Data sources for NetZero Model. All data from Published sources (see Reference list at end)

|  |  |  |  |
| --- | --- | --- | --- |
| **Sector** | **Baseline (2010)** | **Projected net zero condition (2020)** | **Reference** |
| Population(including 6000 civilians/contractors)  | 22,000  | 34,000 | ([Anderson et al. 2011](#_ENREF_1); [McMordie Stoughton et al. 2012a](#_ENREF_45)) |
| Electricity demand  | 179,667 MWh | 260,453 MWh | ([Anderson et al. 2011](#_ENREF_1); [Anderson et al. 2012](#_ENREF_2)) |
| Thermal energy demand (natural gas or equivalent) | 971,778 MMBtu | 950,709 MMBtu  | ([Anderson et al. 2012](#_ENREF_2); [Anderson et al. 2011](#_ENREF_1)) |
| Total energy demand (electricity + thermal energy) | 1,584,800 MMBtu | 1,839,374 MMBtu  | ([Anderson et al. 2011](#_ENREF_1); [Anderson et al. 2012](#_ENREF_2)) |
| Non-tactical fleet fuel | 29,403 MMBtu (2009) | - | ([Anderson et al. 2011](#_ENREF_1)) |
| Electricity generated on site | 3% (2012) | 100% | ([Anderson et al. 2012](#_ENREF_2)) |
| Thermal energy generated on site | 1.5% (2012) | 94% | ([Anderson et al. 2012](#_ENREF_2)) |
| Water demand from utility | 854 Mgal/yr | 424 Mgal/yr (+ estimated 200 Mgal/yr for privatized housing) | ([McMordie Stoughton et al. 2012b](#_ENREF_46); [McMordie Stoughton et al. 2012a](#_ENREF_45)) |
| Volume reclaimed from wastewater | 80 Mgal/yr | 424 Mgal/yr (includes direct potable reuse) | ([McMordie Stoughton et al. 2012b](#_ENREF_46)) |
| Waste generated  | 15,920 tons/yr (MSW)3592 tons/yr (C&D) | - | ([NDCEE 2012](#_ENREF_47)) |
| Waste recycled | 6395 tons/yr (MSW)3259 tons/yr (C&D) | Goal: 100% diversion | ([NDCEE 2012](#_ENREF_47)) |

\*Electricity, thermal, and total energy demand represent site energy (which does not include primary energy). Total energy demand is calculated by converting electricity demand from MWh to MMBtu, using 1 MWh = 3.412 MMBtu. Baseline (2010) energy demand is interpolated from 2009 and 2011 data.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Potential action or sector** | **Energy impact** | **Water impact** | **Waste impact** | **Reference used to calculate impact** |
|  | **MMBtu/y** | **Mgal/y** | **Tons/y** |  |
| **BASELINE** |  **1,584,800**  | **854** | **15920** | (MSW not C&D) |
|  |  |  |  |  |
| **ENERGY actions**a | **-67%** | **-15 to -17%** |   |   |
| Energy efficiency, includes WCM's | -18% | -15% |  | ([Anderson et al. 2012](#_ENREF_2)) Table 7 & p. 58 |
| Solar PV, 101MW | -33% | 0% |  | ([Anderson et al. 2012](#_ENREF_2)) Table 8 |
| Wind power, 11MW | -5% | 0% |  | ([Anderson et al. 2012](#_ENREF_2)) Table 8 |
| Concentrating solar power, 20MW | -11% | 0.4-2% |  | ([Anderson et al. 2012](#_ENREF_2)) Table 29 |
| Foodb | 6% |  | 15% | ([NDCEE 2012](#_ENREF_47)) Figure 3, ([Tharion et al. 2005](#_ENREF_65))  |
| Non-tactical vehicle fleet | 2% | 0.7% |  | ([Anderson et al. 2011](#_ENREF_1)) Figure 7 |
| **WATER actions** | **+0.25%** | **-50%** |   |   |
| WWTP expansion | +0.03% | -25.5% |  | ([Anderson et al. 2012](#_ENREF_2)) Table 30  |
| Direct Potable Reuse (DPR) | +0.22% | -25.2% |  |   |
| **WASTE actions** | **-5 to -40%** | **+1.4 to +22%** | **-85%** |   |
| Waste to energy plant, 40MWc | -5 to -40% | +1.4 to +22% | -85% | ([US Army 2012](#_ENREF_72)) p. 18 |
| Biomass plant, 13MWd | -12% | +6.7% | -63% | ([US Army 2012](#_ENREF_72)) p. 20  |
| Waste, MSW onlye | 2% | 0.11% |  | ([Valkenburg et al. 2008](#_ENREF_73))  |
| Waste, MSW+C&D | 3% | 0.14% |  |  |
| Sewagef | 1% | 49.6% |  | ([Heidrich et al. 2011](#_ENREF_32))  |

1. In some cases, site (demand-side) energy units have been converted using 1 MWh = 3.412 MMBtu
2. Food is not part of the reported energy budget; food energy is estimated from literature
3. WTE: 15,920 tons MSW – 40% diversion = 9550 non-recycled MSW on base; (9550 + 300,000 tons from off-base) x 0.6MWh/ton = 185,730 MWh/yr generated, with 1000 gal/MWh water withdrawal (wet recirculating cooling). A low-water scenario uses 30,000 tons MSW from off-base and 500 gal/MWh water withdrawal.
4. Woody biomass, an alternative to WTE: (10,000 tons on base + 13,000 tons off base)/yr x 8.5 MMBtu/ton = 195,500 MMBtu/yr; 1000 gal/MWh water withdrawal = 293 gal/MMBtu (wet recirculating cooling)
5. 15,920 tons/yr MSW generated (19,512 tons/yr including C&D waste) x 0.6 MWh/ton; 69% of commissary (on-post grocery) waste is compostable, so has energy content ([NDCEE 2012](#_ENREF_47))
6. Sewage is not part of the reported energy or waste budgets. Here, total water entering wastewater treatment is considered sewage.

References for Data Sources

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