

# ET Summit 2019

Presented by



## Warm Mix Asphalt (WMA): Paving the Way to Energy Savings



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Principal Engineer

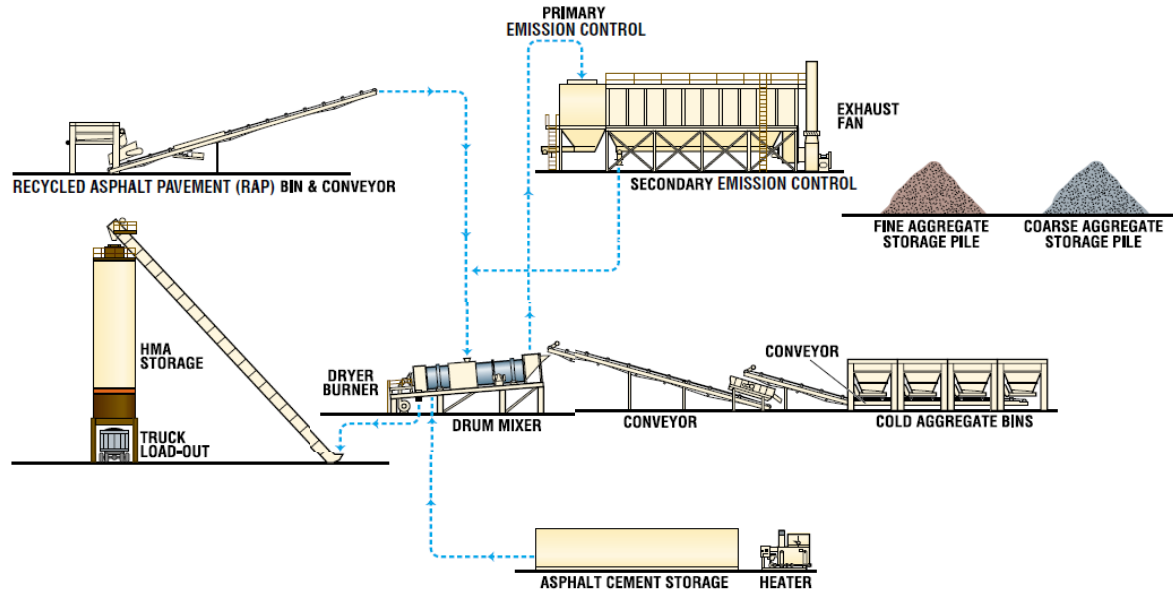
Energy Resources Integration

## Overview

- Asphalt Production and Energy Use
- What Is Warm Mix Asphalt?
- WMA History
- Energy Savings
- Non-Energy Benefits
- Barriers to Entry
- Program Considerations

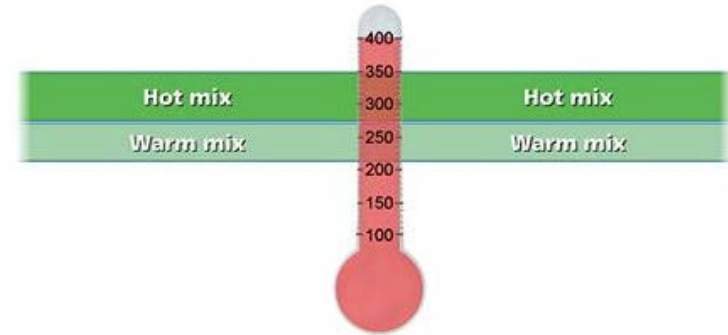


# Asphalt Production - Where Is Energy Used?



## What is Warm Mix Asphalt?

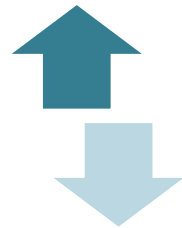
- Warm Mix Asphalt (WMA) technology is a method of producing asphalt pavement at lower mixing and placing temperatures than traditional Hot Mix Asphalt (HMA).



## How Is This Done?

Warm Mix Asphalt is typically made by one of two methods:

1. **Water-Based:** injection to expand binder
2. **Additives:** organic or chemical (typically wax form)



Improve adhesion

Reduce viscosity

## Background and History

- 1870's: First use of asphalt (HMA)
- 1990's: Research on WMA
- 2004: First WMA pilot roads
- 2008-2010: California trials and test roads
- 2011: Caltrans institutes WMA approval process
- 2015-2017: CA use of WMA increases from 1% to 25%

## Energy Savings

- WMA vs. HMA: natural gas savings of roughly 20%





## Non-Energy Benefits

- Greenhouse gas reductions of approx. 8 lbs/ton vs. HMA
- Healthier for workers – less smoke and dust
- Reduced heat losses as compared to HMA
  - Longer hauling distances
  - Faster application times
  - Extended paving season

## Barriers to Entry

- Cost for WMA additives of \$3 to \$5 per ton
- Quality concerns / perception
  - Longer curing time
- Lack of training for design engineers and placement workers
- Changes in operation at mixing plant

## Next Steps & Program Considerations

- Market characterization in CA
  - Agencies, Designers, Producers / Installers
- Determine proper incentive channel
  - Production or Purchaser level
- Workpaper development



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The project report can be found at  
[www.etcc-ca.com/reports/warm-mix-asphalt-literature-review](http://www.etcc-ca.com/reports/warm-mix-asphalt-literature-review)

## Resources

DOT: <https://www.fhwa.dot.gov/innovation/everydaycounts/edc-1/wma.cfm>

Cal APA: <http://www.calapa.net/wma.html>

CalTrans: <https://dot.ca.gov/programs/engineering-services/>

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