



Oregon LNG Project

Presentation to

California Energy Commission

December 4, 2008



Oregon LNG Terminal Simulated View



Presentation Content

- Oregon LNG History
- Project Issues – How We Address Them:
 - Do We Need LNG?
 - Safety/Security – Navigation Risk – Site Selection
 - Airport Impacts
 - Turning Basin Dredging - Fish
 - Ballast/Cooling Water – Fish Entrainment
 - Visual Impacts
 - Greenhouse Gases - LNG
 - Pipeline Siting – Criteria
- Why Oregon LNG
- Project Schedule



OregonLNG

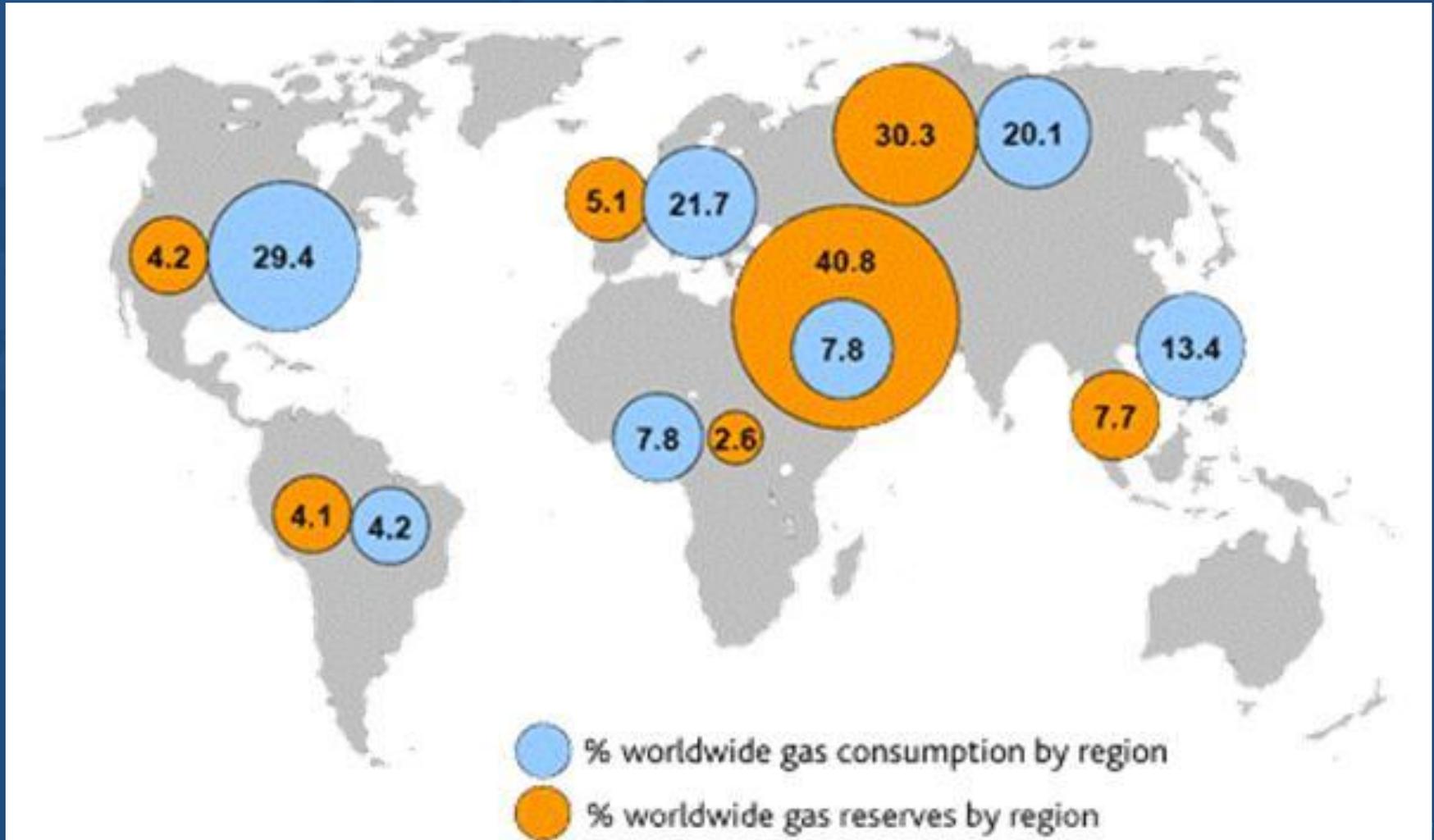
Oregon LNG History

- **Project Started Q1/04 Under Calpine Corp.**
- **Calpine Bankruptcy 12/05 – Project Slowdown**
- **Local Land Use Process Completed 1/06**
- **Legal Challenges Completed 10/06**
- **Management Buyout 1/07:**
- **LNG Dev. Co. dba Oregon LNG**
 - **Funding: Leucadia National Corp. (LUK)**
 - **Passive Member: Jeremy Dockter**
 - **Active Members: Mohammed Alrai, Peter Hansen**



OregonLNG

Do We Need to Import LNG?



**Sandia National
Laboratories'
Report Provided
the Basis for
Oregon LNG's
Selection of the
Skipanon
Peninsula**

SANDIA REPORT

SAND2004-6258
Unlimited Release
Printed December 2004

**Guidance on Risk Analysis and Safety
Implications of a Large Liquefied Natural
Gas (LNG) Spill Over Water**

Mike Hightower, Louis Gritzko, Anay Luketa-Hanlin, John Covan, Sheldon Tieszen, Gerry Wellman, Mike Irwin, Mike Kaneshige, Brian Melof, Charles Morrow, Don Ragland

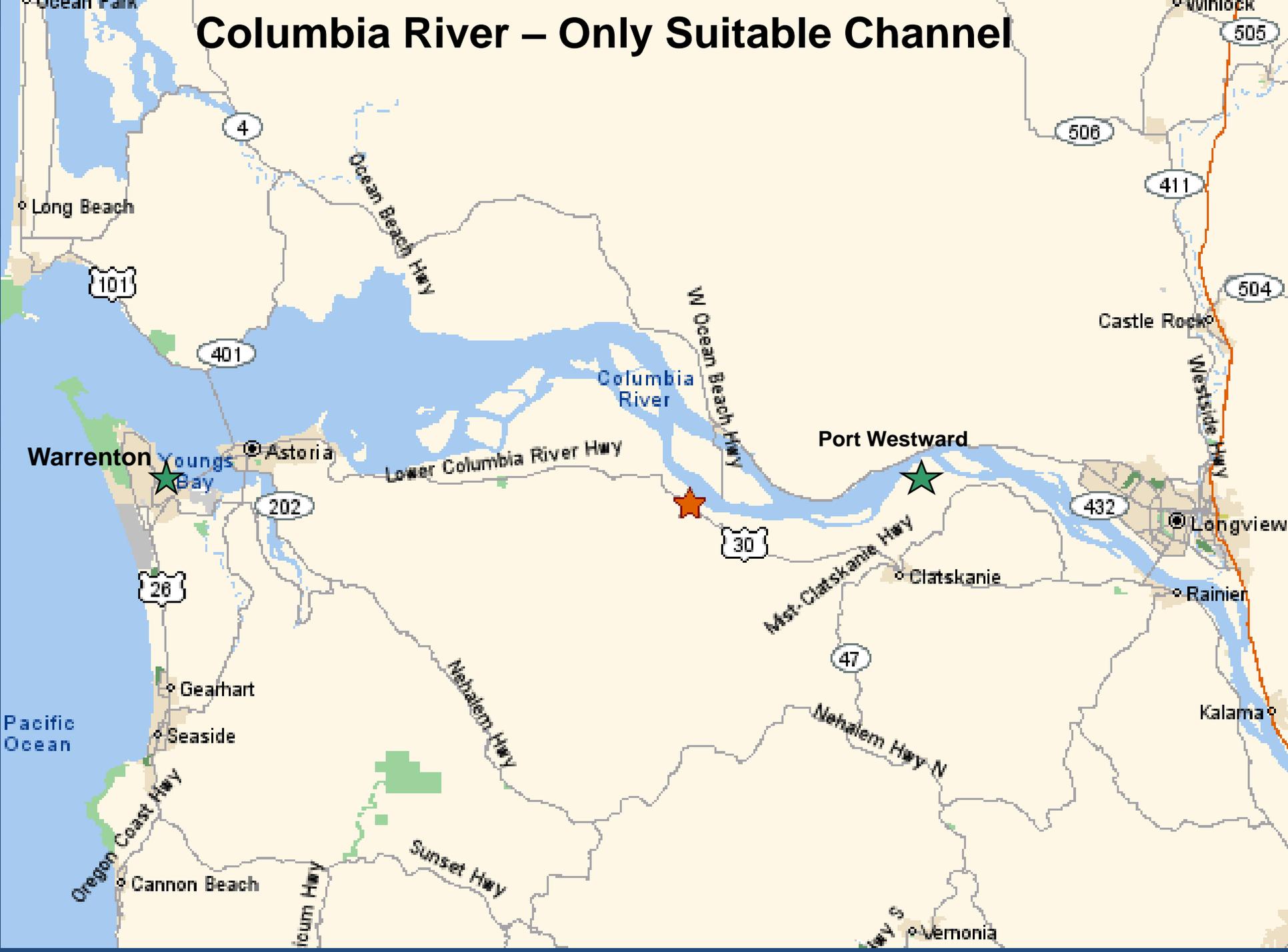
Prepared by
Sandia National Laboratories
Albuquerque, New Mexico 87185 and Livermore, California 94550
Sandia is a multiprogram laboratory operated by Sandia Corporation,
a Lockheed Martin Company, for the United States Department of Energy's
National Nuclear Security Administration under Contract DE-AC04-94AL85000.

Approved for public release; further dissemination unlimited.



Sandia National Laboratories

Columbia River – Only Suitable Channel



2006: 149,000 m³



2007: Q-Flex Class – 213,000 m³



2008: Q-Max Class – 267,000 m³



Astoria's Developing Water Front



Astoria's Water Front – Close to Main Channel



Risk Management

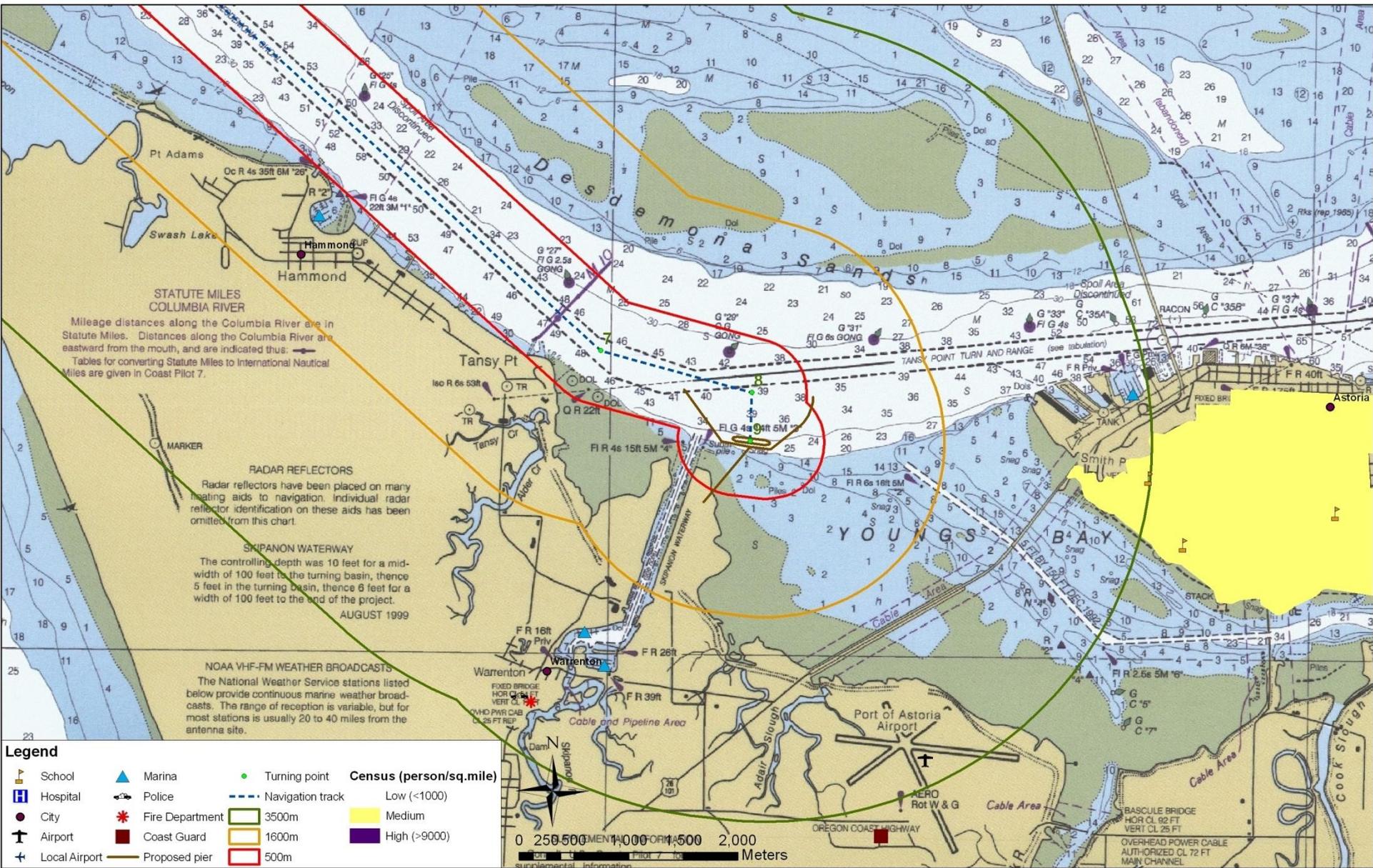
Risk = Likelihood x (1 – Mitigation Effectiveness) x Consequence

- **We Don't Know the Likelihood of Accidents/Attacks**
- **We Know That We Cannot Fully Prevent or Mitigate**
- **But We Can Largely Control Consequences**
- **Common Sense: Let Us Minimize the Consequence**
 - **Example: Truck Routes for Hazardous Cargoes**
 - **So: Keep LNG Ships Away From Population Centers**
- **We MUST Deal With This Issue – Openly and Honestly**



OregonLNG

Sandia Laboratories' Zones of Concern



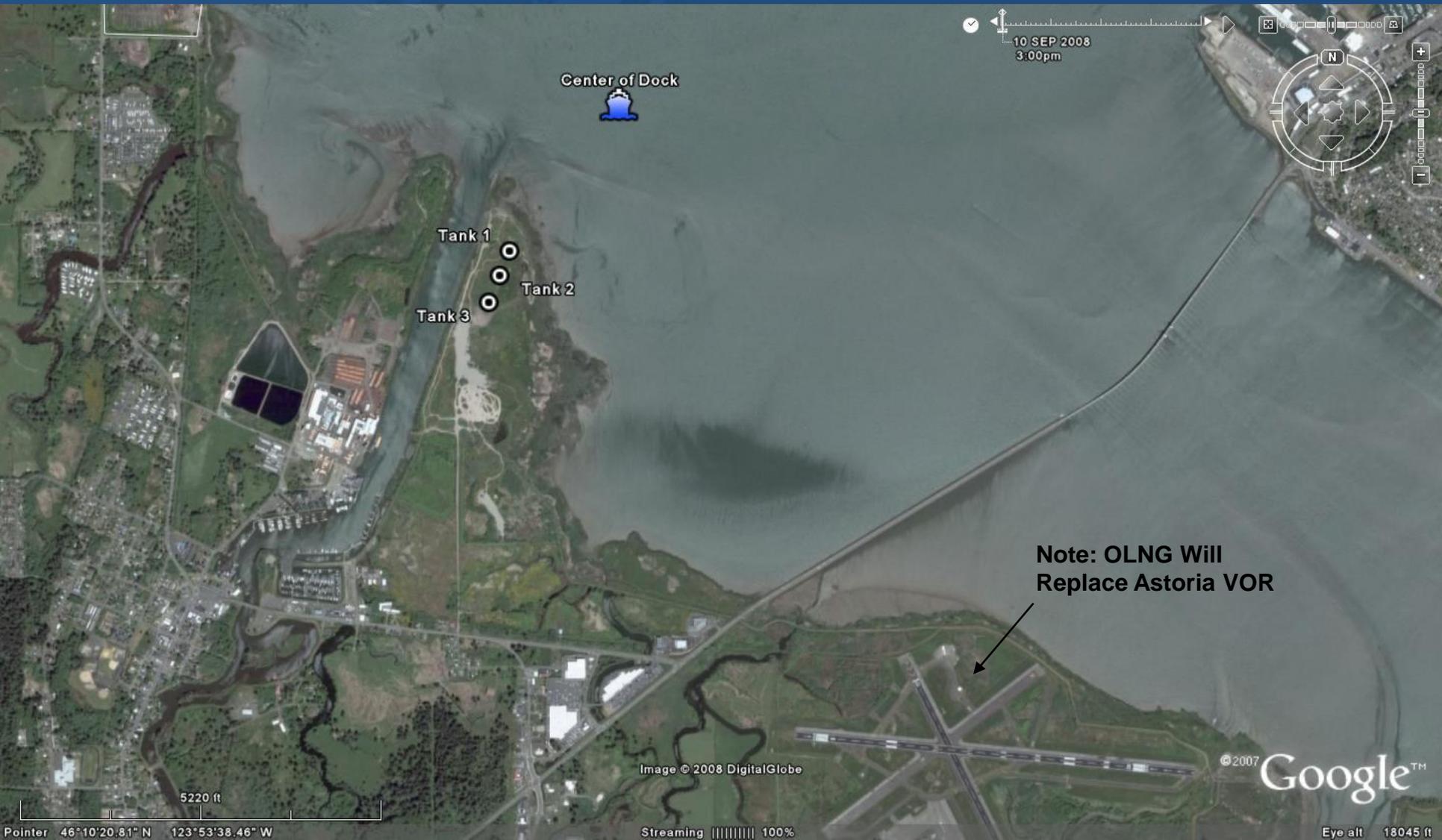
Skipanon Peninsula – River Mile 11



Oregon LNG Terminal Simulated View



FAA: No Impacts on Astoria Airport IFR Traffic



Turning Basin Dredging

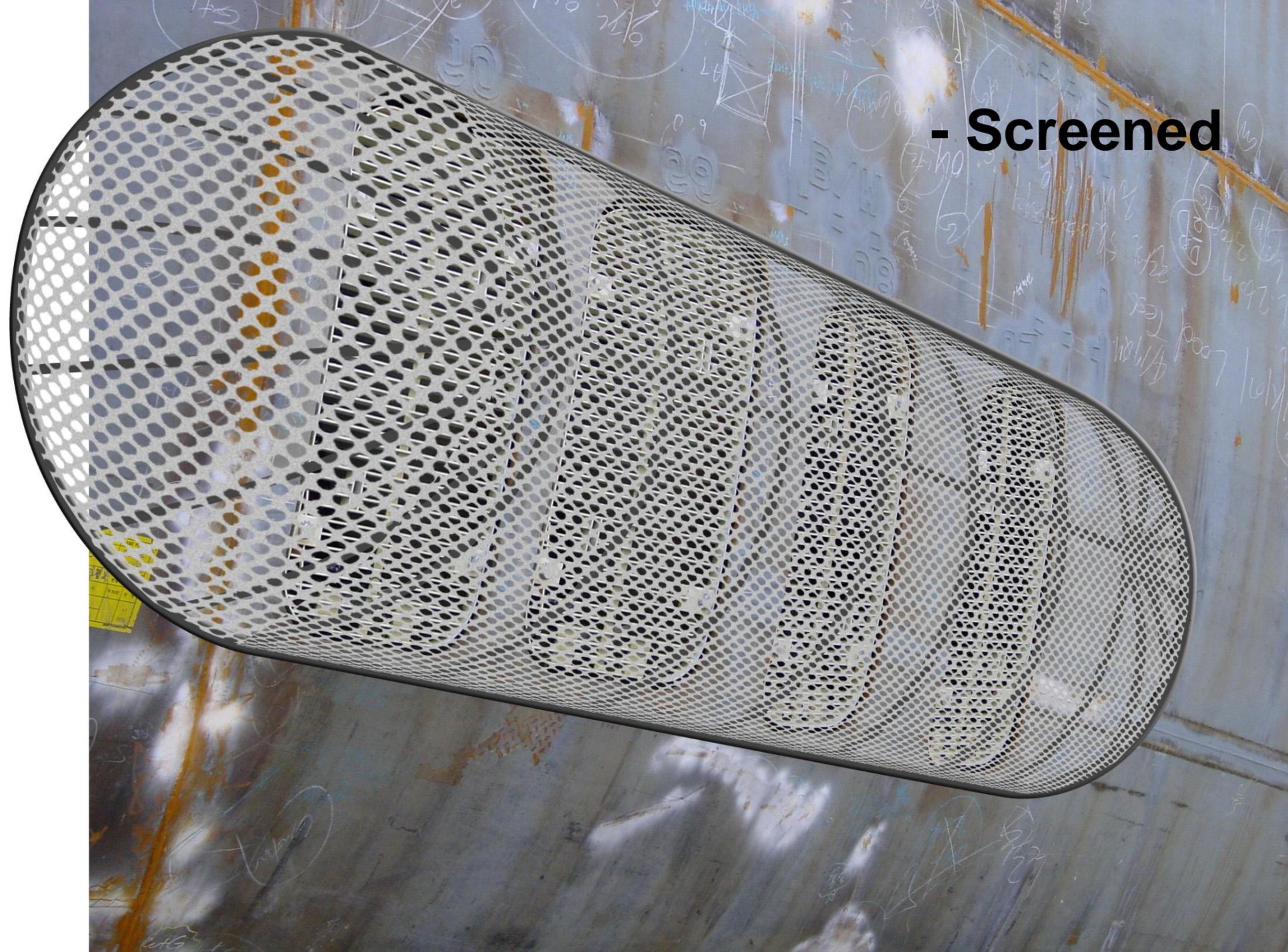
- Initial Dredging – 1.2 Million CY
- Turning Basin Already 25 - 45 Feet Deep
- Channel Already Deep Enough
- Most Dredging Will Occur During Winter Months
- Some Limited Maintenance Dredging Req'd
- All Dredge Materials Are Confirmed Clean
- Benthic Assessment Confirms Limited Impacts
- About 1.0 Million CY Will Be Placed “In-System”
- *Insignificant Salmon Impacts*



Cooling and Ballast Water Intake



- Screened



View of Proposed Terminal from Youngs Bay



View of Proposed Terminal from Astoria



View of Proposed Terminal from Warrenton



LNG and GHG:

Ambient Air Vaporizers

(Lowest Carbon Footprint – But Not Lowest Cost)

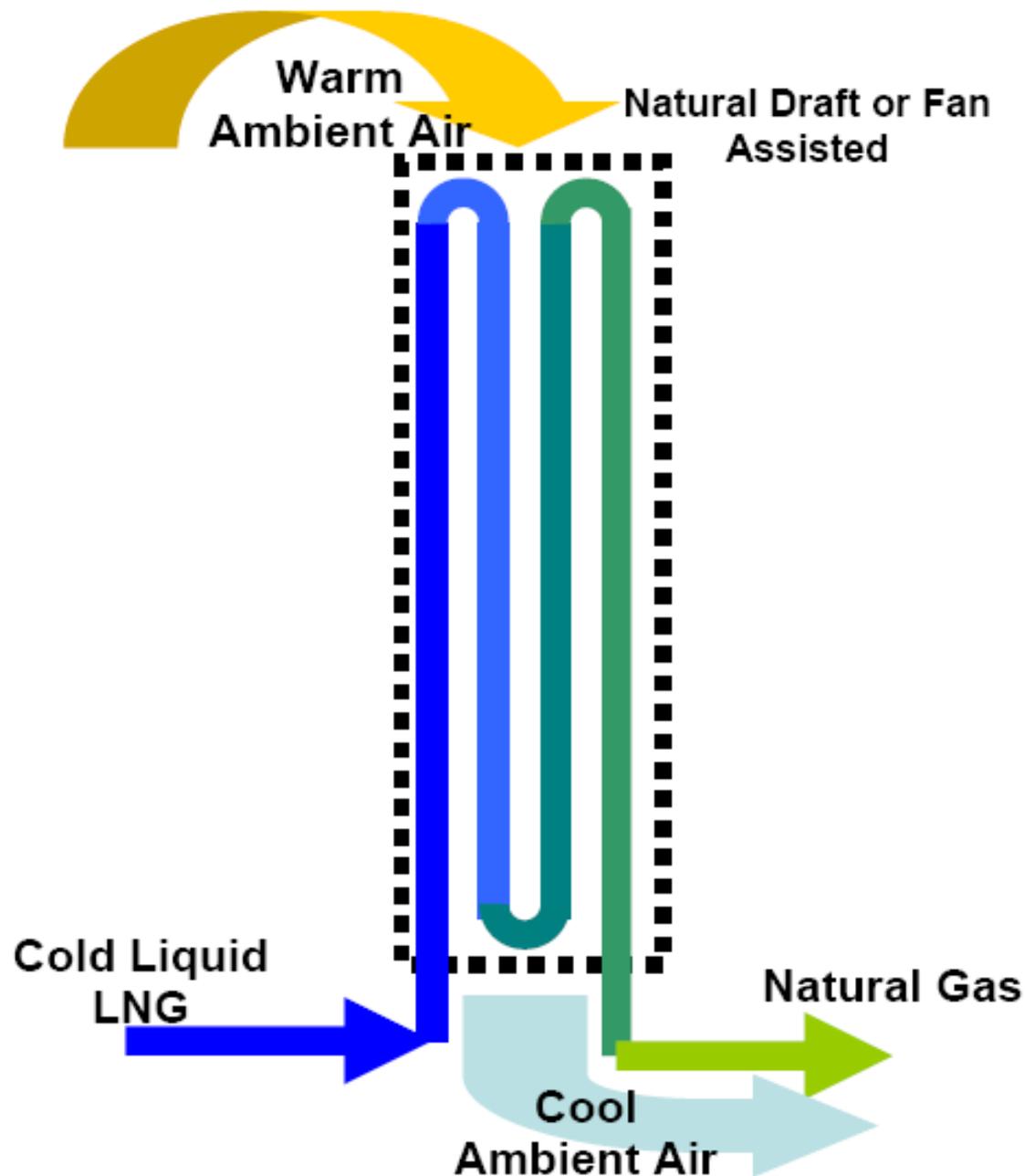
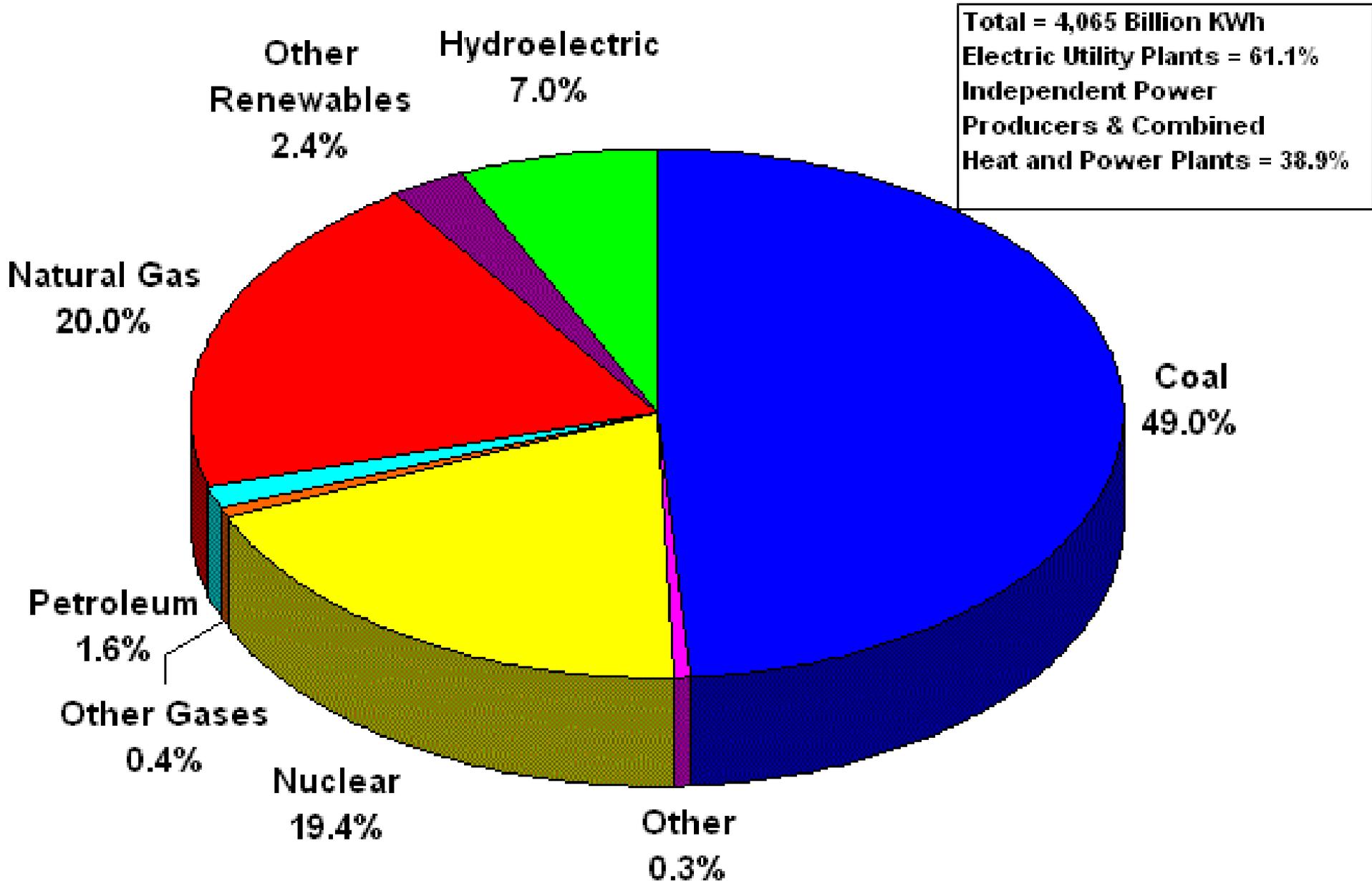


Figure 3.1.1 – Schematic of Direct Ambient Air Vaporizer

Oregon LNG vs. Alaska Gas - GHG

	LNG	AK. Gas
– Gas Processing:	0.5%	0.5%
– Liquefaction (Snohvit):	5.5%	0.0%
– Pipeline to Lower 48:	0.0%	10.4%
– Shipping from W. Australia:	3.4%	0.0%
– <u>Vaporization, 80% Air:</u>	0.5%	0.0%
– Total Self-Consumption:	9.9%	10.9%
– Corrected for HFO GHG:	11.6%	10.9%

US Electricity Supply, 2006 - Low Hanging GHG-Fruit



Summary of Terminal Impacts

- **Insignificant Navigation Safety and Security Impacts**
- **Insignificant Impacts on Air Navigation**
- **Some Minor Impacts on Crabs – Dredging**
- **Limited (If Any) Impacts on Salmon**
- **Some Visual Impacts – Tanks Cannot be Hidden**
- **Almost No Terminal GHG Impacts – Ambient Air Heat**

Pacific NW Pipelines and West Coast Market Access



Why Oregon LNG?

By Far the Safest and Most Secure Site

Bradwood:

- Transit 35 Miles Upriver
- Transit Under Bridge and Through Astoria
- Current WSR: Max 148,000 m³

• Jordan Cove:

- Shallow Harbor – Max 37'
- Narrow Channel – 300'
- WSR: Max. 160,000 m³ – at High Tide



OregonLNG

Why Oregon LNG?

By Far the Lowest Environmental Impact

Bradwood:

- **Very Significant Salmon Impacts – Clifton Channel**

- **Jordan Cove:**

- **Very Significant Spotted Owl Impacts**



OregonLNG

OLNG - Project Schedule

- **Formal FERC Application Submitted:** 10/08
- **DEIS Expected:** Q1/09
- **FEIS Expected:** Q4/09
- **FERC License Expected:** Q4/09
- **WSA Submitted:** Q2/08
- **WSR Expected:** Q1/09
- **Construction Start:** Q4/10
- **Anticipated COD:** Q1/14