Building a Brighter, Resilient Louisiana – Potential for Solar

Utilizing the Sun for a Sustainable Future in Louisiana – a Pilot Solar Deployment Project at LSU

(LSU-2023-IEI-P1-Synthesis-03)

LSU INSTITUTE FOR ENERGY INNOVATION

BASF
We create chemistry

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Corporate Partner

Presentation Overview

1. Introduction & Background
2. Strategic Outlook
3. Development & Impact
4. Progress & Future
5. Q&A Session

Current Energy Landscape

3rd

Energy Consumption Rank

Louisiana ranks third in total U.S. energy consumption

2nd

Per Capita Consumption

Second highest per capita energy use nationally

70%

Industrial Usage

Industrial sector consumes majority of state's energy

188.6M

CO2 Emissions

Million metric tons, ranking sixth nationwide

Transforming Climate

Rising Temperatures

5.85-degree increase in summer temps by 2100

Severe Storms

More frequent superstorms due to warming oceans

Wetland Loss

24 square miles lost annually

Health Concerns

Over 100 heat-related ER visits yearly

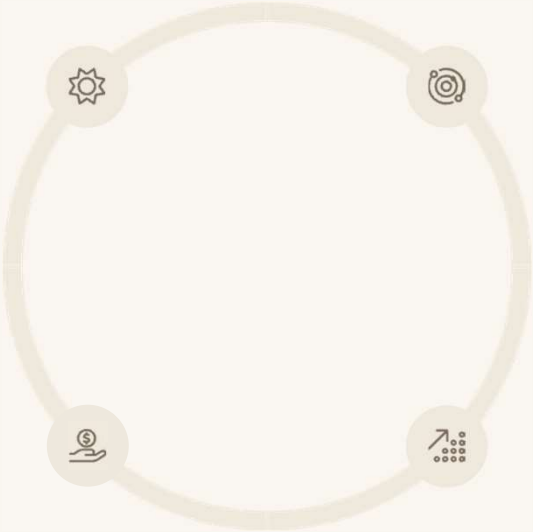
Solar Potential in Louisiana

Abundant Sunshine

216 sunny days per year, above U.S. average

Decreasing Costs

Solar prices fallen 54% in five years



Current Capacity

306 MW installed, only 0.48% of electricity production

Growth Potential

Projected to reach 3482 MW, rising to 14th nationally

Current Solar Developments

Entergy

100 MW station near Ruleville; seeking 224 MW more in Louisiana

Lightsource BP

345 MW Oxbow solar farm on 1,800 acres in Pointe Coupee Parish

BASF

250 MW agreements; innovative floating solar system in Alabama

Future Growth

Expanding from inland to nearshore and offshore facilities

Implementation Challenges - Resilience

1

Land Impact

Soil disturbance, drainage modification

2

Structural Concerns

Wind loads create lift force on panels

3

Weather Vulnerability

Extreme conditions require specialized design

4

Code Limitations

Building codes not designed for solar modules

Implementation Challenges - Community Reception

1

Financial Implications

Cumbersome costs and incentives for investments

2

Participation in Development

Participatory design to enhance perception

3

Socio-cultural Aspects

Community locations and existing infrastructure

4

Policy Incentives

Adaptation framework through guidelines

Implementation Challenges - Workforce Transition

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Land Impact

Soil disturbance, drainage modification

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Rapid Deploymen

Extreme conditions require specialized design

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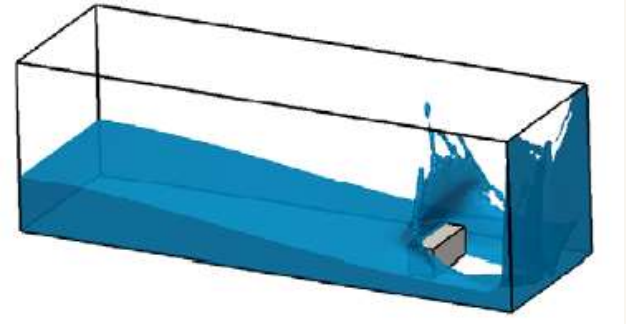
Resiliency in Design

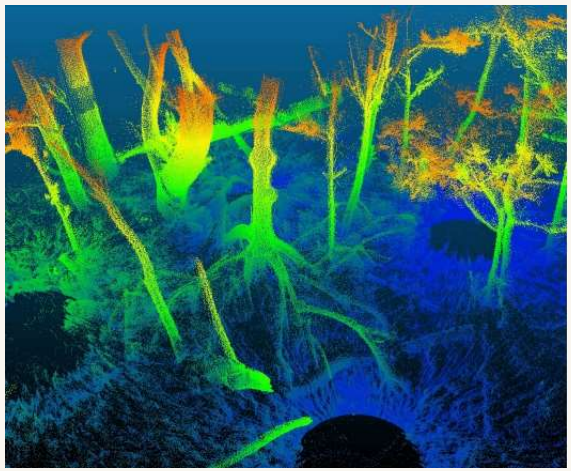


Computational Analysis

Combines CFD and finite element analysis to evaluate structural response under typhoon-strength winds

Wind Load Simulation

Identifies critical wind angles and pressure points that cause maximum stress on panels



Design Optimization

Informs material selection and mounting configurations for hurricane resilience

Resilience Testing

Validates performance under Louisiana's extreme weather conditions

Community Engagement: Socio-Cultural Barriers

- Ethnic and Cultural Factors
- Housing Disparities
- Homeownership Barriers

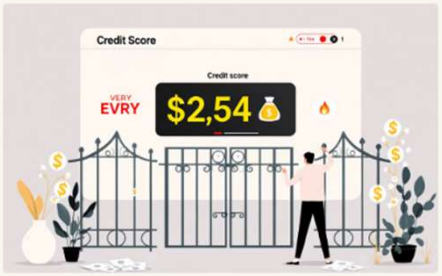
Community Engagement: Financial Barriers

High Upfront Costs

Initial investment remains prohibitive for many households.

Complex Financial Structures

Many find solar financing difficult to navigate.



Limited Access to Credit

Low credit scores exclude many from financing options.

Tax Credit Limitations

Many lack enough tax liability to benefit from credits.

Stakeholder Engagement – How to Succeed?

Social Acceptance

Essential for project success and community support.

Participatory Design

Involving communities actively in planning processes.

Knowledge Sharing

Education reduces resistance and fosters understanding.

Lessons Learnt

China's Subsidy System

- Consistent and Well-targeted Subsidy
- Policy Reforms adaptable to local conditions

Mexico's Adoption Factors

- Socioeconomic status is a major influencer
- Rising electricity costs serve as a significant motivator.

Issues hindering growth at the US

Housing Quality

Older homes often require costly upgrades before solar installation

Financial Access

Limited financing options for low-income households

Community Engagement

Participatory planning increases adoption success

Policy Fragmentation

Inconsistent rules across jurisdictions create barriers

Disaster Recovery

1

Grid Independence

Disconnected from the affected grids

2

Community Resilience

Common space for relief distribution and temporary power

3

Rapid Deployment

Quick turnaround for long-term application

4

Cost Effective

Minimal maintenance cost for long-term deployment

Disaster Recovery Framework for Solar

Resilient Distributed Generation

Strategic placement of solar systems at hospitals, emergency shelters, and community centers to serve as independent backup power sources during outages

Energy Storage Integration

Battery systems store excess energy during peak production and release it dur emergencies, reducing the duration and impact of power failures.

Adaptive Control Systems

Real-time grid management enables automatic switching to isolated microgrids, ensuring critical loads remain powered during disasters.

Policy and Funding Support

Federal allocations and revised net metering policies incentivize distributed solar installations and enhance community resilience.

Community Economic Impact of Solar

32,430

Job Years

Potential full-time job years supported by community solar programs

$4.37B

Economic Contribution

Potential contribution to Gross State Product

1.5

Job Multiplier

Additional jobs created for every megawatt of installed solar capacity

Based on a community Solar Project in Ohio (Pham et. al, 2024)

Workforce Development for Energy Transition

Educational Partnerships

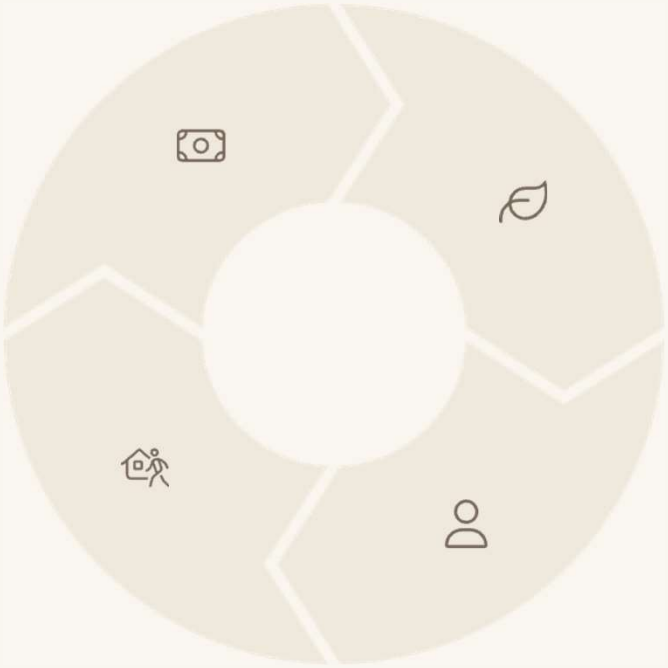
Re-skilling Programs

Job Creation

Socio-Economic and Environmental Benefits

Cost Savings

Reduced energy expenses for households and businesses



Environmental Co-Benefits

Enhanced biodiversity and improved water quality

Property Value

0.5-2.0% increase in property values near smaller solar projects

Community Engagement

Increased public participation in energy decisions

Development Framework Recommendations

Advanced Infrastructure Design

Implement FSI-informed designs and storm-adaptive mounting systems to enhance solar resilience in extreme weather conditions.

Distributed Energy Systems

Develop community-level solar storage and microgrids to maintain power during grid disruptions and support faster recovery.

Workforce Investment

Expand training programs and apprenticeships to build a skilled workforce capable of supporting Louisiana's renewable energy future.

Policy Reform

Update net metering rules and increase funding support to accelerate solar adoption and strengthen community resilience.

Roadmap Framework for Louisiana

Data-Driven Policy Development

Establish mechanisms to collect and analyze data on solar adoption across different socio-economic and cultural groups within Louisiana to tailor incentives and identify areas where policy adjustments are most needed.

Targeted Incentives

Develop financial incentives specifically for low-income and historically marginalized communities, ensuring that the unique challenges of different ethnic and socio-cultural groups are directly addressed.

Inclusive Participation

Design community solar projects that allow non-homeowners and renters to participate, including communities with lower credit scores or limited access to traditional financing.

Disaster-Resilient Systems

Encourage the development of solar installations that are resilient to extreme weather events, including modular or easily recoverable systems that minimize downtime after storms.

Our Research and Engagement

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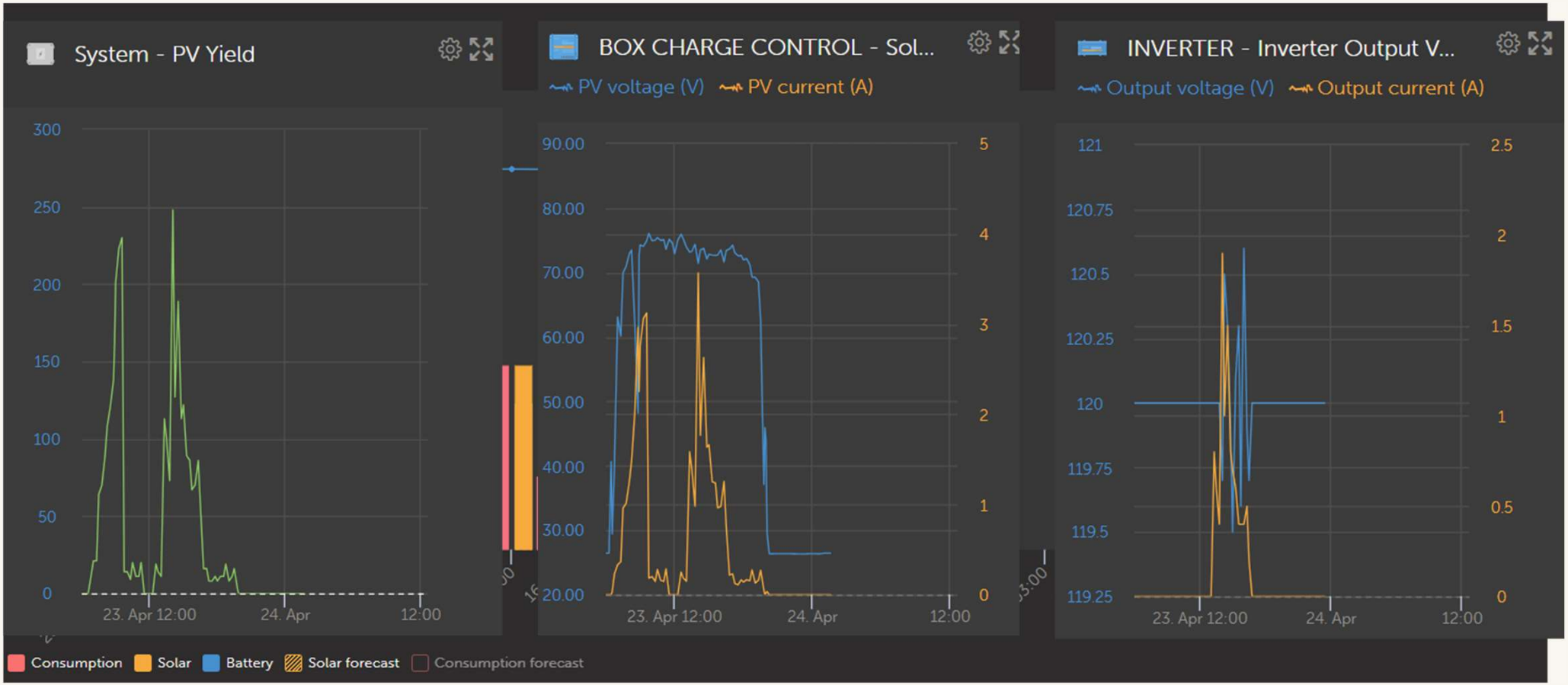

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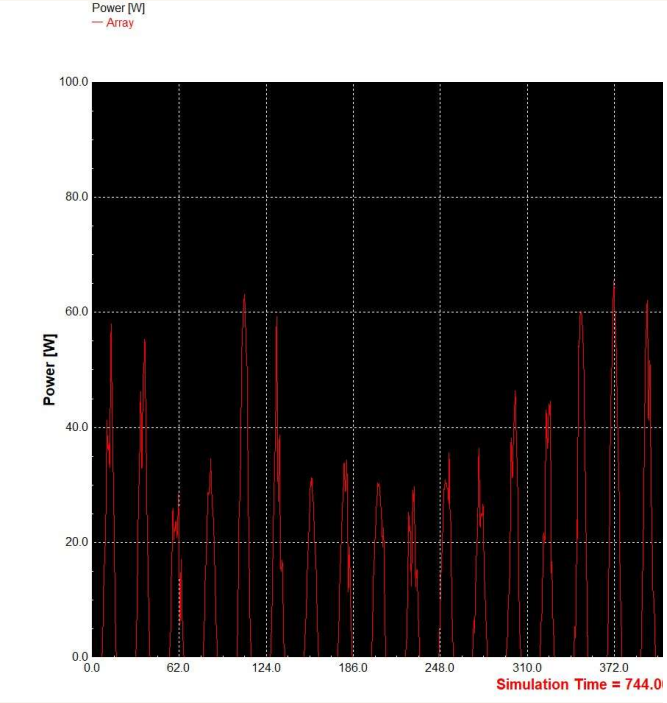
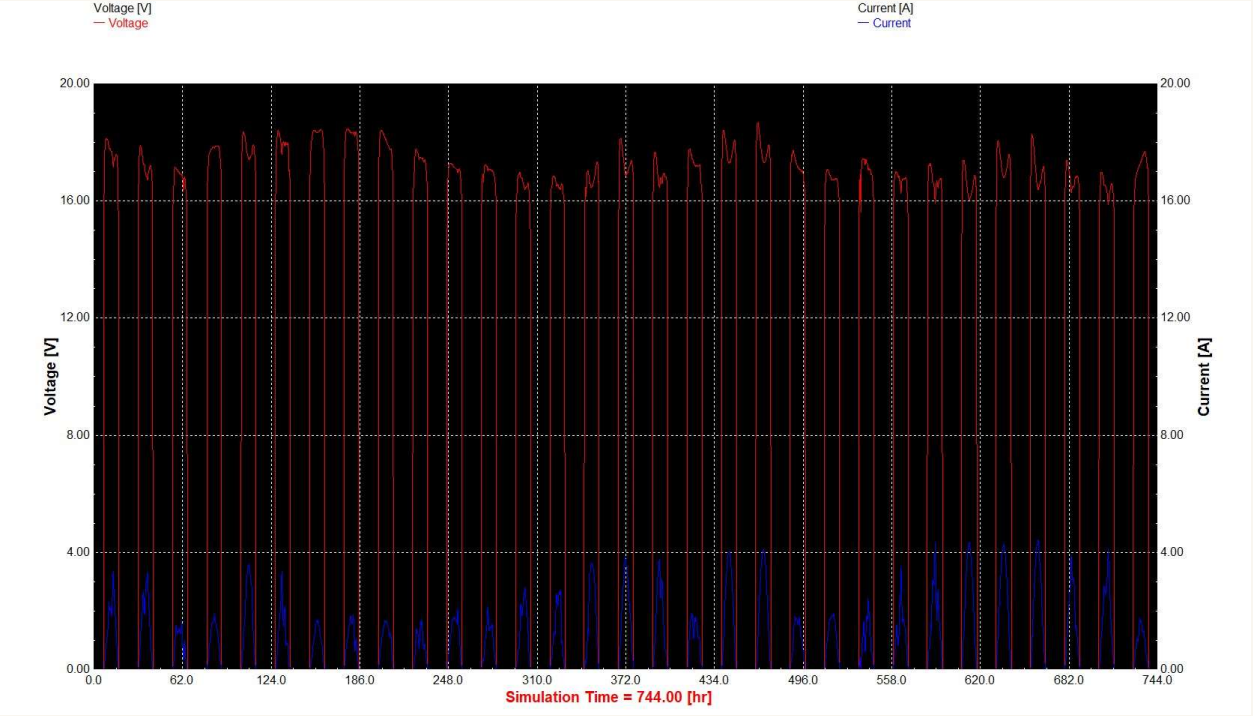
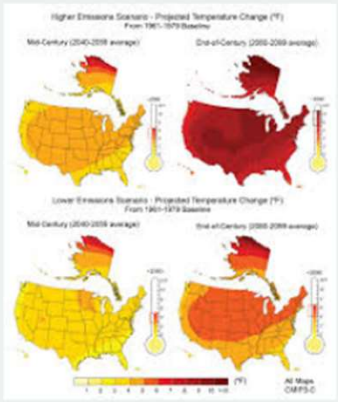




Future Direction of Research



Future Solar Potential

Community Environmental Quality

Digital Twin and Modeling

Rural Deployment and Land Use

Building-integrated PV

Thank you so much!

Questions?