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A River of Energy Solutions

Net Zero and High Performance Sustainable Buildings

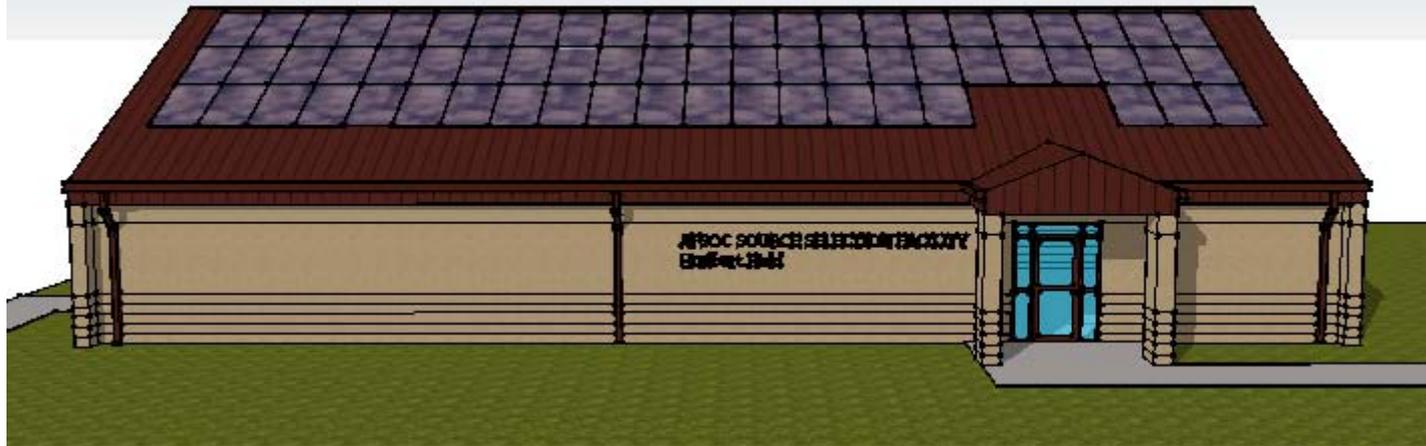
Steve Johnson

Overview

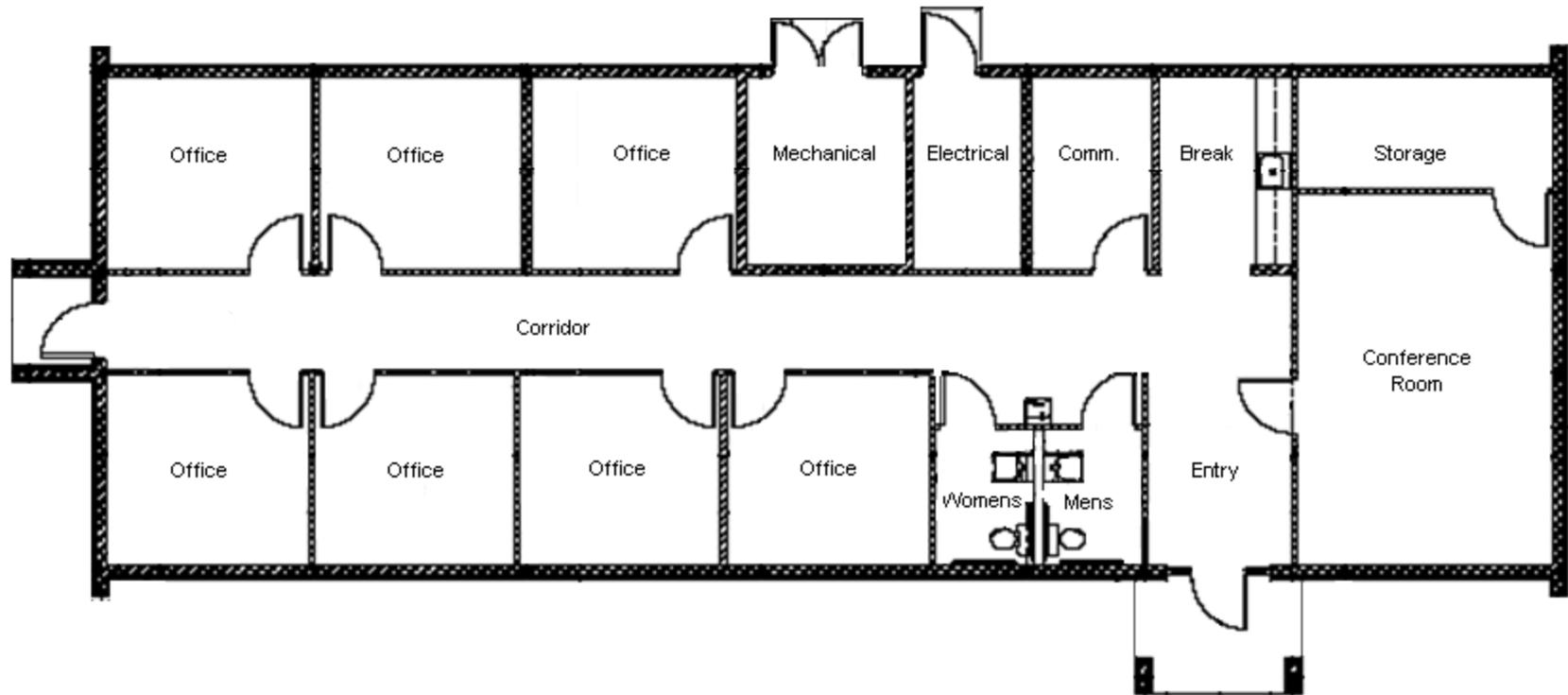
AFSOC Source Selection Facility
Hurlburt Field Air Force Base, Florida

- Owner / Occupant Engagement
- Energy Efficient Design
- Energy Generation
- LEED

AFSOC Source Selection Facility - Hurlburt Field Air Force Base



AFSOC Source Selection Facility - Hurlburt Field Air Force Base Floor Plan



Owner / Occupant Engagement

- All parties must be involved early in the planning
 - Owner or Owner's Representative
 - Occupant
 - Architects and Engineers
 - Environmental Group
 - Construction Team
 - Code Enforcement Officials

Owner / Occupant Engagement

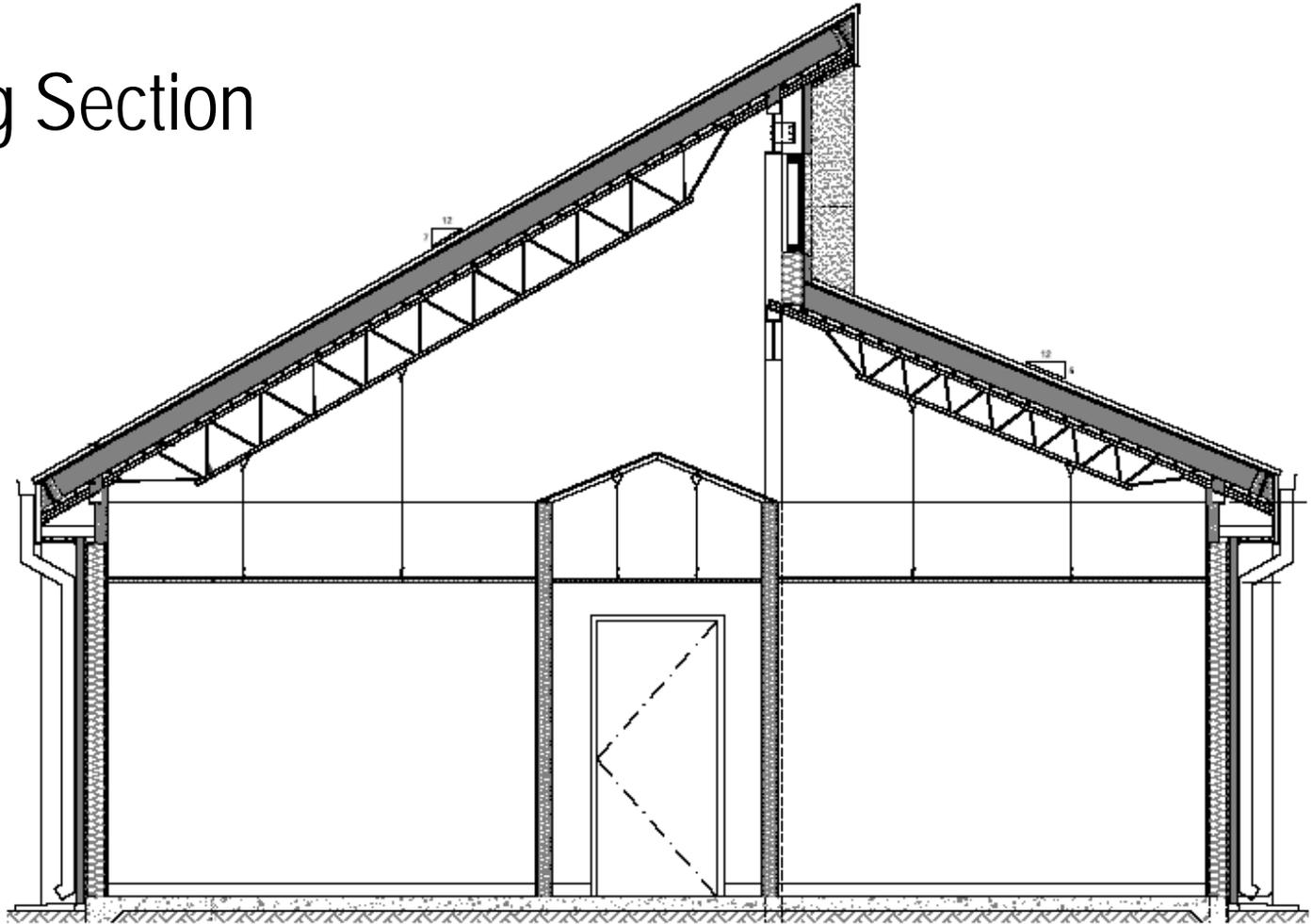
- Critical to the success of any project
 - Owner and Occupant may not be the same
- What do the Owner/Occupants need and want?
 - Owner typically desires low cost and low maintenance
 - Occupant typically desires an attractive, comfortable and functional building
 - Whether these needs and wants are met depends on Architectural, HVAC, Lighting, Plumbing, etc.

Energy Efficient Design

- Architectural
 - 2400sf primarily office space
 - Roof assembly (R-40)
 - Wall assembly (R-29)
 - Windows and Doors meet or exceed min. req. of ASHRAE 90.1
 - North daylighting / reflective ceiling

Energy Efficient Design

- Building Section



Energy Efficient Design

- Electrical
 - Lighting Controls
 - Occupancy Sensors
 - Roof Mounted Photovoltaics
- Plumbing
 - Low Flow Fixtures
 - Tankless Water Heaters
 - Rainwater Harvesting Cistern

Energy Efficient Design

- HVAC
 - High Efficiency Heat Pumps
 - Min 18 SEER
 - Variable Speed AHU's
 - Two-Stage Compressors
 - Controls
 - Zoned and Integrated with Occupancy Sensors
 - Multiple Temperature setbacks
 - Outside Air Control

Energy Efficient Design

- ASHRAE 90.1 Proposed vs. Baseline
 - Based on this buildings variable use and occupancy schedules, the estimated annual energy usage comparison is shown below:

Proposed (AFSOC)

16,679kWh/yr

90.1 Baseline

27,773kWh/yr

- This equates to a 39.9% Annual Energy Savings over the Baseline Building

Energy Generation

- Roof Mounted Photovoltaic Panels
 - South Facing Roof
 - High Efficiency Panels
 - 66 Panels Generate = 21,618 kWh/yr
 - Estimated Building Consumption = 16,679 kWh/yr

LEED

- LEED V3.0 – Attempting Gold Certification (63pts)
 - 19+1* Points EAc1 – Optimize Energy Performance
 - 7+1* Points EAc2 – On Site Renewable Energy
 - 4+1* Points WEc1 – Water Efficient Landscaping
 - 2+1* Points WEc2 – Innovative Wastewater Technologies (Cistern)

*Regional Priority Credits (earn 4 and receive one bonus point toward LEED certification)

Conclusion

We now see that a HPSB can be built with traditional construction methods. We should begin to carefully plan for the HPSB of tomorrow. While Net-Zero is possible with today's technology, it will become even more cost effective over time. We need to educate ourselves and be prepared to meet the challenges of designing and constructing Net-Zero and HPSB based on the operational requirements of the building.

THANK YOU!



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