

## COLORADO SCHOOL OF MINES

1500 Illinois Street  
Golden, CO 80401-1887  
303/273-3280  
303/273-3285 (FAX)

**M. W. Scoggins**  
President

April 1, 2009

Hon. Joe Rice, Chair  
Hon. Edward Casso, Vice-Chair  
Colorado House of Representatives Business Affairs and Labor Committee  
Colorado State Capitol  
200 East Colfax  
Denver CO 80203

Hon. Jennifer Veiga, Chair  
Hon. Rollie Heath, Vice-Chair  
Colorado Senate Business, Labor and Technology Committee  
Colorado State Capitol  
200 East Colfax  
Denver CO 80203

Re: Annual Report from the Colorado Renewable Energy Authority

To the Honorable Chairs and Members of the House Business Affairs and Labor Committee and the Senate Business, Labor and Technology Committee:

On behalf of the Board of Directors of the Colorado Renewable Energy Authority, I hereby report to you regarding the activities of the Authority over the past year, in accordance with Section 24-47.5-102(3), Colorado Revised Statutes.

The principal purpose of the Authority is to direct the allocation of state matching funds to support one or more research proposals of the Colorado Renewable Energy Collaboratory, a research consortium consisting of the Colorado School of Mines, Colorado State University, the University of Colorado at Boulder and the National Renewable Energy Laboratory.

In accordance with H.B. 06-1322, 24-47.5-101 et seq., state matching funds may be allocated to attract and support funding from federal and other public and private sources. The 2006 legislation appropriated \$2 Million per year for three fiscal years, ending in June, 2009. The Authority has until June, 2012 to demonstrate that at least \$6 Million in grants or contracts for renewable energy research in Colorado have been secured through the Collaboratory programs.

Based on current trends, the Authority Board anticipates that the \$6 Million benchmark will be met and surpassed well before 2012. In this regard, it is worth noting that no matching funds are released by the Authority to any Collaboratory center until the Center's private sponsors or



federal funding sources have committed their own funds. Therefore, the disbursement by the Authority of \$6 Million in matching funds to the Collaboratory centers will demonstrate that at least \$6 Million in private or federal monies have been received. As of this date, the Collaboratory's private sponsors have contributed more than \$1.6 Million to support shared research and are committed to expend more than \$5 Million in support of sponsored research.

Through the past twelve months, the Directors of the Authority have worked closely with the leadership of the Collaboratory to support the activities of the Collaboratory. To date, the Directors of the Authority have made commitments to provide matching funds to three Collaboratory research centers, and matching funds have actually been disbursed to two of these Collaboratory centers. The State of Colorado's commitment of matching funds is a significant feature in attracting private members to the Collaboratory's centers and has been a key factor in the Collaboratory's success.

H.B. 06-1322 recognized that the development and production of renewable energy will advance the economic well-being of Colorado. Over the past year, we have seen a continued expansion in Colorado's renewable energy research, development, production and manufacturing capabilities. Colorado's renewable energy research capabilities are one of the assets that draw renewable energy companies and jobs to our state, and the Collaboratory plays a leading role in this progress. In fact, in June, 2008, the Collaboratory received the 2008 Metro Denver Economic Development Council Chair's Award for Outstanding Efforts in Economic Development. In bestowing this award, Kittie Hook, Chair of the Metro Denver EDC's board of governors, said: "Nowhere in the world has an asset such as this unique research partnership. Instead of marketing their individual programs and research, the four founding members present themselves to the world as one single entity through which sponsored research, public-private partnerships, and technical consultation are available." Governor Ritter commented: "The Collaboratory deserves this honor. In a relatively short time, the Collaboratory has mobilized our new energy expertise housed at our excellent institutions and is delivering results. I also commend its efforts in offering education and job training opportunities to meet the workforce demand of our New Energy Economy." I am submitting with this report a short summary of the economic development activities of the Collaboratory.

In the following paragraphs, I summarize the Collaboratory centers that have received commitments of matching funds from the Authority, including a brief overview of each center's research focus and the amount of funds committed and actually disbursed. Each center is managed by a leadership team that includes representatives from all four of the Collaboratory institutions.

#### Colorado Center for Biorefining and Biofuels

The Colorado Center for Biorefining and Biofuels, known as C2B2, is the first research center of the Collaboratory and conducts world class research to develop new biofuels and biorefining technologies and transfer these advances as rapidly as possible to the private sector. C2B2 also trains new researchers for the renewable energy industry in Colorado, and sponsors have the opportunity to recruit future employees. C2B2 offers important value to the state and to the sponsors by providing educational and work opportunities for undergraduate, graduate and post-

doctoral students. The University of Colorado at Boulder is the lead institution for C2B2, but all four Collaboratory institutions play prominent roles in the activities of the Center. C2B2 now includes more than 20 private sponsors, including leaders from the agriculture, oil and gas, chemical, automotive and manufacturing sectors, from Fortune 500 companies to many small Colorado renewable energy companies.

The sponsors' funding and state matching funds have supported 22 research projects in 2008 - 2009. In addition, the sponsors' funding will support post-doctoral fellowships and a summer "Research Experience for Undergraduates" program, helping to develop the scientists and engineers of the next generation.

C2B2 has the potential to attract many biorefining companies to Colorado to participate in the research programs and to benefit from the highly trained researchers and technical workers C2B2 will produce. In fact, the research strengths of the Collaboratory were a key factor in bringing ConocoPhillips' training and technology center to Colorado, a facility that will eventually create more than 5,000 jobs. ConocoPhillips has also entered into a sponsored research agreement through the Collaboratory for \$5 Million in renewable fuels research over the course of approximately three years. This research commenced in 2008.

In support of C2B2, the Authority has committed to provide matching funds equal to the annual financial commitments of the sponsors, up to a maximum of \$500,000 in the first year, \$750,000 in the second year and \$1,000,000 in the third year of C2B2 operations. C2B2 did receive sponsor commitments in excess of \$500,000 in its first year, and also met its target of \$750,000 in its second year. As a result, C2B2 has received \$1.25M in matching funds to date.

#### Center for Revolutionary Solar Photoconversion

The Collaboratory's Center for Revolutionary Solar Photoconversion, or CRSP, conducts research to produce clean solar fuels and electricity at costs comparable to current fuels and power through revolutionary new technologies in photoelectrochemistry and photobiology. NREL is the lead institution for the CRSP center, but, again, all four Collaboratory institutions participate in CRSP's management and research programs.

CRSP presently includes 14 corporate sponsors, including major domestic and international companies, as well as smaller startups, from the aerospace, automotive, chemical, manufacturing equipment and solar energy industries.

The Authority has committed up to \$1 Million per year for three years to CRSP to be used to match up to 15% of federal funding to CRSP or to match the annual financial commitments of CRSP's private sponsors. In 2008, CRSP's first full year of operations, the center collected approximately \$417,000 from its sponsors and received an equal amount in matching funds from the Authority. The portion of the \$1 Million commitment that was not earned will remain in the Authority's accounts for later disbursement to other centers.

### Center for Research & Education in Wind

The third Collaboratory center, the Center for Research & Education in Wind, is presently signing up founding sponsors and will be publicly announced in the spring of 2009. CREW's research areas will include: modeling, design and testing of wind turbines; localized wind forecasting and other atmospheric sciences; design and operational guidance for wind farms; and electrical control systems for wind turbines. The University of Colorado at Boulder is the lead institution for CREW.

CREW is the first Collaboratory center to include additional research institutions beyond the four Collaboratory member institutions. Recognizing the wind industry's interest in atmospheric sciences, CREW invited two of the world's leading atmospheric science research institutions to participate: the National Center for Atmospheric Research and the National Oceanic and Atmospheric Administration, both of which operate laboratories in Boulder, Colorado. The future success of CREW is best indicated by the major wind energy companies that are already committed to sponsorship of CREW: Mitsubishi, RES Americas, Siemens and Vestas. In fact, Vestas is already negotiating a sponsored research agreement with CREW before the center is even publicly launched.

The Authority has committed to provide matching funds to CREW equal to the annual financial commitments of the sponsors, up to a maximum of \$500,000 in the first year and \$750,000 in the second year of operations. Less than \$100,000 is available from the 2006 appropriated funds for the third year of CREW's operations, so the Authority cannot make the full \$1 Million commitment of matching funds desirable for the third year of CREW's operations.

### Additional Collaboratory Research Centers

By the end of 2008, the Collaboratory also expects to announce:

- An additional solar energy research center directed toward near-term technologies for photovoltaics and concentrating solar power. NREL is the lead institution for this research center. This Collaboratory center will work closely with the Solar Technology Acceleration Center, a testing and demonstration facility funded and operated by Xcel Energy, Abengoa Solar and SunEdison, which is now under construction southeast of Denver International Airport;
- A carbon management center, which will conduct research on carbon capture technologies, carbon sequestration technologies (both deep geologic sequestration and terrestrial sequestration through plants and soils) and policy analysis. This center will be led by the Colorado School of Mines; and
- A smart grid and energy efficiency research center, working to design and demonstrate the electrical grid of the future. Led by Colorado State University, this center will work with private and public partners and federal agencies to develop the hardware, software, processes and demonstration projects to build a more efficient, reliable and secure grid that incorporates more renewable energy.

Because the 2006 appropriation will expire in June, 2009, and because all of the funds appropriated by the 2006 legislation have been committed to C2B2, CRSP and CREW, no state matching funds are presently available for the three new Collaboratory centers hoping to launch in 2009.

### Financial Reports

The following financial reports are attached:

- Colorado Renewable Energy Authority Financial Activity Report, including Balance Sheet, Income Statement and Grant Detail;
- Listing of 2009 corporate members in Collaboratory research centers;
- Summary of Matching Fund Commitments, including currently unfunded activities, through 2011.

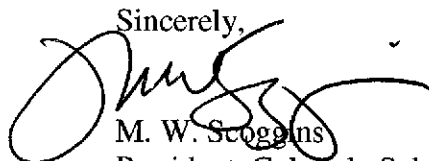
### Conclusion

Over the past twelve months, the Colorado Renewable Energy Collaboratory has continued to build its reputation and to demonstrate its capabilities as a major renewable energy research center. The Collaboratory's success in attracting private partners is due, in significant part, to the availability of state matching funds. Although many other states have much larger pools of matching funds to employ in the competition for research grants and contracts, the Collaboratory's research assets are so strong that the Collaboratory can successfully compete even with lower levels of matching funds.

However, if we are to continue Colorado's recent success in building the New Energy Economy, an extension of the matching funds program will be essential. The Collaboratory must have an adequate baseline of matching funds to compete for federal and private funding opportunities and to demonstrate the State's continuing commitment to the renewable energy sector. Many states are now competing for leadership in renewable energy research, development and production. Those states that succeed in demonstrating such leadership will attract major national and international companies, bringing research, manufacturing, construction, and administrative jobs for the next 25 years. Now is not the time for Colorado to draw back from its demonstrated leadership and commitment in this critical economic sector.

The Directors of the Colorado Renewable Energy Authority are grateful for the support of the Colorado General Assembly. We will be pleased to respond to any questions you may have at this time or in the future.

Sincerely,



M. W. Scoggins  
President, Colorado School of Mines  
Chair, Colorado Renewable Energy Authority

COLORADO RENEWABLE ENERGY AUTHORITY  
BOARD OF DIRECTORS

M.W. (“Bill”) Scoggins, Ph.D., President  
Colorado School of Mines  
(Chair)

Dan Arvizu, Ph.D., Director  
National Renewable Energy Laboratory  
(Vice-Chair)

Philip DiStefano, Ph.D., Interim Chancellor  
University of Colorado at Boulder

Don Elliman, Director  
Governor’s Office of Economic Development and International Trade

Anthony Frank, Ph.D., Interim President  
Colorado State University

Kimberly Jordan, CEO  
New Belgium Brewing Company

Tom Plant, Director  
Governor’s Energy Office

**Colorado Renewable Energy Authority  
Balance Sheets  
as of**

	<u>Dec 31, 07</u>	<u>Dec 31, 08</u>	<u>Feb 27, 09</u>
<b>ASSETS</b>			
<b>Current Assets</b>			
Checking/Savings			
Wells Fargo Checking	5,892.63	5,498.96	5,634.96
Wells Fargo Investment Acct	2,031,740.71	3,206,160.51	3,808,810.77
Total Checking/Savings	<u>2,037,633.34</u>	<u>3,211,659.47</u>	<u>3,814,445.73</u>
Other Current Assets			
Accounts Receivable	0.00	1,200,200.00	600,000.00
Total Other Current Assets	<u>0.00</u>	<u>1,200,200.00</u>	<u>600,000.00</u>
Total Current Assets	<u>2,037,633.34</u>	<u>4,411,859.47</u>	<u>4,414,445.73</u>
<b>TOTAL ASSETS</b>	<u><u>2,037,633.34</u></u>	<u><u>4,411,859.47</u></u>	<u><u>4,414,445.73</u></u>
<b>LIABILITIES &amp; EQUITY</b>			
Equity			
Retained Earnings	0.00	2,037,633.34	4,411,859.47
Net Income	2,037,633.34	2,374,226.13	2,586.26
Total Equity	<u>2,037,633.34</u>	<u>4,411,859.47</u>	<u>4,414,445.73</u>
<b>TOTAL LIABILITIES &amp; EQUITY</b>	<u><u>2,037,633.34</u></u>	<u><u>4,411,859.47</u></u>	<u><u>4,414,445.73</u></u>

**Colorado Renewable Energy Authority  
Profit & Loss for Years Ended**

	Dec 31, 07	Dec 31, 08	TOTAL
Ordinary Income/Expense			
Income			
Appropriations (Note 1)	2,000,000.00	4,000,000.00	6,000,000.00
Total Income	2,000,000.00	4,000,000.00	6,000,000.00
Expense			
Bank Service Charges	107.37	493.67	601.04
Grant (Note 2)	0.00	1,690,784.70	1,690,784.70
Professional Fees			
Accounting	0.00	3,063.63	3,063.63
Total Professional Fees	0.00	3,063.63	3,063.63
Total Expense	107.37	1,694,342.00	1,694,449.37
Net Ordinary Income	1,999,892.63	2,305,658.00	4,305,550.63
Other Income/Expense			
Other Income			
Interest Income	37,740.71	68,568.13	106,308.84
Total Other Income	37,740.71	68,568.13	106,308.84
Net Other Income	37,740.71	68,568.13	106,308.84
Net Income	<u>2,037,633.34</u>	<u>2,374,226.13</u>	<u>4,411,859.47</u>

Note 1 Year ended December 31, 2008 includes State appropriations from FY2007-08 (\$2M) and FY2008-09 (\$2M).

Note 2 Detail provided on attached sheet.



Colorado Renewable Energy Authority  
Grant Transactions Detail

Grant	Date	Name	Memo	Amount	Balance
	05/21/2008	CO Center for Biorefining and Biofuels	University of Colorado	500,000.00	500,000.00
	08/31/2008	CO Center for Biorefining and Biofuels	Wachovia-Collaboratory Photo Conversion Workshop-CU Foundation	4,000.00	504,000.00
	10/16/2008	Co. Rev. Solar Photo Conversion	NREL	416,584.70	920,584.70
	10/16/2008	CO Center for Biorefining and Biofuels	University of Colorado	750,000.00	1,670,584.70
	11/30/2008	CO Center for Biorefining and Biofuels	University of Colorado (Amount should have been \$20,200 not \$20,400)	20,400.00	1,690,984.70
	12/31/2008	University of Colorado Boulder	In November disbursed \$200 too much to the University of Colorado.	-200.00	1,690,784.70
Total Grant				1,690,784.70	1,690,784.70
TOTAL				1,690,784.70	1,690,784.70

**COLORADO RENEWABLE ENERGY COLLABORATORY**  
**Private Corporate Members**  
**2009**

**Colorado Center for Biorefining and Biofuels (C2B2) Member Companies:**

- Aurora Biofuels
- Catchlight Energy
- Ceres
- Chevron
- Cobalt Biofuels
- ConocoPhillips
- Ecopetrol-ICP
- Flad Architects
- General Motors
- Gevo, Inc.
- Kimberly-Clark
- Korth O'Neil Engineering
- LiveFuels, Inc.
- LS9
- Mascoma
- OPX Biotechnologies, Inc.
- Shell Global Solutions
- Solix Biofuels
- Sundrop Fuels
- Symbios Technologies
- Valero

**Center for Revolutionary Solar Photoconversion (CRSP) Member Companies:**

- Applied Materials, Inc.
- Ascent Solar Technologies, Inc.
- DuPont
- Evident Technologies, Inc.
- General Motors
- Konarka Technologies, Inc.
- Lockheed Martin
- Motech Industries Inc.
- QuantumSphere, Inc.
- Sharp Corporation
- Solasta, Inc.
- Sub-One Technology
- SunEdison, LLC
- Toyota

**COLORADO RENEWABLE ENERGY AUTHORITY**  
**Summary of Commitments & Distributions**  
**of Matching Funds Appropriated by HB 06-1322**

**\$2M/yr for FY 2006-07, 2007-08, 2008-09**

	2007	2008	2009	2010	2011
<b>C2B2 – Colorado Center for Biorefining and Biofuels</b>	\$500k	\$750 k	\$1 M		
<b>CRSP – Center for Revolutionary Solar Photoconversion</b>		1M commit 417k distrib 583k balance	1 M	1 M	
<b>CREW – Center for Research and Education in Wind</b>			500k	750k	83k
<b>SolarTAC – Solar Technology Acceleration Center - Research</b>			None	None	None
<b>EEMC - Energy Efficiency &amp; Management Center</b>			None	None	None
<b>CMC - Carbon Management Center</b>			None	None	None
<i>Matching funds released based on members' fees - Annual</i>	\$500k	\$1.167M	\$2.5M	\$1.75M	\$83k
<i>Matching funds released – Cumulative</i>	\$500k	\$1.667M	\$4.167M	\$5.917M	\$6M

1. All commitments of matching funds are made by the Colorado Renewable Energy Authority, pursuant to HB 06-1322. The Authority is an independent authority under Colorado law.
2. Matching funds are not distributed to centers until membership fees are committed.
3. Most commitments provide increased matching fund availability based on expected ability to increase membership and members' annual fees: Yr 1: \$500k; Yr 2: \$750k; Yr 3: \$1M, totaling \$2.25M over three years. All centers except CRSP provide 1:1 match for members' fees.
4. CRSP received commitments of \$1M/yr for three years to support CRSP's proposal for federal funding of \$7M/yr (1:7 match). However, the DOE program was not funded. CRSP reverted to matching private members' fees at 1:1 match. In 2008, CRSP raised \$417k in members' fees and received \$417k in matching funds out of the committed \$1M maximum, leaving an unused balance of \$583k. The unused funds will be applied to CREW's matching fund commitments for 2010 and 2011.
5. NO MATCHING FUNDS ARE AVAILABLE FOR SolarTAC, CMC OR THE EEMC OUT OF THE 2006 APPROPRIATIONS. TO FUND THESE THREE CENTERS FOR 2009 ALONE, THE AUTHORITY and COLLABORATORY NEED \$1.5M IN APPROPRIATIONS FOR FY 2009-10.

**COLORADO RENEWABLE ENERGY AUTHORITY**  
**Summary of Anticipated Requests for Matching Funds**

**2009 - 2011**

	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>
<b>C2B2 – Colorado Center for Biorefining and Biofuels</b>	\$500k	\$750 k	\$1 M		
<b>CRSP – Center for Revolutionary Solar Photoconversion</b>		1M commit 417k distrib 583k balance	1 M	1 M	
<b>CREW – Center for Research and Education in Wind</b>			500k	750k	83k 917k
<b>SolarTAC – Solar Technology Acceleration Center - Research</b>			500k	750k	1 M
<b>EEMC - Energy Efficiency &amp; Management Center</b>			500k	750k	1 M
<b>CMC - Carbon Management Center</b>			500k	750k	1 M
<b>Additional Matching Funds Required For New Collaboratory Centers</b>			\$1.5M	\$2.25M	\$3.917M

6. Anticipated requests for matching funds are shown with gray highlighting.
7. The Colorado Renewable Energy Authority will not commit matching funds that have not been appropriated by the State of Colorado.
8. In 2008, CRSP raised \$417k in members' fees and received \$417k in matching funds out of the committed \$1M maximum, leaving an unused balance of \$583k. The unused funds will be applied to CREW's matching fund commitments for 2010 and 2011.
9. NO MATCHING FUNDS ARE AVAILABLE FOR SolarTAC, CMC OR THE EEMC OUT OF THE 2006 APPROPRIATIONS. TO FUND THESE THREE CENTERS THROUGH 2011, THE AUTHORITY and COLLABORATORY NEED \$1.5M IN 2009, \$2.25 M IN 2010 AND \$3.917 M IN 2011, FOR A TOTAL OF \$7.667 M.