvale
County:
* State: CA: California
Province:
* Country: USA: UNITED STATES
* Zip / Postal Code: 94089

e. Organizational Unit:

Department Name: Service Engineering & Ops

Division Name: Data Center Operations

f. Name and contact information of person to be contacted on matters involving this application:

Prefix: Miss
* First Name: Christina
Middle Name: G
* Last Name: Page
Suffix:

Title: Director, Climate and Energy Strategy

Organizational Affiliation: Yahoo! Inc

* Telephone Number: 408 306 6791
Fax Number:

* Email: cpage@yahoo-inc.com

OMB Number: 4040-0004
Expiration Date: 01/31/2009

Application for Federal Assistance SF-424

Version 02

9. Type of Applicant 1: Select Applicant Type:

Q: For-Profit Organization (Other than Small Business)

Type of Applicant 2: Select Applicant Type:

Type of Applicant 3: Select Applicant Type:

* Other (specify):

*** 10. Name of Federal Agency:**

Golden Field Office

11. Catalog of Federal Domestic Assistance Number:

81.086

CFDA Title:

Conservation Research and Development

*** 12. Funding Opportunity Number:**

DE-FOA-0000107

* Title:

Recovery Act: Energy Efficient Information and Communication Technology

13. Competition Identification Number:

Title:

14. Areas Affected by Project (Cities, Counties, States, etc.):

Lockport, New York

*** 15. Descriptive Title of Applicant's Project:**

Yahoo Compute Coop Next Generation Passive Cooling Design for Data Centers

Attach supporting documents as specified in agency instructions.

Add Attachments | Delete Attachments | View Attachments

Close Form | Previous | Next | Print Page | About

OMB Number: 4040-0004
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Application for Federal Assistance SF-424

Version 02

16. Congressional Districts Of:

* a. Applicant: CA-014 * b. Program/Project: NY-026

Attach an additional list of Program/Project Congressional Districts if needed.

Add Attachment | Delete Attachment | View Attachment

17. Proposed Project:

* a. Start Date: 08/12/2009 * b. End Date: 06/30/2010

18. Estimated Funding ($):

* a. Federal	10,000,000.00
* b. Applicant	47,000,000.00
* c. State	0.00
* d. Local	0.00
* e. Other	0.00
* f. Program Income	0.00
* g. TOTAL	57,000,000.00

*** 19. Is Application Subject to Review By State Under Executive Order 12372 Process?**

☐ a. This application was made available to the State under the Executive Order 12372 Process for review on

☐ b. Program is subject to E.O. 12372 but has not been selected by the State for review.

☒ c. Program is not covered by E.O. 12372.

*** 20. Is the Applicant Delinquent On Any Federal Debt? (If "Yes", provide explanation.)**

☐ Yes ☒ No Explanation

21. *By signing this application, I certify (1) to the statements contained in the list of certifications and (2) that the statements herein are true, complete and accurate to the best of my knowledge. I also provide the required assurances** and agree to comply with any resulting terms if I accept an award. I am aware that any false, fictitious, or fraudulent statements or claims may subject me to criminal, civil, or administrative penalties. (U.S. Code, Title 218, Section 1001)**

☒ ** I AGREE

** The list of certifications and assurances, or an internet site where you may obtain this list, is contained in the announcement or agency specific instructions.

Authorized Representative:

Prefix: * First Name: Christina

Middle Name: G.

* Last Name: Page

Suffix:

* Title: Director Climate and Energy Strategy

* Telephone Number: 408 306 6791 Fax Number:

* Email: cpage@yahoo-inc.com

* Signature of Authorized Representative: Christina Page * Date Signed: 07/21/2009

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Standard Form 424 (Revised 10/2005)
Prescribed by OMB Circular A-102

OMB Number: 4040-0004
Expiration Date: 01/31/2009

Application for Federal Assistance SF-424 Version 02

*** Applicant Federal Debt Delinquency Explanation**

The following field should contain an explanation if the Applicant organization is delinquent on any Federal Debt. Maximum number of characters that can be entered is 4,000. Try and avoid extra spaces and carriage returns to maximize the availability of space.

OMB Number: 4040-0010
Expiration Date: 08/31/2011

Project/Performance Site Location(s)

Project/Performance Site Primary Location ☐ I am submitting an application as an individual, and not on behalf of a company, state, local or tribal government, academia, or other type of organization.

Organization Name: Yahoo! Inc.

DUNS Number: 8843645300000

* Street1: To be determined - site does not have a street address

Street2:

* City: Lockport County: Niagara

* State: NY: New York

Province:

* Country: USA: UNITED STATES

* ZIP / Postal Code: 14094-0000 * Project/ Performance Site Congressional District: NY-026

Project/Performance Site Location 1 ☐ I am submitting an application as an individual, and not on behalf of a company, state, local or tribal government, academia, or other type of organization.

Organization Name:

DUNS Number:

* Street1:

Street2:

* City: County:

* State:

Province:

* Country: USA: UNITED STATES

* ZIP / Postal Code: * Project/ Performance Site Congressional District:

Impact Projections Model

Project Name:
Preparer: Name and Organization

Technology Description
Please provide a concise description (more than one-half page is
- Its function, and benefits to the industrial user of the technology
- The state-of-the art technology it replaces
- The target of the technology and potential limitations to its applic
- Plant modifications necessary to incorporate the new technology
- Competing technologies
- The definition of one technology unit-year

Yahoo Compute Coop Next Generation Passive Cooling Design for Data Centers

The integrated building design allows for use of free cooling 99 percent of the year via the unique building shape and orientation. By eliminating the need for expensive, energy-intensive chiller systems and air handling equipment, and by reducing horsepower required from fans, YCC insures that the vast majority of power is allocated tc providing useful compute work back to the Internet. Using free cooling and evaporative cooling for extreme summer conditions translates to fewer moving parts, lower water consumption, and reductions in both capital and operating expenses. The relatively low initial cost to build, compatibility with current server and network models, a efficient use of power and water are all key features that make it a highly compatible and implementable design innovation for the data center industry.

Goals of the project:
• Run 99% of the year on free cooling, capitalizing upon prevailing winds and local weather conditions
• Eliminate the need for conventional chiller/air handling unit via a backup evaporative cooling system, to be deployed only during extreme temperature and humidity events
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• Withstand 100-year temperature and humidity conditions and extremely low winter temperatures while maintaining server room environmental requirements.
• Lower the cost to cool from an industry standard of 54% to sub-1%. This translates to a DCiE of .90 or higher – as compared to an industry average of .50 DCIe, or the .81 performance of Yahoo!'s previous build in Quincy, WA.

Plant modifications necessary: currently new build only. No plant modifications are involved with this project.

Competing technologies: water cooling; conventional airside economizer design; container data centers.

One technology unit-year = one MW of NEW construction data center server load, excluding infrastructure load

Unit Inputs

Yahoo Compute Coop Next Generation Passive Cooling Design for Data Centers

Per Unit Impacts per year	New Technology	Current Technology	Net Impact
Energy Use			
Electricity (billion kWh)	9.64E-03	1.19E-02	2.28E-03
Natural Gas (trillion Btu)	0.00E+00	0.00E+00	0.00E+00
Petroleum - Residual Fuel (million barrels)	0.00E+00	0.00E+00	0.00E+00
Petroleum - Distillate Fuel (million barrels)	0.00E+00	0.00E+00	0.00E+00
Petroleum - Liquefied Petroleum Gas (million barrels)	0.00E+00	0.00E+00	0.00E+00
Coal (million short tons)	0.00E+00	0.00E+00	0.00E+00
Feedstock (trillion Btu, please specify)	0.00E+00	0.00E+00	0.00E+00
Biomass (trillion Btu, please specify)	0.00E+00	0.00E+00	0.00E+00
Waste (trillion Btu, please specify)	0.00E+00	0.00E+00	0.00E+00
Other (please specify, trillion Btu)	0.00E+00	0.00E+00	0.00E+00

Comments

assumes PUE of 1.1 for YCC
assume 100% uptime (8760 hours/year)
assumes PUE of 1.36 for current state of the art technology
For state of the art technology, assume water cooled colo with conventional building and chiller system.

Market Inputs

Yahoo Compute Coop Next Generation Passive Cooling Design for Data Centers

Total Market

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year for calculation: 2010

annual market growth rate (%): 10.0%

Comments

assumes EPA 2007 projections for 2010 US electricity consumption (100 billion kWh)

assumes a slowdown from 12% global growth in data center electricity consumption globally, projected for 2005 to 2010.

assumes 10% average US growth rate between 2005 and 2009

assumes annual market growth rate of 10% following (based on continued growth but improved compute power per server canceling each other out)

x

Ultimate Potential Market Share

REDACTED EXEMPTION 4

Comments

assumes that roughly 25% of data center growth will be for server farms too small to make YCC appropriate (based on 2007 EPA study)

assumes an additional 20% of data centers that are the correct size for YCC, will be located in regions where temperature and humidity preclude YCC technology

assumes an additional 10% will use an alternate, incompatible design approach (eg, water cooling)

x

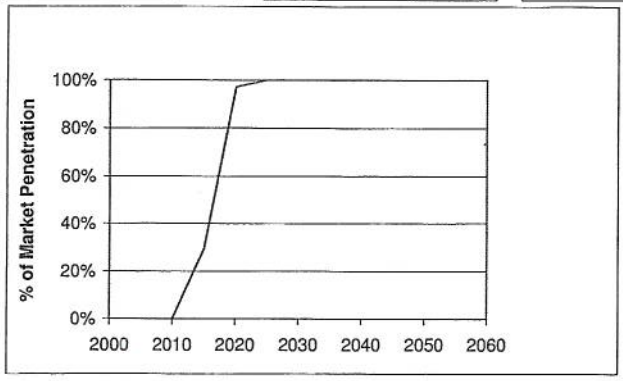
Market Penetration

	(10+ years)	(4-8 Years)			(2-3 Years)		
Case	Initial R&D Completed	Initial System Prototype	Refined Prototype	Commercial Prototype	Commercial Introduction	Technology Class	Years to Saturation
With ITP		2009	2010	2010	2011	a	5

Comments

assumed that YCC prototype is completed June 2010, on schedule

Assumes 6 months of performance data from full 9MW phase buildout prior to expansion to commercial introduction



Impact Projections Model

Impacts: New Technology vs Current Technology

Yahoo Compute Coop Next Generation Passive Cooling Design for Data Centers

Impact By Year	2010	2015	2020	2025	2030	2035	2040
Cumulative Units installed	0						
Annual New Units Installed	0						
Annual Installations Total	0						
Market penetration	0%						
ANNUAL SAVINGS							
Energy Metrics							
Total primary energy displaced (trillion Btu)	0.00						
Direct electricity displaced (billion kWh)	0.00						
Direct natural gas displaced (bcf)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Direct petroleum displaced (million barrels)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Direct coal displaced (million short tons)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Feedstock energy displaced (trillion BTU)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Biomass energy displaced (trillion BTU)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Waste energy displaced (trillion BTU)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other energy displaced (trillion Btu)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Financial Metrics							
Energy-cost savings ($MM/yr)	0.00						
Environmental Metrics							
CO Displaced (Metric tonnes)	0.00	32.24	169.31	280.67	452.19	728.26	1172.87
Carbon Dioxide emissions displaced (MM TCE)	0.00	0.03	0.16	0.26	0.42	0.68	1.09
Other greenhouse emissions displaced (MM TCI	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SO2 displaced (Metric tonnes)	0.00	452.56	2131.94	3534.30	5694.09	9170.43	14769.06
NOx displaced (Metric tonnes)	0.00	284.90	1399.75	2320.49	3738.53	6020.96	9696.82
Particulates displaced (Metric tonnes)	0.00	9.67	45.38	75.23	121.21	195.21	314.39
VOCs displaced (Metric tonnes)	0.00	3.46	18.24	30.23	48.70	78.44	126.32
Hydrocarbons displaced (Metric tonnes)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Solid Waste (Metric tonnes)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other environmental benefits (Metric tonnes)	0.00	0.00	0.00	0.00	0.00	0.00	0.00

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REDACTED EXEMPTION 4

REDACTED EXEMPTION 4

Instructions and Summary

Award Number: _____
Award Recipient: _____

Date of Submission: _____
Form submitted by: _____
(May be award recipient or sub-recipient)

Please read the instructions on each page before starting.
If you have any questions, please ask your DOE contact. It will save you time!

On this form, provide detailed support for the estimated project costs identified on the SF-424A form (Budget).

- The dollar amounts on this page must match the amounts on the associated SF-424A.
- The award recipient and each sub-recipient with estimated costs of $100,000 or more must complete this form and a SF-424A form.
- The total budget presented on this form and on the SF424A must include both Federal (DOE), and Non-Federal (cost share) portions, thereby reflecting TOTAL PROJECT COSTS proposed.
- For costs in each Object Class Category on the SF-424A, complete the corresponding worksheet on this form (tab at the bottom of the page).
- All costs incurred by the preparer's sub-recipients, vendors, contractors, consultants and Federal Research and Development Centers (FFRDCs), should be entered only in section f. Contractual. All other sections are for the costs of the preparer only.

SUMMARY OF BUDGET CATEGORY COSTS PROPOSED

(Note: The values in this summary table are from entries made in each budget category sheet.)

CATEGORY	Budget Period 1 Costs	Budget Period 2 Costs	Budget Period 3 Costs	Total Costs	Project Costs %	Comments (Add comments as needed)
a. Personnel			$0		1.0%	
b. Fringe Benefits			$0		0.2%	
c. Travel			$0		0.2%	
d. Equipment			$0		0.4%	
e. Supplies			$0		0.0%	
f. Contractual		REDACTED EXEMPTION 4		REDACTED EXEMPTION 4		
Sub-recipient			*$0*	*$0*	*0.0%*	
FFRDC			*$0*	*$0*	*0.0%*	
Vendor			*$0*		*1.9%*	
Total Contractual			$0		1.9%	
g. Construction			$0		93.1%	
h. Other Direct Costs			$0		3.2%	
i. Indirect Charges			$0	$0	0.0%	
Total Project Costs			$0		100.0%	

Additional Explanations/Comments (as necessary)

a. Personnel

PLEASE READ!!!

List costs solely for employees of the entity completing this form (award recipient or sub-recipient). All other personnel costs (of subrecipients or other contractual efforts of the entity preparing this) must be included under f., Contractual. This includes all consultants and FFRDCs.

Identify positions to be supported. Key personnel should be identified by title. All other personnel should be identified either by title or a group category. State the amounts of time (e.g., hours or % of time) to be expended, the composite base pay rate, total direct personnel compensation and identify the rate basis (e.g., actual salary, labor distribution report, technical estimate, state civil service rates, etc.).

Add rows as needed. Formulas/calculations will need to be entered by the preparer of this form. Please enter formulas as shown in the example.

Task # and Title	Position Title	Budget Period 1			Budget Period 2			Budget Period 3			Project Total Hours	Project Total Dollars	Rate Basis
		Time (Hours)	Pay Rate ($/Hr)	Total Budget Period 1	Time (Hours)	Pay Rate ($/Hr)	Total Budget Period 2	Time (Hours)	Pay Rate ($/Hr)	Total Budget Period 3			
1. Generation 2A Receiver Design		10000			600			800					Actual Salary
EXAMPLE	Sr. Engineer	2000			200			200					Actual Salary
ONLY!!!	Electrical engineers	6200			400			600		REDACTED EXEMPTION 4			Actual Salary
	Technician	1800			0		$0	0					Actual Salary
1. Design Development													
	Senior Datacenter Design	240											
	Datacenter Design Engineer	480											
	Project Management Support	960											
	Support Personnel	50											
2. Design Testing			REDACTED EXEMPTION 4									$0	
	Senior Datacenter Design	720											
	Datacenter Design Engineer	1080											
	Project Management Support	1440											
	Patent Attorney	50				REDACTED EXEMPTION 4						REDACTED EXEMPTION 4	
	Support Personnel	50											
3. Design Development												$0	
	Senior Datacenter Design				240								
	Datacenter Design Engineer				480								
	Project Management Support				480								
	Patent Attorney						$0					$0	
	Support Personnel				480								
4. Preconstruction and Construction													
	Senior Datacenter Design	0		$0									
	Datacenter Design Engineer	0		$0									
	Project Management Support	440			480								
	Patent Attorney	0		$0	0								
	Legal Support	200			0	$0.00	$0						

and Title	Position Title	Budget Period 1			Budget Period 2			Budget Period 3			Project Total Hours	Project Total Dollars	Rate Basis
		Time (Hours)	Pay Rate ($/Hr)	Total Budget Period 1	Time (Hours)	Pay Rate ($/Hr)	Total Budget Period 2	Time (Hours)	Pay Rate ($/Hr)	Total Budget Period 3			
	Total Personnel Costs	5710		REDACTED EXEMPTION 4	2160		REDACTED EXEMPTION 4	0		$0	0	REDACTED EXEMPTION 4	

Additional Explanations/Comments (as necessary)

b. Fringe Benefits

	Budget Period 1	Budget Period 2	Budget Period 3	Total
Rate applied:	REDACTED	REDACTED	0.0%	REDACTED
Total fringe requested:	EXEMPTION 4	EXEMPTION 4	$0	EXEMPTION 4

A federally approved fringe benefit rate agreement, or a proposed rate supported and agreed upon by DOE for estimating purposes is required if reimbursement for fringe benefits is requested. Please check (X) one of the options below and provide the requested information. Calculate the fringe rate and enter the total amount in Section B, line 6.b. ("Fringe Benefits") of form SF-424A.

____ **A fringe benefit rate has been negotiated with, or approved by, a federal government agency. A copy of the latest rate agreement is included with this application, and will be provided electronically to the Contracting Officer for this project.**
**In the area designated below, identify the full calculations used to derive the total fringe costs. See further information below.*

____ **There is not a current, federally approved rate agreement negotiated and available.**
*When this option is checked, the entity preparing this form shall submit a rate proposal in the format provided at the following website, or a format that provides the same level of information and which will support the rates being proposed for use in performance of the proposed project. Go to https://www.eere-pmc.energy.gov/forms.aspx and select PMC 400.2 Sample Rate Proposal. * In the area designated below, identify the full calculations used to derive the total fringe costs. See further information below.*

Additional explanation/comments (as necessary)

*IMPORTANT: In the space provided below (or as an attachment) provide a complete explanation and the full calculations used to derive the total fringe costs. If the total fringe costs are a cumulative amount of more than one calculation or rate application, the explanation and calculations should identify all rates used, along with the base they were applied to (and how the base was derived), and a total for each (along with grand total). The rates and how they are applied should not be averaged to get one fringe cost percentage. NOTE: The fringe benefit rate should be applied to both the Federal Share and Recipient Cost Share.

c. Travel

PLEASE READ!!!

Provide travel detail as requested below, identifying total Foreign and Domestic Travel as separate items. Purpose of travel are it conference, DOE sponsored meeting, project management meeting, etc. The Basis for Estimating Costs are items such as past t Travel Regulations, etc.

All listed travel must be necessary for performance of the Statement of Projecct Objectives.

Add rows as needed. If rows are added, formulas/calculations may need to be adjusted by the preparer.

Purpose of travel	No. of Travelers	Depart From (not required for domestic travel)	Destination (not required for domestic travel)	No. of Days	Cost per Traveler	Cost per Trip
Budget Period 1						
Domestic Travel						
EXAMPLE ONLY!!! Visit to PV cell mfr. to set up vendor agreement	2			2		
8 design meeting	10			8		
Mock up test	10			5		
						$0
						$0
						$0
						$0
Domestic Travel subtotal						
International Travel						
						$0
						$0
						$0
						$0
International Travel subtotal						
Budget Period 1 Total						$0

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EXEMPTION 4

REDACTED
EXEMPTION 4

Purpose of travel	No. of Travelers	Depart From (not required for domestic travel)	Destination (not required for domestic travel)	No. of Days	Cost per Traveler	Cost per Trip
Budget Period 2						
Domestic Travel						
6 design meeting	10			6		REDACTED EXEMPTION 4
						$0
						$0
						$0
						$0
						$0
Domestic Travel subtotal						
International Travel						REDACTED EXEMPTION 4
						$0
						$0
						$0
						$0
International Travel subtotal						$0
Budget Period 2 Total						REDACTED EXEMPTION 4
Budget Period 3						
Domestic Travel						
						$0
						$0
						$0
						$0
						$0
						$0
Domestic Travel subtotal						$0
International Travel						
						$0
						$0
						$0
						$0
International Travel subtotal						$0
Budget Period 3 Total						**$0**
PROJECT TOTAL						REDACTED EXEMPTION 4

Additional Explanations/Comments (as necessary)

c. Travel

APPLICANT'S

OMB Approval No. 0348-00

BUDGET INFORMATION - Construction Programs

NOTE: Certain Federal assistance programs require additional computations to arrive at the Federal share of project costs eligible for participation. If such is the case, you will be notified.

COST CLASSIFICATION	a. Total Cost	b. Costs Not Allowable for	c. Total Allowable Costs
1 Administrative and legal expenses		$0.00	$0.00
2 Land, structures, rights-of-way, appraisals, e	REDACTED EXEMPTION 4	$0.00	REDACTED EXEMPTION 4
3 Relocation expenses and payments	$0.00	$0.00	$0.00
4 Architectural and engineering fees	$0.00	$0.00	$0.00
5 Other architectural and engineering fees	$0.00	$0.00	$0.00
6 Project inspection fees	$0.00	$0.00	$0.00
7 Site work		$0.00	
8 Demolition and removal	REDACTED EXEMPTION 4	$0.00	$0.00
9 Construction		$0.00	
10 Equipment		$0.00	$0.00
11 Miscellaneous		$0.00	
12 SUBTOTAL		$0.00	REDACTED EXEMPTION 4
13 Contingencies	$0.00	$0.00	$0.00
14 SUBTOTAL		$0.00	
15 Project (program) income	$0.00	$0.00	$0.00
16 TOTAL PROJECT COSTS (*subtract #15 fro*		$0.00	

FEDERAL FUNDING		
17 Federal assistance requested, calculated as follows: (Consult Federal agency for Federal percentage share.) Enter the resulting Federal share.	Enter eligible costs from line 16c Multiply X _____%	0

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Standard Form 424C (Rev. 7-97)
Prescribed by OMB Circular A-102

INSTRUCTIONS FOR THE SF-424C

SF-424C (Rev. 7-97) Back

This sheet is to be used for the following types of applications: (1) "New" (means a new [previously unfunded] assistance award); (2) "Continuation" (means funding in a succeeding budget period which stemmed from a prior agreement to fund); and (3) "Revised" (means any changes in the Federal Government's financial obligations or contingent liability from an existing obligation). If there is no change in the award amount, there is no need to complete this form. Certain Federal agencies may require only an explanatory letter to effect minor (no cost) changes. If you have questions, please contact the Federal agency.

Column a. - If this is an application for a "New" project, enter the total estimated cost of each of the items listed on lines 1 through 16 (as applicable) under "COST CLASSIFICATION."

If this application entails a change to an existing award, enter the eligible amounts approved under the previous award for the items under "COST CLASSIFICATION."

Column b. - If this is an application for a "New" project, enter that portion of the cost of each item in Column a. which is not allowable for Federal assistance. Contact the Federal agency for assistance in determining the allowability of specific costs.

If this application entails a change to an existing award, enter the adjustment [+ or (-)] to the previously approved costs (from column a.) reflected in this application.

Column. - This is the net of lines 1 through 16 in columns "a." and "b."

Line 1 - Enter estimated amounts needed to cover administrative expenses. Do not include costs which are related to the normal functions of government. Allowable legal costs are generally only those associated with the purchases of land which is allowable for Federal participation and certain services in support of construction of the project.

Line 2 - Enter estimated site and right(s)-of-way acquisition costs (this includes purchase, lease, and/or easements).

Line 3 - Enter estimated costs related to relocation advisory assistance, replacement housing, relocation payments to displaced persons and businesses, etc.

Line 4 - Enter estimated basic engineering fees related to construction (this includes start-up services and preparation of project performance work plan).

Line 5 - Enter estimated engineering costs, such as surveys, tests, soil borings, etc.

Line 6 - Enter estimated engineering inspection costs.

Line 7 - Enter estimated costs of site preparation and restoration which are not included in the basic construction contract.

Line 9 - Enter estimated cost of the construction contract.

Line 10 - Enter estimated cost of office, shop, laboratory, safety equipment, etc. to be used at the facility, if such costs are not included in the construction contract.

Line 11 - Enter estimated miscellaneous costs.

Line 12 - Total of items 1 through 11.

Line 13 - Enter estimated contingency costs. (Consult the Federal agency for the percentage of the estimated construction cost to use.)

Line 14 - Enter the total of lines 12 and 13.

Line 15 - Enter estimated program income to be earned during the grant period, e.g., salvaged materials, etc.

Line 16 - Subtract line 15 from line 14.

Line 17 - This block is for the computation of the Federal share. Multiply the total allowable project costs from line 16, column "c." by the Federal percentage share (this may be up to 100 percent; consult Federal agency for Federal percentage share) and enter the product on line 17.

Company	Name	Role
Yahoo!	Scott Noteboom	Principal investigator
Yahoo!	Christina Page	Energy & Climate advisor
Yahoo!	Duane Valz	Commercialization and IP Manager
Yahoo!	Allen Ng	Commercialization and Marketing
Cupertino Electric	Rudy Bergthold	Electrical Engineer
DPR/Fortis	Scott Simmons	Mechanical Electrical and Plumbing Coordinator
EYP	Jim Zuppan	Principal Mechanical Investigator
Structure Tone	Terence Deneny	Design and Construction manager
Structure Tone	Tom Miller	Construction Manager
Structure Tone	Peter McCabe	Mechanical, Electrical and Plumbing Coordinator

d. Equipment

PLEASE READ!!!

Equipment is generally defined as an item with an acquisition cost greater than $5,000 and a useful life expectancy of more than one year. Further definitions can be found at 10 CFR 600 found on the PMC Recipient Resources Forms page at https://www.eere-pmc.energy.gov/Forms.aspx#regs .

List all proposed equipment below, providing a basis of cost such as vendor quotes, catalog prices, prior invoices, etc., and briefly justifying its need as it applies to the Statement of Project Objectives. If it is existing equipment, and the value of its contribution to the project budget is being shown as cost share, provide logical support for the estimated value shown. If it is new equipment which will retain a useful life upon completion of the project, provide logical support for the estimated value shown.

For equipment over $50,000 in price, also include a copy of the associated vendor quote or catalog price list.

Add rows as needed. If rows are added, formulas/calculations may need to be adjusted by the preparer.

Equipment Item	Qty	Unit Cost	Total Cost	Basis of Cost	Justification of need
Budget Period 1					
EXAMPLE ONLY!!! Thermal shock chamber	2	$20,000	$40,000	Vendor Quote	Reliability testing of PV modules- Task 4.3
			$0		
Spray Nozzels			REDACTED EXEMPTION 4	Estimate	Cost
Servers for mockup					
			$0		
			$0		
			$0		
			$0		
			$0		
			$0		
Budget Period 1 Total			REDACTED EXEMPTION 4		
Budget Period 2					
			$0		
			$0		
			$0		
			$0		
			$0		
			$0		
			$0		
			$0		
			$0		
Budget Period 2 Total			$0		
Budget Period 3					

Equipment Item	Qty	Unit Cost	Total Cost	Basis of Cost	Justification of need
			$0		
			$0		
			$0		
			$0		
			$0		
			$0		
			$0		
			$0		
			$0		
			$0		
			$0		
			$0		
Budget Period 3 Total			$0		
PROJECT TOTAL					

Additional Explanations/Comments (as necessary)

REDACTED
EXEMPTION 4

d. Equipment

e. Supplies

PLEASE READ!!!

Supplies are generally defined as an item with an acquisition cost of $5,000 or less and a useful life expectancy of less than one year. Supplies are generally consumed during the project performance. Further definitions can be found at 10 CFR 600 found on the PMC Recipient Resources Forms page at https://www.eere-pmc.energy.gov/Forms.aspx#regs.

List all proposed supplies below, providing a bases of cost such as vendor quotes, catalog prices, prior invoices, etc., and briefly justifying the need for the Supplies as they apply to the Statement of Project Objectives. Note that Supply items must be direct costs to the project at this budget category, and not duplicative of supply costs included in the indirect pool that is the basis of the indirect rate applied for this project.

Add rows as needed. If rows are added, formulas/calculations may need to be adjusted by the preparer.

General Category of Supplies	Qty	Unit Cost	Total Cost	Basis of Cost	Justification of need
Budget Period 1					
EXAMPLE ONLY!!! Wireless DAS components	10	$360.00	$3,600	Catalog price	For Alpha prototype - Task 2.4
			$0		
Miscellaneous materials	1	REDACTED			
		EXEMPTION 4	$0		
			$0		
			$0		
			$0		
			$0		
			$0		
			$0		
			REDACTED $0		
Budget Period 1 Total			EXEMPTION 4		
Budget Period 2					
			$0		
			$0		
			$0		
			$0		
			$0		
			$0		
			$0		
			$0		
			$0		
			$0		
			$0		
Budget Period 2 Total			$0		

General Category of Supplies	Qty	Unit Cost	Total Cost	Basis of Cost	Justification of need
Budget Period 3					
			$0		
			$0		
			$0		
			$0		
			$0		
			$0		
			$0		
			$0		
			$0		
			$0		
			$0		
Budget Period 3 Total			$0		
PROJECT TOTAL					

Additional Explanations/Comments (as necessary)

f. Contractual

PLEASE READ!!!

The entity completing this form must provide all costs related to sub-recipients, vendors, contractors, consultants and FFRDC partners in the applicable boxes below.

Sub-recipients (partners, sub-awardees):
For each sub-recipient with total project costs of $100,000 or more, a separate SF-424A budget and PMC123.1 budget justification form must be submitted. These sub-recipient forms may be completed by either the sub-recipients themselves or by the preparer of this form. The budget totals on the sub-recipient's forms must match the sub-recipeint entries below.

The preparer of this form need only provide further support of the completed sub-recipient budget forms as they deem necessary. The support to justify the budgets of sub-recipients with estimated costs less than $100,000 may be in any format, and at a minimum should provide what Statement of Project Objectives task(s) are being performed, the purpose/need for the effort, and a basis of the estimated costs that is considered sufficient for DOE evaluation.

Vendors (includes contractors and consultants):
List all vendors, contractors and consultants supplying commercial supplies or services used to support the project. The support to justify vendor costs (in any amount) should provide the purpose for the products or services and a basis of the estimated costs that is considered sufficient for DOE evaluation.

Federal Research and Development Centers (FFRDCs):
For FFRDC partners, award recipient will provide a Field Work Proposal (if not already provided with the original application), along with the FFRDC labor mix and hours, by category and FFRDC major purchases greater than $25,000, including Quantity, Unit Cost, Basis of Cost, and Justification. The award recipient may allow the FFRDC to provide this information directly to DOE.

Add rows as needed. If rows are added, formulas/calculations may need to be adjusted by the preparer.

Sub-Recipient Name/Organization	Purpose/Tasks in SOPO	Budget Period 1 Costs	Budget Period 2 Costs	Budget Period 3 Costs	Project Total
EXAMPLE ONLY!!! XYZ Corp.	Partner to develop optimal fresnel lens for Gen 2 product - Task 2.4	$48,000	$32,000	$16,000	$96,000
					$0
					$0
					$0
					$0
					$0

Sub-Recipient Name/Organization	Purpose/Tasks in SOPO	Budget Period 1 Costs	Budget Period 2 Costs	Budget Period 3 Costs	Project Total
					$0
					$0
					$0
	Sub-total	$0	$0	$0	$0

Vendor Name/Organization	Product or Service, Purpose/Need and Basis of Cost (Provide additional support at bottom of page as needed)	Budget Period 1 Costs	Budget Period 2 Costs	Budget Period 3 Costs	Project Total
EXAMPLE ONLY!!! ABC Corp.	Vendor for developing custom robotics to perform lens inspection, alignment, and placement (Task 4). Required for expanding CPV module mfg. capacity. Cost is from competitive quotes.	$32,900	$86,500		$119,400
EYP/HP	To test design in a simulated heat and cold environment and provide mechanical design				
Electrical Engineer	Electrical Design				
GZA Environmental	Phase I enviornmental				
Wendel Duscscherer	Civil Design package for building suitable for efficiency model				
PKJB	Architectural design for ideal model				
NYSEG	Engineering Study				
Therma	Assemby of mock up test				

REDACTED EXEMPTION 4

FFRDC Name/Organization	Purpose	Budget Period 1 Costs	Budget Period 2 Costs	Budget Period 3 Costs	Project Total
					$0
					$0
					$0
		$0	$0	$0	$0

Total Contractual			$0	$0	

REDACTED EXEMPTION 4

REDACTED EXEMPTION 4

AdditionalExplanations/Comments (as necessary)

f. Contractual

g. Construction

PLEASE READ!!!

Construction, for the purpose of budgeting, is defined as all types of work done on a particular building, including erecting, altering, or remodeling. Construction conducted by the award recipient is entered on this page. Any construction work that is performed by a vendor or subrecipient to the award recipient should be entered under f. Contractual.

List all proposed construction below, providing a basis of cost such as engineering estimates, prior construction, etc., and briefly justify its need as it applies to the Statement of Project Objectives.

Add rows as needed. If rows are added, formulas/calculations may need to be adjusted by the preparer.

Overall description of construction actiivities:

Construction Contract for the build of next generation datacenter that lowers PUE from 1.33 to >1.1.

General Description	Cost	Basis of Cost	Justification of need
Budget Period 1			
Three days of excavation for platform site EXAMPLE ONLY!!!	REDACTED EXEMPTION 4	Engineering estimate	Site must be prepared for construction of platform.
Site Development and foundations		Earthwork, Concrete, Sitework estimates	Site preparation for foundations, building and equipment.
Super and Substructure		Estimate of Steel, millwork, waterproofing, roofing, metal,	Materials for the internal and external construction
Pre-Engineered Building systems		Estimate from Pre-Engineered building manufacturer	Pre-engineered building provides a design that can maximize the airflow crucial to the 100% airside economization.
Mechancal and plumbing and electrical		Estimate of plumbing, fire protection, HVAC, and BATC and	Design efficiency required to lower the PUE must come from the mechanical and electrical systems.
General Conditions, Contingency and insurance		General contractor costs	General contractor required to construct project.
Budget Period 1 Total			
Budget Period 2			
Budget Period 2 Total	$0		
Budget Period 3			

General Description	Cost	Basis of Cost	Justification of need
Budget Period 3 Total	$0		
PROJECT TOTAL			

REDACTED
EXEMPTION 4

Additional Explanations/Comments (as necessary)

h. Other Direct Costs

PLEASE READ!!!

Other direct costs are direct cost items required for the project which do not fit clearly into other categories, and are not included in the indirect pool for which the indirect rate is being applied to this project. Examples are meeting costs, postage, couriers or express mail, telephone/fax costs, printing costs, etc.

Basis of cost are items such as vendor quotes, prior purchases of similar or like items, published price list, etc.

Add rows as needed. If rows are added, formulas/calculations may need to be adjusted by the preparer.

General description	Cost	Basis of Cost	Justification of need
		Budget Period 1	
EXAMPLE ONLY!!! Grad student tuition	$16,000	Established UCD costs	Support of graduate students working on project
Land			
Transmission line extensions			
	REDACTED EXEMPTION 4		
Budget Period 1 Total			
		Budget Period 2	
Budget Period 2 Total	$0		
		Budget Period 3	
Budget Period 3 Total	$0		
PROJECT TOTAL	REDACTED EXEMPTION 4		

Additional Explanations/Comments (as necessary)

i. Indirect Costs

	Budget Period 1	Budget Period 2	Budget Period 3	Total
Rate applied:	0.0%	0.0%	0.0%	
Total indirect costs requested:				$0

A federally approved indirect rate agreement, or rate proposed supported and agreed upon by DOE for estimating purposes is required if reimbursement of fringe benfits is requested. Please check (X) one of the options below and provide the requested information if it has not already been provided as requested, or has changed. Calculate the indirect rate dollars and enter the total in the Section B., line 6.j. (Indirect Charges) of form SF 424A.

____ **There is a federally approved indirect rate agreement. A copy is provided with this application and will be provided electronically to the Contracting Officer for this project.**
**In the area designated below, identify the full calculations used to derive the total indirect costs. See further information below.*

____ **There is no current, federally-approved indirect rate agreement.**
*When this option is checked, the entity preparing this form shall submit an indirect cost rate proposal in the format provided at the following website, or in a format that provides the same level of information and which supports the rate(s) being proposed for use in estimating the project. Go to https://www.eere-pmc.energy.gov/forms.aspx and select PMC 400.2 Sample Rate Proposal. *In the area designated below, identify the full calculations used to derive the total indirect costs. See further information below.*

Additional Explanations/Comments (as necessary)

*IMPORTANT: In the space provided below (or as an attachment) provide a complete explanation and the full calculations used to derive the total indirect costs. If the total indirect costs are a cumulative amount of more than one calculation or rate application, the explanation and calculations should identify all rates used, along with the base they were applied to (and how the base was derived), and a total for each (along with grand total). The rates and how they are applied should not be averaged to get one indirect cost percentage. NOTE: The indirect rate should be applied to both the Federal Share and Recipient Cost Share.

Cost Share

PLEASE READ!!!

A detailed presentation of the cash or cash value of all cost share proposed for the project must be provided in the table below. Identify the source & amount of each item of cost share proposed by the award recipient and each sub-recipient or vendor. Letters of committment must be submitted for all third party cost share (other than award recipient).

Note that "cost-share" is not limited to cash investment. Other items that may be assigned value in a budget as incurred as part of the project budget and necessary to performance of the project, may be considered as cost share, such as: contribution of services or property; donated, purchased or existing equipment; buildings or land; donated, purchased or existing supplies; and/or unrecovered personnel, fringe benefits and indirect costs, etc. For each cost share contribution identified as other than cash, identify the item and describe how the value of the cost share contribution was calculated.

Funds from other Federal sources MAY NOT be counted as cost share. This prohibition includes FFRDC sub-recipients. Non-Federal sources include private, state or local Government, or any source not originally derived from Federal funds. Documentation of cost sharing commitments must be provided, if not already provided with the original application and they have not changed since its submission.

Fee or profit will not be paid to the award recipients or subrecipients of financial assistance awards. Additionally, foregone fee or profit by the applicant shall not be considered cost sharing under any resulting award. Reimbursement of actual costs will only include those costs that are allowable and allocable to the project as determined in accordance with the applicable cost principles prescribed in 10 CFR 600.127, 10 CFR 600.222 or 10 CFR 600.317. Also see 10 CFR 600.318 relative to profit or fee.

Add rows as needed. If rows are added, formulas/calculations may need to be adjusted by the preparer.

Organization/Source	Type (cash or other)	Cost Share Item	Budget Period 1 Cost Share	Budget Period 2 Cost Share	Budget Period 3 Cost Share	Total Project Cost Share
ABC Company **EXAMPLE ONLY!!!**	Cash	Project partner ABC Company will provide 40 PV modules for product development at 50% off the of the retail price of $680	$13,600			$13,600
						$0
						$0
						$0
						$0
						$0
						$0

Organization/Source	Type (cash or other)	Cost Share Item	Budget Period 1 Cost Share	Budget Period 2 Cost Share	Budget Period 3 Cost Share	Total Project Cost Share
						$0
						$0
						$0
						$0
		Totals	$0	$0	$0	$0

Total Project Cost: REDACTED EXEMPTION 4

Cost Share Percent of Award: 0.0%

Additional Explanations/Comments (as necessary)

Applicant Name: _____ Award Number: _____

Budget Information - Non Construction Programs

OMB Approval No. 0348-0044

Section A - Budget Summary

Grant Program Function or Activity (a)	Catalog of Federal Domestic Assistance Number (b)	Estimated Unobligated Funds		New or Revised Budget		
		Federal (c)	Non-Federal (d)	Federal (e)	Non-Federal (f)	Total (g)
1.						$0
2.						$0
3.						$0
4.						$0
5. Totals		$0	$0	$0	$0	$0

Section B - Budget Categories

6. Object Class Categories	Grant Program, Function or Activity (1)	(2)	(3)	(4)	Total (5)
	$457,000				
b. Fringe Benefits	$100,540				
c. Travel	$65,000				REDACTED EXEMPTION 4
d. Equipment	$246,950	REDACTED EXEMPTION 4			
e. Supplies	$10,000				
f. Contractual	$1,185,155				
g. Construction					$0
h. Other					$0
i. Total Direct Charges (sum of 6a-6h)	$2,064,645		$0	$0	$2,299,965
j. Indirect Charges					$0
k. **Totals** (sum of 6i-6j)	$2,064,645		$0	$0	$2,299,965
7. Program Income					$0

Section C - Non-Federal Resources

(a) Grant Program	(b) Applicant	(c) State	(d) Other Sources	(e) **Totals**
8.				$0
9.				$0
10.				$0
11.				$0
12. **Total** (sum of lines 8 - 11)	$0	$0	$0	$0

Section D - Forecasted Cash Needs

	Total for 1st Year	1st Quarter	2nd Quarter	3rd Quarter	4th quarter
13. Federal	$0				
14. Non-Federal	$0				
15. **Total** (sum of lines 13 and 14)	$0	$0	$0	$0	$0

Section E - Budget Estimates of Federal Funds Needed for Balance of the Project

	Future Funding Periods (Years)			
(a) Grant Program	(b) First	(c) Second	(d) Third	(e) Fourth
16.				
17.				
18.				
19.				
20. **Total** (sum of lines 16-19)	$0	$0	$0	$0

Section F - Other Budget Information

21. Direct Charges	22. Indirect Charges

23. Remarks

Instructions for the SF-424A

Public Reporting Burden for this collection of information is estimated to average 3.0 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Please do not return your completed form to the Office of Management and Budget; send it to the address provided by the sponsoring agency.

General Instructions

This form is designed so that application can be made for funds from one or more grant programs. In preparing the budget, adhere to any existing Federal grantor agency guidelines which prescribe how and whether budgeted amounts should be separately shown for different functions or activities within the program. For some programs, grantor agencies may require budgets to be separately shown by function or activity. For other programs, grantor agencies may require a breakdown by function or activity. Sections A, B, C, and D should include budget estimates for the whole project except when applying for assistance which requires Federal authorization in annual or other funding period increments. In the later case, Sections A, B, C, and D should provide the budget for the first budget period (usually a year) and Section E should present the need for Federal assistance in the subsequent budget periods. All applications should contain a breakdown by the object class categories shown in Lines a-k of Section B.

Section A. Budget Summary Lines 1-4 Columns (a) and (b)

For applications pertaining to a **single** Federal grant program (Federal Domestic Assistance Catalog number) and **not requiring** a functional or activity breakdown, enter on Line 1 under Column (a) the catalog program title and the catalog number in Column (b).

For applications pertaining to a **single** program **requiring** budget amounts by multiple functions or activities, enter the name of each activity or function on each line in Column (a), and enter the catalog number in Column (b). For applications pertaining to multiple programs where none of the programs require a breakdown by function or activity, enter the catalog program title on each line in **Column** (a) and the respective catalog number on each line in Column (b).

For applications pertaining to **multiple** programs where one or more programs **require** a breakdown by function or activity, prepare a separate sheet for each program requiring the breakdown. Additional sheets should be used when one form does not provide adequate space for all breakdown of data required. However, when more than one sheet is used, the first page should provide the summary totals by programs.

Lines 1-4, Columns (c) through (g)

For new applications, leave Columns (c) and (d) blank. For each line entry in Columns (a) and (b), enter in Columns (e), (f), and (g) the appropriate amounts of funds needed to support the project for the first funding period (usually a year).

For continuing grant program applications, submit these forms before the end of each funding period as required by the grantor agency. Enter in Columns (c) and (d) the estimated amounts of funds which will remain unobligated at the end of the grant funding period only if the Federal grantor agency instructions provide for this. Otherwise, leave these columns blank. Enter in columns (e) and (f) the amounts of funds needed for the upcoming period. The amount(s) in Column (g) should be the sum of amounts in Columns (e) and (f).

For supplemental grants and changes to existing grants, do not use Columns (c) and (d). Enter in Column (e) the amount of the increase or decrease of Federal funds and enter in Column (f) the amount of the increase or decrease of non-Federal funds. In Column (g) enter the new total budgeted amount (Federal and non-Federal) which includes the total previous authorized budgeted amounts plus or minus, as appropriate, the amounts shown in Columns (e) and (f). The amount(s) in Column (g) should not equal the sum of amounts in Columns (e) and (f).

Line 5—Show the totals for all columns used.

Section B. Budget Categories

In the column headings (a) through (4), enter the titles of the same programs, functions, and activities shown on Lines 1-4, Column (a), Section A. When additional sheets are prepared for Section A, provide similar column headings on each sheet. For each program, function or activity, fill in the total requirements for funds (both Federal and non-Federal) by object class categories.

Lines 6a-i—Show the totals of Lines 6a to 6h in each column.

Line 6j—Show the amount of indirect cost.

Line 6k—Enter the total of amounts on Lines 6i and 6j. For all applications for new grants and continuation grants the total amount in column (5), Line 6k, should be the same as the total amount shown in Section A, Column (g), Line 5. For supplemental grants and changes to grants, the total amount of the increase or decrease as shown in Columns (1)-(4), Line 6k should be the same as the sum of the amounts in Section A, Columns (e) and (f) on Line 5.

Line 7—Enter the estimated amount of income, if any, expected to be generated from this project. Do not add or subtract this amount from the total project amount. Show under the program narrative statement the nature and source of income. The estimated amount of program income may be considered by the federal grantor agency in determining the total amount of the grant.

Section C. Non-Federal Resources

Lines 8-11—Enter amounts of non-Federal resources that will be used on the grant. If in-kind contributions are included, provide a brief explanation on a separate sheet.

Column (a)—Enter the program titles identical to Column (a), Section A. A breakdown by function or activity is not necessary.

Column (b)—Enter the contribution to be made by the applicant.

Column (c)—Enter the amount of the State's cash and in-kind contribution if the applicant is not a State or State agency. Applicants which are a State or State agencies should leave this column blank.

Column (d)—Enter the amount of cash and in-kind contributions to be made from all other sources.

Column (e)—Enter totals of Columns (b), (c), and (d).

Line 12—Enter the total for each of Columns (b)-(e). The amount in Column (e) should be equal to the amount on Line 5, Column (f) Section A.

Section D. Forecasted Cash Needs

Line 13—Enter the amount of cash needed by quarter from the grantor agency during the first year.

Line 14—Enter the amount of cash from all other sources needed by quarter during the first year.

Line 15—Enter the totals of amounts on Lines 13 and 14.

Section E. Budget Estimates of Federal Funds Needed for Balance of the Project

Lines 16-19—Enter in Column (a) the same grant program titles shown in Column
(a), Section A. A breakdown by function or activity is not necessary. For new applications and continuation grant applications, enter in the proper columns amounts of Federal funds which will be needed to complete the program or project over the succeeding funding periods (usually in years). This section need not be completed for revisions (amendments, changes, or supplements) to funds for the current year of existing grants.
If more than four lines are needed to list the program titles, submit additional schedules as necessary.

Line 20—Enter the total for each of the Columns (b)-(e). When additional schedules are prepared for this Section, annotate accordingly and show the overall totals on this line.

Section F. Other Budget Information

Line 21—Use this space to explain amounts for individual direct object-class cost categories that may appear to be out of the ordinary or to explain the details as required by the Federal grantor agency.

Line 22—Enter the type of indirect rate (provisional, predetermined, final or fixed) that will be in effect during the funding period, the estimated amount of the base to which the rate is applied, and the total indirect expense.

Line 23—Provide any other explanations or comments deemed necessary.