

# Connecticut Studios & CTS Fuel Cell Projects

Town of South Windsor

January 5, 2015



# Agenda

## Overall Synopsis:

- General discussion
- Project status
- Power Purchase Agreement
- Fuel cell
- Studio campus
- Ancillary development
- Fuel cell cost budget
- Studio campus cost budget
- Capital funding

# Project Status

- Finalizing purchase agreement with the Charboneau property
- Current with reporting to CL&P as per the PPA
- Current with delay damages to CL&P as per the PPA
- Finalized amendments for the PPA
- Withdrew motion with PURA to change equipment provider, which in turn nullified the balance of the motions, cleansed slate with PURA
- Finalizing agreements with Fuel Cell Energy to build Fuel Cells and ongoing servicing during the life of the PPA
- Finalizing with The Film Studio Group for consulting on the development and management of the Studio Campus
- Preparing applications and presentation with the CT DECD
- Finalizing project capital financing

# Fuel Cell Summary

- Construct two, 2.8 Mega Watt fuel cells governed down to a 5 Mega Watt power plant which will be fueled by natural gas.
- Construct the fuel cells as per the approved site plan.
- Install a heat exchanger to the fuel cells to create a district heating system for the studio campus buildings.
- Install a Micro System to the fuel cell power plant which will be used as a local generator power source.
- Execute the Equipment, Service and EPC contracts with Fuel Cell Energy. Timeline by January 16, 2015.
- Execute application with Town and DEEP for a Micro Grid system for the fuel cell power plant. Timeline upon PPA approved amendment.
- Make building application for fuel cells to the Town upon PPA amendment approval. Timeline April 1, 2015

# Studio Campus Summary

- Construct two buildings of sound stages and office production support centers.
- Each building will consist of two, 20,000 square foot sound stages and two, 10,000 square foot office production centers.
- Each building will be 60,000 square feet, for a total of 120,000 square feet in both buildings.
- Construct a 25,000 mill work shop and equipment storage facilitate to support the production of the sound stages.
- The Studio Campus will be completed in two phases.
- Phase one will be the construction of one building consisting of two sound stages and two office support centers. The construction of 50% of the mill building.
- Phase II development will depend on the production usage of Phase I and the percentage return on costs.
- Phase II building size and scope of building will be determined by Phase I production types.

# Ancillary Development Summary

Upon commencement of Phase I of the studio campus, CT Studios will immediately commence the following:

- Market restaurant pads to national and regional multi unit operators.
- Market hotel pad to a hotel developer and or hotel franchisee
- Market space to local and national retailers for the 16,000 square foot strip shopping retail center for rent.

# Power Purchase Agreement

- Current status:
  - In critical milestone default, although in agreement with CL&P to amend while paying delay damages.
  - Amended new ownership requirement.
  - Finalizing purchase agreement with the Charboneau property
  - Current with quarterly reporting to CL&P
  - Finalized amendments for the PPA
  - Withdrew motion with PURA to change equipment provider, which in turn nullified the balance of the motions, cleansed slate with PURA
- Amendments:
  - Requesting permit, start date and commercial operation date changes
  - Requesting date change of sale and purchase of electricity
  - Eliminating the use of 515 Fitch Boulevard to the project scope
  - Adding a mill and equipment building to be constructed on the studio campus, to the project scope

# Capital Funding

- Fuel Cell:
- Working Capital, dck North America / Connecticut Studios operating account
- Construction loan; Fuel Cell Energy
- Equipment end loan, Fuel Cell Energy
- Federal Renewable Energy Tax Credit
- Studio Campus:
- Working Capital, dck North America / Connecticut Studios operating account
- Construction Loan, Banking Institutions, Connecticut Clean Energy Fund, and potential equity investors
- CT Film Infrastructure Tax Credits
- Town of south Windsor Revenue Bonds
- CT Gap Loan



# Team:

- **Ownership:**

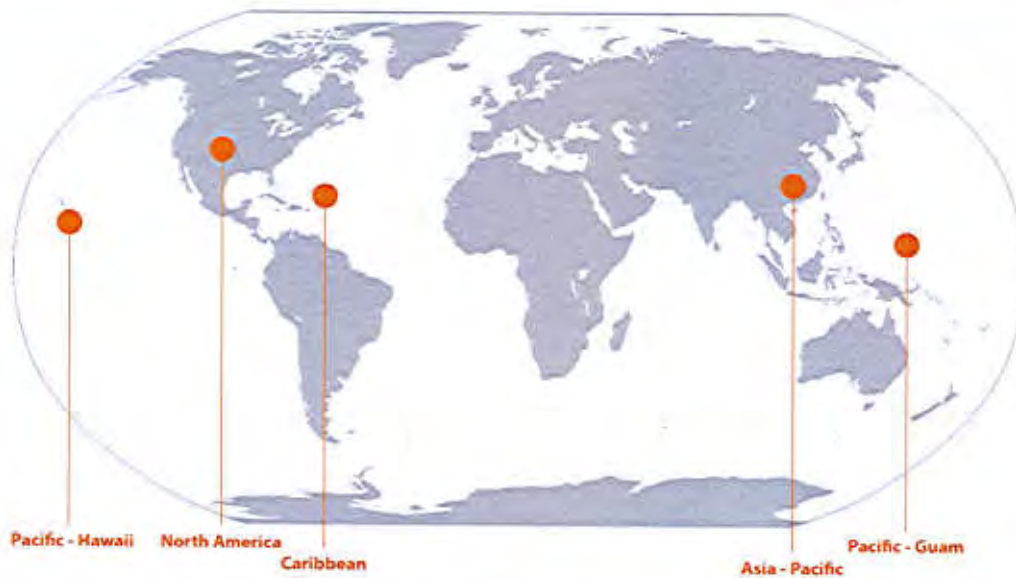
- Connecticut Studios LLC is the owner and developer of the property, Studio Campus and the ancillary development buildings.
- CTS Energy LLC is the owner and developer of the Fuel Cell Power Plant.
- dck North America owns 100% of the Shares of Connecticut Studios
- Connecticut Studios LLC owns 100% of the shares of CTS Energy LLC

- **Development and Operating Team:**

- dck North America; Stephen DeAngelo, Principal, Chis Barbe SVP Business Development, Aaron Capone Project Manager, Ray Crothers, Legal
- AFT Management LLC ; Andrew F. Toth, Owners Representative and day to day project manager
- Energy Consultant; Asa Davis
- Fuel Cell Manufacturer; Fuel Cell Energy Co, Michael Bishop SVP and Ben Toby VP Sales
- Studio Campus Consultants, Film Studio Group, Stephan Smith
- Legal; Jesse Langer, Fuel Cell & PPA

### company overview

- Design-build, program and construction management, and general construction to public and private sector clients
- Headquartered in Pittsburgh, PA. Operates throughout North America, Pacific Rim and Caribbean
- A construction leader – backed by 90 years of history
- More than 1,400 professional and craft employees



#### Core markets:

- Aviation
- Commercial
- Education
- Energy
- Federal / Military
- Healthcare
- Hospitality
- Justice
- Multi-family
- Senior Living
- Capital Solutions

**dck worldwide is a global construction company specializing in developing, managing, and building highly complex projects.**

For more information: [www.dckww.com](http://www.dckww.com)

dck worldwide, LLC is an Equal Opportunity Employer.

## services

### Project & Construction Management

- Planning and conceptualization
- Project financing and funding analysis
- Design
- Procurement
- Construction management
- Commissioning and start-up
- Operations and asset management
- Formal risk management process

### Design-Build & General Construction

- Engineer – Procure – Construct (EPC)
- Global supply chain management
- Labor sourcing and management
- Global network of A&E firms
- Project controls and scheduling
- Integrated management information systems

### Global Project Development

- Pre-development planning and feasibility analysis
- Structured finance and risk management
- Team selection and integration
- Program management
- Asset transfer and operations

### Additional Capabilities

- LEED® (over 40 projects)
- BIM



#### Testimonial

*"A particular asset to us on both of these projects has been [dck's] ability to work independently and essentially function as an extension of our staff. They know how we work, what quality we and our very particular tenants expected and demanded, and were very familiar with our rules, regulations, and limitations. Their highly talented and dedicated staff's attention to detail and concern for accuracy was always evident ..."*

*Gerald Deptolla  
General Services Administration*

## excellence in safety

### focus on safety

As leaders in the construction industry, **dck worldwide** is committed to safety as a core business value. It is the company's primary objective to ensure that projects get built safely and efficiently.

### dck's safety program

- Education and Training
- Best Practices
- Subcontractor Controls
- Top-Down Commitment



### safety awards

- More than 60 national and local construction safety awards since 2005
- Corporate member of Voluntary Protection Programs Participants' Association (VPPPA)
- OSHA VPP Star Status
  - A.J. Celebrezze Federal Building
  - Howard M. Metzenbaum U.S. Courthouse
  - Clifford Hollow Bridge
  - Clay Center for the Arts & Sciences
  - PNC Firstside Center
- Dept. of Navy Star Award
  - P-460 Joint Strike Fighter Hangar, Yuma
  - P-447 Joint Strike Fighter Hangar, Yuma
  - P-583 Communications Facility, Yuma
  - P-546 Utilities Infrastructure Upgrade, Yuma
- Over four years worked in Guam with more than 2.5 million man-hours without a lost time injury

	Industry Average	dck in 2011	dck in 2012	dck in 2013
LTA's	1.40	.39	.40	.36
DART	2.0	2.34	2.19	1.26
RIs	3.70	3.12	3.38	1.81
EMRs	1.00	.71	.74	.73

\* Statistics from U.S. Bureau of Labor; the most current statistics published are for the year of 2008.

OSHA Lost Work Day Rate (LWDR) is an industry standard rate of lost work day cases per 200,000 man hours worked.

OSHA Days Away from Work (DART) is an industry standard rate of days away from work cases per 200,000 man hours worked.

OSHA Recordable Incident Rate (RIR) is an industry standard rate of recordable cases per 200,000 man hours worked.

\*\* Experience Modification Rating (EMR) is a multiplier to determine Workers Compensation Insurance Premiums calculated upon previous losses by the National Council on Compensation Insurance. dck's EMR is well below the national average.

## LEED experience



- Constructed or managed construction of 8.4 million SF of LEED-certified space with projects totaling \$1.98 billion in construction value
- Participation in making recommendations during design phase relating to material & systems selection / energy & site issues

### a number of "firsts":

Construction Manager as Constructor for the first LEED certified GSA Project in the U.S.: Nathaniel R. Jones Federal Building & Courthouse, Youngstown, OH

General contractor for the first and largest commercial building in the U.S. awarded a LEED Silver certification: PNC Firstside Center, Pittsburgh, PA

General contractor for the first LEED commercial building in Guam: Coast 360 Federal Credit Union, Maite, Guam

Design-build contractor for the first DoD Child Development Center awarded LEED certification: Oceana Naval Air Station CDC, Virginia Beach, VA



**building solutions**

**dck**  
WORLDWIDE



# FuelCell Energy

Ultra-Clean, Efficient, Reliable Power



## Presentation to Town of South Windsor

January 2015

# Ultra-Clean | Efficient | Reliable Power

## Significant Recent Growth and Progress

- **Over 180 MW of Direct FuelCell® (DFC) power plants operating** at more than 50 locations worldwide, with availability factor >95% and capacity factor >90%
- **World's largest fuel cell installations** – 59 MW in Seoul Korea, and 14.9 MW in Bridgeport CT
- **Employ of over 600** skilled personnel at Danbury and Torrington and over 700 total
- **Two-stage expansion underway** to double CT manufacturing base to 200 MW when completed
- **ISO 9001 certified** and products certified to ANSI/CSA, CARB 2007, IEEE, ISO, NFPA and UL
- **POSCO Energy**, Korea's largest IPP and sub of worlds 4<sup>th</sup> largest steel company, owns 11% of FCE, will open 140 MW fuel cell plant in 2015 in South Korea under license from FCE – serving Asia and back-up to FCE in N. America
- **NRG Energy**, the largest IPP in North America, owns 6% of FCE, extends \$40-million debt facility for project finance, and co-markets DFC plants

***FCE business model is turnkey and comprehensive – manufacturing, financing, construction, and service – delivering cost savings, environmental benefits and greater resiliency with minimal risk***

# Integrated Fuel Cell Company

## R&D

*Design megawatt-class distributed power generation solutions*

- *Global fuel cell platform*
- *Robust intellectual property portfolio*
- *Developing hybrid applications of existing technology for new markets*



## Manufacture / EPC

*Global manufacturing profile*

- *North America*
- *Europe*
- *Asia via partner*

*Engineering, Procurement and Construction*

- *Project development*
- *Project Finance*



## Services

*Operate & Maintain power plants*

- *Over 100 DFC® plants operating at more than 50 sites in 9 countries*
- *>2.8 billion kWh ultra-clean power produced*
- *> 300 MW installed/backlog*




**Providing turn-key distributed power generation solutions**


**NASDAQ: FCEL**




## Global platform – scale enhances economics



**Individual fuel cell  
&  
350 kW fuel cell stack**



**Completed module  
1.4 megawatts**



**Four-Stack Module  
1.4 megawatts**



**59MW fuel cell park**

- Utilizes 21 DFC3000 plants



**2.8 MW DFC3000<sup>®</sup>**

- Utilizes two modules
- Adequate to power 2,800 homes



**1.4 MW DFC1500<sup>®</sup>**

- Utilizes one module
- Adequate to power 1,400 homes

# Customer Operating Models

## On-site Power (*Behind the Meter*)

Project sizes 1.4 – 11.2 MW (1 to 4 plants)

- **Affordable & Clean energy**
  - High efficiency drives savings
  - CHP reduces costs and improves customer's carbon footprint
  - Virtual lack of pollutants benefits public health
- **Supports energy security (micro-grid)**

## Electric Grid Support

Project Sizes 5.6 – 60 MW (2 to 22 plants)

- **Cost effective baseload power**
  - when/where needed (*i.e. next to existing sub-stations*)
  - Avoids transmission cost and permitting / reduces congestion
- **Enhances grid resiliency**
- **Supports economic development & renewable portfolio standards**

### FCE Approach to Market

- Direct Sale to End-Users
  - Product Sale/EPC/Operation/Service
- Long term Power Purchase Agreements
  - Partner/project investor owns
- Lowering cost of capital
  - Debt at 50%
  - Tax Equity 30-35%
  - Partner or FCE Ownership 15-20%

### FCE Approach to Market

- Project development by FCE
- Ownership
  - Rate base by utility
  - Partner or project investor owns using PPA structure
- Build projects which follow disciplined milestones and sell or utilize tax equity financing at commissioning

## Unsubsidized Levelized Cost of Energy

\$/kWh

\$0.25

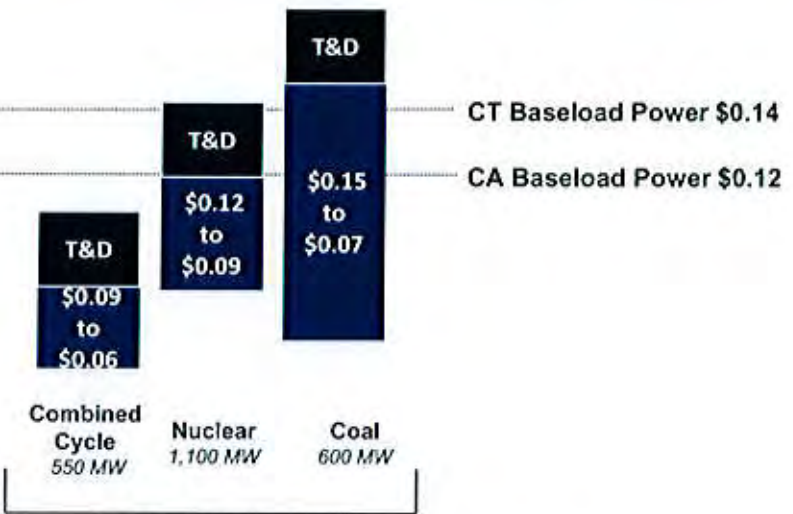
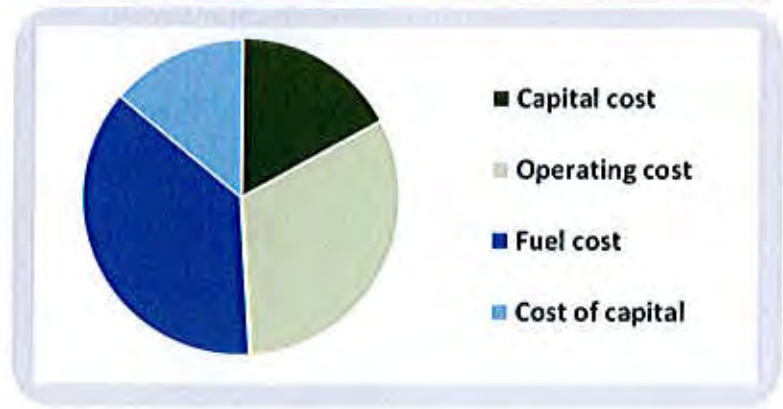
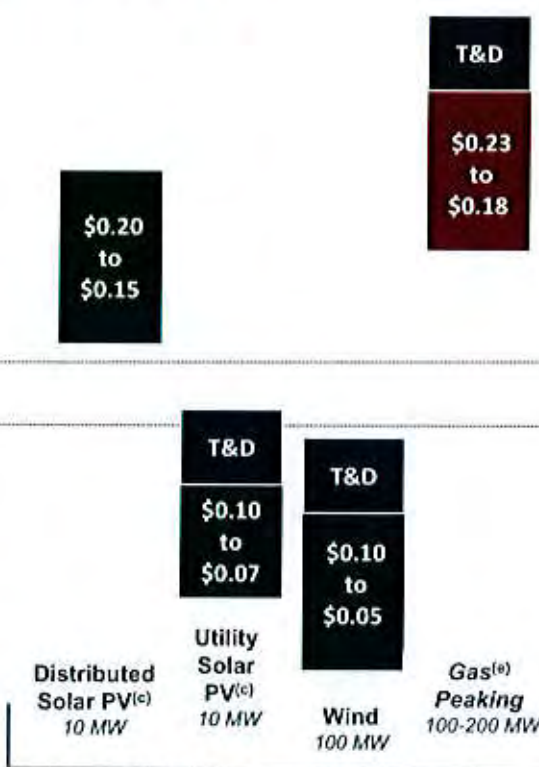
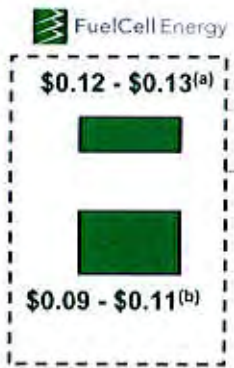
\$0.20

\$0.15

\$0.10

\$0.05

\$0.00



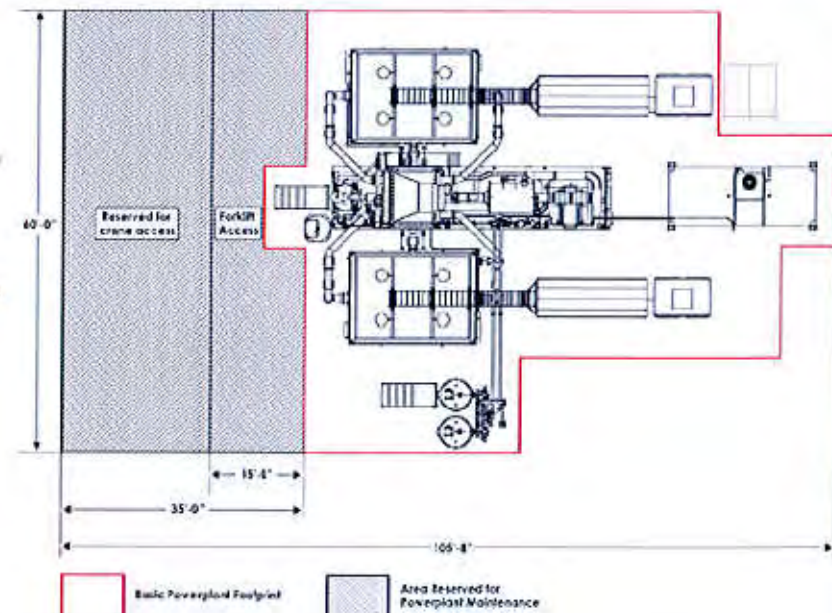
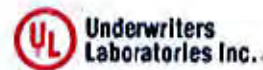
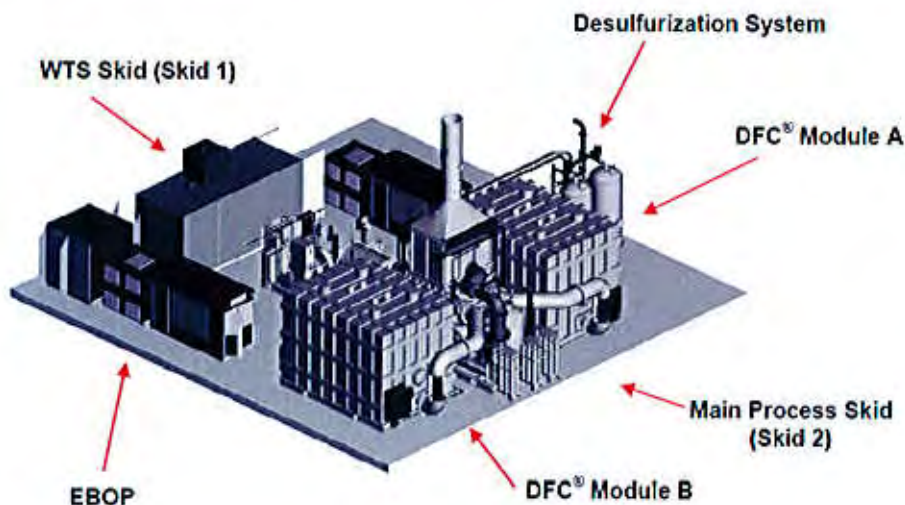
- (a) LCOE of \$0.13/kWh with natural gas at \$7/mmBtu or \$0.12/kWh at \$5/mmBtu; each \$2/mmBtu change equates to about \$0.01/kWh.
- (b) Mid-term LCOE target of \$0.09-\$0.11/kWh based on global production volume of approximately 210 MW annually.
- (c) Distributed solar based on rooftop installation in SW USA with 20-23% capacity factor; Utility solar based on tracking technology and 27-28% capacity.
- (d) Installation and maintenance cost of Transmission & Distribution (T&D) is estimated to add up to \$0.024/kWh.
- (e) Gas peaking addresses intermittency of solar and wind when power is required but sun not shining/wind not blowing.
- (f) Does not include waste disposal costs, incremental emission clean-up costs or nuclear-related security costs.

Source: Company estimates, Lazard's Levelized Cost of Energy Analysis—Version 7.0, U.S. Energy Information Administration (EIA) & Oak Ridge National Lab.

# DFC<sup>®</sup> 3000 Fuel Cell Power Plant

FuelCell Energy's DFC3000™ system is the largest of the Direct FuelCell<sup>®</sup> (DFC<sup>®</sup>) power plant fleet, capable of providing high-quality baseload power with 47% electric power generation efficiency around-the-clock. Scalable for Multi-Megawatt Fuel Cell Parks, the system is especially suitable for applications with larger load requirements such as universities, manufacturing facilities, wastewater treatment plants, and utility/grid support.

Gross Power Output		Available Heat		Pollutant Emissions	
Power @ Plant Rating	2,800 kW	Exhaust Temperature	700 +/- 50 °F	NOx	0.01 lb/MWh
Standard Output AC voltage	13,800 V	Exhaust Flow	36,600 lb/h	SOx	0.0001 lb/MWh
Standard Frequency	60 Hz	Allowable Backpressure	5 iwc	PM10	0.00002 lb/MWh
Optional Output AC Voltages	By Request	Heat Energy Available for Recovery		Greenhouse Gas Emissions	
Optional Output Frequency	50 Hz	(to 250 °F)	4,433,000 Btu/h	CO <sub>2</sub>	980 lb/MWh
<b>Efficiency</b>		(to 120 °F)	7,460,000 Btu/h	CO <sub>2</sub> (with waste heat recovery)	520-680 lb/MWh
LHV	47 +/- 2 %				



## *Multi-MW Project Experience*



# Multi-MW Project Experience



*2.8 MW On-Site Biogas Fuel Cell in California*



*Dominion Bridgeport Fuel Cell Park in Bridgeport CT*

*Multi-MW Fuel Cell Plants in South Korea*

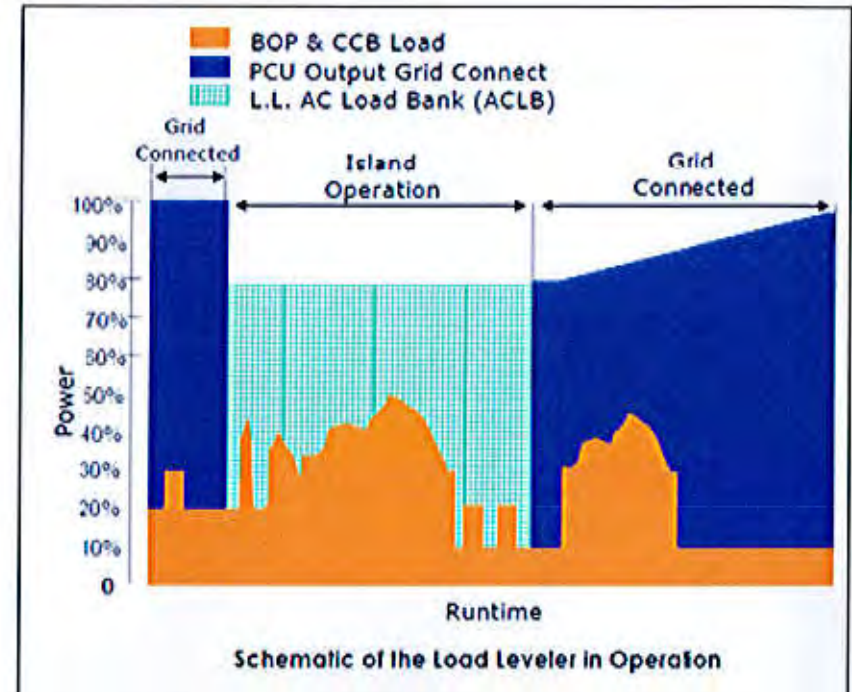


*59 MW District Heating Fuel Cell in Seoul, Korea*

**Proven Capability to Deliver Clean, Cost-Competitive, Local Power**

# Microgrid Applications

- Full grid-independent (G-I) capability
- Clean, quiet, reliable power island
- Proven G-I track record:
  - R&D, prototype testing began 2004
  - Commercial shipments since 2008
  - Showcase sites CCSU, Univ of Bridgeport, San Jose (CA) Wastewater Plant
- Operating Sequence:
  - Grid outage → inverter switches to voltage control mode
  - Load Leveler responds within 5 seconds, maintains the fuel cell output at 85%
  - Local loads are re-connected to fuel cell via Microgrid controller
  - Process reversed upon return of grid
- This method accommodates very large and fast facility load changes.



# Microgrid Case Study

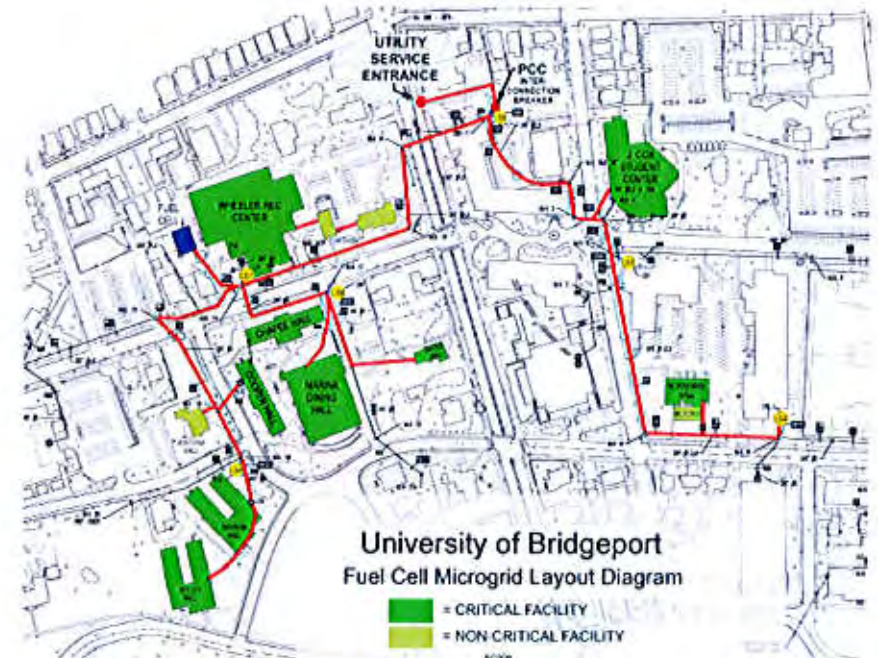
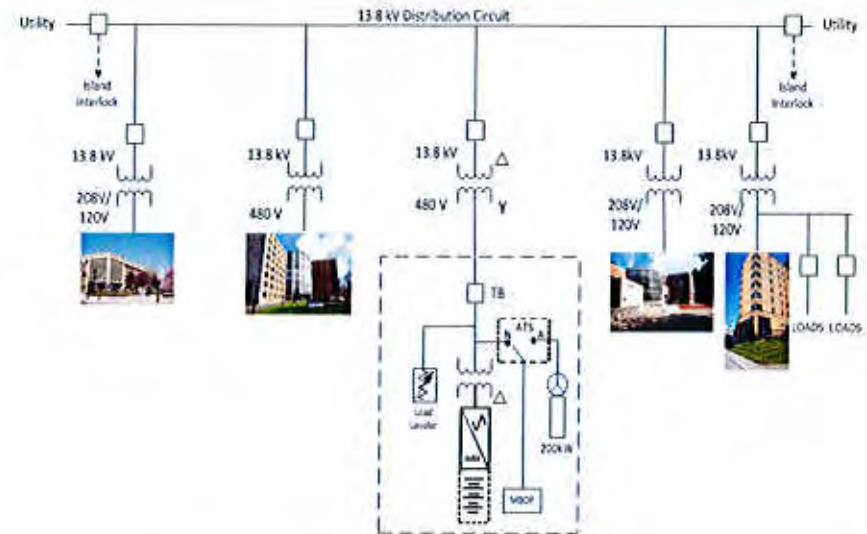


**University of Bridgeport**  
\$2.2M Grant awarded in Round 2 of CT DEEP Microgrid program (2014)

## Project Scope

- If UI grid is unavailable, fuel cell powers UB microgrid, supplying power to six critical facilities (Campus Housing, Dining Facilities, and Campus Security)
- Upgrade of the electrical interconnection to UI grid, including new 15kV switch, metering, breakers, and SCADA cabinet
- “Smart Grid” upgrade of campus 13.8kV loop switches, including motorized load breaks and communications
- Fiber optic communication cables between loop switches and microgrid controller
- Microgrid controller

**\$2.2M Grant Award – with \$7M cost share from Fuel Cell PPA**



University of Bridgeport Microgrid



## FILM STUDIO GROUP—WHO WE ARE, WHAT WE DO



- SHM is a diversified Los Angeles-based commercial and industrial development company founded in 1985
  - Specialties in motion picture/television studios and historic properties.
  - Planned, developed and/or operated over 6 million square feet of office, mixed use, industrial, residential and film production space.
- Film Studio Group (FSG), wholly owned by SHM
  - Development, management and consulting services for its own account as well as outside clients
  - Entry into the business--development of downtown's Los Angeles Center Studios, the first new independent studio in Los Angeles in over 50 years (see next slide).
    - Adaptive re-use of 500,000 SF former Unocal headquarters building on 18.5 acre site
    - Conceived of, programmed, oversaw design and construction of 6 new stages and support facilities, contracted with vendors and suppliers, marketing to productions and management/operations (similar scope to Connecticut Studios)
  - Myriad private and public sector partners and clients
    - Governmental entities, film commissions
    - Developers, land owners, producers, former CEO of one of major media companies
  - Involved in over 50 projects since 1998 in various capacities
    - 5 continents, a dozen countries
    - Numerous states in the U.S. and Puerto Rico, five provinces in Canada, two locations in Mexico
    - List includes U.K., Spain, the Czech Republic, South Africa, Australia, New Zealand, and Thailand
- Consulting, development and management expertise--proposed as well as existing film production facilities
  - Site selection and acquisition,
  - Feasibility, financial modeling and capitalization assistance
  - Programming, design and value engineering through construction
  - Operations, marketing and management
    - Operational procedures, controls, training
    - Accounting system—billing, receivables/payables, internal/external reporting
    - Acquisition/provision of equipment and service—in house or from third parties
    - Pre- and ongoing marketing to decision makers and negotiating packaging deals
    - Securing/maintaining the asset

# Los Angeles Center Studios

**FSG**  
FILM STUDIO GROUP



## LOS ANGELES CENTER STUDIOS



Film Studio Group's parent company, SHM Partners, originally acquired the Los Angeles Center Studios site, formerly known as Unocal's world headquarters, in 1988 in a partnership with Hillman Properties. Over the ensuing five years, SHM assembled and entitled the site, increasing its total buildable square footage from 3.2 to 5.6 million square feet.

When the persistent recession and lack of demand for high-rise office space in downtown Los Angeles frustrated the development of the first tower, SHM formed a new partnership and purchased the property from Hillman in 1998 and proceeded to program the project, hire and direct the architect to design the studio, engage the contractor to build it and oversee all aspects of its development. Simultaneous with the construction, SHM re-purposed the existing buildings into production offices, location filming spaces, screening theaters, a commissary and special event venues.

SHM oversaw pre-opening as well as on-going marketing, established policies and procedures, hired staff, engaged equipment and service providers and managed all aspects of the studio through hundreds of films, television show, commercial, music videos and special events starting with *Mission Impossible 3*.

The studio's attributes include:

- A relatively flat, contiguous 18.5 net (21.8 gross) acre site secured by perimeter walls and fencing;
- Six state-of-the-art stages totaling 108,000;
- Fully supportive grip and lighting department;
- Both subterranean and surface parking for up to 1,400 automobiles and trucks;
- Full commissary and catering capability;
- 420 seat theater located within a separate 26,000 square foot building capable of hosting a variety of events;
- 40 seat screening theater
- 435,000 square feet of office, meeting and conference space;
- 72 dressing rooms complete with private restrooms and showers;
- Established practical filming location & standing sets;
- A fully scalable fiber optic campus network infrastructure;

LOS ANGELES CENTER STUDIOS—BEFORE AND AFTER



## FILM STUDIO GROUP--PROSPECTIVE ROLE IN CONNECTICUT STUDIOS



- Site plan:
  - ingress and egress to/from studio campus for production vehicles, all on-site personnel and visitors
  - circulation of trucks/support vehicles through the campus, access to stages, parking
  - automobile parking—proximity to production offices, stages; weather considerations; audience parking, if applicable
  - structure sizing—combining stages, production offices, mill for maximum efficiency
  - adjacencies and orientation for optimal movement of sets, equipment, people without sacrificing noise isolation
  
- Design:
  - programming, including facility dimensions and capabilities
  - input on interior/exterior design
  
- Construction:
  - value engineering
  - assist with design interpretation/alternatives
  
- Production services:
  - identify potential providers of third-party services, e.g. grip and lighting suppliers, heavy equipment; post production; recommend best candidate
  - negotiate contracts
  
- Pre- and ongoing marketing to:
  - studio physical production executives, e.g. Warner Bros. Paramount decision-makers
  - independent producers of television and film projects (usually with large studio backing)
  - scouts, location managers—those engaged by studios to scout/recommend locations
  
- Studio operations:
  - hire/train staff
  - establish policies and procedures
  - provide accounting system and controls
  - oversee ongoing studio operations

## PHASED DEVELOPMENT/SITE CONSIDERATIONS



### Project Phasing

Phased development is most highly recommended, especially in a new or emerging market:

- Minimize investment risk—four stages maximum, in two structures, plus office and mill support space
  - Eight 20,000 SF stages—too many, too inflexible
  - Leave space for two additional stages, sizes to be determined later; provides temporary backlot for outdoor sets, staging
  - Office space should be scalable—for short term production, as well as longer term, users
    - Combine, design flexibly for efficiency—open space, minimal demising
    - Minimal tenant improvements for production offices; upgrade for long term tenants
  - Mill must be on-site, adjacent to stages (sets are built in mill, moved to stages)
  - Mill can provide “overflow” stage space if necessary
  - Potential to “share” power, HVAC—CapEx and operating efficiencies
- Stages are loss leaders—attract productions and enable revenue streams
  - Productions are drawn by stages, but utilize, and pay handsomely for, office space and equipment, services
  - Important to be a full service facility regardless of number of stages
- Gauge market through experience—number and type of productions
  - Initial phase must appeal to a wide range of users—television, film, commercial
  - Build additional facilities based on observable characteristics of market demand
- Challenge: site layout to minimize impact of future construction on production
  - Noise and vibration
  - Circulation/access to stages

# PHASED DEVELOPMENT/SITE CONSIDERATIONS



## Existing Masterplan (dated 6/14/13)

### Site Plan

- Advantages
  - Development site works well for properly sized studio campus
    - Dimensions
    - Roughly rectangular configuration
  - Source of power (fuel cells) is adjacent and presumed to be more than adequate
  - Two means of ingress and egress to/from the campus is important
  - Adequate parking available
  
- Disadvantages
  - Entrances/exits from opposite ends of site optimal
  - Potential road noise from U.S. Route 5
  - No mill on site
  - Remote parking an issue in inclement weather

### Improvements

- Advantages
  - Combining two stages in single structure is economical, allows sharing of utilities
  - Adjacency of office space to stages
  
- Disadvantages
  - Eight stages too many for market and for site
  - Stages need to be re-oriented to promote greater circulation
  - More parking for trucks adjacent to stages recommended

