



adiCET

Institution Profile

**Asian Development College for
Community Economy and Technology**

Chiang Mai Rajabhat University

February 2015

Name **Asian Development College for Community Economy and Technology**
Address Chiang Mai World Green City, Chiang Mai Rajabhat University, Mae Rim Campus, 180 Moo 7, Chotana Rd., Keelek Subdistrict, Mae Rim District, Chiang Mai Province 50180 Thailand
Tel/Fax +66-53-885-871
Website www.adicet.cmru.ac.th
Email adiCET@cmru.ac.th

1. General Information

Asian Development College for Community Economy and Technology (adiCET), Chiang Mai Rajabhat University is concerned about energy conservation, higher efficiencies, and use of renewable energies in the integration to the local community. adiCET aims to be the learning center for green technologies to showcase real applications for sustainable living. Chiang Mai World Green City is the main project to develop the Green College, Smart Community ASEAN Renewable Energy Center (AREC) and Green Technology Exhibition. Chiang Mai World Green City is also the first model community in the world that is integrated with nature, uses renewable energy, green technology and strives to be fully sustainable. The green city is situated in 500 rai of the Mae Rim Campus, Chiang Mai Rajabhat University, Mae Rim, Chiang Mai. Associate Professor Dr. Wattanapong Rakwichian established the College as the first dean. Currently, the dean of adiCET is Dr. Worajit Setthapun.



adiCET has the main mission of conducting graduate programs & research, providing academic services. For the graduate programs, adiCET provides 2 interdisciplinary programs include:

1. Master of Science in Community Economy and Technology Development
2. Master of Science in Community Energy and Environment
3. Doctor of Philosophy in Community Economy and Technology Development
4. Doctor of Philosophy in Community Energy and Environment



For research and academic services, adiCET is the recipient of several national and international grants such as the National Research Council of Thailand (NRCT), Department of Alternative Energy Development and Efficiency (DEDE), Energy Policy and Planning Office (EPPO), Ministry of Energy, Office of Naval Research-Global (ONRG), PTT Public Company Limited (PTT), Energy Regulatory Commissions (ERC), and DuPont Thailand Co. Ltd. Basic and applied research in adiCET is the main instrument to build the Chiang Mai World Green City. All the research is performed with the strong team work of faculties, graduate and undergraduate students. From the funding of ONRG, adiCET research team was able to develop a Smart Community that uses 100% electricity from 50.5 kW PV systems. The power is distributed through a Smart DC microgrid network making it the first community in the world that uses DC appliances. The Smart Community is also flexible as the platform to test both AC and DC usability. We were also the consultant for DEDE Ministry of Energy for the project “Evaluating and Improving Online Data Collection System for Off-Grid Solar Monitoring Sites”. In addition, adiCET has a 700 kW PV off grid system for the university as the test-bed and learning center for community power systems. We have the real hands-on experience to monitor and assess the PV both for On-grid and Off-grid System. adiCET aims to be the integrator of green technology and renewable energy. The smart grid is the platform to integrate these technologies.

adiCET also have biogas digesters, biomass gasification and diesel generators integrate as hybrid energy systems. The energy (power and heat) are used in the green city in the daily lives of green city citizens. For example, the biogas is used for the kitchen. The electricity from PV are used for solar pumping in farm for the low carbon agriculture. In

addition, the buildings in the Chiang Mai are designed to be eco-friendly and energy efficient. NRCT has also provided funding for energy efficient seminar hall with EPS foam technology and PV rooftop. The university also support research on carbon sink road which uses approximately 2 million waste plastic bags to construction the 2 km asphaltic road in the Chiang Mai World Green City.



adiCET provides short course and technology transfer training at the Chiang Mai World Green City and in the local community. Mainly, adiCET provide training in renewable energy technology application such as PV for water pumping in agriculture, PV for household usages, low cost community PV systems, and community biogas digesters. adiCET team are also the consultant for energy efficiency, energy policy and planning and also energy awareness programs for target participants all over Thailand.



adiCET Vision

Asian Development College for Community Economy and Technology strives to be the leading institution to promote and develop the technologies and management model for the betterment of the community. The focusing area of adiCET is renewable energy, green technology, environment protection, local wisdom and culture conservation for the local community of Asia and the world. The main missions of adiCET are graduate program management, research development, academic services and arts & culture conservation.

2. Development of Chiang Mai World Green City

Chiang Mai World Green City is a Living-Laboratory the integration of green technologies and renewable energy. adiCET staff, students and faculty members uses the green city as office, classroom, laboratory and living quarters. We feel that we can not learn or teach if we do not experience it ourselves. The picture below is the green city plan and the top view of each zone. Zone A is the smart community with the DC/AC Microgrid. Smart Community focused on sustainability in 5 areas: Energy, Food, Residential, Economics and Environment. Zone B is the green college and has classroom and seminar halls. Zone C is the Green Technology Exhibition Center.

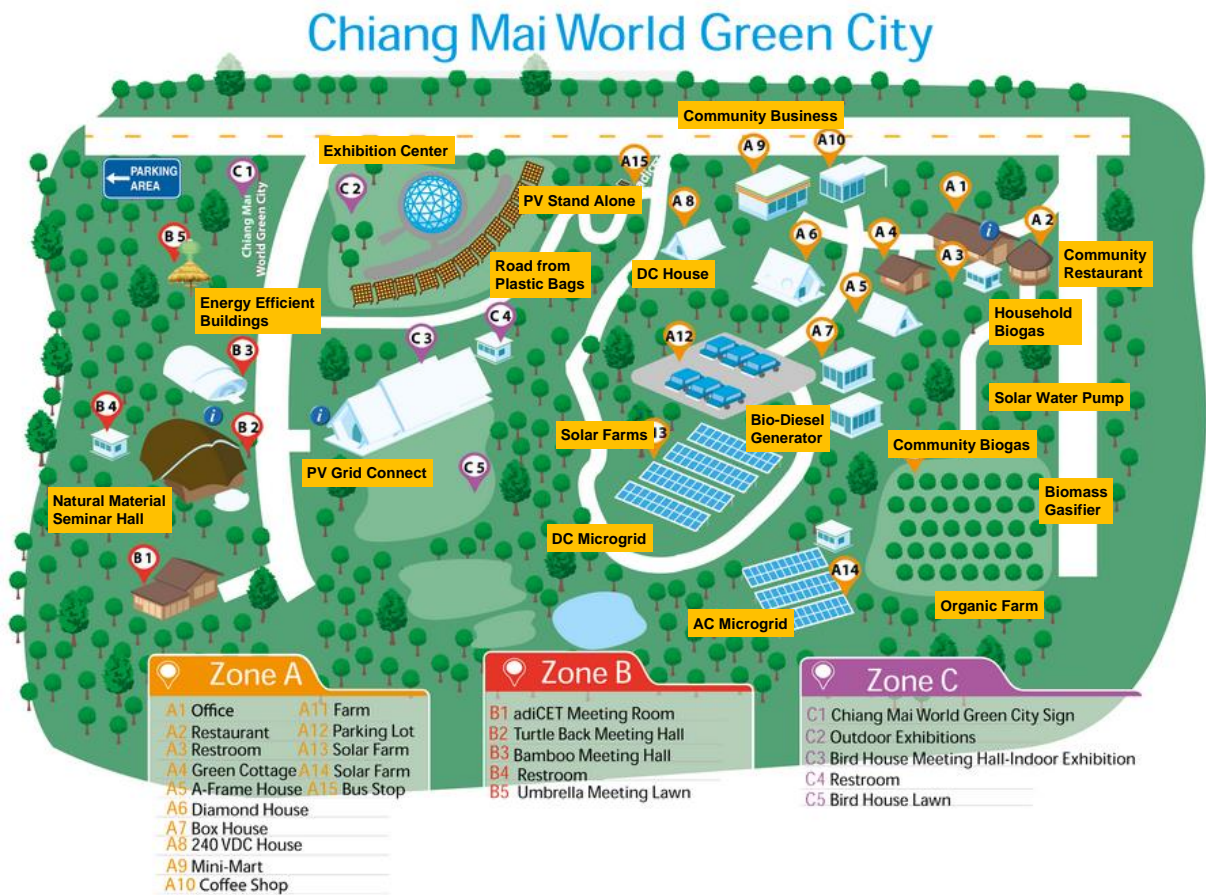


Figure 1: Arial View of Chiang Mai World Green City

4. Research, Academic Service and Consultation Projects by the Asian Development College for Community Economy and Technology for 2010 - 2015

	Project	Funding Source	Timeframe	Project Description
1	Evaluating and Improving Online Data Collection System for Off-Grid Solar Monitoring Sites	DEDE, MoEN	December 2010 - 30 November 2011	The maintenance and modification of the online data collection for 4 off-grid solar monitoring sites for the Department of Alternative Energy Development and Efficiency, Ministry of Energy, Thailand
2	Workshop of Alternative and Renewable Energy for Sustainability "Exploring Technologies for Building a Green City" (WARES2010)	ONRG	April - December 2010	Conference organization with 40 expert participants in the technical and policy area in renewable energy and green technology from 10 countries
3	Workshop of Alternative and Renewable Energy for Sustainability "Exploring Smart Community" (WARES2011)	NEDO, ONRG	April - December 2011	Conference organization with 100 speakers & participants in the technical and policy area in renewable energy and smart grid technology from 15 countries
4	The Development of Community Biogas System for Saluang Subdistrict, Mae Rim District, Chiang Mai, Thailand	NRCT	April 2011 – March 2012	Community capacity building for community biogas system. 3 fixed dome system was built to yield biogas for 50 households.
5	PV Low Power DC Community Power Grid	ONRG	September 2011 – August 2013	The main objective of this project is to design a stable, efficient and affordable community DC power grid system with low voltage from PV. This work will demonstrate the efficiency in DC power generation and minimization of energy loss when compare to AC power grid.
6	The Promotion of Applied Energy Course for Non-formal and Vocational Education	Office of Permanent Secretary, MoEN	August 2011 - September 2012	The development of applied energy course for non-formal and vocational education: analysis of current national and international energy course, analysis of policy of Ministry of Education and Ministry of Energy for the promotion of teacher and students. Over 200 participants in the program.
7	Environmentally Eco-Friendly Energy Efficient Class Room	NRCT	August 2011 – July 2012	The development of Energy Efficient Classroom from EPS foam with the modification of landscape.
8	Asphaltic Road from Waste Plastic Bags	CMRU	June 2011 – May 2012	The development of 2 km road from 2,000,000 waste plastic bags
9	Model Energy Efficient Classroom for Graduate Studies	CMRU	June 2011 – May 2012	The design and construction of 2 energy efficient class room in the Chiang Mai World Green City
10	10 Year – Renewable Energy and Energy Conservation Policy with the Ministry of Energy: World Alternative Energy Forum (WAEF 2012)	DEDE, MoEN	12 October 2012 - 11 May 2013	To promote the success of Ministry of Energy on Renewable Energy and Energy Conservation through Green Exhibitions and International Forum with over 2,000 attendees and 18 participating countries

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11	Low carbon society model with community power system from renewable energy	ENCON Fund, EPPO, MoEN	August 2012 – August 2013	The development of low carbon community with 25 kW PV system and low carbon agriculture
12	Chiang Mai World Green City GreenEXPO2012	Public and Private Organization	10 - 20 December 2012	Green Technology outdoor exhibition to showcase the real application of renewable energy and green technologies in the community
13	Thailand-Germany Conference on Renewable Energy and Energy Efficiency for Green City	NRCT, DFG	11 - 12 December 2012	Organized conference for Thai and German Researchers on the topic of novel technology for energy and environment with 50 participants
14	The 5 th Thailand Renewable Energy for Community Conference	TREC	18 - 20 December 2012	Organized academic conference for Thailand research and community leaders in the area of renewable energy with 150 participants
15	The 3rd Workshop on Alternative and Renewable Energy for Sustainability “Decentralized Power Solution for Community and Islands”	ONRG	10 December 2012	To solve a specific scenario relating to the Country’s Community or Island Power and Renewable Energy Integration. The attendees will be divided to 2 small working groups where each group will work together to come up with a realistic integrated plan for technology, policy and implementation strategies (60 participants)
16	The Promotion of Energy Awareness and Participation of Energy Regulations in Energy District 2 of Thailand	ERC	May - November 2013	The promotion of energy awareness at 8 provinces of Energy District 2: sites survey and analyze issues regarding to power services and business; and organize public forum in each province (1,270 participants)
17	The Promotion and Technology Transfer of Low Cost Community Renewable Energy System	NRCT	February - September 2013	The promotion and technology transfer of low cost PV systems through training (1,200 participants) and setting up 5 learning centers to the community of 5 provinces.
18	PV-Biodiesel Hybrid-DC Microgrid for Community	ONRG	October 2013 – July 2015	1) Develop and evaluate a PV-Biodiesel hybrid DC microgrid system 2) Design and evaluate a flexible power supply controller for the DC microgrid 3) Develop software to control and manage power supplies, load demand, and battery storage 4) Develop simulation software for the hybrid DC microgrid system
19	Thai-German Advance Renewable Energy Training Course	University of Applied Sciences, Berlin, Germany and Hamburg University of Technology	September 2013	Advance short course in biomass and biogas technology (30 participants) by Prof. Dr-Ing. MirkoBarz, University of Applied Sciences, Berlin, Germany and Prof. Dr-Ing. Martin Kaltschmitt from Hamburg University of Technology, Germany
20	PV Water Pumping Station for Health Promotion Hospital,	DuPont	November 2013	Corporate Social Responsibility program by DuPont Thailand Co. Ltd

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	Kaojao Subdistrict, Prانبuri District, Prachuabkirikan Province			to develop water pumping system for the remote Health Hospital
21	The Promotion of Energy Awareness and Participation of Energy Regulations in Energy District 3 of Thailand	ERC	November 2013 - April 2014	The promotion of energy awareness at 6 provinces of Energy District 3: sites survey and analyze issues regarding to power services and business; and organize public forum in each province (1,204 participants)
22	The Study of Renewable Energy Potential in the Northern Part of Thailand	PTT	December 2013 – April 2014	The study of renewable energy potential in Mae Ta Subdistrict, Chiang Mai (6 communities)
23	ASEAN Renewable Energy Workshop (AREW 2013)	ONRG	December 2013	Conference on the development of renewable energy for ASEAN Economy with 100 participants from 10 countries
24	Workshop on Solar Energy System for Buildings	RADC	June 2014	Short course training program on solar energy system for building for 100 soldiers of Royal Thai Aide-De-Camp by hands-on training to install 2 kW system
25	APEC Workshop on Smart DC Power Opportunity for Community	APEC Secretariat	November 2014	Organize APEC workshop for the opportunity assessment of Smart DC Community Power Systems for the APEC member economies with 120 participants from 11 countries
26	Technology Transfer Workshop for the Application of PV Systems	NRCT	June - December 2014	The technology transfers on the application of PV systems to targeted 120 participants for real use the household in the local community with hands-on training to install 4 PV systems.
27	The Campaign for Energy User Protection	ERC	August - December 2014	The promotion of energy awareness and user benefits at 13 Energy Districts in 8 provinces sites survey and analyze issues regarding to power services and business; and organize public forum in each province; energy conservation exhibitions (2,800 participants)
28	The Promotion of Energy Awareness and Participation of Energy Regulations in Energy District 7 of Thailand	ERC	November 2014 - July 2015	The promotion of energy awareness at 6 provinces of Energy District 3: sites survey and analyze issues regarding to power services and business; and organize public forum in each province (1,204 participants)
29	Technology Transfer Workshop for Household and Community Biogas System from Animal Wastes	NRCT	June - December 2014	The technology transfer on the household and community biogas systems to targeted 120 participants for real use the household in the local community with hands-on training to install 3 biogas digesters
30	Technology Transfer Workshop for Small PV Systems	NRCT	August 2014 - March 2015	The technology transfer training on small PV systems to 100 students, teachers and staff of Chitrada College with hands-on training to install 4 PV systems

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31	Technology Transfer Workshop for Small Rice Mills	NRCT	February - December 2015	The technology transfer training on small rice mill system to 5 communities
32	High Efficient Smart Home Integrated with DC Appliances	ONRG	May 2015 – November 2016	1)Develop all characteristic loads to be DC devices and integrate electric vehicle to energy storage and supply source 2) Measure and transmit energy consumption for each appliance. 3)Control operation algorithm for maximum energy efficiency and develop display and user interface system to reduce energy consumption.
33	The Conservation and Promotion of Renewable Energy in the Royal Initiated Area and the Royal Projects at Chiang Mai	ISOC by ENCON Fund, EPPO, MoEN	August 2015- March 2016	The development of 700 kW PV Community Power Plant Learning Center at the Chiang Mai World Green City