Fleet Electrification

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Walmart’s Network

**Stores**
- 5,362 Retail Units
- 5 Formats
- 38,000 – 185,000 ft²
- 1.5 Million Associates
- Walmart.com

**Distribution Centers**
- > 175 Facilities
- 18 Formats
- 75-100 Stores / DC
- 250 Mile Radius

**Transportation**
- 8,200 Drivers
- 6,500 Tractors
- 60,000 Trailers
- 750 Million Miles / Year
Walmart’s Network

- Grocery DC network
- High Velocity DC network
- Regional DC network
Walmart’s 2025 Energy Commitments

• In 2005 we set an aspirational goal to be powered 100% by renewable energy

• On November 4, 2016 we announced new sustainability goals for 2025 that build on our existing energy goals
  • Be supplied by 50% renewable energy
  • Use a combination of energy efficiency and renewable energy to reduce emissions in our operations by 18 percent
  • Target is science-based, which is the level of decarbonization needed to keep global temperature increase below 2°C compared to pre-industrial temperatures
Walmart’s Fleet is Integral to Walmart’s Sustainability Efforts

• Fleet Efficiency = Cases Shipped / Gallons of Fuel Burned

• Historical Fleet Efficiency Goals vs. 2005 Baseline:
  – 25 Percent Increase by 2008 – Reached 38%
  – Double U.S. Fleet Efficiency by 2015 – Reached 102.2%

• 2015 Compared to 2005 Baseline:
  – Delivered 1 Billion More Cases
  – Drove 465 Million Less Miles
  – Equates to a One Year Savings of $1 Billion
Walmart’s Fleet is Integral to Walmart’s Sustainability Efforts

- Alternative Fuels, Including Electricity, are the Next Step in Our Fleet Sustainability Journey
Fleet Electrification: Two Paths Forward

Yard Trucks

- Best option near-term
- Currently available in the market
- Don’t require national infrastructure
- Captured asset
- Short term demos in California and ongoing long term test in Kansas

Over the Road Trucks

- Longer-term focus
- Current availability is very limited
- Initial hypothesized usage is for distribution centers in densely-populated areas with shorter trips (e.g., Houston, Southern California, Northeastern U.S.)
Fleet Electrification: Managing Adoption

**Internal Factors**
- Our logistics operation is demanding and dynamic
  - Real time route optimization and trucks can be out for up to 5 days
  - Can’t sub-optimize routing and efficiency for charging
- **Significant incremental capital cost**
  - Electric yard trucks are 3X the cost of diesel yard trucks and OTR cost is TBD
- **Range anxiety for OTR trucks**
  - Battery range of 300 to 500 miles vs. diesel range of > 1,000 miles
- **Charge times**
  - Estimated fast-charge time of 1-1.5 hours vs. diesel fueling in 10 minutes

**External Factors**

**Standards**
- Multiple options for chargers and power requirements are not sustainable
- Finite space at distribution centers

**Reliability and resiliency of the grid**
- Electrical system uptime becomes extraordinarily critical, as an extended outage would shut down both distribution center and fleet

**National charging network**
- OTR requires off-site charging and must be fast and reliable

**Utility factors**
- Incentives for equipment and infrastructure costs
- Rates
Demand Charges Vs. Utilization – 500 kW Charger

Hours of Use Per Month

Monthly Bill

Westar MGS - Current
Demand Charges Vs. Utilization – 500 kW Charger

- Monthly Bill
- Hours of Use Per Month

- Westar MGS – Energy Instead of Demand
- Westar MGS - Current

357 Hours/Month
Breakeven (48.9% LF)