



POWER RENEWABLE ENERGY

Diversifying the Power
Generation Fleet

ZACHRY

CURRENT OPPORTUNITIES AND CHALLENGES IN RENEWABLE ENERGY

1

GROWTH

- Potential for reduced greenhouse gas emissions and other environmental benefits have broadened public support and government mandates
- Diversifying energy supply reduces risk of overdependence on individual fuel sources
- Renewable energy relies primarily on indigenous resources, so associated economic benefits tend to remain local

2

EFFICIENCY

- Standard offer contracts and other policies offer economic incentives
- Technical enhancements have made some renewable options more commercially viable

3

COSTS

- Scalability and development cycle time may fall short of addressing current needs
- Location and/or intermittency of energy sources impact supply and demand equation and grid stability

4

UNCERTAINTIES

- Renewable options rely on continued favorable treatment in energy and climate policies
- Health and environmental advantages difficult to quantify
- Increased domestic energy could slow incentive for renewables

“Renewable energy investments are usually spent within the United States, frequently in the same state, and often in the same town. This means your energy dollars stay home to create jobs and fuel local economies, rather than going overseas.”

RenewableEnergyWorld.com

ZACHRY ADDS VALUE ACROSS THE LIFECYCLE OF RENEWABLE POWER FACILITIES



PLAN

We plan with the end in mind – engineering a facility that makes the optimal use of its site, and is designed for maximum efficiency, ease of maintenance and upgradability. We plan this way because we understand the priorities across the full lifecycle of renewable power generation facilities.



BUILD

The construction phase is where the majority of the project risk in power generation resides. That is why Zachry has a self-perform model that allows us to manage project risk more effectively, and to respond to changing customer requirements more swiftly.



RENEW

We work on the assumption that renewable power facilities can operate for multiple decades - that with strategic maintenance and thoughtful capital investments, our customers should be able to extend the productive lives of these facilities for generations.

DISTINGUISHED SERVICE ON NUMEROUS RENEWABLE ENERGY OPPORTUNITIES

THE SCALE

- ✓ Over 30 years of project experience in biomass power projects includes design and construction for more than 640 megawatts of installed biomass power plant capacity.
- ✓ We've completed more than 20 biomass projects in the past 10 years.
- ✓ Our team designed, provided procurement services and built one of the largest solar power installations in the world.
- ✓ With more than 110,000 megawatts of power designed and constructed, Zachry is a leader in the domestic power industry.

THE SKILLS

- ✓ Services provided for Xcel Energy's French Island Generating Station earned Zachry Engineering the *Seven Wonders of Engineering Award* from the Minnesota Society of Professional Engineers.
- ✓ Our biomass projects have included a variety of feedstocks, including wood, agricultural waste, biofuels and municipal solid waste.

THE SAFETY

- ✓ Despite challenges of an extremely large scope and adverse (triple-digit) weather conditions, Zachry's EPC team on the Mesquite Solar 1 project achieved safety statistics far better than industry averages – while delivering the project ahead of schedule.

CREATING AND SUSTAINING AMERICA'S RENEWABLE ENERGY CAPACITY



OUR ADDED VALUE DURING THE PLAN PHASE OF RENEWABLE ENERGY FACILITIES

Our capabilities in the '**PLAN**' phase of renewable energy power project execution include:

- ✓ Fuel studies
- ✓ Front-end design
- ✓ Estimates
- ✓ Detailed design
- ✓ Front-end development
- ✓ Project Design Manual (proprietary)



BIOMASS UNIT TURNS WOOD WASTE INTO SUSTAINABLE ENERGY



THE CUSTOMER'S CHALLENGE

Southern Power Company is a subsidiary of Southern Company that acquires, builds, manages and owns wholesale generation assets. Southern Company focuses on helping its customers meet their energy needs in a cost-effective, reliable and environmentally responsible manner. This includes continuing to develop a diverse portfolio of nuclear power, clean coal and renewables. In 2009, Southern acquired a late stage biomass development project near Nacogdoches, Texas. The greenfield facility was to be fueled by wood waste sourced from the surrounding region. Power from the facility would be marketed to Austin Energy to help meet the state's Renewable Portfolio Standard, as well as the City of Austin's goal to obtain 35 percent of its electricity from renewable sources by 2020.



BIOMASS UNIT TURNS WOOD WASTE INTO SUSTAINABLE ENERGY



THE ZACHRY APPROACH

Zachry's engineering and design services for the 100 megawatt Nacogdoches Generating Facility included plant layout; detailed balance of plant engineering, procurement specifications, technical bid evaluation, field engineering, checkout startup and training and as-built documentation. The greenfield biomass facility utilizes just one boiler, making it the largest biomass bubbling fluidized bed boiler unit in North America at the time it was completed. It also features selective non-catalytic reduction and an axial flow steam turbine and condenser.

THE BUSINESS OUTCOMES

The unit was turned over for commercial operation on time and on budget in 2012. Later that year, it was named The Best Bioenergy Project of the Year by *Power Engineering* magazine. It uses 1 million tons per year of 100 percent non-merchantable wood fuel, which consists of forest residue from the surrounding areas, wood processing residues and clean municipal wood waste. The facility generates enough power for approximately 60,000 homes. The electricity is supplied to Austin Energy in a 20-year power purchase agreement

“This is an important milestone for the community, the city of Austin and Southern Company, as the plant provides jobs and economic impact for Nacogdoches County and further diversifies the fuel portfolios of Austin Energy and Southern Company to strengthen our nation's energy independence.”

Thomas A. Fanning
CEO, Southern Company

OUR VALUE ADDED DURING THE BUILD PHASE OF RENEWABLE ENERGY FACILITIES

Our capabilities in the '**BUILD**' phase of renewable energy power project execution include:

- ✓ Direct hire construction
- ✓ Project management
- ✓ Field engineering
- ✓ Startup and commissioning
- ✓ Staffing



MESQUITE SOLAR 1 HARNESSSES SUN'S ENERGY ON GRAND SCALE



THE CUSTOMER'S CHALLENGE

Sempra U.S. Gas & Power, the project development division of Sempra Energy, set a goal of owning and operating 1,000 megawatts of renewable energy capacity by the end of 2013. As a major power provider to the California market, Sempra's strategy is consistent with the state's Renewable Portfolio Standard goal of having 20 percent of its electricity provided by renewable sources by 2017. By positioning a solar energy complex in the Arizona desert about 40 miles west of Phoenix, Sempra could access 300 days of sunshine each year and take advantage of existing transmission infrastructure to supply renewable power to California's Pacific Gas & Electric under a 20-year contract.



MESQUITE SOLAR 1 HARNESSSES SUN'S ENERGY ON GRAND SCALE



THE ZACHRY APPROACH

Zachry's EPC services for the Mesquite 1 Solar Project included design and installation of a massive field of 830,000 photovoltaic panels covering about 920 acres or 1.4 square miles. Approximately 85,000 steel piers support the ground-mounted system, each embedded four feet in the ground. At the peak of installation, approximately 500 Zachry personnel were involved in mounting the Suntech America panels at the site, often enduring triple-digit temperatures in the process. Efficient logistics were crucial to the challenge of installing thousands of the panels per day, as well as more than 1,000 miles of cabling over the course of the project.

THE BUSINESS OUTCOMES

The Mesquite 1 Solar Power project was completed ahead of schedule, with an outstanding safety record. It was recognized by Power magazine as a top plant in 2013. At the time of its completion, it was the largest solar power project in North America. It reduces greenhouse gases by about 190,000 tons annually, which Sempra estimates to be the equivalent of the environmental impact of taking 33,000 cars off the road. The facility also requires no water to generate electricity, a key resource conservation measure in the arid region where the facility is located.

“Large, multi-phase solar projects like the 700-MW Mesquite Solar energy complex are at the heart of our renewable strategy. That’s why this first 150-MW phase is so important, and why we are pleased to partner with Suntech and Zachry.”

Jeffrey W. Martin
*President and CEO,
Sempra Generation*

OUR VALUE ADDED DURING THE RENEW PHASE OF RENEWABLE ENERGY FACILITIES

Our capabilities in the '**RENEW**' phase of renewable energy power project execution include:

- ✓ Continuous presence maintenance
- ✓ Reliability analysis
- ✓ Plant optimization
- ✓ Fuel conversions
- ✓ Co-firing
- ✓ Quality assurance and training
- ✓ Small capital projects



OUR ABILITY TO ADD VALUE TO YOUR PROJECT IS THE PRODUCT OF OUR DISTINCTIVE APPROACH

Zachry's approach to business is based on four key principles

Focus on Distinctive Value

We're always looking for ways to deliver distinctive value to our customers – through performance on immediate work and through using the freedom that our structure allows to focus on value beyond today's bottom line.

Priority on Customer Success

We recognize customer success is the basis for our success. We work to understand your goals so we can collaborate effectively and identify opportunities to enhance your business outcomes.

Right Team in the Right Place

We've assembled an extraordinary professional workforce. We continue to invest in training and development to keep their skills on the leading edge.

Adaptive Excellence in Execution

We believe every project is unique. Our self-perform model, integrated capabilities, loyal workforce and stable project teams allow us to deliver outstanding execution safely under any conditions.

WHAT WE WANT YOU TO KNOW

The Zachry Group's approach to doing business is purpose-built to help you take advantage of your biggest opportunities and tackle the challenges that you will face along the way.

Like you, we are completely focused on accountability for results. Our entire operating model is designed to deliver that accountability – from our lifecycle mindset to our self-perform execution capabilities.

We recognize that the projects we do represents some of the biggest commitments that our customers make – not just for them, but for the customers, communities and employees that depend on them.

LET'S CONTINUE THE CONVERSATION IN PERSON

We would welcome the chance to learn more about your needs.



SCOTT DUFFY

Senior Vice President
Business Development
Zachry Group
527 Logwood
San Antonio, TX 78221-1738
210.588.5149
duffys@zachrygroup.com