

# SAINT-GOBAIN AT A GLANCE



# SAINT-GOBAIN'S VISION



**Be the worldwide leader in light and sustainable construction**



**Improving daily life through high-performance solutions**

*Click here to find out more!*





# MATERIALS EXPERTISE AT THE HEART OF OUR KNOW-HOW

Advanced knowledge of materials and co-development of solutions with our customers



Sustainable solutions for construction, mobility and industry

Collection and sorting services to increase the proportion of recycled content in our products

Efficient logistics and personalized digital experience

# THANKS TO OUR SOLUTIONS, WE ARE CONTRIBUTING TO 3 LONG TERM AMBITIONS

2050  
NET ZERO CARBON



A decarbonated home



More performance with less



A better living for all



Recognized commitments



# SAINT-GOBAIN SUSTAINABILITY GOALS

## 2025 GOALS

2010 Baseline, metric per production unit



Energy consumption: -15% (MWh/NSP)  
Total CO<sub>2</sub> emissions: -20% (MTCO<sub>2</sub>/NSP)



Water discharge: - 80% (M<sup>3</sup>/NSP)  
Long-term: Zero industrial water discharge in liquid form



Non-recovered waste: - 50% (Ton/NSP)  
Long-term: Zero non-recovered waste

## 2030 GOALS

2017 Baseline, no regard for units produced or acquisitions



# SAINT-GOBAIN & CERTAINTEED

Purpose & Vision

Our Purpose

**MAKING  
THE WORLD  
A BETTER  
HOME**

Our Vision

**BE THE WORLDWIDE  
LEADER IN LIGHT &  
SUSTAINABLE  
CONSTRUCTION**

Our Strategy

**GROW &  
IMPACT**  
2021-2025



A long-exposure photograph of a city street at night, showing light trails from cars and streetlights. The street is flanked by tall buildings with illuminated windows. The image is split vertically by a diagonal line, with a dark blue background on the left and the city scene on the right.

# CERTAINTEED

RECYCLED ASPHALT SHINGLE PELLETS

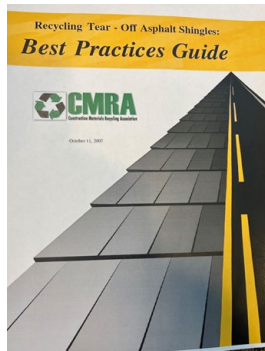
# PAST CHALLENGES IN RAS USAGE

The use of RAS in pavement developed in the 1990's – 2000's without sufficient investigation of the effects of RAS on HMA

Limited studies performed on RAS in HMA



1990's



## Technical information reports on RAS

Initial reports were concerned with economics, process, regulatory compliance, feedstock handling, processing.

Only an initial discussion of effects on HMA.



Early 2000's

## Many recyclers entered the marketplace

- Early 2000's - many recyclers entered the RAS market.
- Tipping fees more than offset the processing cost in many areas.
- Contractors counted the asphalt introduced in RAS form as 100% effective asphalt in the HMA, when there was very little effective bitumen.
- RAS was difficult to consistently feed into the HMA plant.



# CHALLENGES IN RAS USAGE

In the 2010's, asphalt in RAS started to be investigated further; pavement failures began to occur.

## FHWA and NCAT published RAS asphalt cement test data

- PG grading test methodology
- Asphalt in RAS was found to be as extreme as PG 175+41



2010's

## Failures in pavements containing RAS started to occur

- Premature cracking
- Stripping and ravelling

2014

## RAS usage peaked and started to decline after 2014

- HMA plant personnel EHS concerns due to airborne fiberglass particulate
- Shingle mountains were created and abandoned, left to local entities to clean up

Table 2: RAS Binder Performance Grade (FHWA, 2018)

Reference	Material	High Temperature Grade	Low Temperature Grade
Standard	Virgin Binder	52°C to 76°C	-28°C to -16°C
NCAT (2014)	RAP	85°C to 95°C	-20°C to -5°C
	MWAS	125°C to 135°C	
	PCAS	150°C to 170°C	
Willis (2013)	MWAS	132°C to 154°C	-18°C to > 0°C
	PCAS	121°C to 175°C	-6.9°C to 41°C
Zhou et al. (2013)	MWAS	124°C to 138°C	
	PCAS	159°C to 214°C	
Bonaquist (2011)	RAS	110°C to 126°C	-10.1°C to 4.5°C
Willis & Turner (2016)	MWAS	126.6°C to 144.7°C	
	PCAS	144.4°C to 170.3°C	

# CHALLENGES IN RAS USAGE

RAS usage has fallen out of favor

## HMA PRODUCERS

2017 – Most producers paused acceptance of unprocessed shingles.

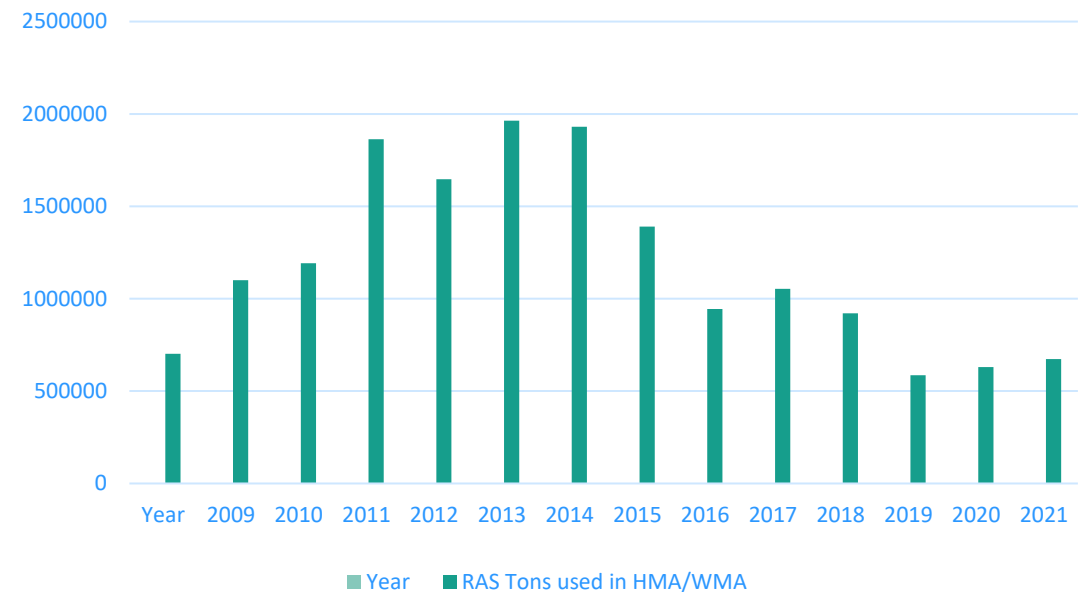
According to the U.S. EPA, 15.1 million tons of shingle waste generated annually, of which 13 million is landfilled.

## CERTAINTEED/ASPHALTICA PROCESS

CertainTeed/Asphaltica patented process will unlock the ability of HMA producers to recapture this available material without affecting the quality of pavement.



Estimated Annual RAS usage into HMA/WMA



# THE CERTAINTEED & ASPHALTICA SOLUTION

## Pre-Treatment of RAS



### RAS IS GROUND

RAS is ground to industry standard 3/8 minus.



### RECYCLING AGENT ADDED

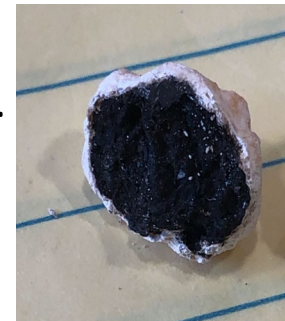
Recycling agent added, pelletized and coated with a water-resistant shell to facilitate storage and transportation.

Stores/feeds like gravel.



### OXIDIZED ASPHALT IS SOFTENED

Softens oxidized asphalt to paving PG grade.



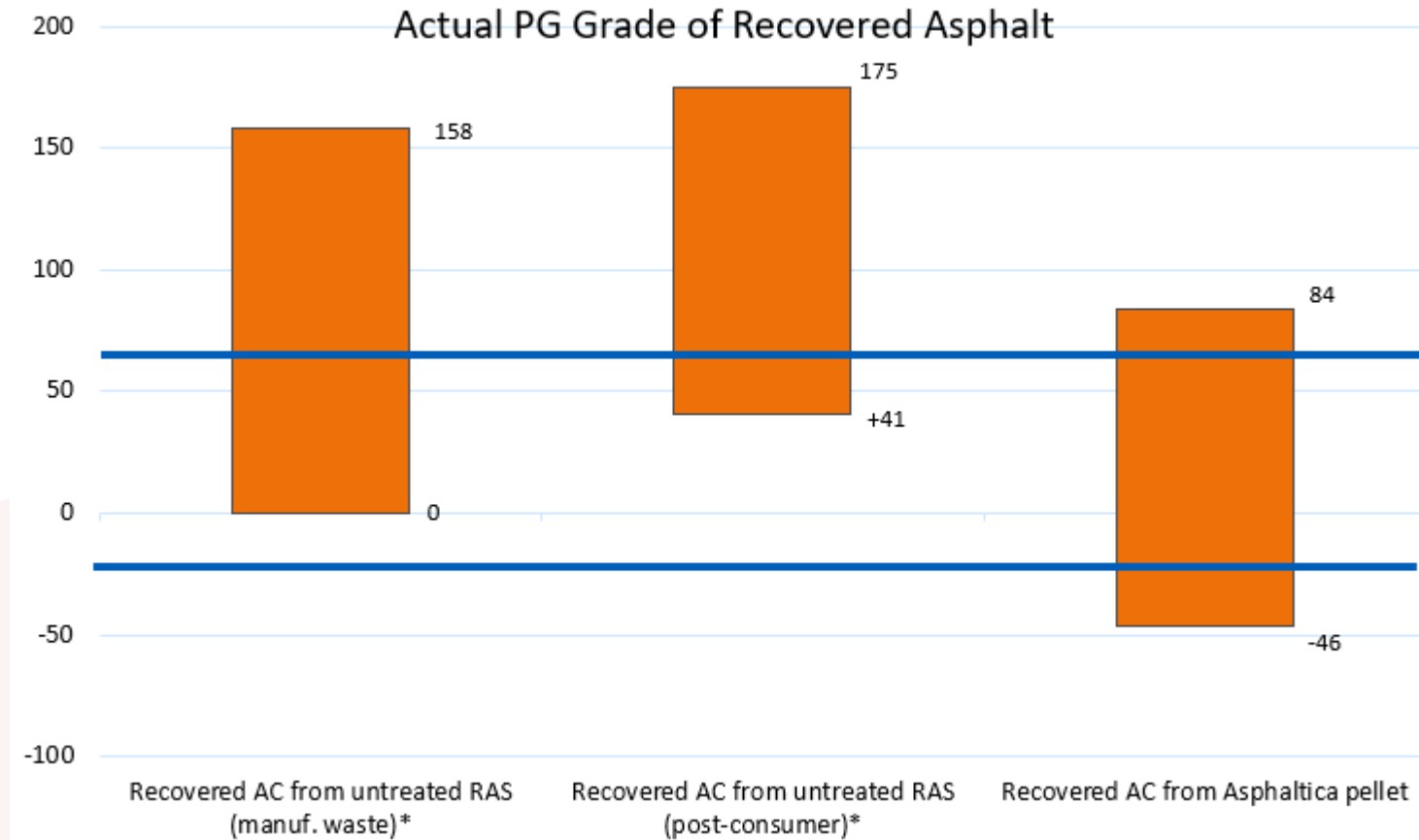


# RAS PG GRADING PROVES EFFECTIVENESS



## PG GRADING OF TREATED VS. UNTREATED RAS

Once pre-treated, AC from RAS results in a very good binder for pavements.

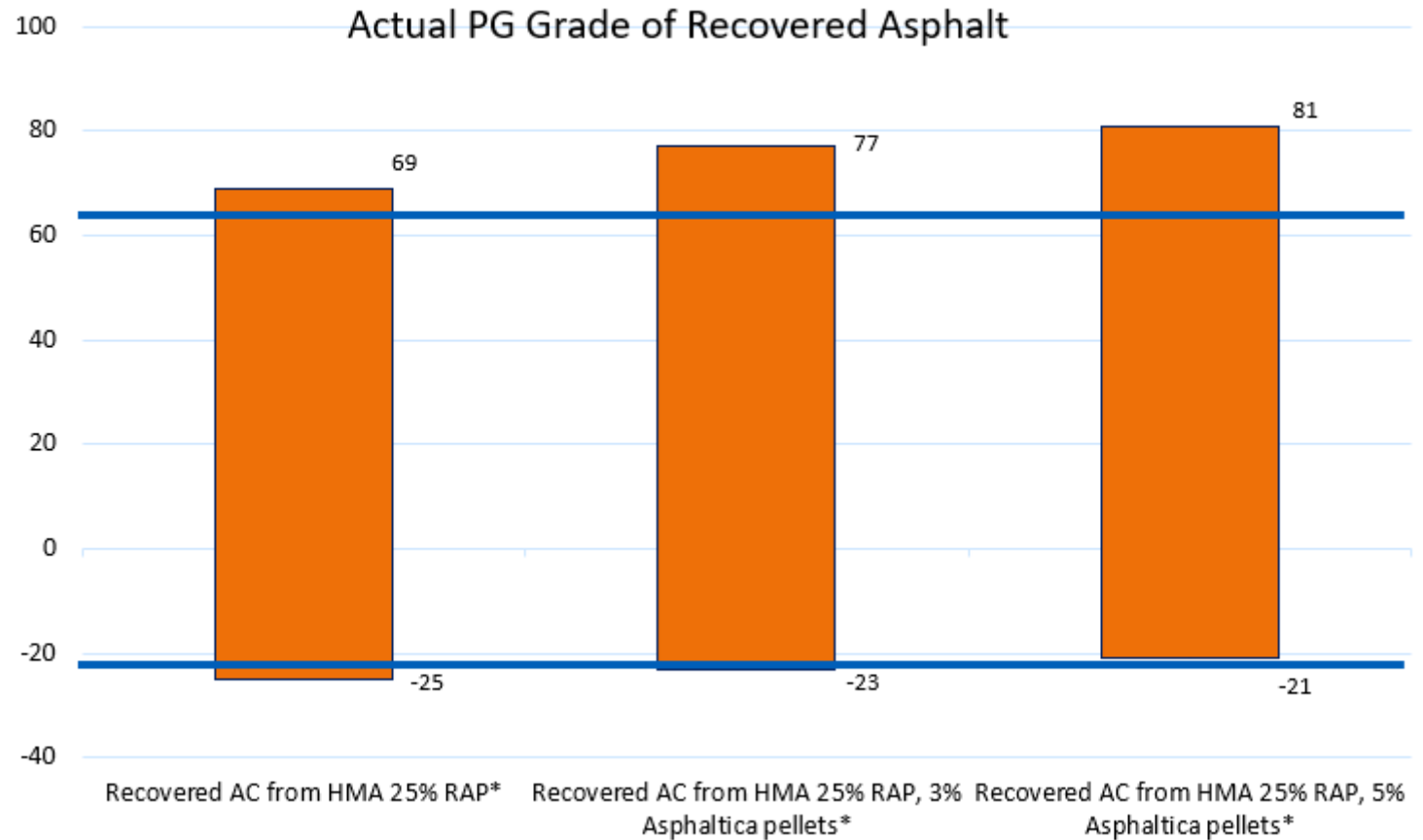


# HMA PG GRADING REFLECTS EQUIVALENCY



## PG GRADING OF HMA WITH VS. WITHOUT TREATED RAS

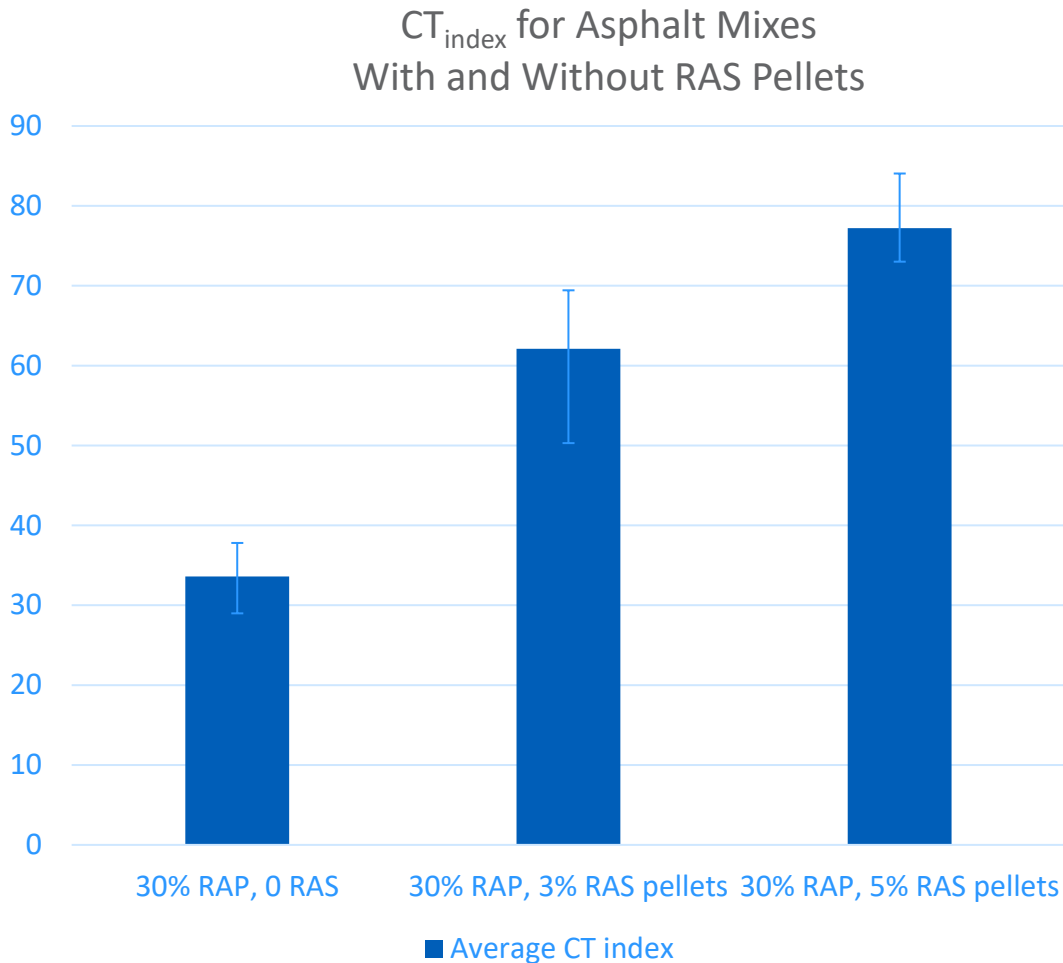
AC recovered from HMA with pelletized RAS reflect improved top end (more resistance to rutting and shoving), with minimal impact to bottom end.



\*Virgin AC was PG 64-22

# IDEAL-CT TESTING

RAS pellets have a positive impact on cracking resistance.

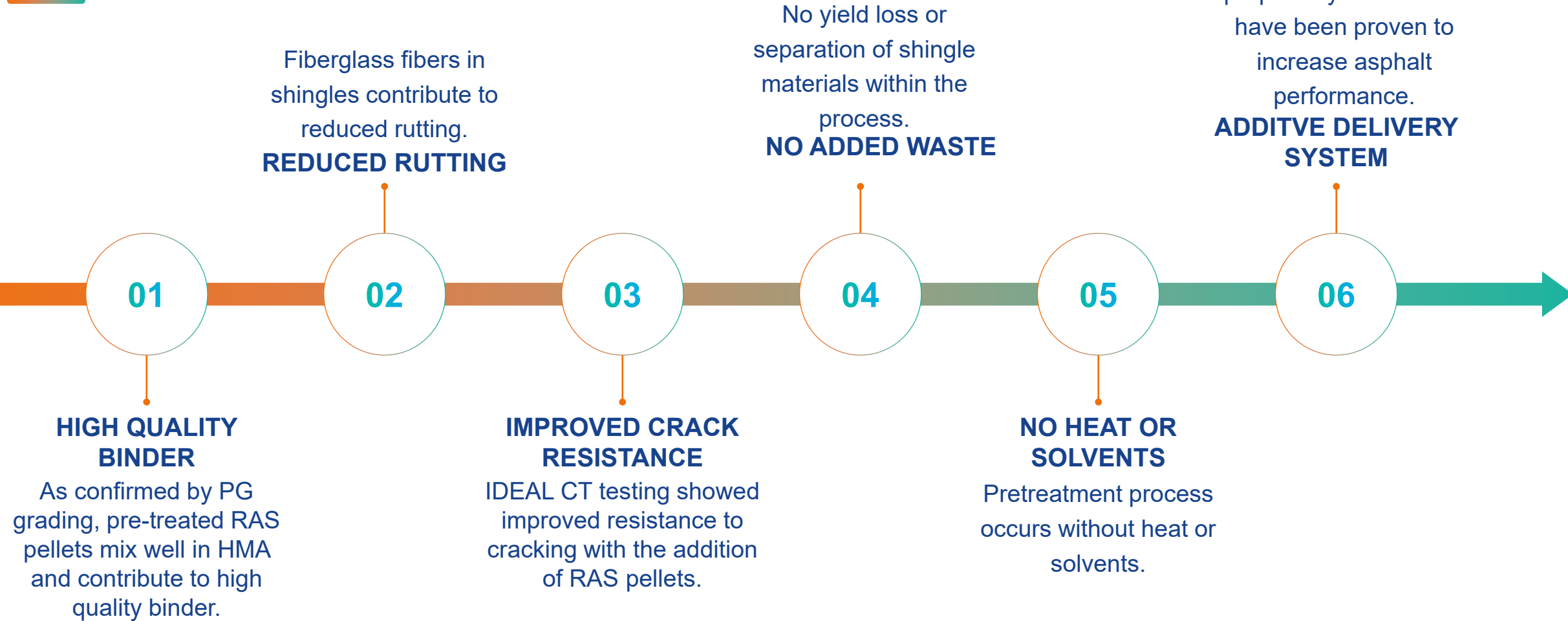


- Asphalt Testing Services (ATS) performed IDEAL-CT tests on three mixes with different RAP/RAS levels.
  - 30% RAP, no RAS pellets
  - 30% RAP, 3% RAS pellets
  - 30% RAP, 5% RAS pellets
- Average CT index value **increased** with the addition of RAS pellets, from an average of 34 with no RAS, to 77 with 5% RAS pellets.



# QUALITY PRODUCT

## CertainTeed RAS Pellets Contribute to a Quality Product



# ELIMINATES PLANT FEED ISSUES



- Consistent feed rate into the drum – no agglomeration.
- Controlled composition of pellets leads to a consistent HMA product.
- No special equipment needed.
- Handles like RAP.
- Virtually eliminates airborne fiberglass at HMA plant.
- Pellets can be stored indefinitely, whereas ground RAS require reprocessing if stored for more than a few weeks.

# REDUCED NEED FOR VIRGIN BINDER

CertainTeed RAS Pelletization process is scalable



- Yields a high quality, paving grade asphalt from recycled shingles and displaces high cost, virgin material.
- For example, 35,000 tons of shingles will yield 7,000 tons of virgin asphalt replaced.
- At a 3% pellet content in the HMA, 35,000 tons of shingles provides enough material for ~1.2M tons HMA
- Pellet production process is scalable and modular.



# UTILIZATION

Over 748,000 tons of HMA have been produced with excellent results, resulting in 22,440 tons virgin asphalt savings



## CITY OF PORTLAND, OR

City of Portland  
Standard Constructio  
Specifications, 2020



## CLACKAMAS COUNTY, OR

Clackamas County  
Roadway Standards,  
June 2020, references  
Oregon Standard  
Specifications for  
Construction.



## COWLITZ COUNTY, WA

Washington DOT  
Standard Materials  
Specifications M 46-  
01.43



## COLUMBIA COUNTY, OR

Columbia County Road  
Standards

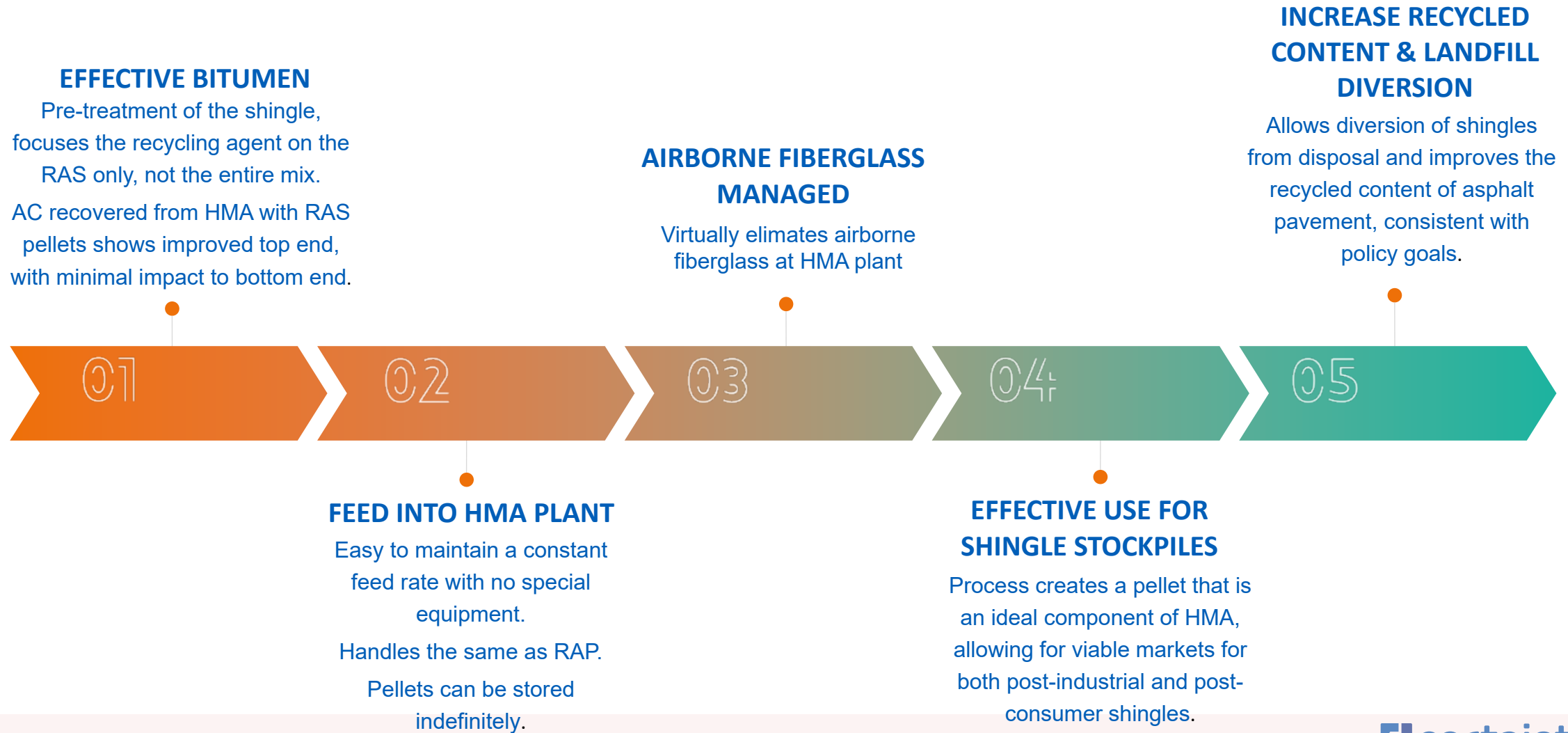


## CITIES OF LONGVIEW AND KELSO, WA

Washington DOT Standard  
Materials Specifications M  
46-01.43

# CONCLUSIONS

The process resolves the historic challenges with RAS, **unlocking a pathway for additional recycled content in HMA/WMA.**





# THANK YOU

## QUESTIONS & DISCUSSION

- Pilot Opportunities
- How can we help?

**Maure Creager**  
**Maure.creager@saint-gobain.com**  
**507-330-4330**

**Avni Patel**  
**Avni.patel@saint-gobain.com**  
**484-473-5830**