



Wholesale Renewable Energy Power Purchase Agreements



APTA
August 1, 2018



System Facts

- System opened/began operating in 1972
- Governed by a 9 member elected board
 - 3 Board members elected from 3 counties (Alameda, Contra Costa, San Francisco)
- Today: 48 stations & 122 miles of track in 4 counties
- 420,000 weekday exits
- 669 existing train cars + 775 new train cars in process (20 already in service)



Energy Facts

- Annual electricity usage: ~400,000 MWh
- Annual electricity cost: ~\$43 million per year
- Current renewable energy content: 4%
- Unique buying authority:
 - Since 1995, allows BART to buy wholesale electricity directly rather than through incumbent utility
 - 2015 update allows BART to buy wholesale renewable energy directly



Wholesale Electricity Portfolio Policy

Performance measures:

1. Maintain a long-term cost advantage compared to rates that BART would otherwise pay as a bundled utility customer; and
2. Maintain per unit energy costs within BART's projections; and
3. Achieve a portfolio that:
 - From 2017 – 2024, has an average emission factor no greater than 100 lbs-CO₂e/MWh)
 - **By 2025, is from at least 50% renewable energy and at least 90% low and zero carbon energy**
 - By 2035, 100% from zero carbon supply
 - **By 2045, 100% renewable energy supply**



Why Renewable Energy?

	Source	Current Low Cost	Long-Term Fixed Cost	Low or Zero GHG Emissions	RPS-Qualified Renewable
RPS Compliant	Solar	✓	✓	✓	✓
	Wind	✓	✓	✓	✓
	Other renewables Small Hydro Geothermal Biomass	?	✓	✓	✓
Not RPS	Specified low- and zero-carbon	✓	✗	✓	✗
	Conventional/ Gas power	✓	✗	✗	✗

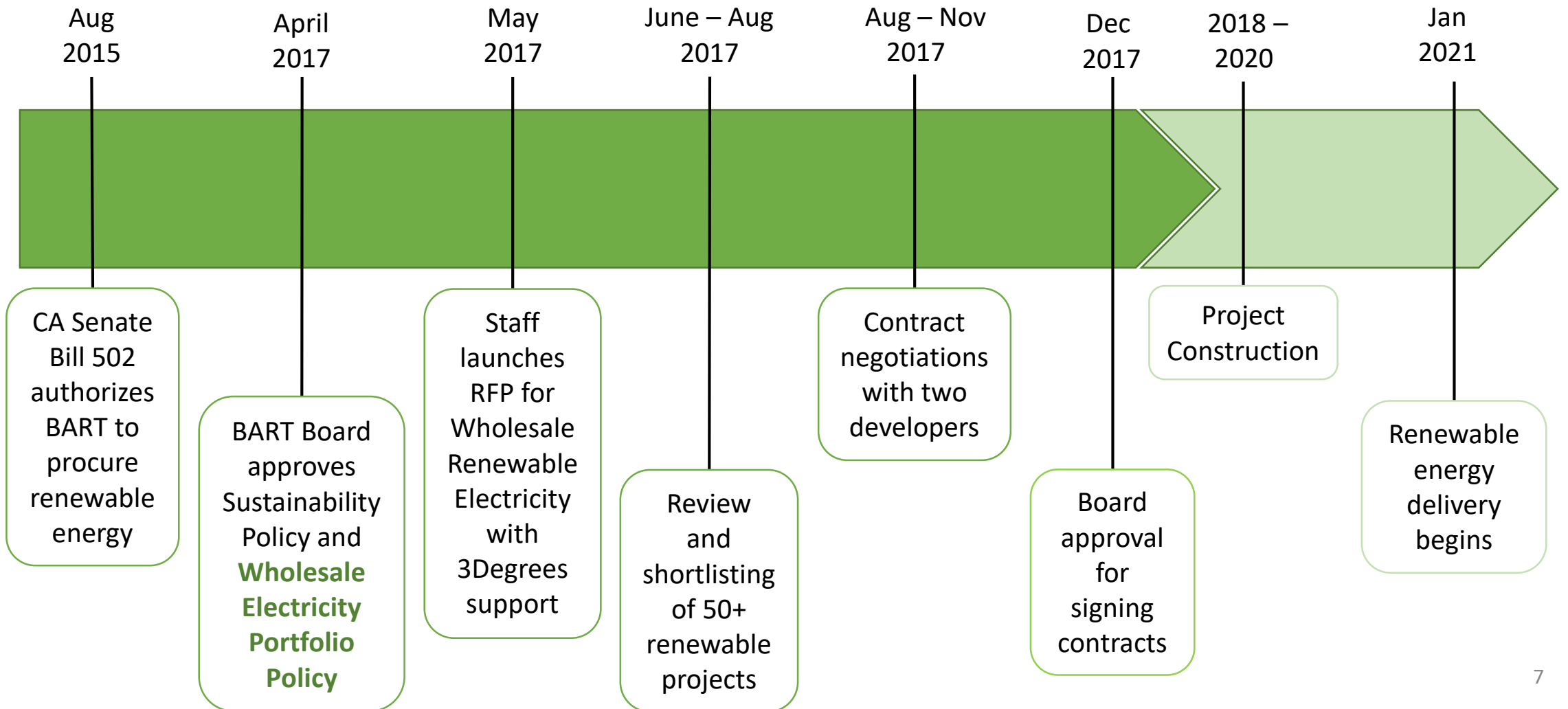


Renewable RFP Objectives & Results

- Objectives:
 - Align procurement with Board Policy
 - Purchase long-term (10-30 year) renewable supply at stable, competitive prices
 - Ensure developers are experienced and creditworthy, and contracts mitigate BART's exposure to market risks
 - Ensure projects are realistic and far along in pre-construction planning
 - Ensure BART's risks during delivery terms are minimized
- Results:
 - **Two executed PPAs**
 - **~90% of the BART supply will be renewable in 2021**



Timeline of Renewable Energy Procurement





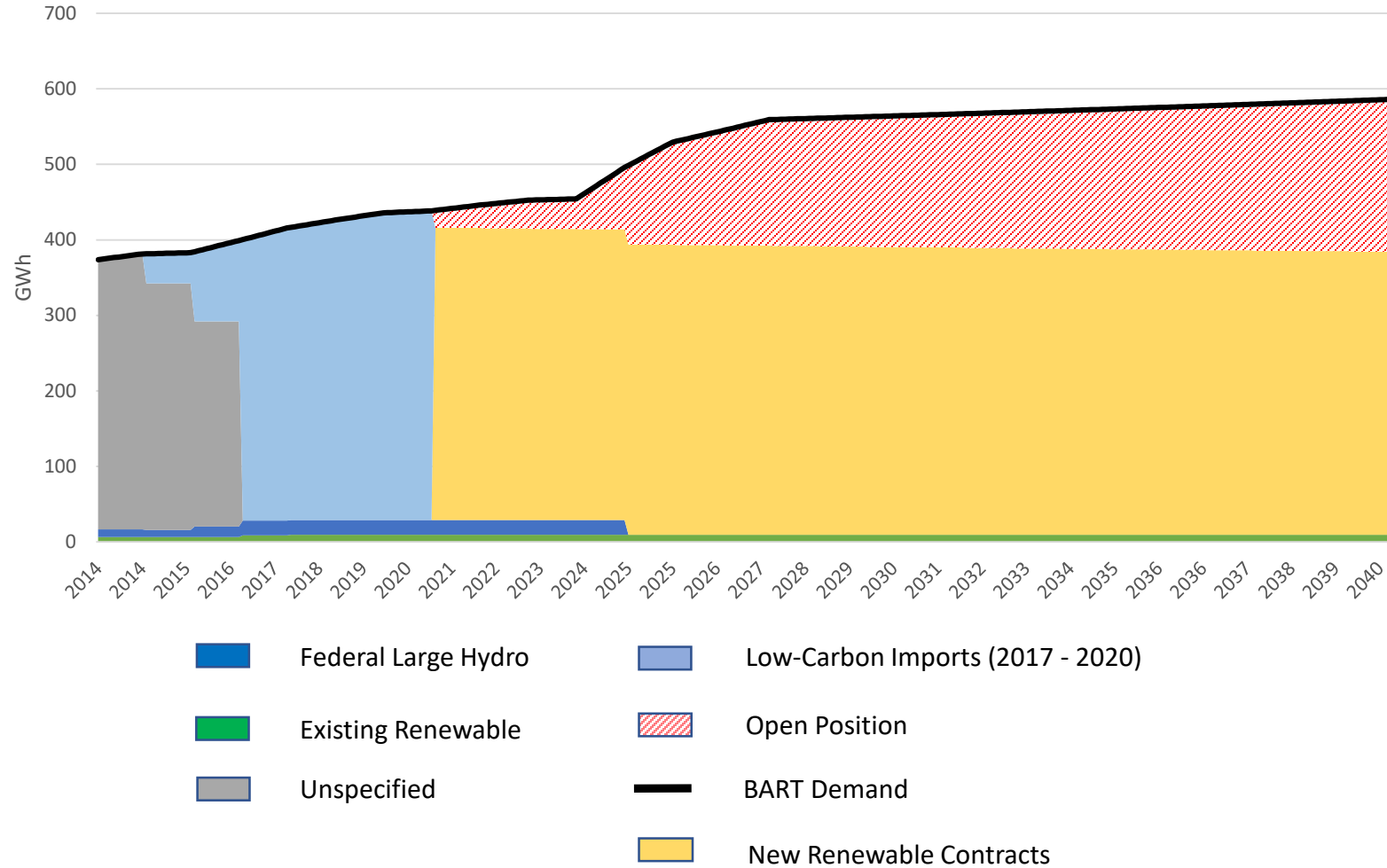
Renewable Energy Contracts

Developer	NextEra Energy	Recurrent Energy
Project Name	Sky River	Gaskell West 2
Technology	Wind	Solar
Project Size	61.7 MW	45 MW
Expected Output	257,000 MWh/Year	142,000 MWh/Year
Expected COD	Dec 31, 2020	Dec 31, 2020
Term	20 years	20 years
Location	Kern County East of Bakersfield	Kern County SE of Bakersfield





BART Energy Supply



GHG emissions - electricity sources	lbs CO2e/MWh
2015	742
2016	683
2017	56



Positive PR Across the US



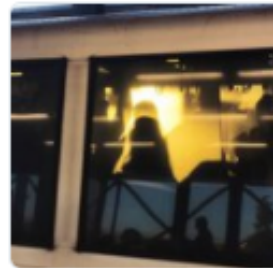
Mike Bloomberg ✓

@MikeBloomberg

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To deliver on [@AmericasPledge](#), transit systems can follow the lead of [@SFBART](#) by procuring more energy from renewable sources



BART board approves wind, solar purchase for 90 percent r...

BART will soon be powered almost entirely by renewable energy. The transportation system will be 90 percent powered by wind, solar and other renewables by 2021, after the BART Board ...
[sfexaminer.com](#)

6:54 AM - 8 Dec 2017

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Evaluation & Selection

- **Project Analysis**

- Over 50 projects submitted with over 150 iterations
- Stress testing for potential market dynamics
- Quantitative and qualitative due diligence:
 - Price ranking is only part of the story
 - Project viability: Permitting, site control, interconnect status, developer experience—technology specific
 - Suniva surprise: Did developers have a viable mitigation strategy?

- **Final Selection**

- Process is an “art” not a science
- Highly collaborative effort
- Opportunistic portfolio strategy
 - Technology diversity
 - Cost-effective chance to meet 90% of goal ahead of deadline



Procurement Challenges

- Started without approved renewable energy goals
- Board approval required for goals and contract execution
 - Elected Board members are unique stakeholders
- California power market dynamics
 - Physical PPA: Supply vs. load correlation
 - Solar concentration risk
 - Overall market complexity
- Suniva trade case
 - Unknown impact on pricing
- Negotiating two(!) PPAs at the same time
 - Standardizing key terms
 - Maintaining confidentiality



On-Site solar energy projects

Completed: 2 MWs

In progress: 1 MW

On the horizon: 5-8MWs



Warm Springs BART station (2017)



Antioch BART station (2018)



Sustainability at BART

1. Implement ongoing reductions of BART and the Bay Area's environmental footprint.
2. Raise consciousness and change culture internally.
3. Inspire rider loyalty and interest and encourage other organizations and institutions to act similarly.



Thank You

Holly Gordon

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BART

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