Annual Energy Use

- 890,958 MWh* (Global)
- Boise site is one of the:
 - Largest U.S. sites
 - Larger energy loads, globally

Current Renewable Electricity (RE) Use

- In 2017, 40% of total energy consumption procured from the following renewable energy sources:
 - <1% on-site generation
 - 20% direct utility purchase
 - 79% renewable energy credits (RECs) or similar
- **EPA Green Power Partner**
- #12 on EPA's 2019 Green Power Partnership
- Top 30 Tech & Telecom

HP, Inc.

Worldwide with key operations in Boise



Renewable Energy Sources

- Renewable Energy Credits
 Direct Utility Purchase
 - On-site Generation





HP, Inc. Worldwide with key operations in Boise



Global Operations Energy Goals

- 40% RE by 2020 Achieved*
- □ 60% RE by 2025
- □ 100% RE in global operations by 2035

Barriers to Clean Energy

- □ Lack of local, cost-effective RE options
- Energy Wants/Needs
 - □ Renewable and affordable
 - Reliable
 - New local projects that green the grid

Source: Interviews with key sustainability and facilities staff

Global Operations Renewable Energy Goals

Non-Renewables
Renewables



*HP 2017 Sustainable Impact Report

Micron Worldwide with HQ in Boise

Annual Energy Use 7,431,413 MWh* (Global)

Energy Goal

- To achieve at least 10% energy savings by 2022*
 - measured in KWh saved compared to 2016 baseline year energy use

*According to 2018 Sustainability Report





Micron Technology, Inc.

- American global corporation based in Boise, Idaho
- □ 6,700 Idaho employees

Micron Worldwide with HQ in Boise



Barriers to Clean Energy

- Price Purchasing renewable power or credits costs more than utility-provided power
- Reliability Clean energy may be weather pattern related and reliability may be challenging
- Technology Energy storage technology is still developing

Energy Wants/Needs

- □ Reliable clean energy sources
- □ Affordable cost to maintain competitive advantage

Idaho Potato Farm



Southwest Idaho

Annual Energy Use

- □ ~ 3,600 Mwh with 70 meters total
- □ ~ \$6 million/year

Energy Goal

- Stabilize rates. Concerned about rate changes want to pass farms on to next generation.
- □ Reduce costs



Idaho Potato Farm



Southwest Idaho

Barriers to Clean Energy

- □ Price can be high for smaller farms but at scale the price comes down
- Land availability although pivots do often have land in the corners that isn't used
- □ Net Metering limits 100kW Idaho limit isn't enough for really large pumps
- □ Resistance based on preconception of expense or political affiliation

Energy Wants/Needs

- □ Clean and affordable
- Reliable
- Stable Pricing

Idaho National Laboratory

Advancing Battery Research

Idaho National Laboratory

INL Energy Storage Research on:

- Battery Electrolytes
- Battery Life Cycle Evaluation
- Battery Health and Monitoring tech
- Integrated Energy Systems (wind, solar, coal, nuclear, etc.)
- □ Technical Assistance Program (TAP) to small businesses

Goals:

- □ Lower costs of energy storage
- □ Improve performance
- □ Reduce size and environmental impacts to address siting concerns
- □ Explore <u>commercial applications</u> such as:
 - Utility energy storage

• Telecommunications

• EVs

• Drones



- Medical devices
- Military systems

Idaho National Laboratory

Advancing Battery Research



INL Microgrid and Smart Grid Research and Development:

Testing and demonstrating microgrid test bed options and smart grids that include:

- □ Renewable energy generation
- □ Heavy vehicle batteries
- Flow batteries
- Controllable loads
- □ Supercapacitors



Source: Interviews with INL

Energy Storage - Independence for Idaho

Accelerated adoption of energy systems would lead to a more *affordable*, *resilient*, and *secure* grid, and benefit Idahoans in the following ways:



Reducing Electricity Bills

Reduce monthly bills for commercial utility customers by reducing demand charges

Bolstering Service Reliability and Resilience

- □ Price of hydropower can jump during drought conditions.
- Battery storage can deliver emergency power for critical facilities, like hospitals.

Enabling Energy Independence

 \Box >3/4 of the electricity Idaho consumes originates outside the state.¹

Supporting Emerging Markets and Rural Communities

□ Surging demand for clean energy systems in the western U.S. positions Idaho to lead the nation in the development, manufacturing, and deployment of battery storage technologies.

Integrating Clean Energy into the Grid

Integrate more renewable energy into Idaho's grid and achieving the long-term goals of its utilities and municipalities.