Cleanroom Energy Benchmarking

**Facility 1**
- **Hot Water & Steam**: 23%
- **Chilled Water**: 19%
- **Cleanroom Fans**: 16%
- **Other Misc.**: 8%
- **Process**: 13%
- **Cleanroom Lights**: 1%
- **Compressed Air & Process Vacuum**: 6%

**Facility 2**
- **Hot Water, Steam and Cafeteria**: 17%
- **Total Chilled Water**: 20%
- **Cleanroom Fans**: 27%
- **Other Misc.**: 10%
- **Compressed Air**: 7%
- **Cleanroom Lights**: 1%
- **Process**: 9%

**Facility 3**
- **Total Chilled Water**: 18%
- **Hot Water & Steam**: 7%
- **Cleanroom Fans**: 11%
- **Process Utilities**: 17%
- **Process**: 35%
- **Cleanroom Lights**: 1%
- **Other Misc.**: 6%
- **Office (Lights, Plugs)**: 9%
Air-change Rates

Facility A
- Class 10
- Press.
- Plen.

Facility B.1
- Class 100
- Ducted

Facility B.2
- Class 100
- FFU

Facility C
- Class 100
- Ducted

Facility D
- Class 10
- Press.
- Plen.

Facility E
- Class 100
- FFU

Facility F
- Class 10
- Press.
- Plen.

Facility F
- Class 10
- Press.
- Plen.

Facility F
- Class 10
- Press.
- Plen.

Facility F
- Class 10
- Press.
- Plen.

Facility F
- Class 10
- Press.
- Plen.

Facility F
- Class 10
- Press.
- Plen.

Facility F
- Class 10
- Press.
- Plen.

Facility F
- Class 10
- Press.
- Plen.

Facility F
- Class 10
- Press.
- Plen.

Facility F
- Class 10
- Press.
- Plen.

Facility F
- Class 10
- Press.
- Plen.

Facility F
- Class 10
- Press.
- Plen.

Facility F
- Class 10
- Press.
- Plen.

Facility F
- Class 10
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Facility F
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Facility F
- Class 10
- Press.
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Facility F
- Class 10
- Press.
- Plen.

Facility F
- Class 10
- Press.
- Plen.

Facility F
- Class 10
- Press.
- Plen.

Facility F
- Class 10
- Press.
- Plen.
Make-up Air System Efficiency

CFM / kW (higher is better)
Minienvironment Investigation

- Examine efficiency opportunity in selected minienviroment(s)
- Partner with Asyst
- Collaborate with Sematech
- Develop strategies to improve efficiency
Minienviroment Investigation

- Identify opportunities to improve overall facility energy efficiency
- A field-study site is being sought
- A demonstration in operating facility will be proposed to the CA Energy Commission
Contact

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Demand Controlled Filtration

- Pilot study in LBNL cleanroom - completed
- Workshop being planned to review the concept with industry
- Alternate methods of recirculation setback investigated
- Demonstration in an operating industry cleanroom