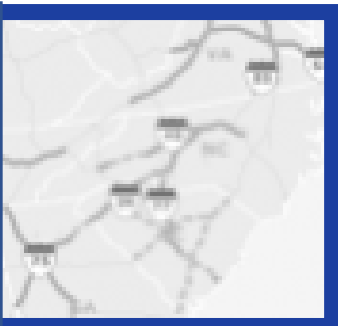




# Alternative Fuel Corridor Infrastructure Placement Plan

March 2019



## INTRODUCTION

To create and expand Alternative Fuel Corridors, Palmetto Clean Fuels (PCF) has developed a Corridor Infrastructure Placement Plan for electric (EV), compressed natural gas (CNG), liquified natural gas (LNG), propane (LPG), and hydrogen infrastructure. The goal of this plan is to identify major gaps in the current Alternative Fuel Corridor network and suggest sites/areas to strategically expand and create new corridor-ready roadways.

## BACKGROUND

### Nominations

#### July 2016

The US Department of Transportation Federal Highway Administration (FHWA) called on states to nominate national plug-in electric vehicle (EV) charging and hydrogen, propane, and natural gas fueling corridors along major roadways as a part of the “Fixing America’s Surface Transportation” (FAST) Act.

#### August 22, 2016

PCF submitted a response to the call for nominations of Alternative Fuel Corridors (81 FR 47850, July 22, 2016) with SC Department of Transportation (SCDOT) approval.

#### November 3, 2016

The Energy Office received a response from the FHWA indicating several nominations were being designated as Alternative Fuel Corridors. Parts of I-20, I-26, I-77 and I-85 were designated as corridor-ready in South Carolina.

The Energy Office has not submitted any further nominations for corridor designation.

### Signage

#### December 21, 2016

FHWA released a memorandum containing guidance on “Signing for Designated Alternative Fuel Corridors.”

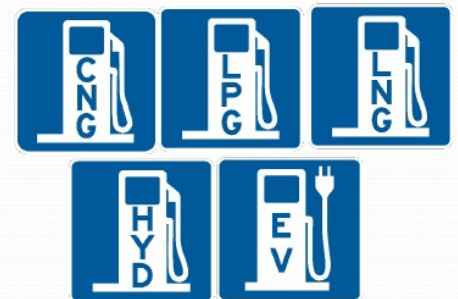
#### March 14, 2017

PCF submitted a signage request to the Director of Traffic Engineering at SCDOT, requesting that appropriate signage be

installed along the signage-ready corridors. This request was lengthy, including specific signage locations, Manual on Uniform Traffic Control Devices reference numbers, and an interactive map.

#### March 17, 2017

Coordinators received a response from SCDOT.



June 6, 2017

PCF received an official proposal from SCDOT for the placement of signs and a cost estimate of \$4,531.25. Installation costs were waived, as SCDOT would cover the installation.

June 29, 2017

PCF received confirmation that fabrication of the signs was complete. SCDOT sent an invoice for \$2,092.96. Instead of using the SCDOT Sign Shop, the signs were fabricated at the SC Department of Corrections – Prison Industries, significantly reducing the cost.

### Alternative Fuel Corridor Convenings

PCF held a South Carolina-specific Alternative Fuel Corridor convening on June 13, 2018. This meeting was used to inform input at the Southeast convening in September. The topics included anchor fleets, sustainability, financing, and locations to determine the best methods to build out the existing corridors and implement new ones. There were four sessions, two of which were led by coalition stakeholders/PCF Advisory Board members. Participants wrapped up the day by summarizing key takeaways during a roundtable discussion.



A Regional Alternative Fuel Corridor Convening took place on September 25, 2018, in Charleston, SC. The regional convening consisted of 40 stakeholders. Representatives from the USDOT and the National Renewable Energy Laboratory provided key background information about future corridor nominations and the next round of designations. There were several key takeaways to expand the Alternative Fuel Corridors in the Southeast. The initiative to expand the Alternative Fuel Corridors has increased collaboration across states. This collaboration is necessary for the success of the corridors since corridors cross state and county lines. Signage can help normalize the use of alternative fuels by making consumers aware of their availability. Lastly, state leaders can encourage the expansion of the corridors by promoting alternative fuels through rate schedules, streamlining permitting processes, incentivizing infrastructure, and providing incentives for consumers to use alternative fuels.

# DESIGNATION CRITERIA

## Corridor-Ready

A corridor-ready corridor is defined as having a minimum of 2 stations. Final classifications will be made on a case-by-case basis.

## Corridor-Pending

If a corridor is being designated as corridor-pending and currently has no alternative fuel facilities located on it, then a strategy for infrastructure build-out should be submitted.

## Fuel-specific Criteria

### EV Charging

Electric vehicle designations will only consider corridors with DC Fast Charge infrastructure. Because Tesla stations are proprietary, they are not included.

#### Corridor-Ready

Public DC Fast Charging no greater than 50 miles between one station and the next on corridor, and no greater than 5 miles off the highway

#### Corridor-Pending

Public DC Fast Charging chargers separated by more than 50 miles

### Hydrogen

If a hydrogen refueling station currently used for non-road transportation purposes is being used to support the nomination process, then the station must be compliant with SAE J2601 standards and meet all of the criteria outlined in this document for a hydrogen corridor including being publicly accessible.

#### Corridor-Ready

Public hydrogen stations no greater than 100 miles between one station and the next on the corridor, and no greater than 5 miles off the highway

#### Corridor-Pending

Public hydrogen stations separated by more than 100 miles

### Propane

For propane stations, only "primary" stations (i.e., those stations that offer vehicle-specific fueling capabilities and fuel priced specifically for use in vehicles, as designated by the US Department of Energy's Alternative Fuel Station Locator) would be considered when determining infrastructure coverage along a nominated corridor.

#### Corridor-Ready

Public, primary propane stations no greater than 150 miles between one station and the next on the corridor, and no greater than 5 miles off the highway

#### Corridor-Pending

Public, primary propane stations separated by more than 150 miles

### CNG

#### Corridor-Ready

Public fast fill, 3,600 psi CNG stations no greater than 150 miles between one station and the next on the corridor, and no greater than 5 miles off the highway

#### Corridor-Pending

Public, fast fill, 3,600 psi CNG stations separated by more than 150 miles

## LNG

### Corridor-Ready

Public LNG stations no greater than 200 miles between one station and the next on the corridor, and no greater than 5 miles off the highway

### Corridor-Pending

Public LNG stations separated by more than 200 miles

## CURRENTLY DESIGNATED CORRIDORS IN SOUTH CAROLINA

The chart below outlines interstates designated corridor-ready and corridor-pending during the 2016 call for nomination:

Interstate	Designation Status	Fuel Types	State(s) Covered	EV	CNG	LNG	LPG	H2
I-85	Designated 2016: <i>Ready</i>	EV CNG	South Carolina	From GA border to NC border.	From NC border to GA border.			
	Designated 2016: <i>Pending</i>	LPG H2					Entire length of corridor.	Entire length of corridor.
I-77	Designated 2016: <i>Ready</i>	EV	South Carolina	From NC border to the end of I-77 in Columbia.				
	Designated 2016: <i>Pending</i>	CNG LPG H2			Entire length of corridor.		Entire length of corridor.	Entire length of corridor.
I-26	Designated 2016: <i>Ready</i>	EV LPG	South Carolina	From Columbia to Orangeburg and from North Charleston to Charleston.			From Spartanburg, SC to Charleston, SC.	
	Designated 2016: <i>Pending</i>	CNG H2		From NC border to Columbia; and from Orangeburg to North Charleston.	Entire length of corridor.			Entire length of corridor.
I-95	Designated 2016: <i>Ready</i>		South Carolina					
	Designated 2016: <i>Pending</i>	EV CNG LPG H2		From SC/NC border to SC/GA border.	Entire length of corridor.		Entire length of corridor.	Entire length of corridor.
I-20	Designated 2016: <i>Ready</i>	LPG	South Carolina				From Camden, SC to GA border.	
	Designated 2016: <i>Pending</i>	EV CNG LPG H2		From Florence to SC/GA border.	Entire length of corridor.		From Florence to Camden.	Entire length of corridor.

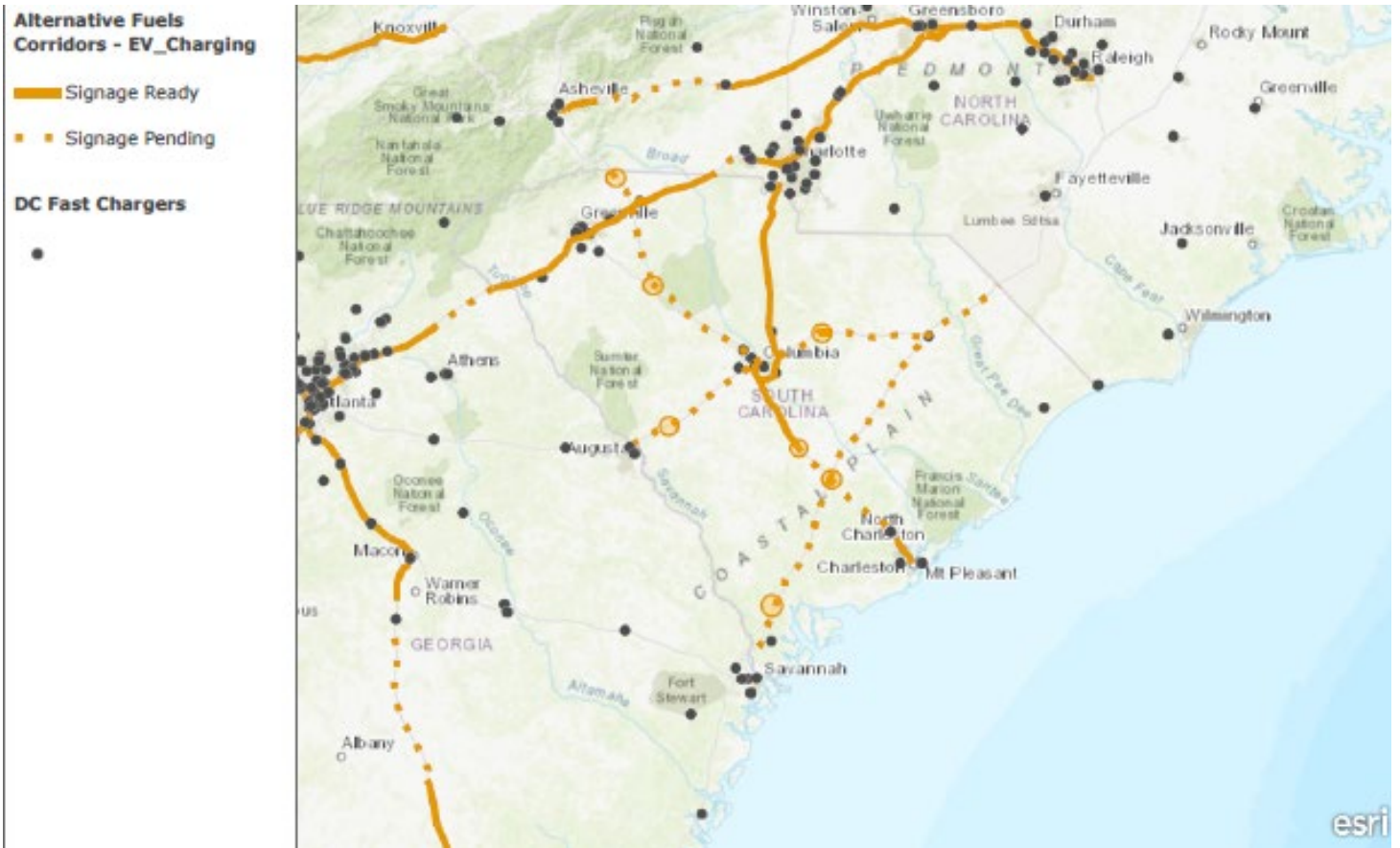
## NECESSARY INFRASTRUCTURE PLACEMENT

The chart below outlines interstates designated corridor-pending during the 2016 call for nominations and the needed infrastructure at points along the corridor to switch the interstate to corridor-ready:

Interstate	EV	CNG	LNG	LPG	Hydrogen
I-85			Spartanburg, SC at the intersection of I-26 and I-85 and Anderson, SC	Spartanburg, SC at the intersection of I-26 and I-85 and Anderson, SC	Spartanburg at the intersection of I-26 and I-85 and Anderson, SC
I-77		Columbia, SC at the intersection of I-26 and I-77	Columbia, SC at the intersection of I-20 and I-77	Rock Hill, SC	Rock Hill, SC and Columbia, SC at the intersection of I-77 and I-20
I-26	Bowman, SC off I-26 and I-95, Orangeburg, SC, Clinton, SC at the fork of I-26 and I-385, and Landrum, SC	Columbia, SC at the intersection of I-26 and I-77 and Bowman, SC at the intersection of I-95 and I-26	Bowman, SC at the intersection of I-95 and I-26, Spartanburg, SC at the intersection of I-26 and I-85	Spartanburg, SC at the intersection of I-26 and I-85	Bowman, SC at the intersection of I-95 and I-26, Columbia, SC at the intersection of I-20 and I-26, and Spartanburg, SC at the intersection of I-26 and I-85
I-95	Bowman, SC off of I-26 and I-95 and Ridgeland, SC	Bowman, SC at the intersection of I-95 and I-26 and Florence, SC at the intersection of I-95 and I-20	Bowman, SC at the intersection of I-95 and I-26	Florence, SC at the intersection of I-20 and I-95 and Ridgeland, SC	Florence, SC at the intersection of I-20 and I-95, and Bowman, SC at the intersection of I-95 and I-26
I-20	One station in Aiken, SC and one in Camden, SC	Florence, SC at the intersection of I-95 and I-20 and Columbia, SC at the intersection of I-20 and I-26	Columbia, SC at the intersection of I-20 and I-77 and Aiken, SC	Florence, SC at the intersection of I-20 and I-95	Florence, SC at the intersection of I-20 and I-95 and Columbia, SC at the intersection of I-20 and I-26

## EV

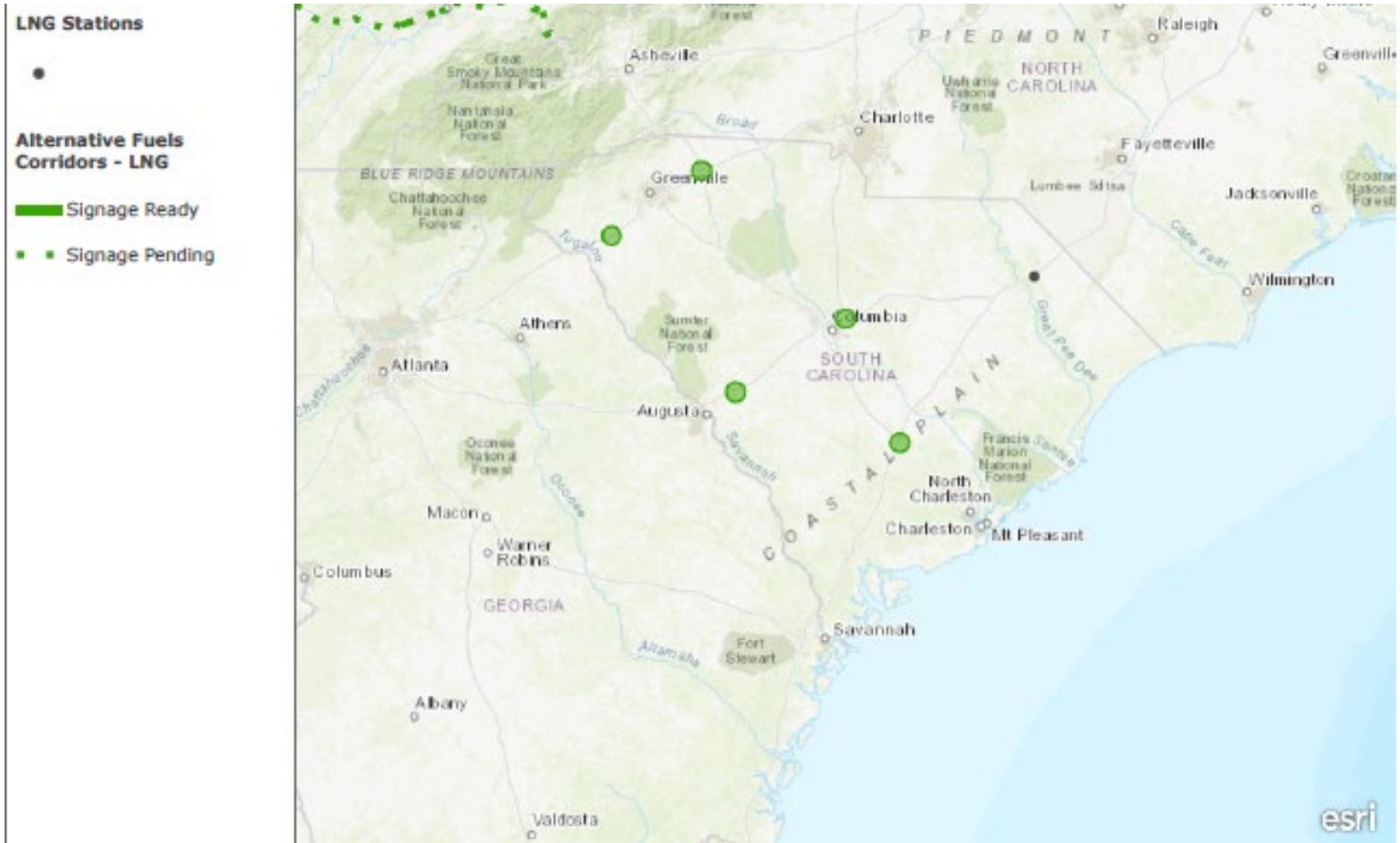
Current locations of DC Fast Chargers can be found at each of the black dots on the map. Corridor-ready corridors are marked in solid orange and corridor-pending corridors are depicted by dashed lines. Orange circles mark optimal locations for the deployment of DC Fast Chargers. By installing DC Fast Chargers at suggested locations, charging stations would be no longer than 50 miles apart and less than 5 miles from the corridor.



Interstate	New Stations Needed	Locations of Necessary Infrastructure
I-85	0	
I-77	0	
I-26	4	<ol style="list-style-type: none"> <li>1. Bowman, SC off I-26 and I-95</li> <li>2. Orangeburg, SC</li> <li>3. Clinton, SC at the fork of I-26 and I-385</li> <li>4. Landrum, SC</li> </ol>
I-95	1	<ol style="list-style-type: none"> <li>5. Bowman, SC off I-26 and I-95</li> <li>6. Ridgeland SC</li> </ol>
I-20	2	<ol style="list-style-type: none"> <li>7. Aiken, SC</li> <li>8. Camden, SC</li> </ol>

## LNG

There is currently only one LNG station in South Carolina, and it is represented by the black dot on the map. Due to the lack of infrastructure, there are also no designated corridor-ready or corridor-pending roadways in the state. The green circles represent optimal placement for new infrastructure. By installing stations at suggested locations, infrastructure is no more than 200 miles apart and less than 5 miles from the corridor.



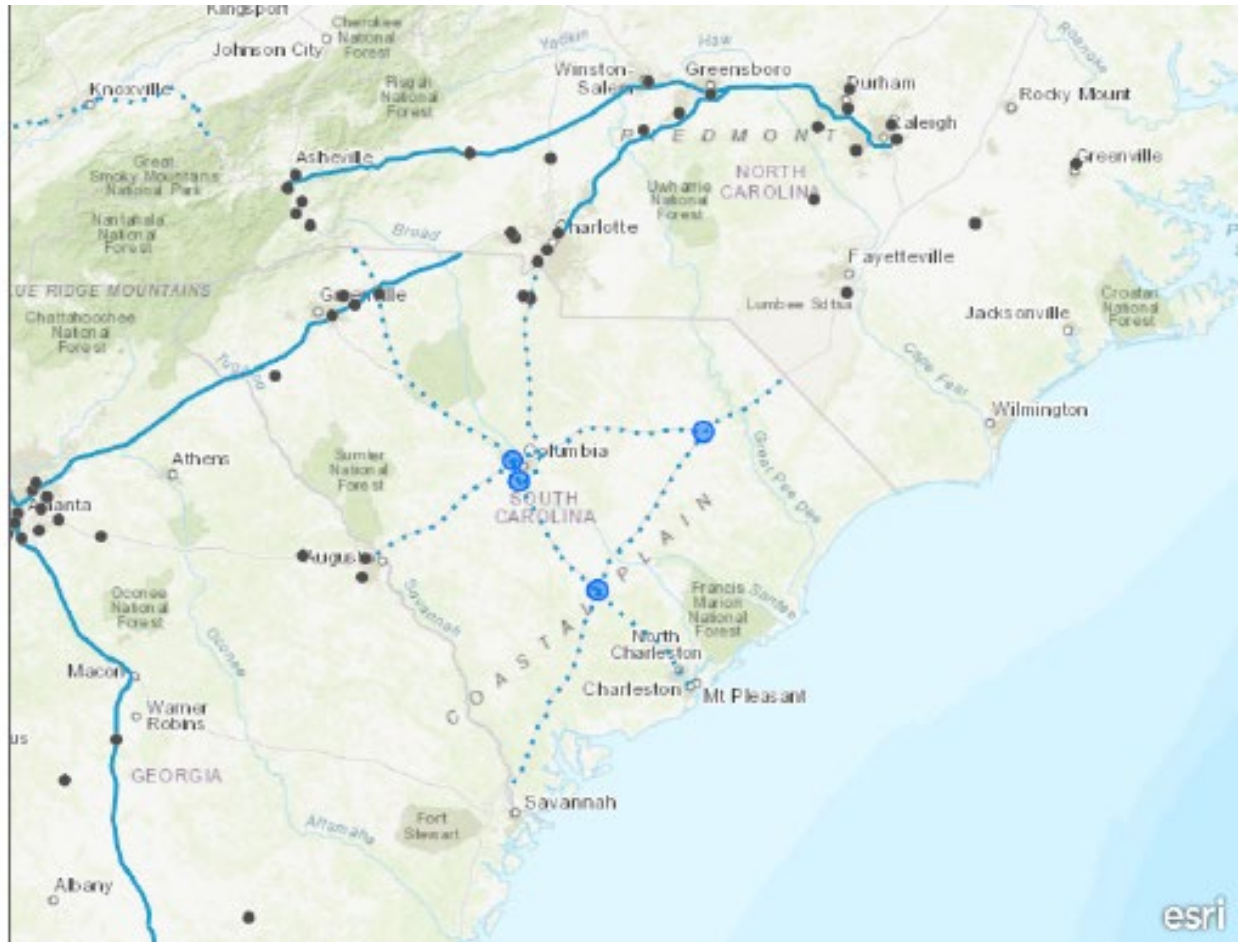
Interstate	New Stations Needed	Locations of Necessary Infrastructure
I-85	2	1. Spartanburg, SC at the intersection of I-26 and I-85 2. Anderson, SC
I-77	1	3. Columbia, SC at the intersection of I-20 and I-77
I-26	2	4. Bowman, SC at the intersection of I-95 and I-26 5. Spartanburg, SC at the intersection of I-26 and I-85
I-95	1	6. Bowman, SC at the intersection of I-95 and I-26
I-20	2	7. Columbia, SC at the intersection of I-20 and I-77 8. Aiken, SC



## CNG

There are several CNG stations that meet corridor-ready criteria, as shown by the black dots. These stations created one corridor-ready corridor. Blue circles show optimal infrastructure placement. By installing stations at suggested locations, infrastructure is no more than 150 miles apart and less than 5 miles from the corridor.

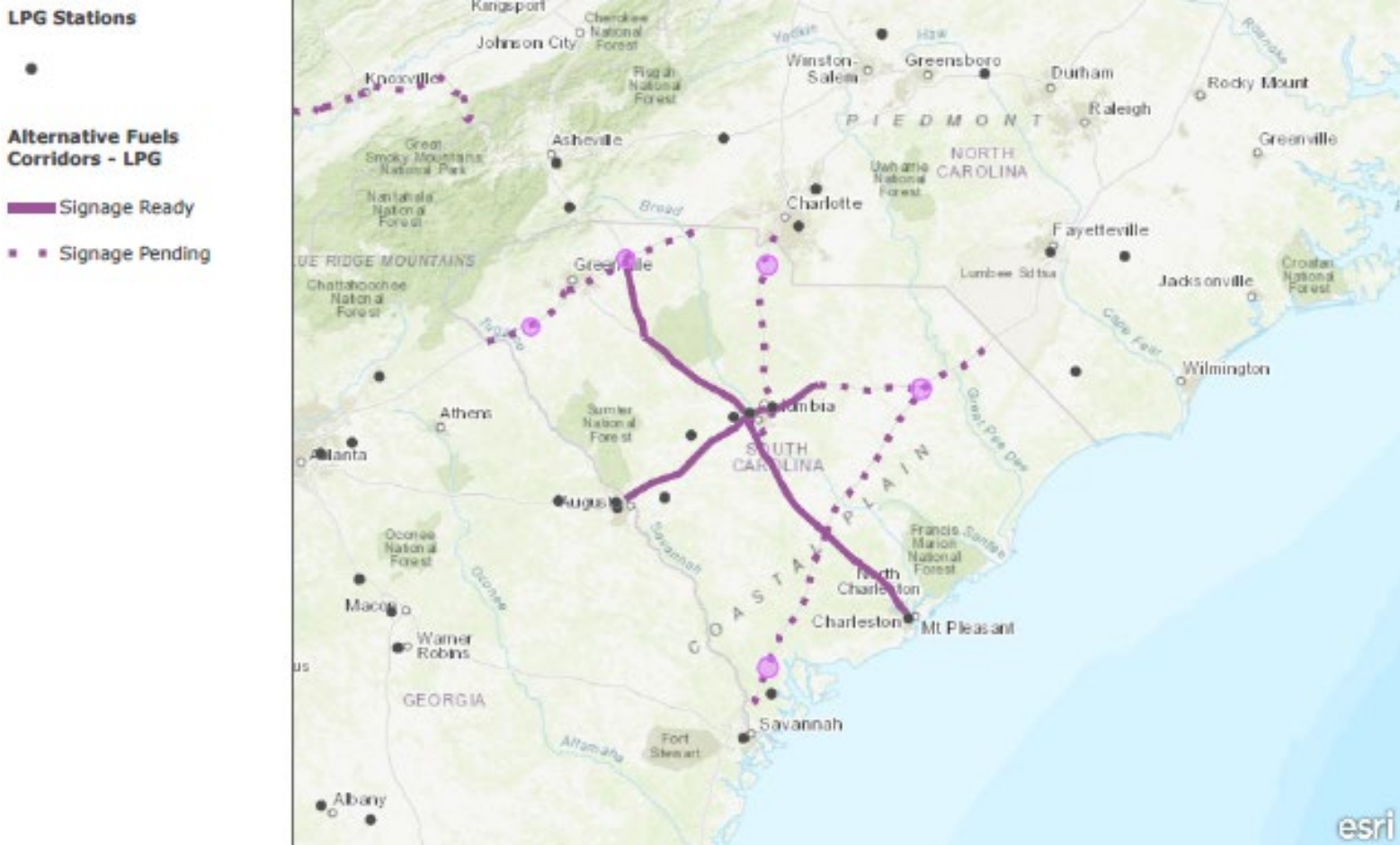
- CNG Stations**
- 
- Alternative Fuels Corridors - CNG**
- Signage Ready
  - Signage Pending



Interstate	New Stations Needed	Locations of Necessary Infrastructure
I-85	0	
I-77	1	1. Columbia, SC at the intersection of I-26 and I-77
I-26	2	2. Columbia, SC at the intersection of I-26 and I-77 3. Bowman, SC at the intersection of I-95 and I-26
I-95	2	4. Bowman, SC at the intersection of I-95 and I-26 5. Florence, SC at the intersection of I-95 and I-20
I-20	2	6. Florence, SC at the intersection of I-95 and I-20 7. Columbia, SC at the intersection of I-20 and I-26

## LPG

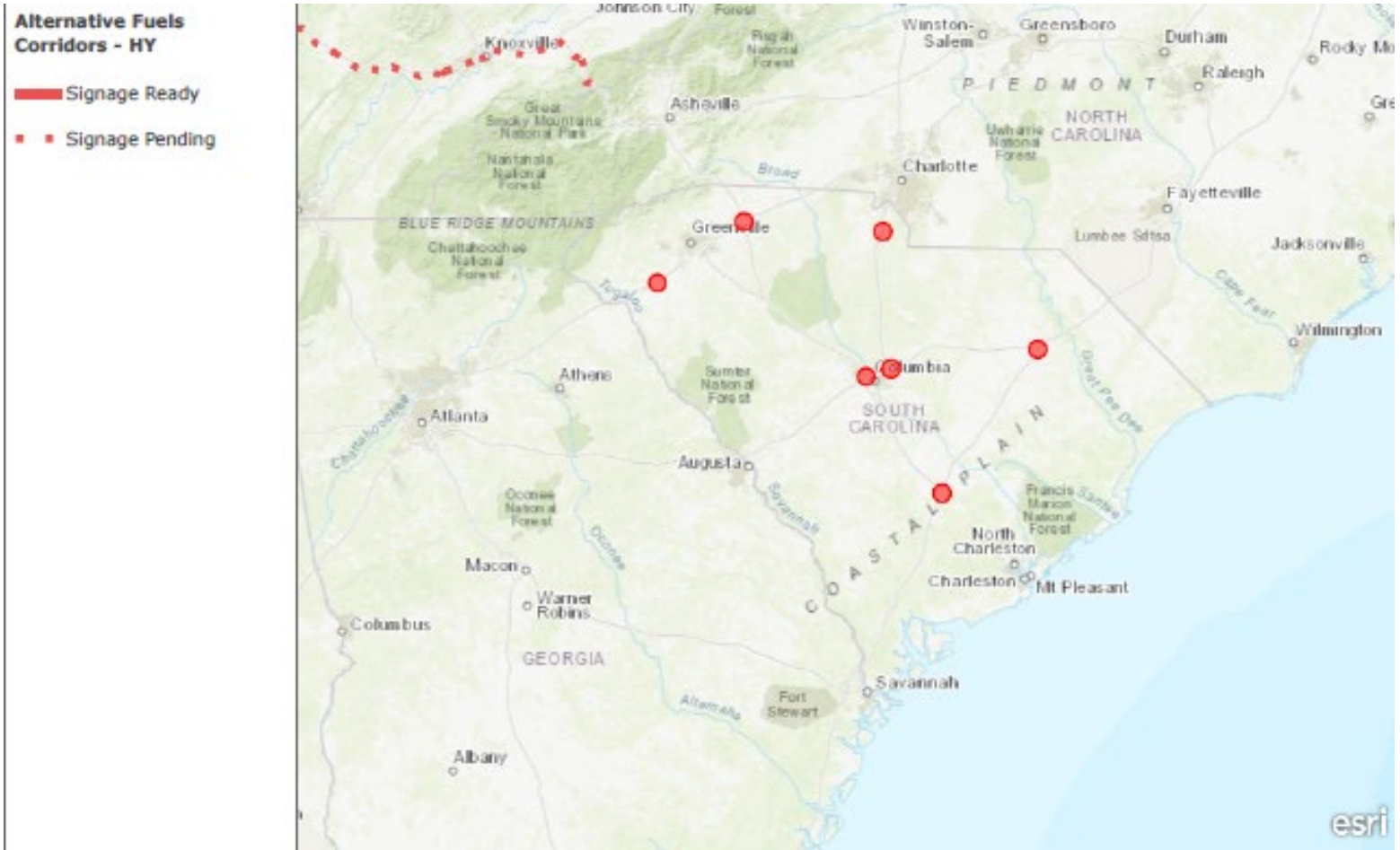
The current propane infrastructure, as shown by the black dots, has allowed two highways to be designated as corridor-ready. Purple circles show optimal placement for propane infrastructure to designate all interstates as corridor-ready. By installing stations at suggested locations, infrastructure is no more than 150 miles apart and less than 5 miles from the corridor.



Interstate	New Stations Needed	Locations of Necessary Infrastructure
I-85	2	1. Spartanburg, SC at the intersection of I-26 and I-85 2. Anderson, SC
I-77	1	3. Rock Hill, SC
I-26	1	4. Spartanburg, SC at the intersection of I-26 and I-85
I-95	2	5. Florence, SC at the intersection of I-20 and I-95 6. Ridgeland, SC
I-20	1	7. Florence, SC at the intersection of I-20 and I-95

## Hydrogen

There are currently no hydrogen stations in South Carolina that meet corridor-ready criteria. To create an optimal corridor-ready corridor system, PCF suggests infrastructure be placed at the location of the red dots on the map. By installing stations at suggested locations, infrastructure is no more than 100 miles apart and less than 5 miles from the corridor.



Interstate	New Stations Needed	Locations of Necessary Infrastructure
I-85	2	<ol style="list-style-type: none"> <li>1. Spartanburg at the intersection of I-26 and I-85</li> <li>2. Anderson, SC</li> </ol>
I-77	2	<ol style="list-style-type: none"> <li>3. Rock Hill, SC</li> <li>4. Columbia, SC at the intersection of I-77 and I-20</li> </ol>
I-26	3	<ol style="list-style-type: none"> <li>5. Bowman, SC at the intersection of I-95 and I-26</li> <li>6. Columbia, SC at the intersection of I-20 and I-26</li> <li>7. Spartanburg, SC at the intersection of I-26 and I-85</li> </ol>
I-95	2	<ol style="list-style-type: none"> <li>8. Florence, SC at the intersection of I-20 and I-95</li> <li>9. Bowman, SC at the intersection of I-95 and I-26</li> </ol>
I-20	2	<ol style="list-style-type: none"> <li>10. Florence, SC at the intersection of I-20 and I-95</li> <li>11. Columbia, SC at the intersection of I-20 and I-26</li> </ol>

