Southern Company

Southern Company's Approach for Electrification

By

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Southern Company - America's Premier Energy Company

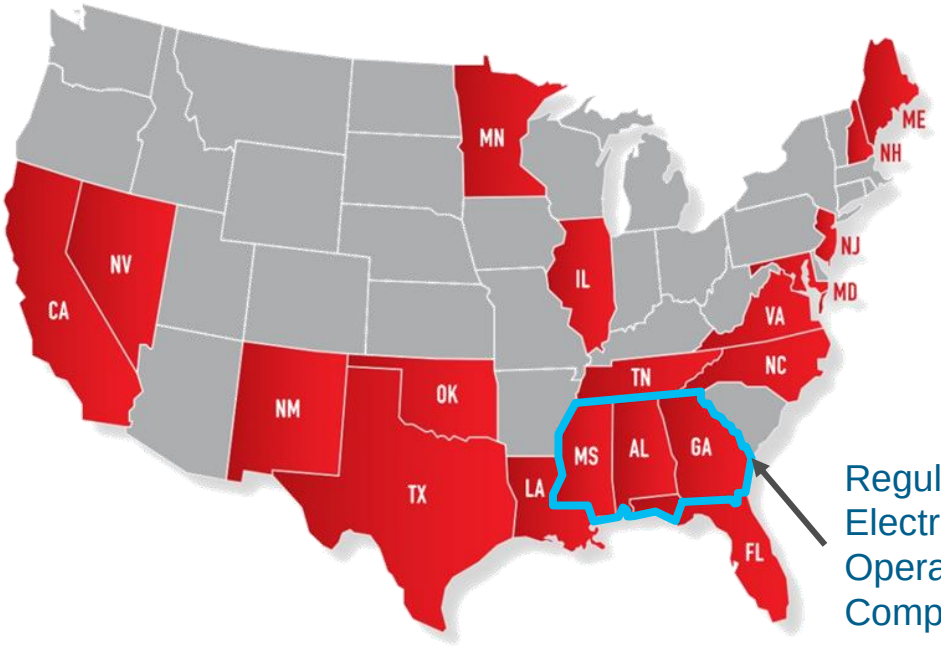
Service Territory

Approximately
44,000 mw
of Generating Capacity

Nearly
200,000
Miles of Power lines

More than
80,000
Miles of Natural Gas Pipelines

190 Bcf
of Natural Gas
Storage Capacity



Operations in
19 States

11
Electric & Natural Gas Utilities

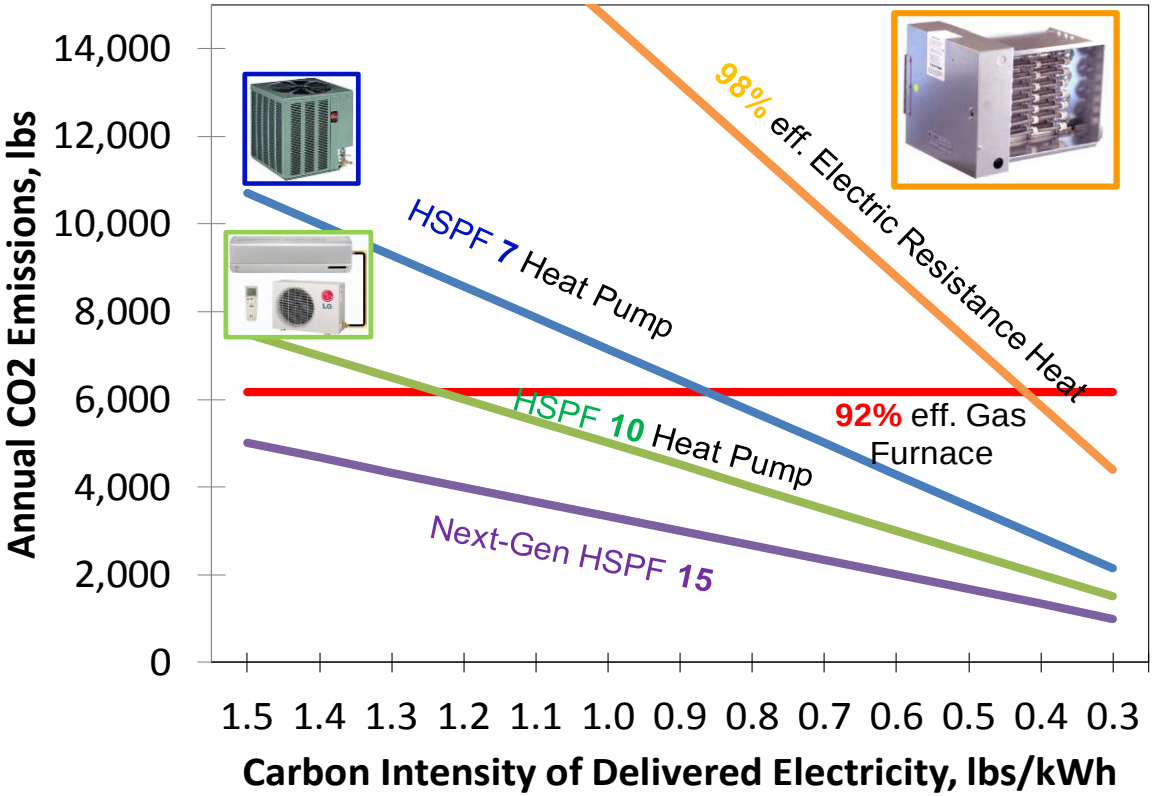
32,500
Total Employees

9 Million
Utility Customers

More than
1 Million
Retail Customers

- ✓ **Carbon Reduction Goal: Low to no carbon by 2050; 50% by 2030**
- ✓ **Achieved 36% reduction compared to 2007**

Carbon Intensity of Residential Heating Sources



Electricity is an Important Strategy to Reduce Carbon Emissions

Fact

Electricity is getting cleaner

Fact

Electric End-Uses are becoming more efficient

Question

Does electrification have a place in the industry's carbon emissions reduction strategy?

Answer: Yes!!

Fact

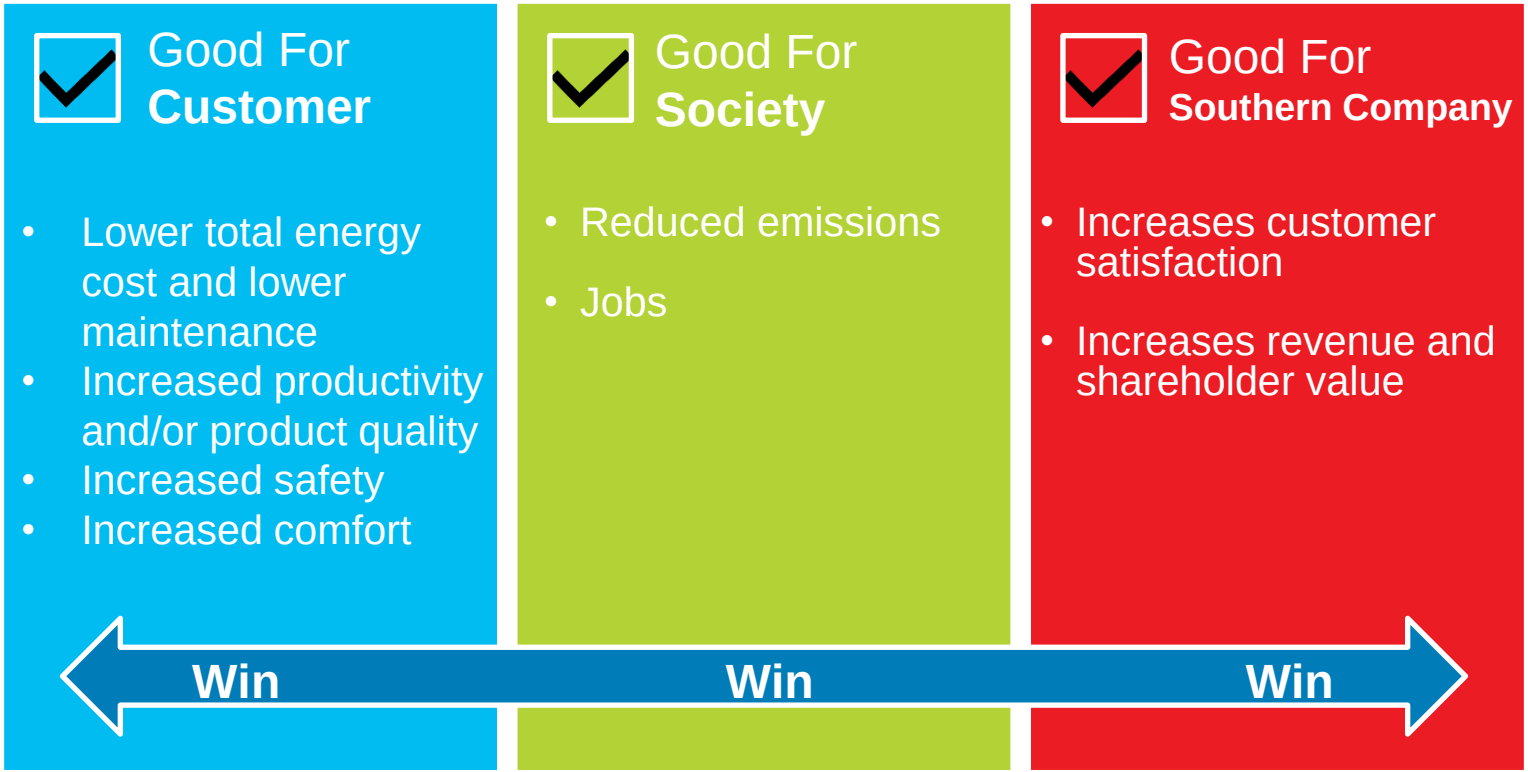
2/3 of man-made GHG come from sources other than electricity

Fact

Decreasing non-electric combustion processes reduces GHG

Electrification – A Pathway for Decarbonization

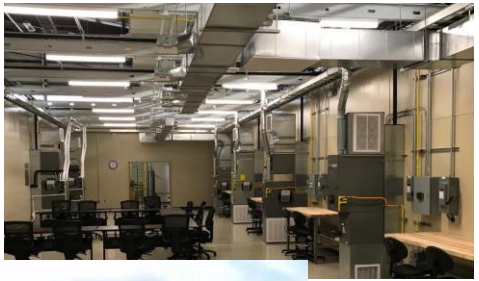
Electrification – A Win/Win/Win



Electrification – Southern Company's Approach

Technology Development and Demonstration

- ✓Robust internal R&D
- ✓Industry collaboration (EPRI, DOE, Universities, and Others)



Readiness and Education

- ✓Technology Application and Resource Centers
- ✓Training to Marketing Reps and Customers
- ✓Promotional Materials

Sales and Marketing

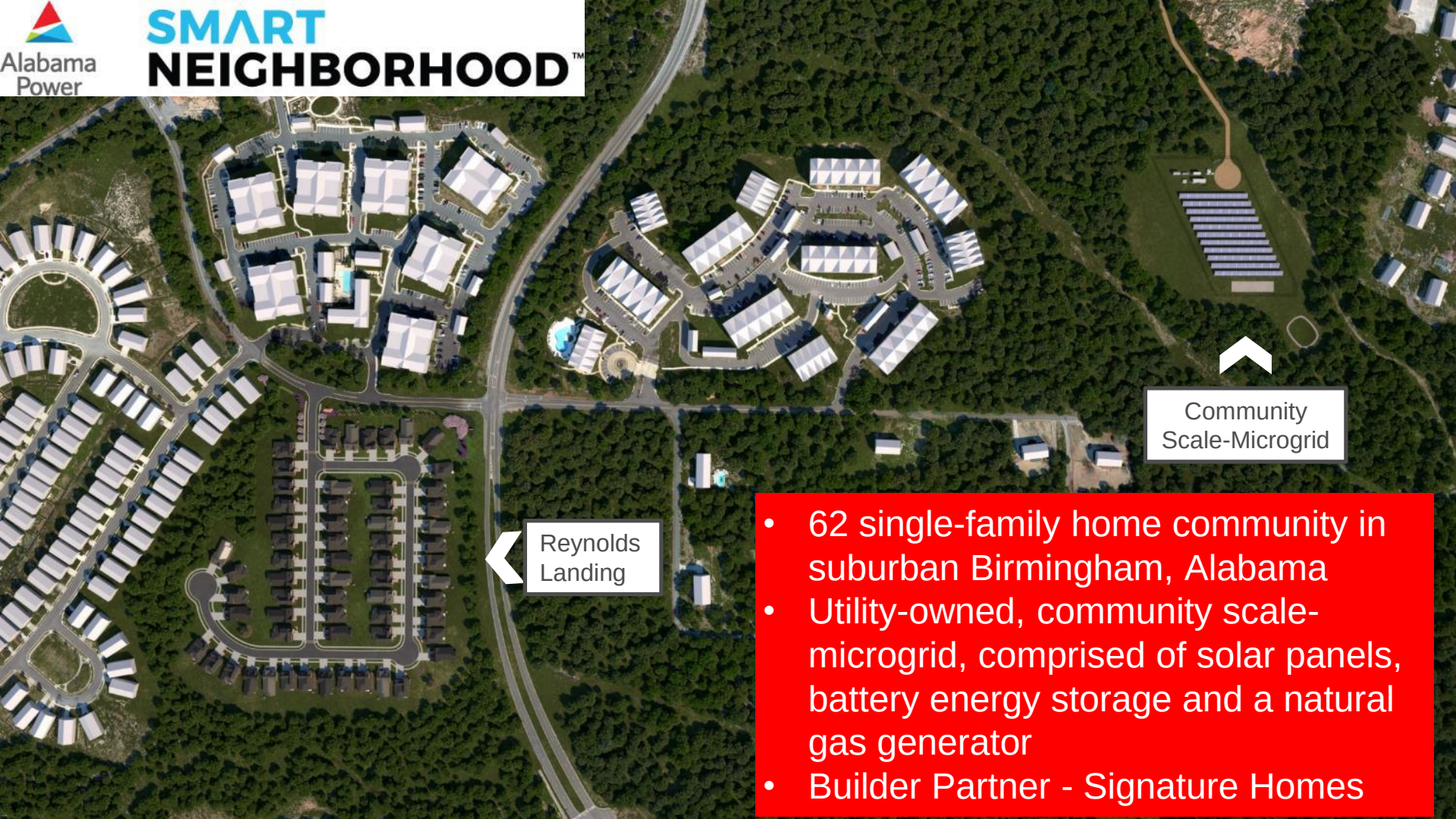
- ✓Marketing programs and staff to promote electric end-uses
- ✓Electric end-use sales goals
- ✓Rebates

Policy Influence

- ✓Regulatory Affairs – Education and involvement in shaping the regulations

Alabama Power

SMART NEIGHBORHOOD™

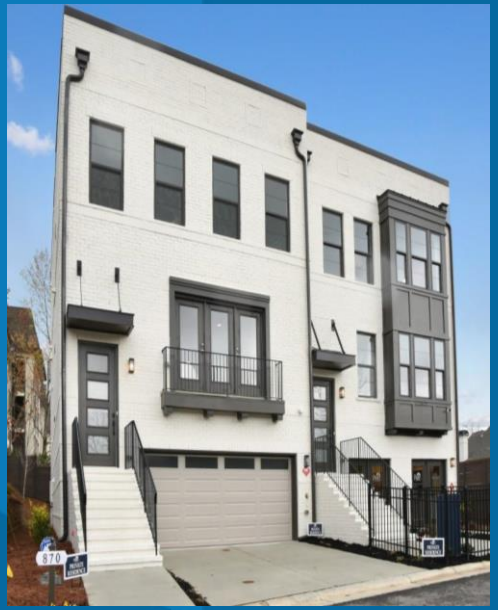


- 62 single-family home community in suburban Birmingham, Alabama
- Utility-owned, community scale-microgrid, comprised of solar panels, battery energy storage and a natural gas generator
- Builder Partner - Signature Homes

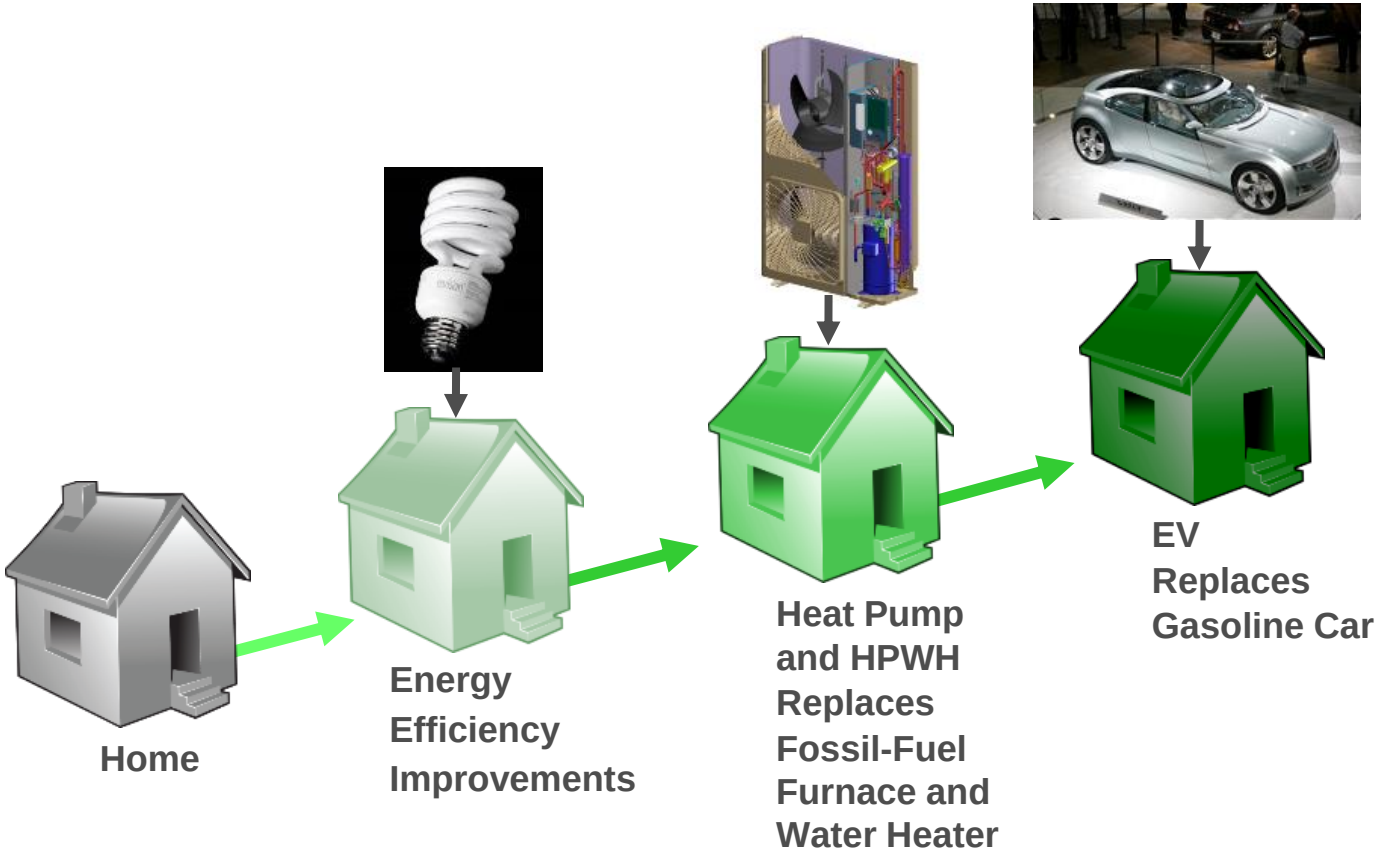
Georgia Power

SMART NEIGHBORHOOD™

- 46-townhome community in Atlanta
- Customer-owned rooftop solar and in-home battery energy storage
- Builder partner - PulteGroup



Efficient Electric End-Use – Pathway to Reduce Carbon Reduction



Heat Recovery Heat Pump (HRHP):

Technology

- Captures chiller waste heat and uses HRHP to produce 150 °F water
- Coefficient of Performance: >5.0

Applications

- Simultaneous cooling and low temperature hot water requirements

Case Study (GKN Industries)

- 560-ton HRHP
- Significantly reduced boiler operation
- Net CO2 reduction: ***1.35 million lbs annually***
- Energy cost savings: $348,000
- Customer payback: 1.5 years

Heat Recovery Heat Pump

Electric Transportation Strategy

Demonstration

Charging Infrastructure
- DC fast charging
- Smart Charging
- Standards
- Wireless Charging

EV Demonstrations
- Forklift; eTRU; Airport & Seaport
- Medium & Heavy-Duty Vehicles

Other
- Industry Collaboration

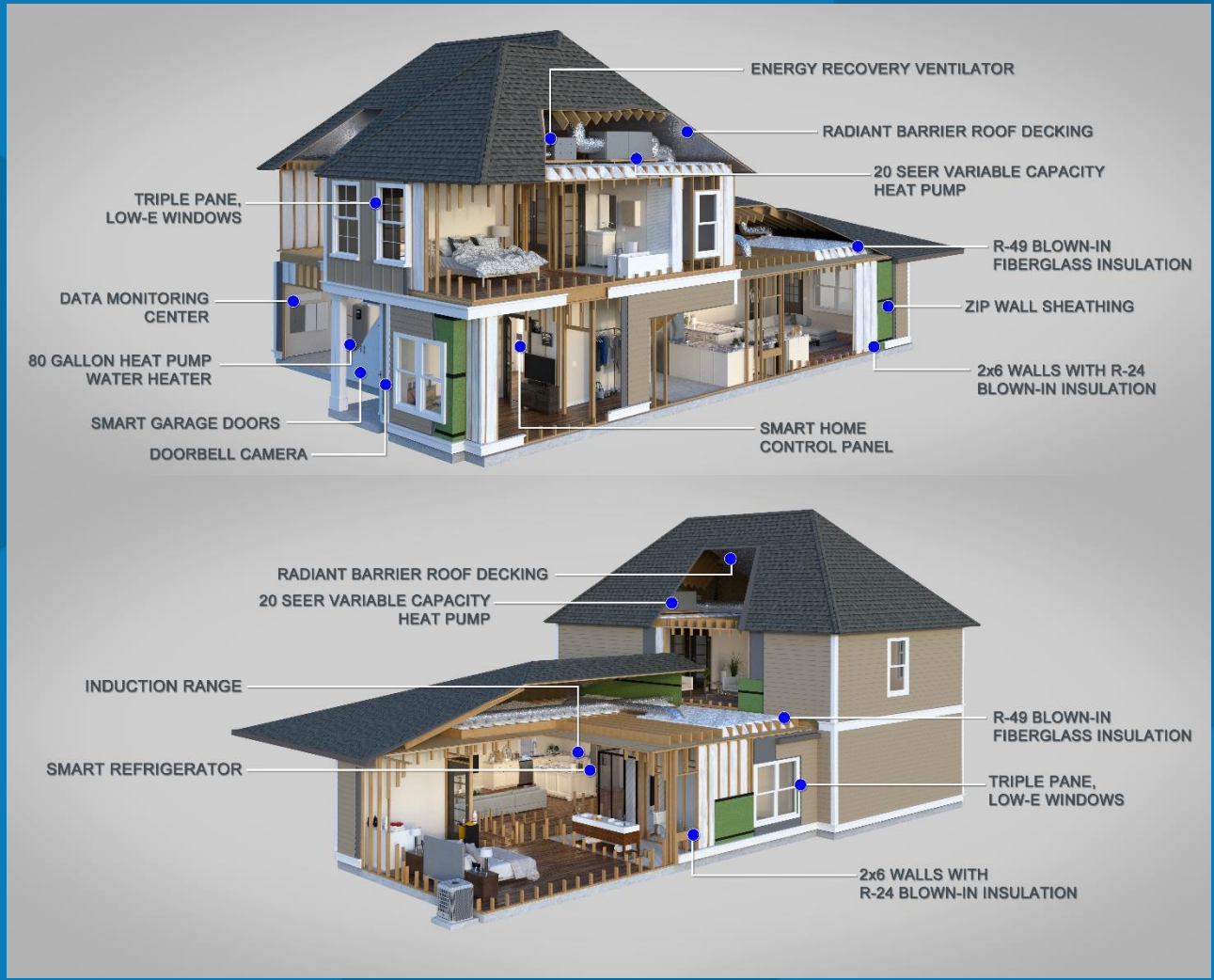
Readiness & Education

- Deployment of workplace charging
- Deployment of 37 public DC fast chargers in Georgia
- Customer demonstration sites
  - TAC, SN, CRC, EIC
- Social Media Engagement
- Widespread ET education through ride and drive events

Sales & Marketing

- Rebates for customers, dealers, homebuilders, workplace
- Special Rates for EV Charging
- Promotional Materials
- Sales goals

Questions?


ENERGY RECOVERY VENTILATOR
RADIANT BARRIER ROOF DECKING
20 SEER VARIABLE CAPACITY HEAT PUMP
TRIPLE PANE, LOW-E WINDOWS
R-49 BLOWN-IN FIBERGLASS INSULATION
DATA MONITORING CENTER
ZIP WALL SHEATHING
80 GALLON HEAT PUMP WATER HEATER
2x6 WALLS WITH R-24 BLOWN-IN INSULATION
SMART GARAGE DOORS
SMART HOME CONTROL PANEL
DOORBELL CAMERA
RADIANT BARRIER ROOF DECKING
20 SEER VARIABLE CAPACITY HEAT PUMP
INDUCTION RANGE
R-49 BLOWN-IN FIBERGLASS INSULATION
SMART REFRIGERATOR
TRIPLE PANE, LOW-E WINDOWS
2x6 WALLS WITH R-24 BLOWN-IN INSULATION

HVAC and Water Heating Training Center

PURPOSE

Workforce Development

FOCUS AREAS

Residential and Small Commercial HVAC and Water Heating Technologies

HAVC and Water Heating Fundamentals
Refrigeration, Plumbing, Controls, Ductwork, Brazing, Welding

GOALS

- Technician Training and Certification
- Student Education

Technology Application and Training Centers

PURPOSE

Demonstrate and Validate End-Use Technology Applications
Workforce Development - Education and Training

TECHNOLOGIES

Industrial Process, Residential and Commercial End-Uses
Electric Transportation

GOALS

- Demonstrate Increase productivity
- Improve product quality
- Technician Training
- Reduce production costs

Indoor Agriculture

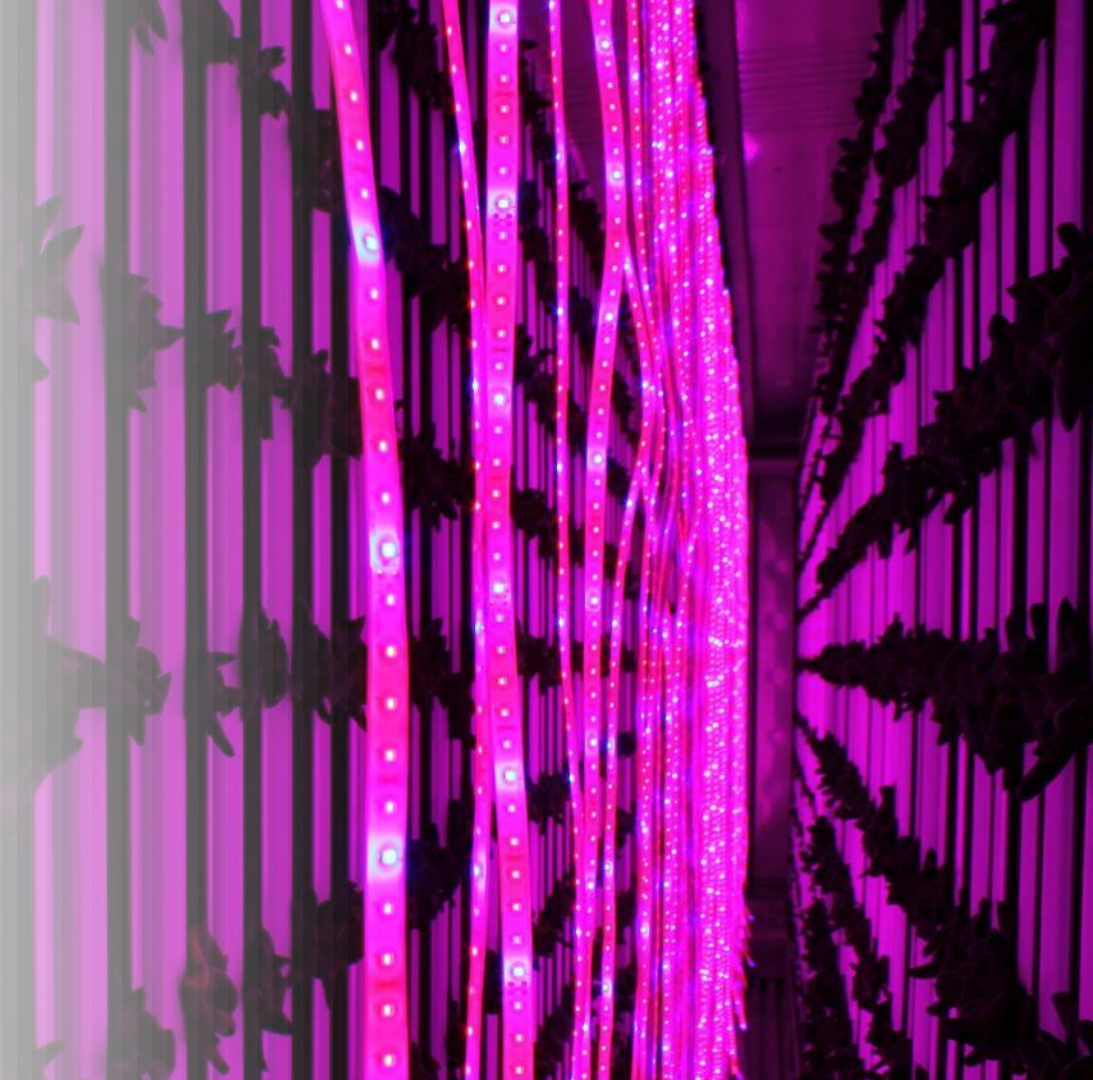
Shortens
growing cycle

Conserves
water

Promotes local jobs and access to fresh foods

Virtually
Eliminates
pesticide use

Reduces
emissions from transportation



Electric Ladle Preheating

Current Method

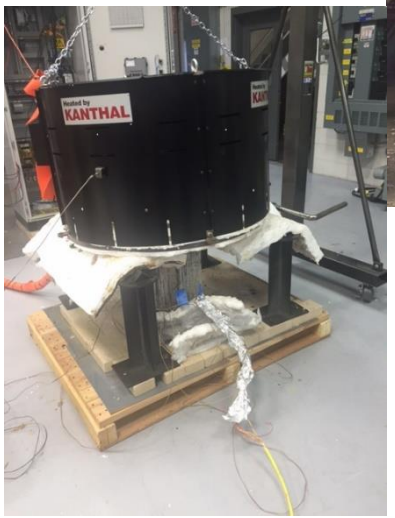
- ✓Ladles carry molten metal from melt-to-cast operation
- ✓NG open flame – Safety and worker comfort issues; Very inefficient

Khanthal Electric Heaters

- ✓Tested at the lab and customer site
- ✓Very efficient and minimal heat spillage to surroundings

Major industrial customer placed an order for two units

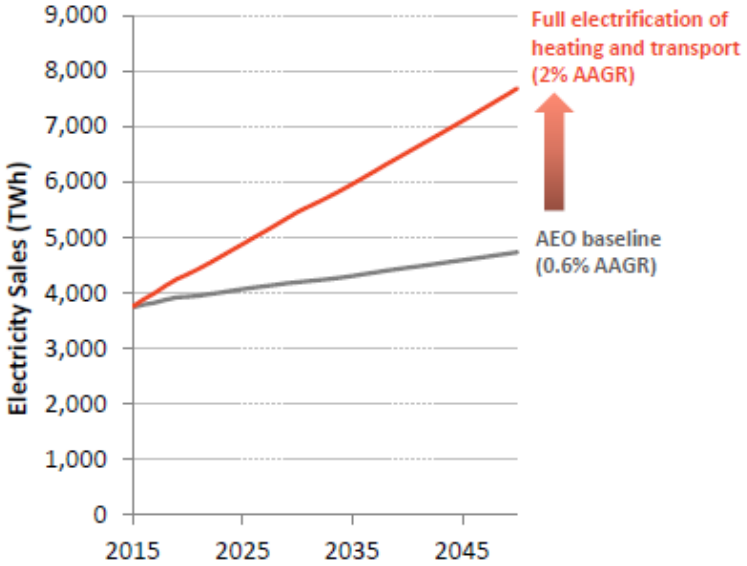
- ✓First ladle preheaters sold in USA
- ✓Kanthal Award - Finalist



Drivers

FIGURE 1 Impact of Electrification Combined with Deep Decarbonization of Power Sector

Impact on Electricity Sales



Impact on GHG Emissions