



Station Sustainability Metrics

Transit-Land Use Committee

June 14, 2017

At a program level, High-Speed Rail has leading and achievable goals.

- ▶ Operate on 100% renewable energy
- ▶ Net-positive energy stations and facilities
- ▶ LEED Platinum stations and facilities
- ▶ Carbon and criteria pollutant-neutral construction

Progress against these and other goals through a range of cross-program strategies is detailed in our annual Sustainability Report.

CALIFORNIA HIGH-SPEED RAIL
AUTHORITY

SUSTAINABILITY POLICY
POLI-PLAN-03

Approved By *JH*
Name
Title
Date 7/29/16

SUBJECT: Sustainability

AGENCY POLICY

The Authority will deliver a sustainable high-speed rail system for California that serves as a model for sustainable rail infrastructure. The Authority has developed and will continue to implement sustainability practices that inform and affect the planning, siting, designing, construction, mitigation, operation, and maintenance of the high-speed rail system.



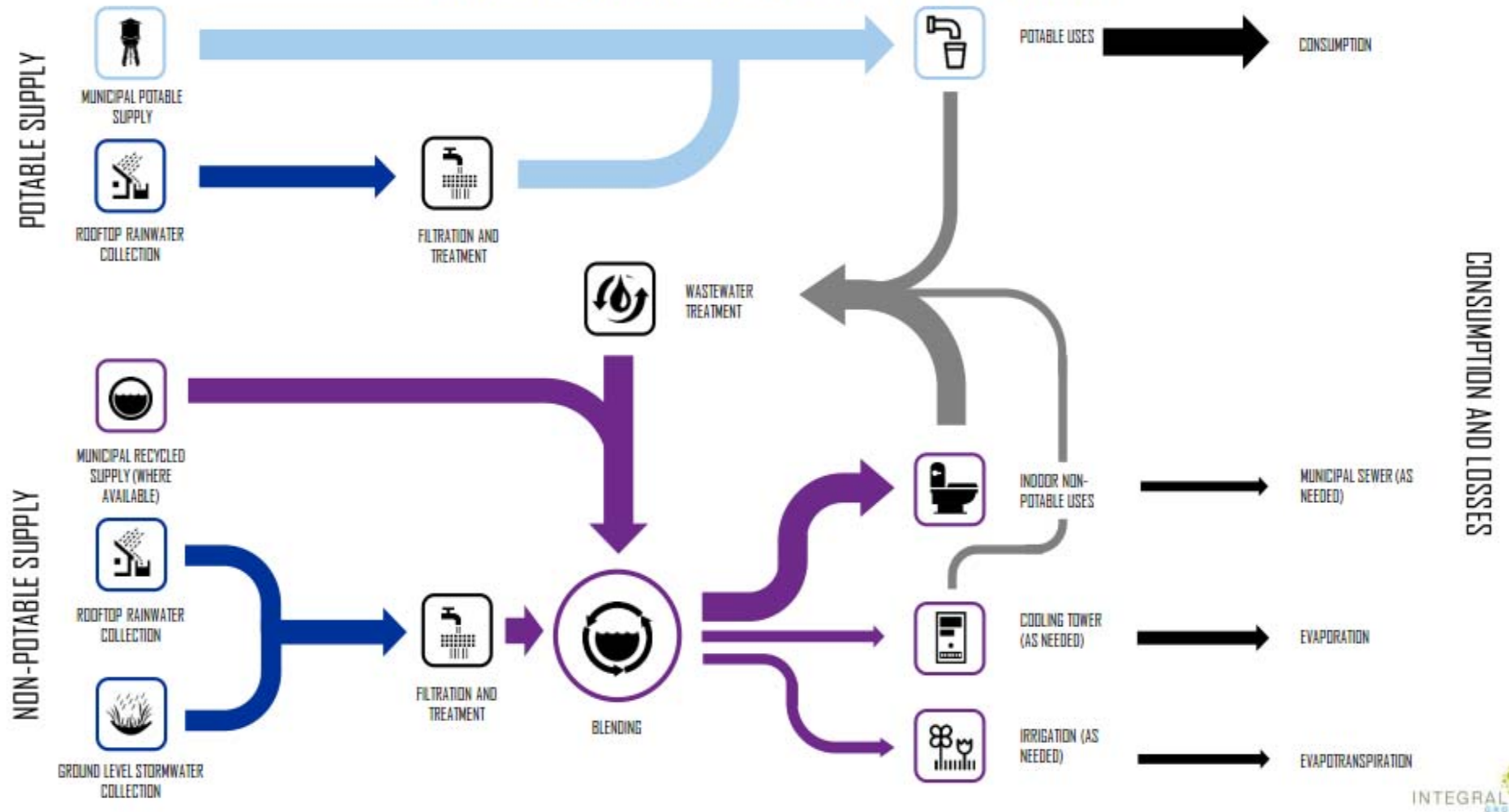
Today we know more about facility location which enables the team to focus on the contribution of individual buildings to the system energy story.

- ▶ To achieve net-zero balance system-wide:
 - Identified priorities within the system
 - Understood station-specific opportunities and constraints
 - Balance net producers with net consumers
- ▶ Variables examined
 - New Build v. Retrofit
 - Urban v. Rural
 - Climate zone
 - Mixed-used v Stand-alone
 - Ridership volumes



In addition to energy, water is a critical resource the team examined in detail to determine site-specific goals.

EXAMPLE WATER SYSTEM FOR A STATION



As delivery advances, establishing resource performance targets creates a baseline for station investments.

We have developed a tool that assists us with:

- Setting targets specific to locations and climatic conditions and developing performance criteria relevant to each station development
- Development of the kit of parts
- Our coordination with local jurisdictions, as we better understand the impact of proposed investments on our station performance

	Burbank (BUR)	Los Angeles (LAUS)
Station Attributes & Selections		
Building area (ft2)	138,000	273,000
Site area (ft2)	2,902,674	1,725,499
Occupants (per day)	12,800	20,500
Climate zone	LA Inland	LA Inland
EUI scenario	High Performance	High Performance w/ Cooling Towers
Energy Consumption		
EUI, weighted average, site (kBtu/ft2/yr)	87	91
Annual energy consumption, site (kBtu)	12,013,753	24,954,655
Annual energy consumption, source (kBtu)	28,891,520	60,012,712
On-Site Solar Generation		
Solar capacity (kW)	5,542	3,294
Solar system size (ft2)	478,941	284,707
Annual generation, site (kBtu)	29,734,000	18,242,861
Annual generation, source (kBtu)	93,662,098	57,465,011
Net Zero Energy Balance		
Achieved NZE?	Yes	No
Energy surplus (kBtu)	64,770,578	- 2,547,701
Options to become NZE		
Make-up Option 1: Add more solar PV (assumes prem		
Additional PV capacity required to eliminate Energy Deficit (kW)	-	479
Additional area needed to achieve NZE (ft2)	-	31,915
Make-up Option 2: Increase the average module (pane		
Average module efficiency needed with planned PV system size	5.9%	20.9%
Average module efficiency of PV system as currently designed	17.1%	17.1%

Example only. Not actual expected values.

While our planned stations will achieve aggressive resource efficiency, it is the multi-building, multi-block or district scale that could enable a step-change.

- ▶ Shared energy resources allow for balancing loads across multiple users with different peak demands
- ▶ Shared stormwater management allows for low-impact development techniques at scale
- ▶ Shared parking resources minimizes space given over to parking and maximizes the use of that space
- ▶ Investigating district scale or multi block infrastructure a requirement of climate investments

