

# Energy/GHG Assessment

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# Energy/GHG Assessment

- Evaluate and recommend strategies to meet Century Agenda energy and greenhouse gas reduction goals

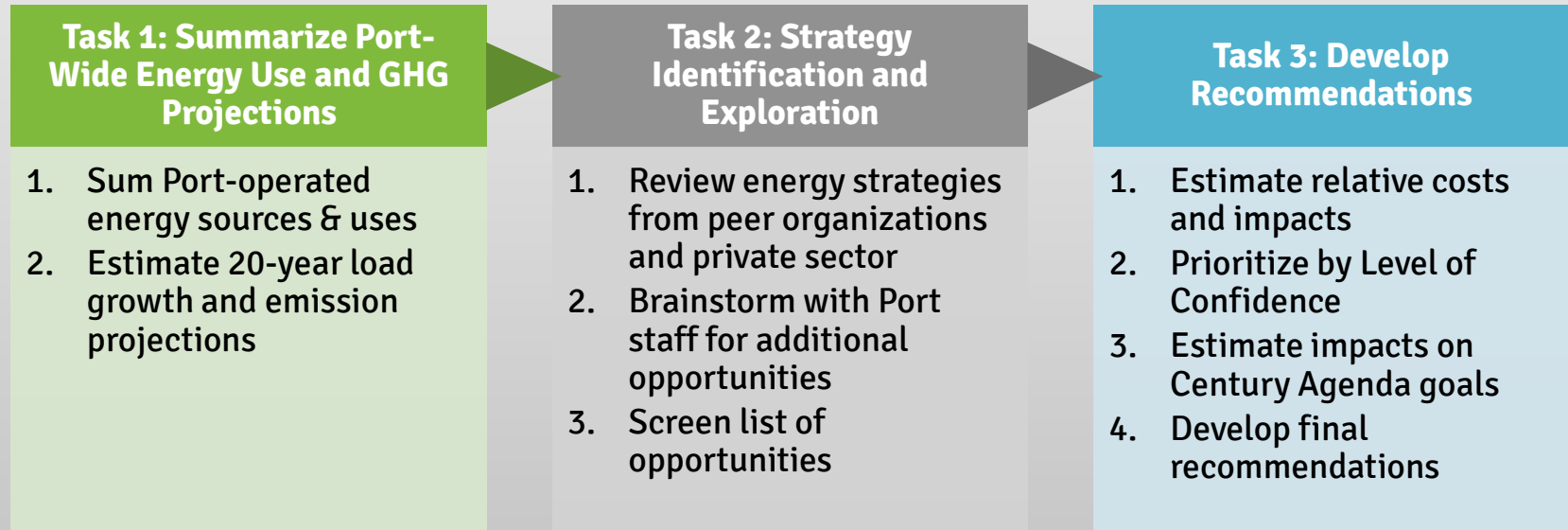
Protect our climate, advance clean technologies, create jobs



Strategies evaluated by experts across the Port

# Project Approach

**Objective:** Identify opportunities to achieve the Port Century Agenda **energy load growth and GHG reduction goals.**



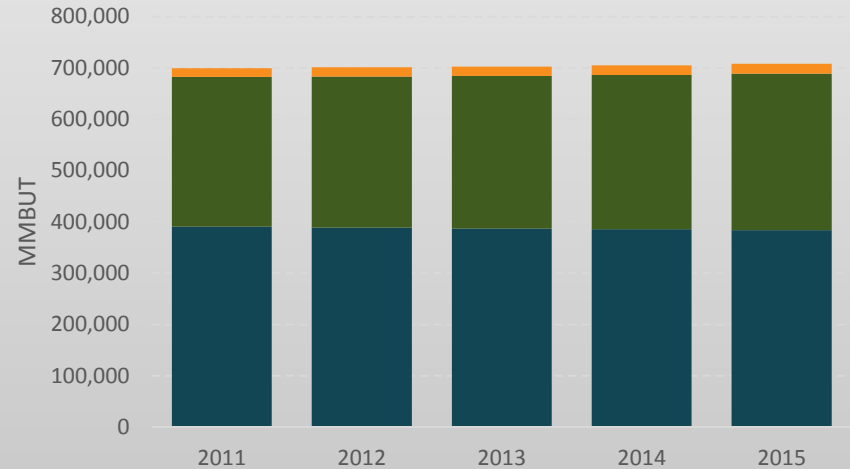
Approach combines technical analysis and collaboration

# Annual Energy Usage

## Seaport Energy Use By Type 2011-2015



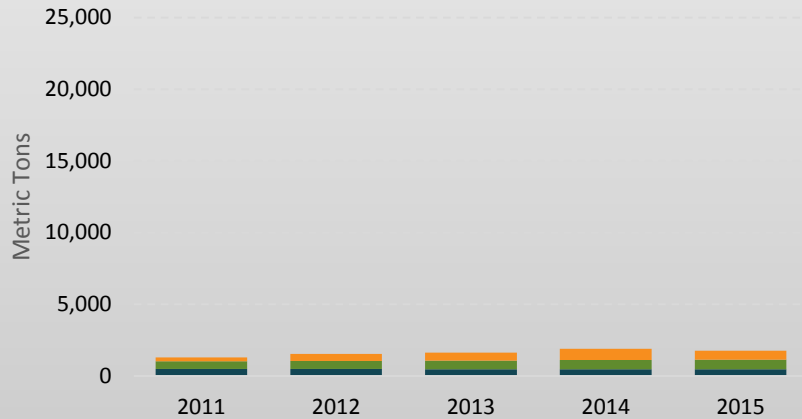
## Airport Energy Use By Type 2011-2015



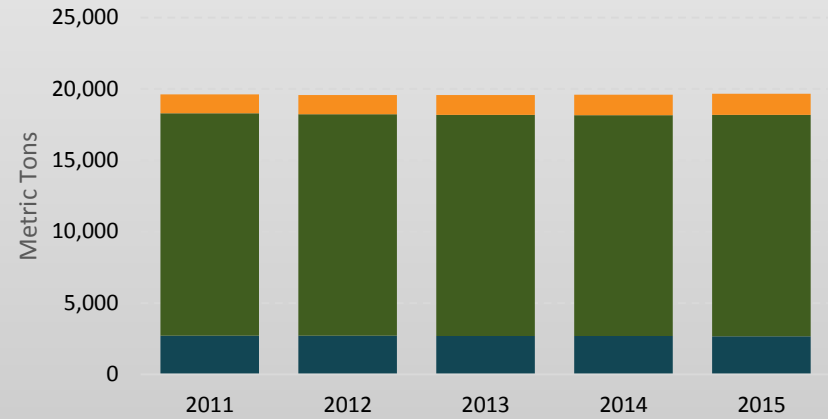
Electricity      Natural Gas      Liquid Fuels

# Annual Greenhouse Gas Emissions

## Seaport GHG Tons By Source 2011-2015

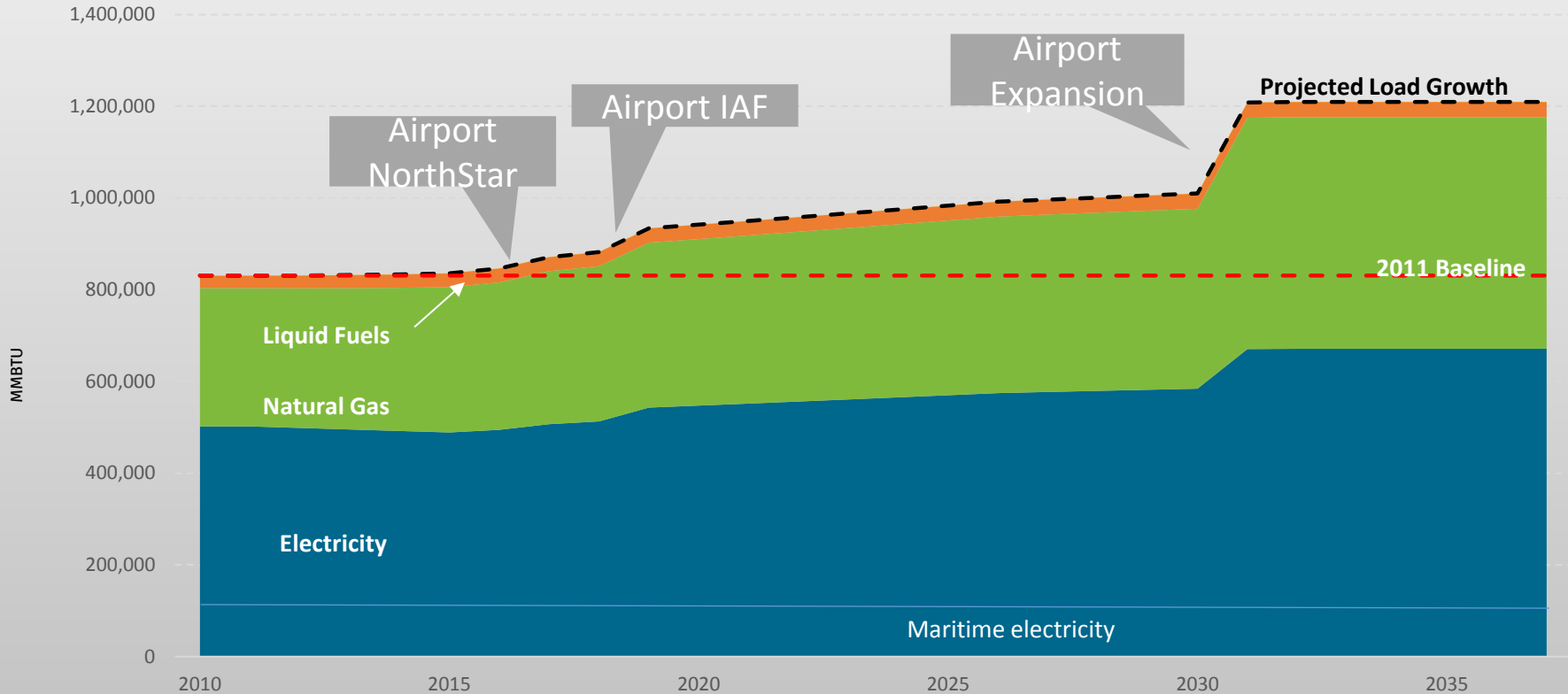


## Airport GHG Tons By Source 2011-2015

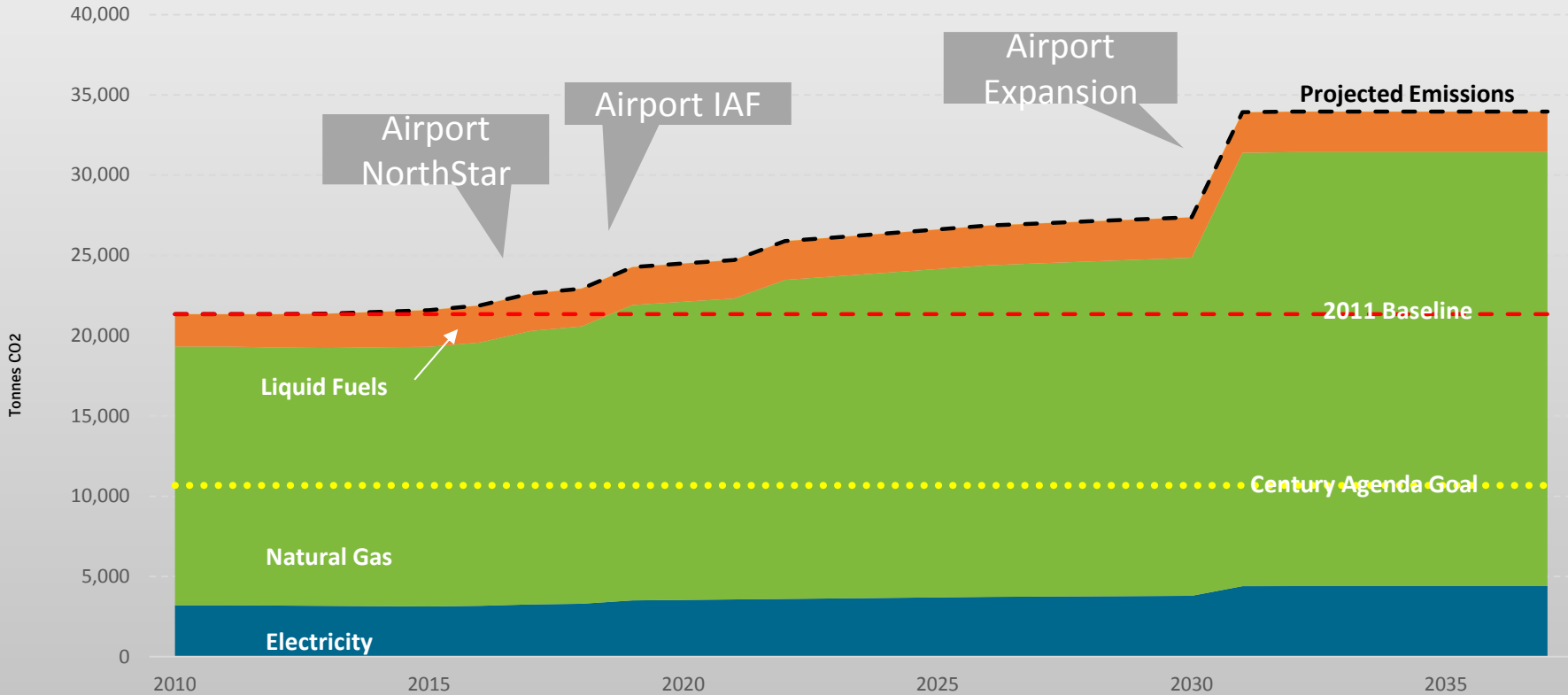


Electricity      Natural Gas      Liquid Fuels

# Port-wide Energy Forecast



# Port-wide GHG Emissions Forecast



# Task 3: Develop Recommendations Prioritized by Level of Confidence

## High

- Technical analysis complete
- Understand energy reduction potential
- Understand return on investment

## Med

- Industry best practice
- Proven technology
- Understand potential benefits and costs at high level
- Further exploration warranted

## Low

- Emerging technology
- Shows promise for potential application in Port context
- Many unknowns
- Further exploration warranted

Preference for technologies that we understand



# Port's Strong Legacy of Energy Conservation

- Airport completed over 50 conservation projects since 2001
- Cumulatively, projects reduce
  - 164,300 MMBTU/year
  - 2980 tons/year GHG emissions
- Annual energy bill savings \$1.9M
  - Represents a 21% savings



Long-term savings from early conservation projects

## Recommended Energy Conservation Measure

**Energy  
Reduction  
(% Port Use)**



**Metering & Data System Upgrades**

Enabling



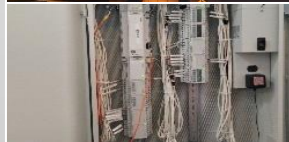
**Mechanical Upgrades**

2%



**Advanced Lighting Technologies & Controls**

5%



**Plug Load Management**

1%



**Building Retuning**

2%



**Fleet Optimization**






1%



**Advanced Building Envelope Systems**

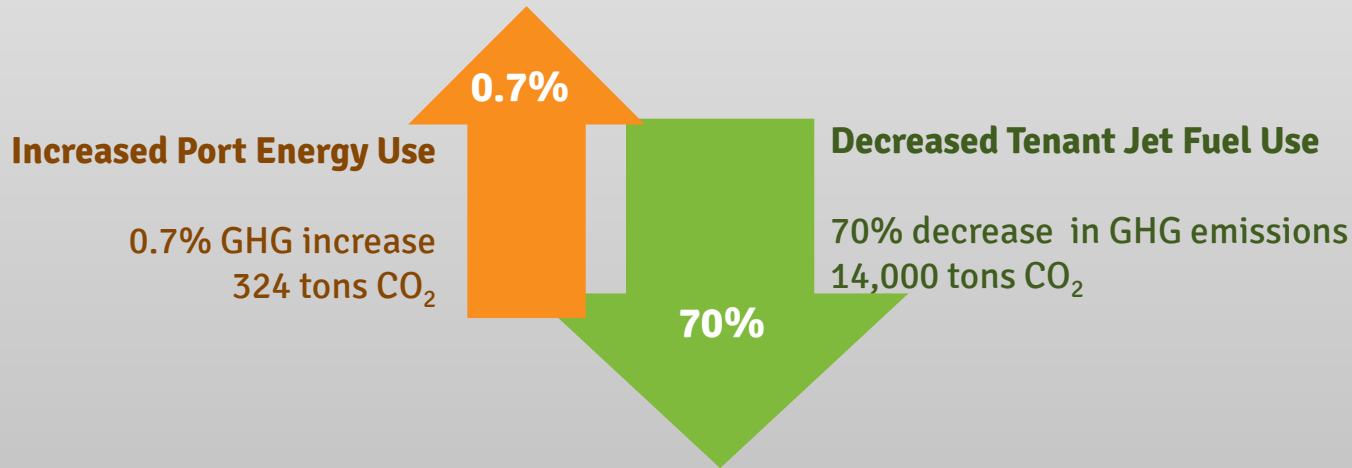
3%

# Recommended Renewable Energy Strategies

Renewable Energy Measure	Energy Generation (% Port Use)
	<b>Renewable Natural Gas (RNG)</b> 35%
	<b>Solar Photovoltaics</b> 1%
	<b>Power Purchase Agreement or Offsite Project</b> TBD
	<b>Waste Heat Recovery</b> TBD
	<b>Emerging Generation Technologies</b> TBD

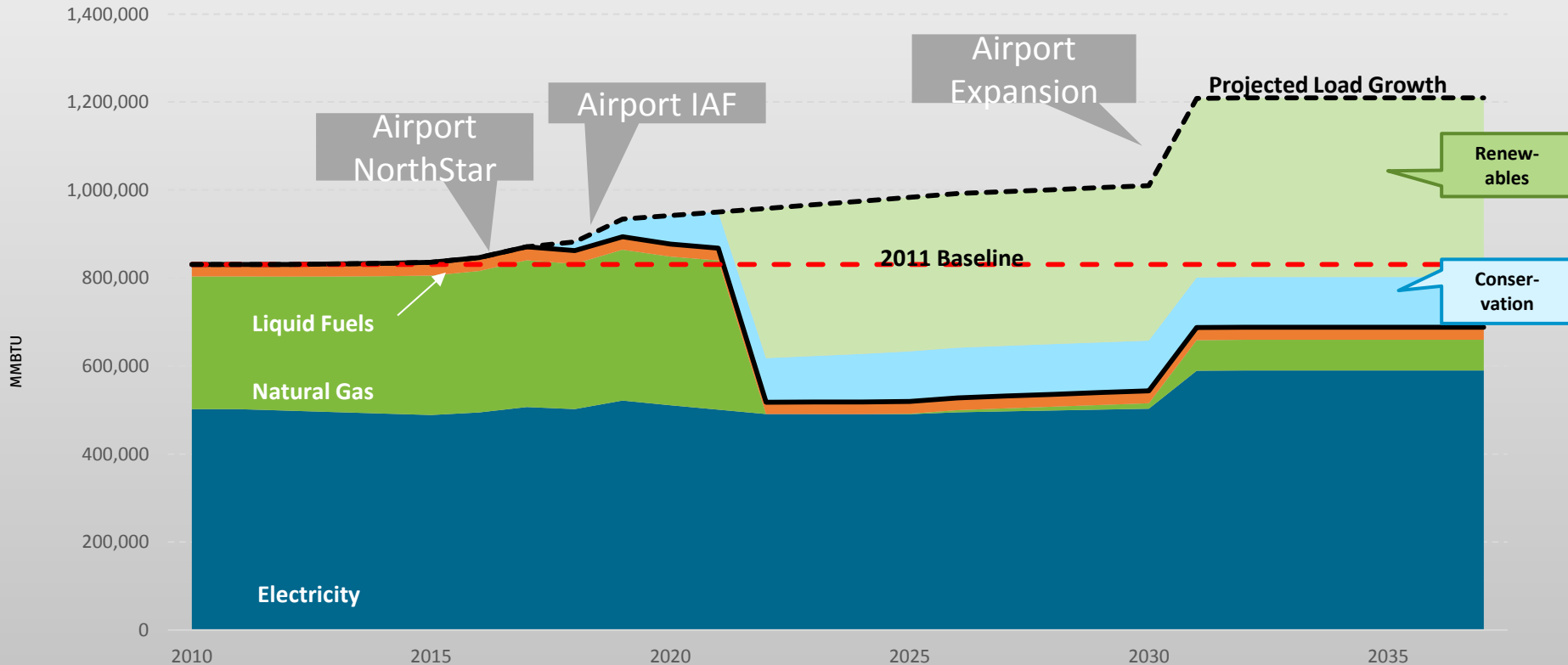
# Renewable Energy can Increase Airport Energy and Emissions

- Ground power connections and Pre-conditioned air supplied from a central plant
- Aircraft doesn't idle its APU, which runs on jet-fuel

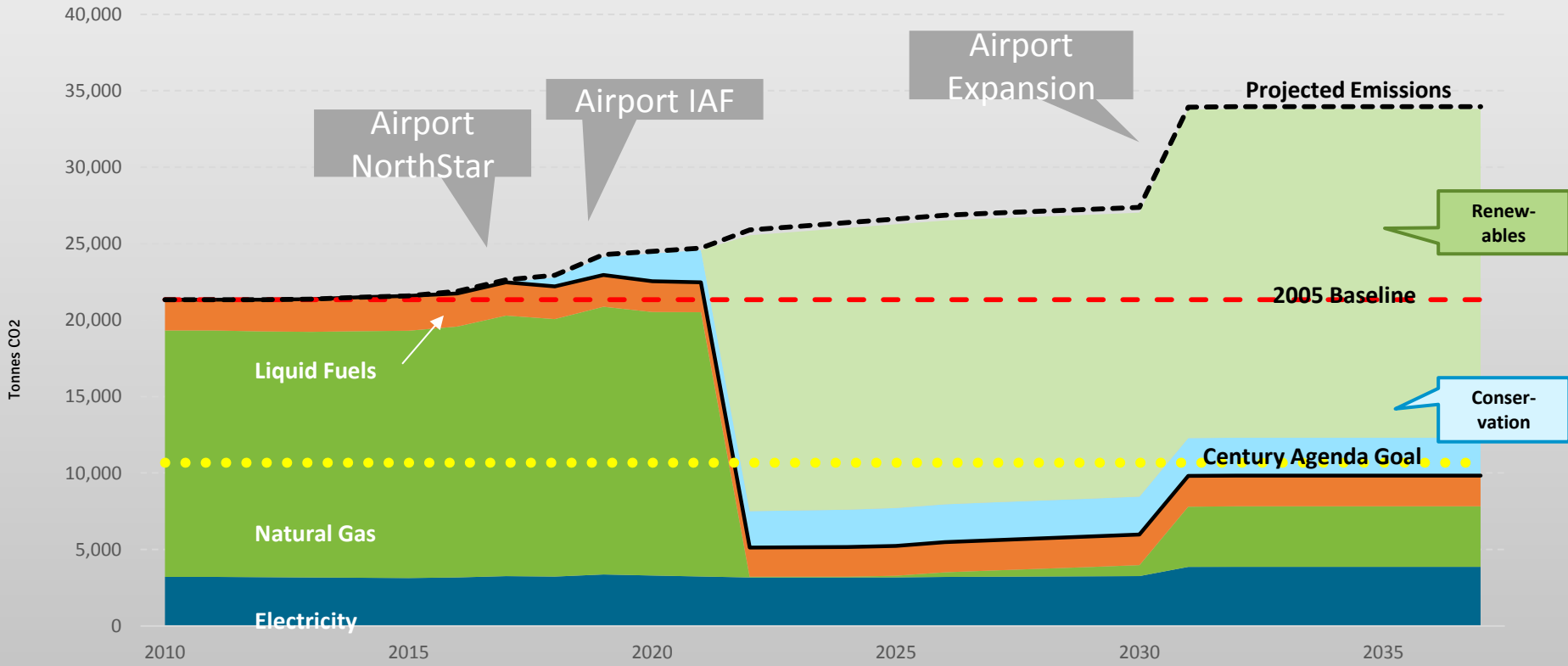


Helping Partners Reduce Emissions

# Impact of Energy Strategies on Future Load Growth



# Impact of Energy Strategies on GHG Emissions



# Implementation Schedule

## 1. Metering & Data System Upgrades

- Request budget, develop Metering Plan  
*2017 - 2018*
- Implement Metering Plan  
*2019*

## 2. Mechanical Upgrades

- Design and install “Stage III” Mechanical Upgrades  
*2017 - 2018*

## 3. Advanced Lighting Technologies & Controls

- Continue to replace lighting throughout Port facilities  
*Ongoing*

Focus on Highest Priorities

# Implementation Schedule

## 4. Renewable Natural Gas (RNG)

- Identified range of potential sources in WA state  
*2015-2016*
- Research and evaluate options for RNG projects *Ongoing*

## 5. Solar Photovoltaics

- Evaluating solar opportunities at both seaport and airport locations
- Airport Solar Feasibility Report  
*February 2017*

## 6. Integrate recommendations from Energy and Sustainability Committee

- Revise project review procedures as appropriate  
*2017*

Focus on highest priorities