ACEEE Hot Water Forum

A Utility Case for Continued Innovation in Storage Water Heating

February 22, 2016

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Energy Policy and Sustainability Manager

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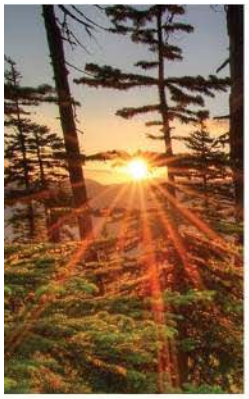
WHY?



- Why does a gas utility care about efficient water heat?
- Three perspectives:
  - Environmental ethic
  - Marketing
  - Resource planning
- The embedded challenge
- An optimistic future

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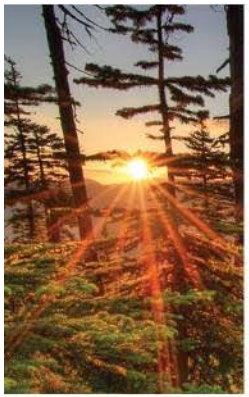
Background: NW Natural



- Largest independent natural gas utility in the Pacific Northwest
- 700,000 customers
- 1100 employees
- Headquarters in Portland, OR
- Efficiency programs delivered by third party – Energy Trust of Oregon
- Usage/revenue decoupled

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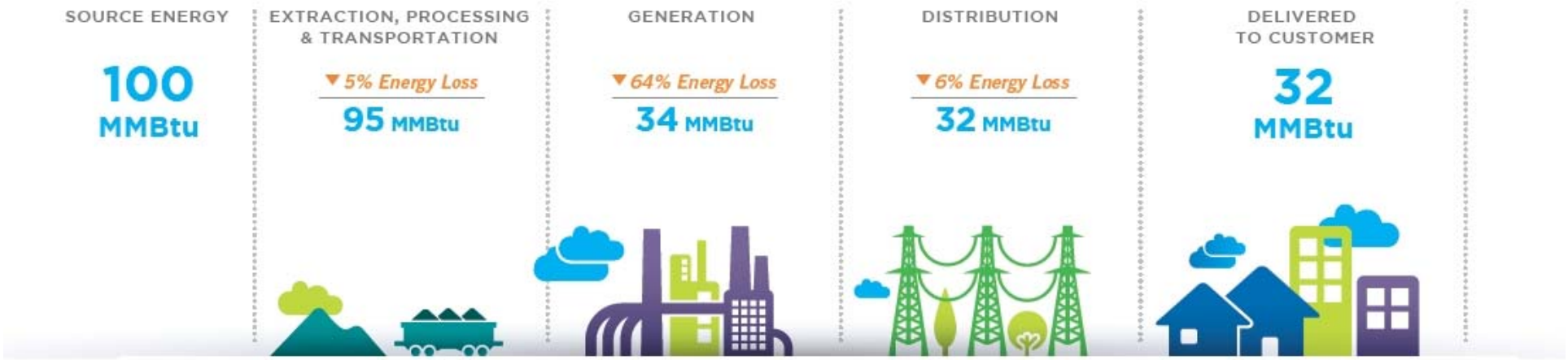
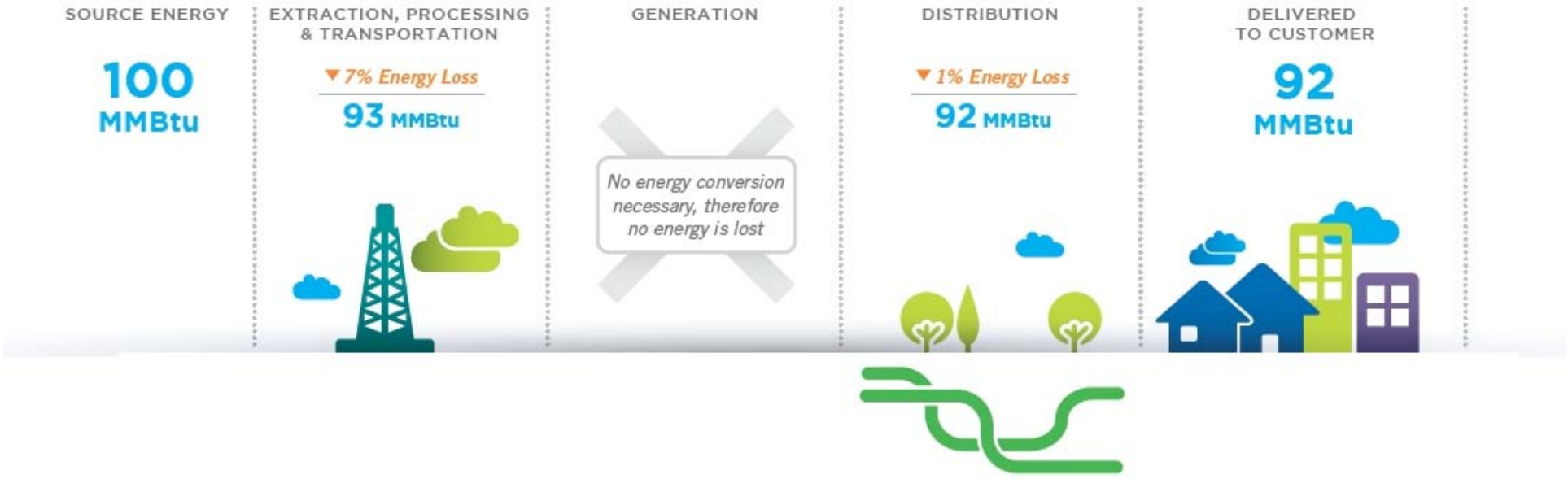
Sustainability

Electricity



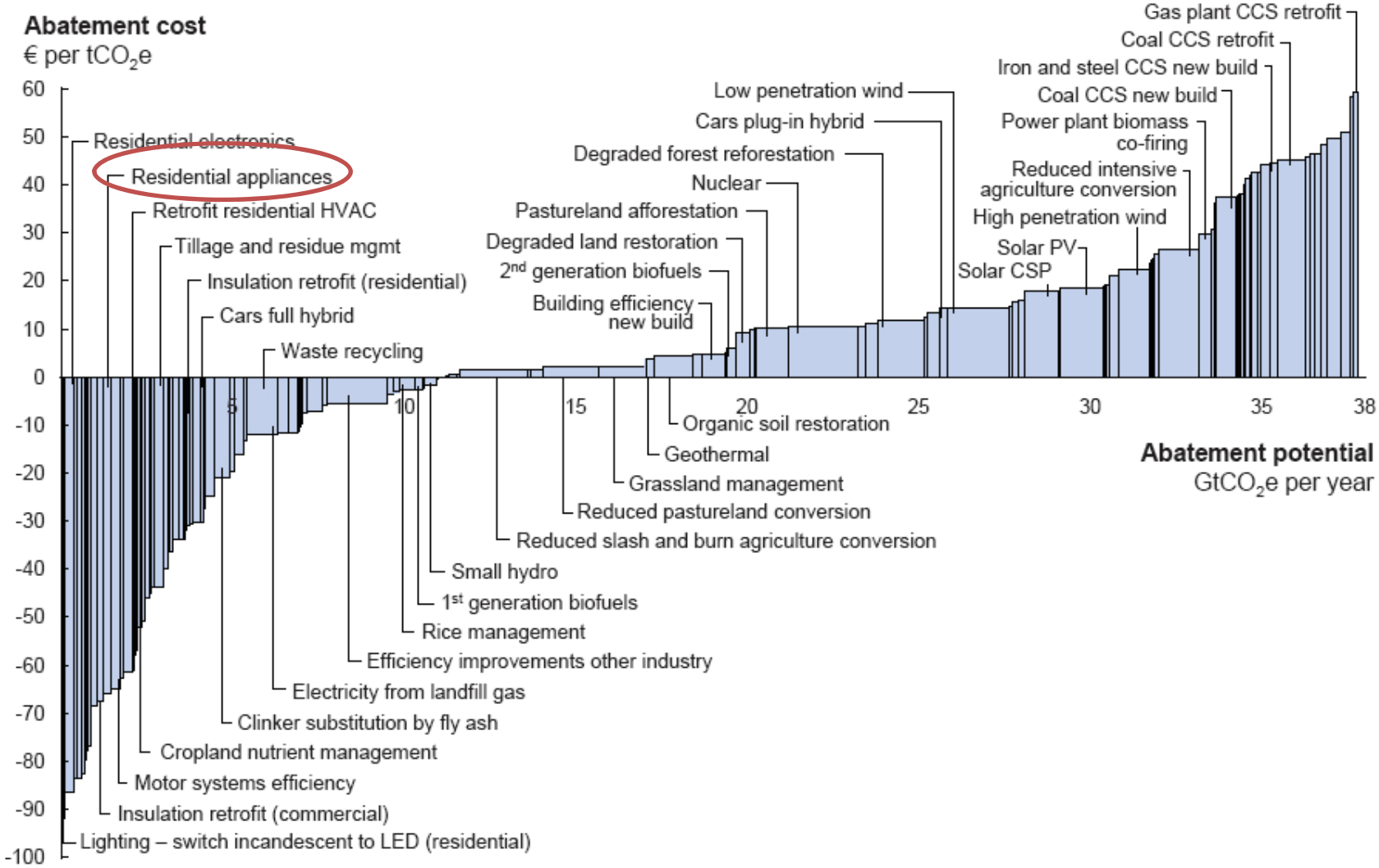
*Based on 2007 actual generation mix of all energy sources

Natural Gas



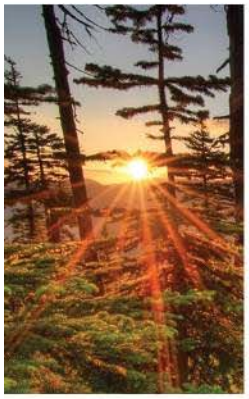
Carbon Reduction Costs

Global GHG abatement cost curve beyond business-as-usual – 2030



Note: The curve presents an estimate of the maximum potential of all technical GHG abatement measures below €60 per tCO_2e if each lever was pursued aggressively. It is not a forecast of what role different abatement measures and technologies will play.
Source: Global GHG Abatement Cost Curve v2.0

Marketing



- Impacts of decoupling
  - Aligns shareholder and customer interests
  - New goal = More meters (not greater usage)
  - Path to goal = happy customers, low cost energy

	50 Gal (tank)	Eff	Annual Energy Cost
Electric			
Conventional	tank	0.95	$501.57
Heat pump	tank	2.0	$238.25
Natural Gas			
Conventional	tank	0.67	$222.43
Tankless- non condense	tankless	0.82	$181.74
Tankless- condense	tankless	0.95	$156.87

Assumptions

Therm price	99	cents
Kilowatt price	10.8	cents
Estimated use/day	64	gallons

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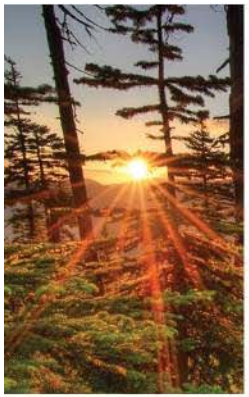
Least Cost Planning



- Goal and mandate to acquire all “cost-effective conservation”
- EE delivery partner - Energy Trust of Oregon
- Stand alone utilities
- Incenting <1% of water heater replacements
- OAR vs reality on “conservation”
- Fuel switching delicate subject

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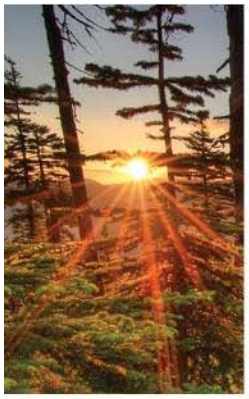
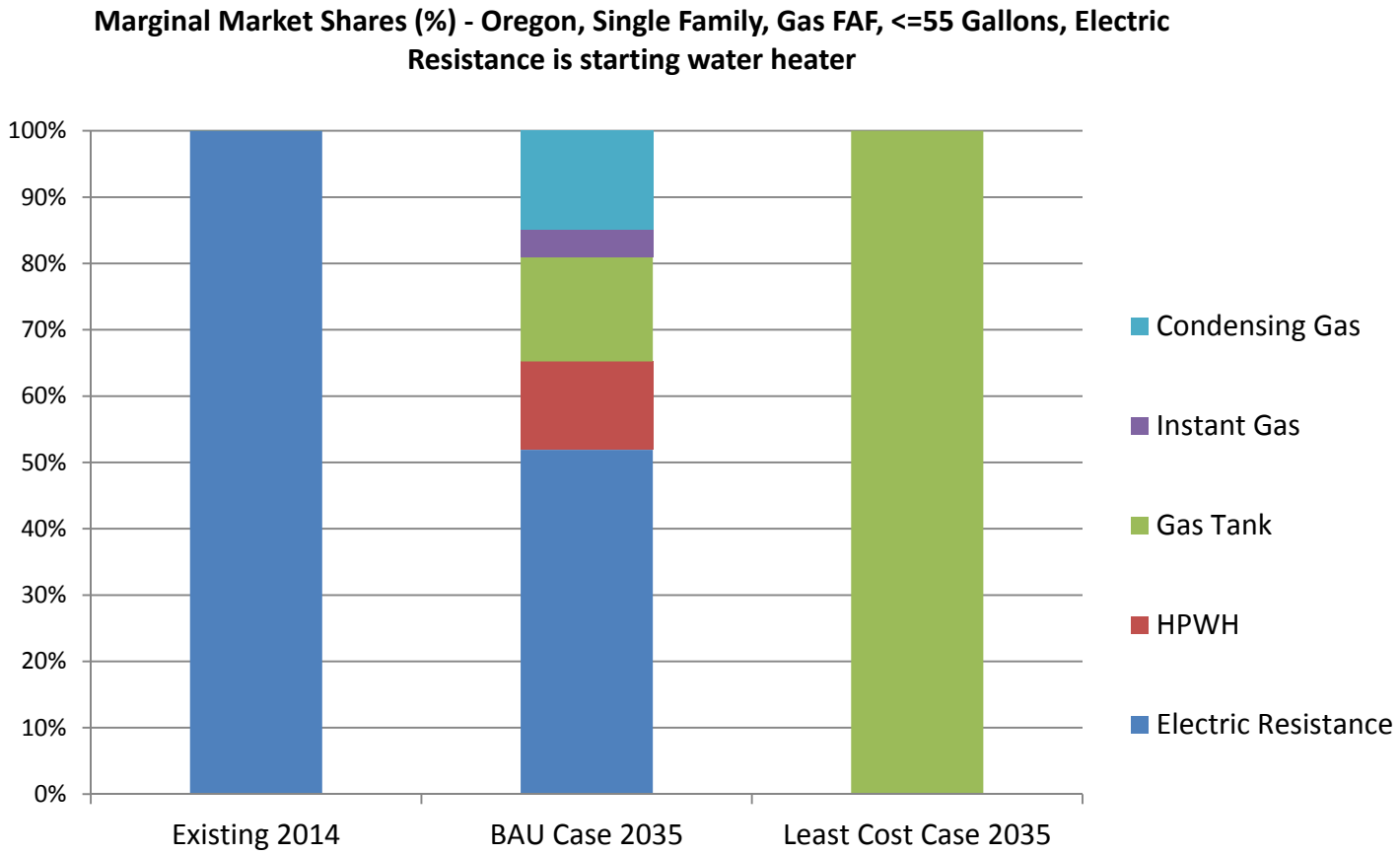
The Challenge





Source: NWPPC's "Direct Use of Natural Gas: Fuel Choice from the Consumer's Perspective " January 13, 2015

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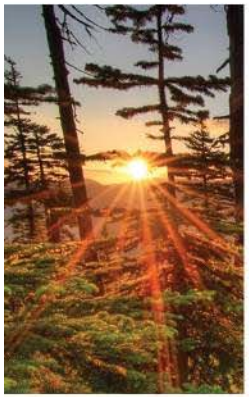
The Future



Drop-in replacement for condensing and non-condensing gas water heaters

Energy Factor ~1.3

Field testing 2014-15

Lab testing 2016

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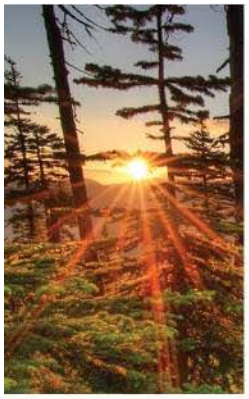
It gets even better



Approximate Cost To Heat 100 Gallons of Water					
Fuel	**Heater Type**	**EF**	**$**	**Savings**	**%**
Natural Gas	Gas Heat Pump	1.30	$0.59		
Natural Gas	Condensing Tankless	0.90	$0.86	$0.26	44%
Natural Gas	Tankless	0.82	$0.94	$0.35	59%
Natural Gas	Gas Storage	0.70	$1.10	$0.51	86%
Electric	Electric Heat Pump	2.00	$1.13	$0.54	91%
Natural Gas	Gas Storage	0.60	$1.28	$0.69	117%
Electric	Electric Resistance	0.95	$2.37	$1.78	301%

- **Natural Gas: $1.20 per Therm**
- **Electricity: $0.12 per kW-hr**
- **Ambient: 68 °F**
- **Temperature Rise: 77F (53F-130F)**

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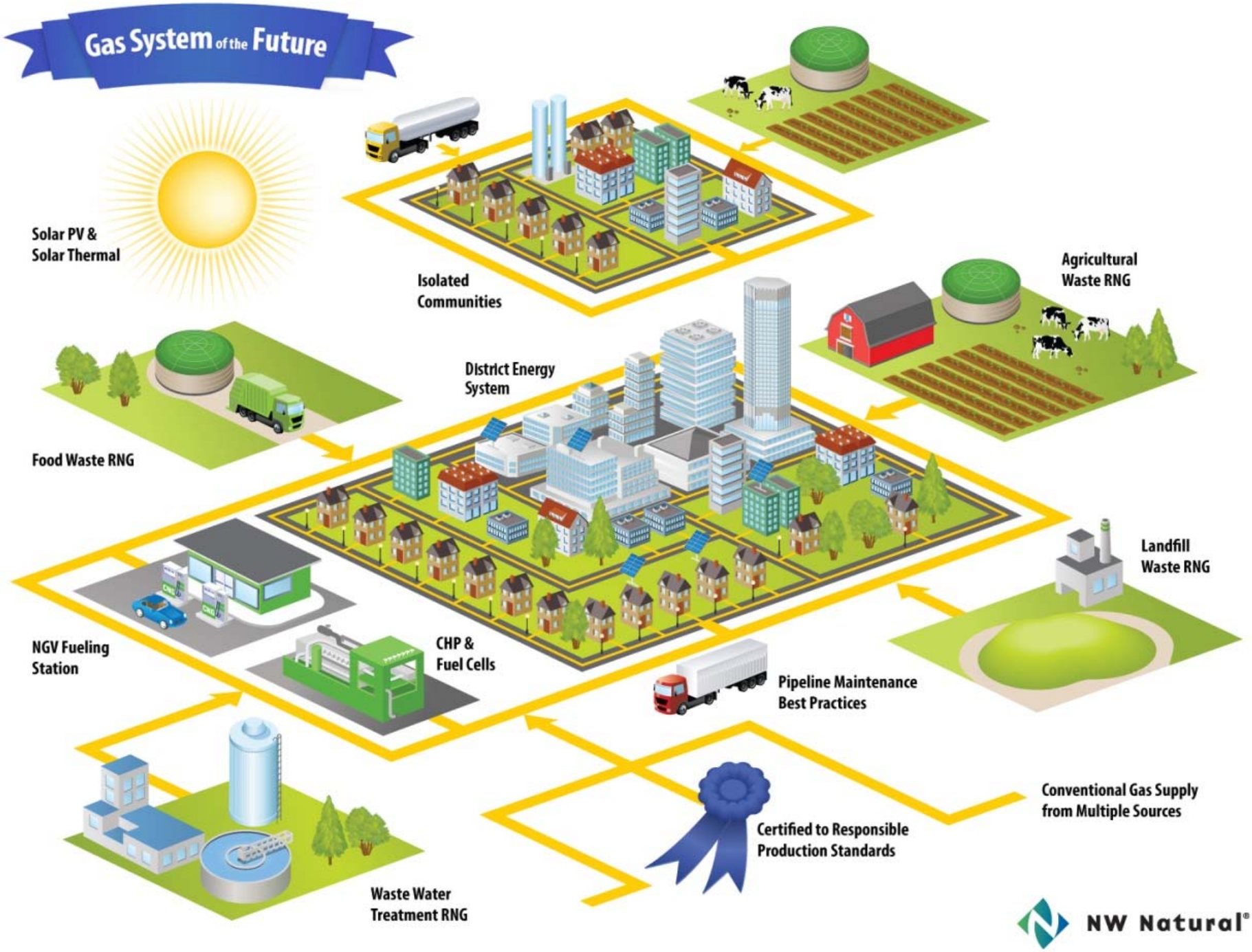
Gas System of the Future
Solar PV &
Solar Thermal
Isolated
Communities
Agricultural
Waste RNG
District Energy
System
Food Waste RNG
Landfill
Waste RNG
NGV Fueling
Station
CHP &
Fuel Cells
Pipeline Maintenance
Best Practices
Conventional Gas Supply
from Multiple Sources
Certified to Responsible
Production Standards
Waste Water
Treatment RNG
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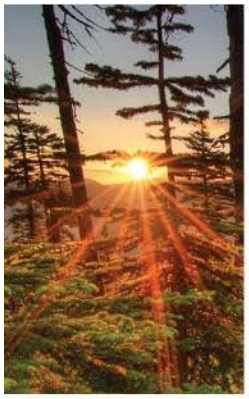
Contact info



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Halloween 2011

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