

Project Title: Renewable Energy Research & Development

Recipient: Nevada Institute for Renewable Energy & Commercialization (NIREC)

Award Number: DE-FG36-08GO88161

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Project Start Date: July 1, 2008

Project End Date: March 31, 2013

Notice

The following is a compilation of progress reports and presentations submitted by NIREC to the DOE's Solar Energy Technologies Office for award number DE-FG36-08GO88161. This compilation has been uploaded to OSTI by DOE as a substitute for the required Final Technical Report, which was not submitted to DOE by NIREC or received by DOE.

CHRONOLOGICAL SUMMARY OF QUARTRLY REPORTS

Period Covered by Report: July 1, 2008 – September 30, 2008

Project Objective: The primary goal of NIREC is to advance the transformation of the scientific innovation of the institutional partner's research in renewable energy into a proof of the scientific concept eventually leading to viable businesses with cost effective solutions to accelerate the widespread adoption of renewable energy. NIREC will a) select research projects that are determined to have significant commercialization potential as a result of vetting by the Technology and commercialization Advisory Board, b) assign an experienced Entrepreneur-in-Residence (EIR) to each manage the scientific commercialization-preparedness process, and c) facilitate connectivity with venture capital and other private-sector capital sources to fund the rollout, scaling and growth of the resultant renewable energy business.

PROGRESS:

We held our first request for proposals this spring inviting submissions of proposals for project work applicable to the renewable energy field. Applications were due in the summer, all of which were peer reviewed by our Technology & Commercialization Advisory Board. Four projects were recommended for funding to the Board of Trustees and approved by the board.

Period Covered by Report: October 1, 2008 – December 31, 2008

PROGRESS:

Goals: Task 3 - Sub-project Selection / Initiation

- Develop sub-award contract documentation
- Develop Entrepreneur-in-Residence (EIR) Program framework in support of selected projects
- Hire EIRs to mentor selected projects
- Confirm DOE sub-award funding for selected projects
 - a) Establish project budget and milestones, and launch funding for selected projects
 - b) Sub-award contract documents completed and sent to recipient PIs/Universities for signature and processing
 - c) EIR Project documentation and framework completed. EIRs and PIs briefed as to the goals of NIREC, the EIR program's desired outcomes, mentorship framework, and reporting requirements
 - d) Two EIRs hired. EIRs started to engage with and mentor projects
 - e) Additional documentation submitted to DOE, and approval for sub-award funding for selected projects received.
- 3 projects were confirmed as recipients for sub-award funding:
 - a) *Utility Accountant – An interactive tool to manage utility costs (DRI)*
 - b) *A Novel Dropwise Condenser for Geothermal Applications (UNR)*
 - c) *Direct Conversion of Sugars, Cellulose, and Cellulosic Biomass into Fuels (UC Davis) – milestones still under discussion prior to initiating funding*

Period Covered by Report: January 1, 2009 - March 31, 2009

PROGRESS:

Goals: Task 1 – Provide Education and Outreach

- a) Participate in Renewable Energy World Conference In Las Vegas

- b) 4 representatives from NIREC participated in the conference. We took this opportunity to have discussions with existing and potential partners, and further, collaborated with NV Energy to display materials of our organization at the exhibition.

Goals: Task 2 – Sub-project Identification and Selection

- A. The second Call for Proposals was successfully launched on March 18.
- a. In addition to the eligibility of our Research Partners to participate, we have opened eligibility to pre-seed companies either associated with our Research Partners, or registered in the State of Nevada.
 - b. We have been working very closely with each of our Research Partners and various State of Nevada organizations to ensure all potential applicants are aware of the opportunity

Goals: Task 3 - Sub-project Selection / Initiation

- a) Initiate funding for first-round of awarded projects and begin to implement research commercialization roadmap
- The scientific research commercialization plan (including project budgets and milestones) were established and approved prior to commencement of the projects
 - Our Entrepreneurs-In-Residence (EIRs) meet regularly with the projects to manage, monitor and report on their progress

Period Covered by Report: April 1, 2009 – Jun 30, 2009

PROGRESS:

Goals: Task 1 – Provide Education and Outreach

- a) Performed outreach in conferences and other events
- Attended Fortune Brainstorm: Green Conference 2009
 - Spoke at World Bank International Finance Corporation Conference
 - Attended Nevada Medal Dinner (organized by DRI – a research partner)
 - Attended Department of Energy Federal Grant Workshop

Goals: Task 2 – Sub-project Identification and Selection

- a) Conducted RFP outreach
- Conducted four Request for Proposal (RFP) workshops for each of our research partners
 - Conducted a RFP video conference to reach out to other potential applicants (such as Boise State University, University of Washington)
- Email-based outreach targeted at prospective applicants
- b) Successfully concluded March 09 Request for Proposals
- 18 applications received in total
 - NIREC's Research Partners submitted 11 proposals (including joint proposals.
- c) Refined the Selection Criteria
- Better defined the selection criteria and kicked off the evaluation process with NIREC's Technology Commercialization Advisory Board (TCAB)

Goals: Task 3 - Sub-project Selection / Initiation

- a) Entrepreneurs-in-Residence (EIR) Program made progress on developing commercialization roadmaps
- Projects currently refining their articulation of industry value chain, competitive landscape and potential business models
- b) Quarterly Project Review conducted in May
- Three projects presented their progress to the TCAB and other NIREC stakeholders
 - Projects were given feedback on the on-going development of their commercialization roadmaps

Goals: Task 4 – Project Management and Reporting

a) Implemented project management infrastructure

CHANGES:

NIREC made two full-time management hires during this period:

Jim Croce, President and CEO, _ Appointment effective June 22nd

Li Han Chan, Director of Operations, Appointment effective May 1st

PATENTS, PUBLICATIONS

Patent: University of Nevada, Reno (UNR)

PI: Dr. Kwang Kim

Provisional patent was filed April 15, 2009; Application number: 61169496

Patent: University of California, Davis (UC Davis)

PI: Dr. Mark Mascal

Provisional Patent was filed March 16; US Patent Application Number: 12/404

Article: University of California, Davis (UC Davis)

An article by Dr. Mascal titled "Towards the Efficient, Total Glycan Utilization of Biomass" was published in ChemSusChem (Vol. 2 Issue 5).

<http://www3.interscience.wiley.com/journal/122370829/abstract?CRETRY=1&SRETRY=0>

Period Covered by Report: July 1, 2009 – September 30, 2009

PROGRESS:

Goals: Task 1 – Provide Education and Outreach

a) Conduct outreach:

- NIREC President and CEO Jim Croce, Chairman Ian Rogoff and Director of Operations Li Han Chan attended National Clean Energy Summit (Aug 10, Las Vegas)
- NIREC President and CEO Jim Croce spoke at UNLV Renewable Energy Symposium (Aug 11-12, Las Vegas). Also attended by Vice-Chairman and Secretary of the Board Bob Goff, and Director of Operations Li Han Chan
- NIREC President and CEO Jim Croce presented to the Nevada Renewable Energy Integration and Development Consortium regarding the importance of and key success factors related to the commercialization of renewable energy technologies (Aug 12, Las Vegas). Also attended by Vice-Chairman and Secretary of the Board Bob Goff, and Director of Operations Li Han Chan
- Desert Research Institute Project team (Hampden Kuhns, Morien Roberts) and Entrepreneur-In-Residence (Maureen Mullarkey) attended 2009 ACEEE Summer Study on Energy Efficiency in Industry (July 28-31, New York) to raise awareness of their technology solution and better understand the market
- CEO Press Release (June 2009) announcing new CEO and provide further awareness of NIREC and programs

b) Education:

- NIREC management mentored projects at the Green Technology Entrepreneur Academy (July 6-10, Nevada)
- NIREC Principal Investigator Dr. Mark Mascal, attended Green Technology Entrepreneur Academy (July 6-10, Nevada)
- Entrepreneur-in-Residence Maureen Mullarkey attended Grid Week 2009 (Sep 21-24, Washington, DC)
- Inception of NIREC was included in *Tahoe Quarterly* magazine (Summer 2009) article about moving renewable energy technologies to market
- NIREC was featured in Sparks Chamber of Commerce newsletter, increasing local visibility
- Started production of monthly email newsletter (Sep 2009) to increase education and awareness of related issues (clean energy, commercialization support, innovation) and NIREC programs

- Produced NIREC brochure to provide a vehicle for disseminating information and increasing awareness of the funding and services available through NIREC Entrepreneur-in-Residence Mentorship
 - Quarterly Project Review was conducted in August where TCAB and Board of Trustees members provided feedback and input to commercialization plans
 - Developed an understanding of the potential cost benefit of the technology, the industry value chain, and further, articulated 4 potential business model alternatives
 - _ Commercialization support next step: Help PI establish industry connections in the innovation ecosystem to stress test assumptions and seek potential commercialization partners
 - ii. Desert Research Institute Project on the Utility Accountant Commercialization support next step: Validate path to market, further develop the business plan and apply for Small Business Innovation Research (SBIR) Phase 2 Grant
 - iii. University of California Davis Project on Converting Waste Biomass into Biofuels Performed initial feedstock analysis and laid out the long term commercialization roadmap for deployment of the biofuel
- Commercialization support next step: Project completed. Relevant reports for submission to NIREC underway

Goals: Task 2 – Sub-project Identification and Selection

- a) Completed March 09 RFP Proposal Evaluation
7 projects were shortlisted for further due diligence. 3 projects selected for award, pending DOE and Board of Trustees approval
- b) Scheduled launch of RFP 2 delayed until Nov 09 to coincide with the National Small Business Innovation Research/Small Business Technology Transfer (SBIR/STTR) Conference, where NIREC is a key sponsor

Goals: Task 3 - Sub-project Selection / Initiation

Additional information submitted to DOE (e.g. environmental checklist) for review and approval of proposed March 09 RFP awardees

Goals: Task 4– Project Management and Reporting

The following distinguished persons were added to NIREC's Technology Commercialization Advisory Board (TCAB):

- ☐ Dr. Oliver Hemmers, executive director of the Harry Reid Center for Environmental Studies at UNLV
- ☐ Travis Johnson, manager of substation construction and maintenance for NVEnergy.
- ☐ Wil Agastein, Executive Director, Center for Entrepreneurship, Graduate School of Management, University of California, Davis

The following TCAB members have elected to step down due to time constraints:

- ☐ Dr. Andy Hargadon, Professor of Technology Management at the Graduate School of Management at University of California, Davis
- ☐ Dr. Peter Williams, CTO, Big Green Innovations, IBM

PATENTS, PUBLICATIONS: NA

Period Covered by Report: October 1, 2009 – December 31, 2009

PROGRESS:

Goals: Task 1 – Provide Education and Outreach

- 1) Conduct outreach activities:
- a) RFP 3 successfully launched at the Re-energizing America: 2009 SBIR/STTR Conference.
 - b) CEO Jim Croce delivered the keynote speech and NIREC exhibited at Re-energizing America: 2009 National SBIR/STTR Conference (Nov 3-5; Sparks, NV)
 - c) CEO Jim Croce attended the 22nd NREL Industrial Growth Forum (Nov 3-5; Boulder, CO)

- d) Director of Operations Li Han Chan attended Solar Power International Conference and reception hosted by NV Energy (Oct 27-30; Anaheim, CA)
 - e) CEO Jim Croce met with Department of Commerce and DOE Program officials to provide education and insight regarding NIREC's mission (Oct - Nov)
 - f) Li Han Chan conducted 6 outreach sessions to research partners and other potential RFP applicants (Dec 2, 2009 - Jan 8, 2010; Reno, Las Vegas and Incline Village, NV; Davis, CA; online seminar)
 - g) Director of Operations Li Han Chan participated in the Women in Green Jobs panel (Nov 10; Reno, NV)
 - h) Chairman Ian Rogoff and Director of Operations Li Han Chan attended CleanTech Open Award Gala (Nov 17; San Francisco, CA)
 - i) CEO Jim Croce and/or Director of Operations Li Han Chan developed key relationships with important economic development agencies and organizations, including NCET, EDAWN, NDA, NNDA, and key officials in key cities in Nevada (Oct - Dec)
- 2) Conduct education activities:
- a) Provided training sessions and individual consultations to support technologists' assessment of the commercialization potential of their technologies at the Reenergizing America: 2009 National SBIR/STTR Conference (Nov 3-5; Sparks, NV)
 - b) Identified approximately 10 potential EiRs and began interview and vetting process for EiRs and refined EiR education program curriculum and deliverables.

Goals: Task 2 – Sub-project Identification and Selection

NIREC has no processes in place to validate budgets and NEPA review, so NIREC subawards require DOE review and approval. Information is being provided to DOE.

PUBLICATIONS/PATENTS:

Article: University of California, Davis (M. Mascal) M. Mascal, et.al., "Dramatic Advancements in the Saccharid to 5-(Chloromethyl)furfural Conversion Reaction," *ChemSusChem*, 2:9, pp. 859-61 (Sep 21, 2009)..

Period Covered by Report: April 1, 2010 - June 30, 2010

PROGRESS:

Goals: Task 1 – Provide Education and Outreach

- a) Conduct education and outreach activities
 - Local/Regional Public Education and Outreach Activities
 - Organized a community outreach events titled "Silver to Gold: Nevada's Innovation & Entrepreneurship Imperative" and "NIREC's Clean Energy Technology Showcase," to increase awareness of the economic impact of clean energy innovation and deployment, and NIREC's R&D projects to date (Organized in June, took place July 1; Incline Village, NV)
 - CEO participated in live interview on Nevada Newsline NPR Radio talk show to discuss the value of clean technology commercialization and NIREC's funding and commercialization services opportunities (May; Reno, NV)
 - Director of Operations discussed importance of clean energy commercialization and job creation opportunities at Reno Green Jobs Summit (June; Reno, NV)
 - Director of Operations spoke at Davidson Academy – a school for profoundly gifted students regarding importance of innovation and clean energy in today's world (April; Reno, NV)
 - CEO served as a judge for Lt-Governor's Cup business plan competition [Clean Energy Focused] (April; Reno, NV)
 - CEO spoke at the Sierra Nevada College Fireside Chat, a community outreach event in Incline Village, NV, to increase awareness of the economic impact of Clean Energy innovation and deployment (April; Incline Village, NV)

- National Public Education and Outreach Activities
 - Actively engaged in TechConnect World's Green Technology Conference. Increased public awareness of the importance of clean energy technology commercialization, commercialization funding challenges, capital sources, and of NIREC's activities (launch of RFP4). Had 2 speaking engagements and a booth presence (June; Anaheim, CA)
 - Actively supported the UC Davis Green Technology Entrepreneurship Academy. Provided mentors to clean energy researchers at the Academy, and CEO increased awareness of importance of clean energy innovation and commercialization through a speaking engagement (June; Incline Village, NV)
 - NIREC discussed challenges and solutions of clean energy innovation and deployment with Energy Foundation representatives (May; San Francisco)
 - Director of Operations participated in DOE Annual Solar Program Review to provide leadership for review of technologies (May; Washington, DC)
- NIREC Ecosystem Outreach Activities:
 - Research Partner and RFP Outreach
 - Continually cultivated relationship with existing research partners (DRI, UNR, UNLV, UC Davis) through support of DRI Medal dinner and other meetings (such as with UNR Dean of the College of Engineering, UC Davis Center for Entrepreneurship Director) (April-June; Reno)
 - Established new relationships with potential research partners Lawrence Berkeley National Lab, National Renewable Energy Laboratory and UC Berkeley. Accomplished through meetings with technology transfer officers, researchers at the Labs, attendance at the NREL Energy Executive Leadership Program, and meetings with the UC Berkeley Clean Tech Institute (April-June; Berkeley, CA, Golden, CO)
 - Increased awareness of NIREC's services to researchers and conducted potential EIR outreach through a series of meetings. Focused on IP-rich ecosystems. (April-June, San Francisco Bay Area, CA, Greater Detroit Area, Michigan)
 - Venture Outreach
 - Strengthen venture networks through speaking engagements (e.g. to the Clean Tech Luncheon Group on challenges and solutions to commercializing technologies from University and National Laboratories), attendance at the Angel Capital Association Summit and several meetings with VCs and Angels (April-June, San Francisco Bay Area, CA, Greater Detroit Area, Michigan)
 - Industry and Government Outreach
 - Participated as member of Nevada Energy Strike Force. Purpose of group is to overcome Nevada's clean energy innovation and deployment challenges. NIREC shared thought leadership, increased organizational awareness and established potential partnerships (April; Carson City)
 - Strengthened industry engagement in the clean energy ecosystem (e.g. with Chevron Energy Solutions, Sierra Nevada Corporation) (April; San Francisco bay area, CA, Reno, NV, Greater Detroit Area, Michigan)
- b) EIR Education Program:
 - Increased robustness of EIR Program structure, curriculum and engagement (e.g. implemented month 1, 6 and 12 formal reviews, structured project management software to better support program, clearly defined pre-commercialization deliverables)
 - Finalized EIR contracts for RFP 2 projects, and conducted through EIR orientation on program deliverables, structure and reporting requirements
 - Commenced EIR Program with Clausius Technologies. Commenced internship project - Intern guided by EIR to conduct market research and competitive analysis on the heat pump market (May-June, Reno)

Goals: Task 2 – Sub-project Identification and Selection

- a) Attained DOE approval to commence R&D activities for recommended RFP 2 projects.
- b) RFP3 Project Selection: Reviewed RFP3 proposals with domain experts and NIREC Technology Commercialization Advisory Board. Principal Investigators from projects selected for final round presented project information in-person to the TCAB and Board. Five projects selected to undergo additional due diligence and subsequent three projects shortlisted for funding.
 - Next step prior to seeking DOE funding approval is NIREC Board of Trustees approval.
- c) RFP 4 launch:
 - Refined instructions and related documents for RFP4 launch. (June)
 - Launched RFP4 at TechConnect World Clean Technology Conference. (June)

PUBLICATIONS/PATENTS: NA

Period Covered by Report: July 1, 2010 – September 30, 2010

PROGRESS:

Goals: Task 1 – Provide Education and Outreach

1. Conducted outreach activities to increase awareness of NIREC RFP4 funding opportunity and further strengthen NIREC's innovation ecosystem.
Local/Regional Public Education and Outreach Activities
 - (a) Promoted NIREC to researchers and early-stage companies and met with potential applicants (July, August, September)
 - (b) Participated in Nevada Energy Economy Strike Force to address pre-commercialization challenges in scaling-up RE systems (July, August, September)
 - (c) Conducted open-to-the-public, in-person RFP4 presentations at NIREC's four partner institutions: Desert Research Institute, Reno (simulcast to Las Vegas DRI location); University of Nevada, Reno; University of Nevada, Las Vegas; University of California, Davis (August)
 - (d) Attended Lake Tahoe Basin Prosperity Forum (August)
 - (e) Interviewed and quoted in *Northern Nevada Business Weekly* newspaper and *Lake Tahoe Bonanza* newspaper in story about commercialization promises and challenges (August)
 - (f) NIREC issued press release announcing RFP4 funding opportunity (August)
 - (g) Conducted three RFP4 webinars (September)
2. National Public Education and Outreach Activities
 - (a) Attended NREL Energy Executive Leadership Program to identify ecosystem expansion and collaboration opportunities (July, August, September)
 - (b) Met with potential applicants (researchers and entrepreneurs) to RFP4 to educate them on submission requirements (July, August, September)
 - (c) Sent email announcements and reminders of RFP4 funding opportunity to NIREC mailing list database (1,765 August and 2,562 September)
 - (d) Published *Innovation Insights* electronic newsletter distributed to database of 1,765 (August)
 - (e) Met with representatives from other technology accelerators to educate them about NIREC and share best practices (August)
 - (f) Conducted outreach meetings and presentations to NREL TTO and other NREL researchers (August)
 - (g) Provided mentorship for one NREL Industry Growth Forum applicant (August, September)
 - (h) Conducted three RFP4 webinars (September)
 - (i) Attended National Clean Energy Summit in Las Vegas (September)
3. NIREC Ecosystem Outreach Activities

- (a) Research Partner Outreach
 - (i) Met with key contacts at UNR, UNLV, DRI and UC Davis key (July, August, September)
 - (ii) Conducted Open-to-the-public, in-person RFP4 presentations at NIREC's four partner institutions: Desert Research Institute, Reno (simulcast to Las Vegas DRI location); University of Nevada, Reno; University of Nevada, Las Vegas; University of California, Davis (August)
 - (iii) Presented at Nevada Renewable Energy Consortium (August)
 - (iv) NIREC sponsored the UNLV Clean Energy Forum and participated with a booth in the expo, providing outreach to prospective Las Vegas collaborators/ entrepreneurs. (September)
 - (b) Venture Outreach
 - (i) Hosted Green Technology Entrepreneurship Academy (GTEA) mentors and NIREC Innovation Showcase events (July)
 - (ii) Conducted individual calls/meetings with select mentors (July, August)
 - (c) Industry and Government Outreach
 - (i) Hosted Silver to Green: Nevada's Innovation and Entrepreneurship Imperative & Technology Showcase in Incline Village, NV for local community, GTEA mentors, statewide EDA officials (July)
 - (ii) Attended USAF Nevada Energy Forum (August)
2. Entrepreneur -In-Residence (EIR) Education Program
- a. Conduct one-month review/check-in with each EIR to support process implementation for newly funded RFP2 project teams.
 - b. Conduct quarterly internal stakeholder education and outreach meeting in support of commercialization roadmap development
 - c. Held quarterly progress meeting to enlist assistance of TCAB and Board to facilitate each project's commercialization milestones and introduce new Clausius project and EIR Nicola Kerslake (August)

Goals: Task 2 – Sub-project Identification and Selection

- 1. Contract negotiations with UC Davis delayed. Negotiations expected to be completed by Q4 2010.
- 2. Finalize research and development milestones for newly funded RFP2 projects and ensure they are met. R&D milestones finalized and met for Clausius Project (July)

PUBLICATIONS/PATENTS: NA

Period Covered by Report: October 1, 2010– December 31, 2010

PROGRESS:

Goals: Task 1 – Provide Education and Outreach

- 1. Conduct education and outreach activities to increase awareness of NIREC funding opportunity RFP5 and to continue to build NIREC's innovation ecosystem
 - a. RFP5 delayed pending 2011 budget certainty.
 - b. Participated in NREL Industry Growth Forum as an evaluator and mentor for companies presenting at the forum and conducted outreach to venture community. (Oct)
 - c. Education and outreach with various clean energy deployment stakeholders, including DOE, DOD, Researchers, Early Stage Companies, and Potential Research Partners. (Oct)
 - d. Attended Stanford Pre-Court Institute for Energy Efficiency and conducted outreach to venture community. (Oct)
 - e. Attended SARTA Clean Tech Showcase in Sacramento, CA, to conduct education and outreach with various clean energy technology stakeholders, including researchers, early stage companies, and other key innovation ecosystem stakeholders (Oct)
 - f. Panel speaker at the Southwest Energy Innovation Forum in Arizona (Oct)

- g. Fostered relationship with Lawrence Berkeley National Lab leading to a pilot program that will link clean energy industry and a selected industry problem to researchers in the lab to solve the identified problem. (Oct, Nov, Dec)
 - h. Conducted outreach and education to clean energy industry companies. (Oct, Nov, Dec)
 - i. Attended AIChE conference to present white paper on challenges and solutions in clean energy. (Nov)
 - j. Attended Pinyon-Juniper Summit to conduct outreach and education with stakeholders interested in clean energy and energy efficiency programs. (Nov)
 - k. Attended EDA Regional Training conference to conduct outreach and education with stakeholders interested in clean energy and energy efficiency programs. (Dec)
2. Entrepreneur-in-Residence (EIR) Education Program
- a. Refined entrepreneurial mentorship/education program, focused on assisting university-based researchers with preparing a commercialization roadmap outline and assembling a small group of advisors.

Goals: Task 3 – Sub-project Identification and Selection

- a. Finalized UC Davis RFP 2 – Islam project contract (Dec)

Goals: Task 4– Project Management and Reporting

Working to provide updated NIREC budget for DOE.

PUBLICATIONS/PATENTS: NA

Period Covered by Report: January 1, 2011 March 31, 2011

PROGRESS:

Goals: Task 1 – Provide Education and Outreach

- 1. Conduct education and outreach activities to build NIREC's innovation ecosystem.
 - a. Participated in Nevada 2.0 conference and conducted outreach to potential ecosystem stakeholders and current Research Partners. (Jan)
 - b. Attended Clean Economy Network Conference and National Network of Clean Energy Innovation Organizers and conducted outreach to potential ecosystem stakeholders. (Jan)
 - c. Outreach and education to various clean energy deployment stakeholders, including EDA, DOD, SBA, Senator Reid's Office, Early-Stage Companies and potential Research Partners. (Jan, Feb)
 - d. Attended ARPA-E Technology Energy Innovation Summit to conduct outreach and to educate potential stakeholders and expand ecosystem. (Mar)
 - e. Attended Association of Technology Managers Conference to conduct outreach and expand ecosystem with key stakeholders. (Mar)
 - f. Outreach to Research Partners to educate them on current activities, services and accomplishments. (Jan, Feb, Mar)
 - g. Outreach to clean energy ecosystem stakeholder to educate them on current activities, services and accomplishments. (Jan, Feb, Mar)
 - h. Distributed monthly outreach newsletter to current and potential innovation ecosystem and stakeholders. (Jan, Feb, Mar)
 - i. Provide ongoing updates of program progress on the NIREC website as outreach and education to existing and potential innovation ecosystem and stakeholders. (Jan, Feb, Mar)
 - j. Promoted mentoring program to Research Partners by creating outreach flyer and website and conducting in-person meetings and direct email campaigns. (Jan, Feb, Mar)

2. Entrepreneur-in-Residence (EIR) Education Program
 - a. Further refined pre-commercialization milestones for projects and ensured they are on track with agreed-upon goals and milestones. (Feb)
 - b. RFP4 proposal review and selection of up to 4 projects completed by TCAB; due diligence begun on selected projects.
 - c. Invite 4-8 projects to participate in mentorship/education program

Goals: Task 4– Project Management and Reporting

Continuing to work to provide budget and supporting documentation for DOE funding.

CHANGES: Walt Borland appointed new director for NIREC.

PUBLICATIONS/PATENTS: NA

Period Covered by Report: October 1, 2011 – December 31, 2011

PROGRESS:

Goals: Task 1 – Provide Education and Outreach

A: Outreach

1. NIREC increased the frequency of its newsletter during this time period. It published eight (8) issues of the redesigned newsletter, which is now called *Nevada Clean Energy Commercialization Newsflash* and shortened to *Nevada Newsflash* for most uses.

2. With fewer organizations reaching out to their audiences through printed mediums, NIREC redesigned and, for the first time, prepared printed letterhead, envelopes, stamps and notecards for use in communicating with more impact to its constituents.

3. As part of an organization-wide move to using the online contact and outreach management tool, Salesforce.com, the NIREC stakeholder database was reviewed and audiences were added as contacts in the new system.

4. NIREC's new program manager, EIR and communications manager attended the 'ReCharge Nevada' economic development summit (November 17, 2011), which provided the opportunity to explore the area's economic challenges and to discuss and propose ideas for economic development activities. With internet-based experiences becoming ever more important to our stakeholders, NIREC conducted the following online outreach activities:

5. Realizing that many of NIREC's audiences are becoming more active in social media outlets, NIREC increased its postings to Facebook and Twitter. NIREC experienced a ten percent (10.0%) increase in followers through Facebook and a one hundred thirty percent (130.0%) increase in followers via Twitter.

6. Evaluated and posted over twenty (20) industry events on our website.

7. Researched and posted on our website approximately twenty (20) grant and presentation opportunities accepting applications in the fourth quarter.

B. Entrepreneur in Residence (EIR) Education Program

- 1) NIREC continued to perform its EIR education program in conjunction with the following researchers and entrepreneurs.. A commercialization roadmap – including competitive analysis, market analysis, financial model, market channel evaluation, and pricing strategy – was completed during the quarter.
- 2) The final report is currently being prepared. There is an operable commercialization plan suitable for use for grant funding needed to advance the technology to a point it will be considered fundable by VC's. This has been used for multiple SBIR proposals. The underlying operating plan spreadsheet

with detailed bottoms-up manufacturing and operating estimates is nearly complete. The market study is complete. The concept and market for this technology, transfer-printed flexible solar cells, has been screened by a number of investors. Conclusion and supporting data will be described in the final report, which is due by the end of 1Q 2012.

- 3) Tech Chats - Tech Chats are monthly meetings that bring together university researchers from the University of Nevada, Las Vegas and Desert Research Institute in Southern Nevada to discuss commercialization and research activities. NIREC hosted three (3) Tech Chats in the quarter, and is seeing growing attendance and interest in the program.
- 4) **Indirect Activities:** As one part of its organizational mission, NIREC led a statewide coalition to apply for an Economic Adjustment Grant from the Economic Development Administration (EDA).
- 5) NIREC's President and Vice President have attended all meetings of the Nevada Capital Investment Corporation (NCIC) created by Senate Bill 75, and have provided input to the committee on the applicability of proposed private equity and venture capital funding structures to support Nevada's clean energy industry where appropriate.

Goals: Task 3 - Sub-project Selection / Initiation

The Company continued to gather and analyze data during the period as per the technical scope of work.
2. UC Davis (RFP 2 winner, PI: Saif Islam, EIR: John Argo)

Goals: Task 4— Project Management and Reporting

Modifications to the Phase 3 contract are underway. Activities under Task 2 remain restricted until sub-awardees are approved.

PUBLICATIONS/PATENTS: NA

Period Covered by Report: January 1, 2012 – March 31, 2012

PROGRESS:

Goals: Task 1 – Provide Education and Outreach

1. *Champions of Change.* John Argo (EIR) represented NIREC at the White House's event "Champions of Change" on March 7. The White House Champions of Change series spotlights everyday heroes who are demonstrating commitment to improving their own communities, their country, or the lives of their fellow citizens.

2. *Cleantech Open.* NIREC announced a partnership with Cleantech Open on March 3, which entails working with Cleantech Open's volunteers to encourage participation in the business competition in Nevada. The partnership is called Cleantech Open Nevada. The Cleantech Open is the world's largest cleantech business competition. Its mission is to find, fund and foster entrepreneurs with big ideas that address today's most urgent energy, environmental and economic challenges. The program provides the infrastructure, expertise and strategic relationships to turn clever ideas into successful global cleantech companies. Since 2006, through its one-of-a-kind annual business competition and mentorship program, the Cleantech Open has enabled hundreds of clean technology startups to bring their breakthrough ideas to fruition, helped alumni contestants raise over \$260 Million, and created an estimated 1,200 green collar jobs. Fueled by a network of more than 600 volunteers and sponsors, the Cleantech Open unites the public and private sectors in a shared vision for making America's cleantech sector a thriving economic engine. Historically, Nevada's entrepreneurs have traveled to the Bay Area and Los Angeles to participate in the competition, but will now be able to benefit from an improved local ecosystem. NIREC hosted a launch event simultaneously in Las Vegas and Reno on March 22, with over seventy (70) entrepreneurs and stakeholders in attendance. In addition, NIREC created a contact database and prepared outreach mailings for two (2) Cleantech Open events and promoted Cleantech Open within our networks through newsletter and social media.

3. *Corporate Image.* In January and February, NIREC refined its letterhead and stationery branding, and followed this with the introduction of a new brochure in March. The brochure has been well received by stakeholders, and is now displayed in several partner locations, such as, at DRI - North and DRI - South.

4. *CRM Management.* As an eligible non-profit, NIREC was awarded free use of Salesforce CRM management software, and transferred its contact information to the platform during the 1st quarter.

5. *Expanded Presence.* NIREC announced the expansion of its physical presence in Nevada to two additional office locations – Desert Research Institute (Las Vegas) and Desert Research Institute North (Reno) – on March 21.

6. *FLoW Business Plan Competition.* NIREC assisted the Department of Energy's FLoW student business plan competition with its outreach activities in Nevada, including introducing the FLoW executive director to key influencers in Nevada's institutions and promoting the competition through our publications and social media.

7. *Media Outreach.* Walt Borland (President and CEO) was interviewed for an article by Karoun Demirjian that appeared in the February 26 issue of the Las Vegas Sun newspaper.

8. *Nevada Directions 2012 Event.* NIREC representatives contributed to the Nevada Directions 2012 Event on February 2. The annual event focuses on business and job creation in the state.

9. *Newsletters.* We produced and distributed nine (9) newsletters in the quarter, promoting them to our 2,000+ recipient mailing list.

10. *Renewable Energy World Conference.* NIREC was represented at the Renewable Energy World Conference on February 14-16. The event offers unprecedented access to the latest information, solutions and technologies driving the future of the renewable energy industry.

11. *YPE Nevada.* NIREC began planning for a Nevada chapter of the Young Professionals in Energy (YPE) networking group. Young Professionals in Energy (YPE) is a non-profit energy industry networking organization with over 20,000 members worldwide. YPE is dedicated to providing a forum for networking and career development for professionals in the global energy industry. YPE runs a year-round calendar of events in 20 chapters around the world.

The project is close to completion, and the team is continuing to work on submitting final reporting requirements as required by the DOE.

During the first quarter, FlexStrata (UC Davis) has made progress on both the technical and business fronts. The technical team is moving into the final report phase and has been engaged in the business development efforts, as well. Progress with the key initial investor prospect, a small private equity fund, did not bear fruit. Initial discussions were very promising for bringing in some support for some of the next development efforts but the fund, it turns out, had limited resources and we mutually concluded that, given the scale of investment needed to take this technology to the next level was not a good fit for the fund.

Development efforts for the first quarter were focused on two specific areas. First, we're finalizing the model that identifies key cost goals that would need to be achieved for the technology to be attractive to investors. This includes detailed process steps and identification of the most cost-sensitive steps that represent the most important opportunities to make the technology economically viable. Also, as an alternative to the conventional solar space, we're summarizing the characteristics of the alternative application segments needed also to materialize (i.e., markers of segment maturation) for application in alternative segments (i.e., other than the commercial rigid module format)

PUBLICATIONS/PATENTS: NA