

Propane shortages and skyrocketing prices in parts of the United States have made it difficult for some homeowners to affordably and consistently heat their homes this winter.

2 Analysis

Safety Goal Impacted

People unable to heat their homes
Evidence: Media stories covered the issues; formal complaints made by homeowners.

Use propane for heating
Evidence: ~ 5% of US households use propane for heat.

Customer Service Goal Impacted

Can't afford propane
AND
Skyrocketing propane prices
Evidence: The average price of a gallon of residential propane for the week ending Jan. 20 hit \$2.96, increasing 60 cents from mid-October. Propane prices in the Midwest have been even higher, peaking at ~\$5 a gallon.

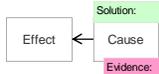
Low supply/ high demand

Local propane shortages

See same cause

Regulatory Goal Impacted

Regulators stepped in to help
Evidence: Federal Energy Regulatory Commission (FERC) issued an order to request Enterprise TE Products Pipeline Company LLC (Enterprise) to prioritize propane shipments to the US areas impacted by the propane shortages.



1 Problem

What	Problem(s)	Propane shortage, increasing propane prices
When	Date	Winter 2014
	Different, unusual, unique	Abnormally cold winter
Where	Facility, site	Widespread issues in US
	Task being performed	Heating with propane
Impact to the	Goals	
	Safety	People unable to heat their homes
	Customer Service	Skyrocketing propane prices
	Regulatory	Regulators stepped in to help propane shortage
	Production/ Schedule	Difficulty replenishing local propane supplies

3 Solutions

Production/ Schedule Goal Impacted

Difficulty replenishing local propane supplies

AND

Issues with infrastructure

Major pipeline shutdown for repairs
Evidence: The Cochin pipeline was shutdown for repairs.

AND
Rail re-routing impacted Canadian shipments

AND
Lucrative

AND
Improved infrastructure for shipping propane

Completion of several port dock expansions

AND
More propane exported than in past
Evidence: Propane exports have quadrupled in the last 3 years.

AND
Increased propane production in US

New mining techniques

Implementation of hydraulic fracturing

AND
US propane demand has been down in recent years

Dangerous Combination: Propane Shortages and a Bitterly Cold Winter

Larger, wetter than normal grain crop last fall

AND
Increased demand for agriculture uses
Evidence: Five times as much propane was used to dry corn this year than last year.

Grain need to be dried prior to storage

Prevents grain from spoiling

AND
Propane is used to dry grain

Grain was wet when harvested

AND
Propane is used to fuel drying process

Limited access to other fuel sources

Typically done in rural areas

Cause Mapping is a Root Cause Analysis method that captures basic cause-and-effect relationships supported with evidence.

CAUSE MAPPING

Problem Solving • Incident Investigation • Root Cause Analysis

- Step 1 **Problem** - What's the Problem?
- Step 2 **Analysis** - Why did it happen?
- Step 3 **Solutions** - What will be done?



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The final step in the Cause Mapping process is to develop solutions to reduce the risk that the problem will recur. In the short term, lawmakers are taking a number of steps to get propane shipped to the impacted areas, but how the US chooses to deal with this issue in the long term is still being debated.