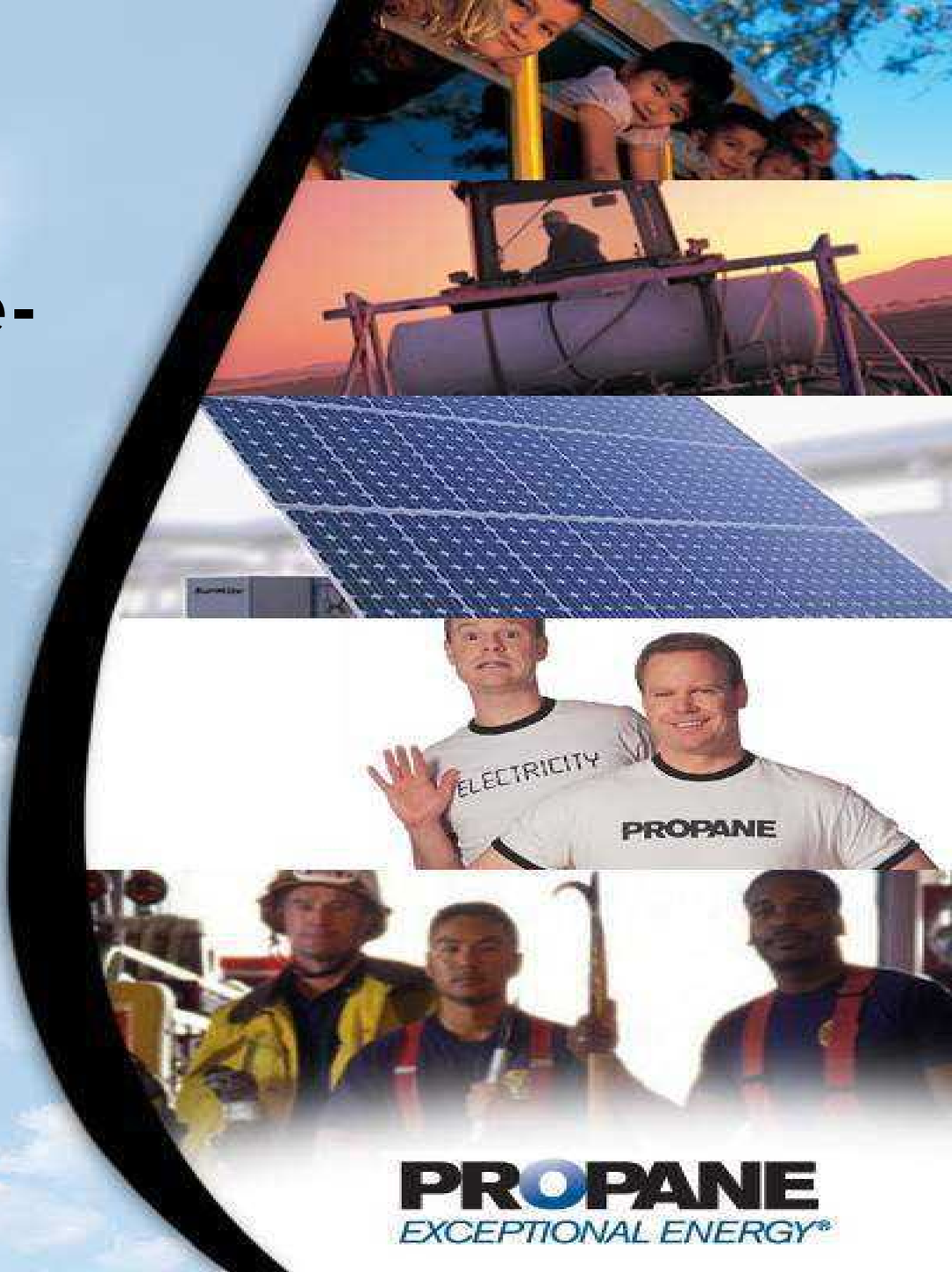
The Advantages of Propane-Powered Small Engines



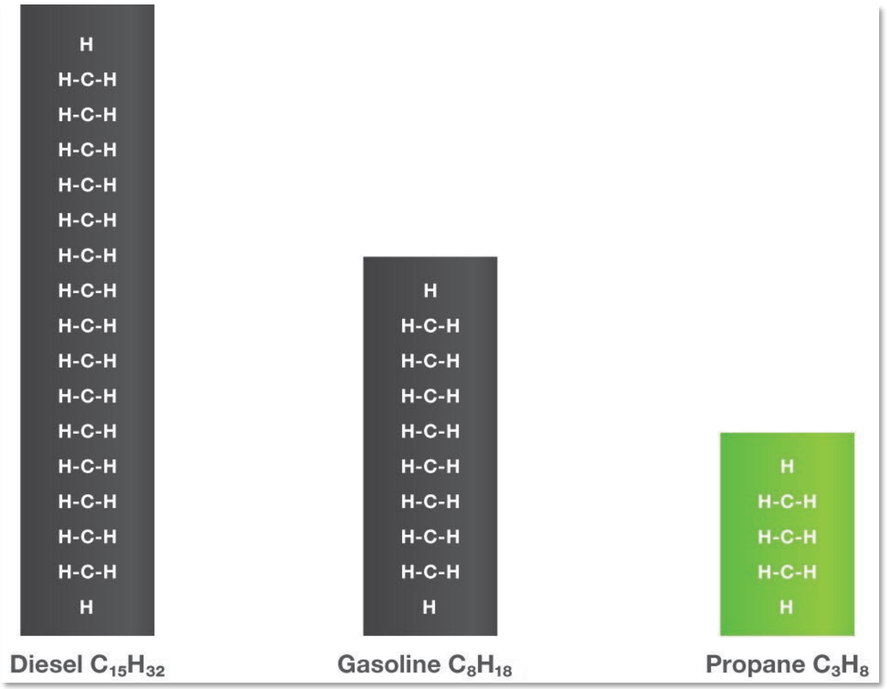
Introduction

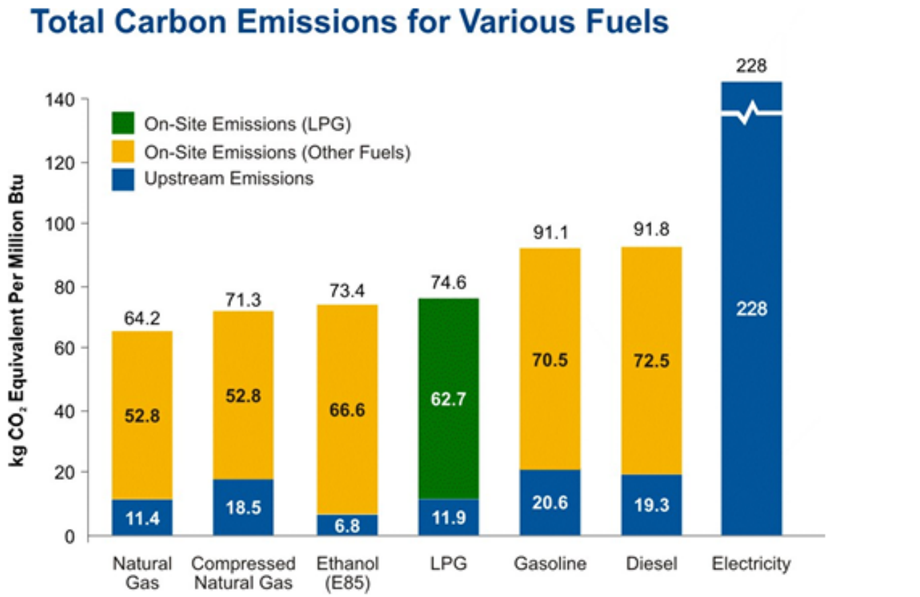
Today, I am delighted to share with you the remarkable advantages of propane-powered mowers and how they can revolutionize fleet operations, promote sustainability, and deliver substantial cost savings. In this presentation, we will explore the key benefits of using propane as a fuel source for mowers and highlight its impact on fleet efficiency, environmental stewardship, and financial considerations.

Environmental Benefits

- Reduced greenhouse gas emissions compared to gasoline or diesel.
- Lower carbon footprint due to cleaner combustion.
- Decreased air pollutants such as nitrogen oxides and particulate matter.

Statistical Comparison





Sources: DOE 1994, EPA 2007, GREET 2007
On-site emissions estimates based on chemical composition of the fuel with 99 percent combustion.
Actual life-cycle emissions vary by application; in many cases, electricity provides more useful energy on a per-Btu basis.

- **Produces lower level of CO2, NOx, PM, and VOCs**

Engine Maintenance Advantages

- Less carbon buildup in combustion chamber and exhaust systems.
- Prolonged engine life due to cleaner combustion.
- Reduced engine wear and oil contamination.

Statistical Evidence

- **Running a vapor thru engine is better because it burns cleaner and less contaminants that result in less carbon build up in the engine**

CLEANER COMMUNITIES

Propane Mowers Reduce Greenhouse Gas Emissions By 15 Percent And CO Emissions By 40 Percent To Keep Your City Cleaner.

CLEANER OPERATION

Compared with gasoline mowers, propane equipment produces 17 percent fewer greenhouse gas emissions, and 19 percent fewer NOx emissions. Imagine the impact that cleaner operation would have on your community greenspaces. Crews that work with propane also report enjoying the work environment more, increasing overall efficiency.

Cost Efficiency

- **Potentially lower fuel costs compared to gasoline or diesel.**
- **Reduced maintenance expenses and longer intervals between service.**

US avg. gas price chart per gallon vs. avg. since 2018

U.S. Propane Residential Price (Dollars per Gallon)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1990										1.063	1.053	1.019
1991	1.002	0.939	0.884							0.877	0.908	0.919
1992	0.892	0.880	0.867							0.858	0.872	0.895
1993	0.979	0.946	0.956	0.930						0.871	0.878	0.881
1994	0.887	0.908	0.902							0.846	0.856	0.867
1995	0.880	0.892	0.898							0.886	0.892	0.914
1996	0.973	1.013	1.018							1.047	1.119	1.309
1997	1.287	1.174	1.091							0.956	0.971	0.978
1998	0.981	0.974	0.961							0.872	0.876	0.879
1999	0.887	0.891	0.890							0.960	0.981	1.002
2000	1.080	1.220	1.209							1.281	1.290	1.399
2001	1.663	1.556	1.432							1.139	1.132	1.120
2002	1.134	1.129	1.123							1.133	1.160	1.211
2003	1.307	1.480	1.652							1.308	1.330	1.384
2004	1.496	1.536	1.509							1.615	1.691	1.717
2005	1.728	1.720	1.717							1.942	1.944	1.974
2006	2.010	2.001	1.987							1.937	1.945	1.979
2007	1.992	2.020	2.038							2.183	2.407	2.489
2008	2.563	2.561	2.601							2.587	2.455	2.352
2009	2.313	2.311	2.248							1.991	2.152	2.306
2010	2.562	2.602	2.556							2.270	2.389	2.516
2011	2.639	2.684	2.716							2.635	2.685	2.708
2012	2.710	2.706	2.708							2.205	2.241	2.249
2013	2.279	2.312	2.315							2.370	2.495	2.692
2014	3.165	3.692	3.182							2.392	2.404	2.385
2015	2.367	2.360	2.337							1.919	1.939	1.983
2016	2.014	2.028	2.016							2.037	2.062	2.169
2017	2.329	2.442	2.406							2.313	2.399	2.479
2018	2.572	2.572	2.499							2.400	2.422	2.436
2019	2.429	2.431	2.410							1.843	1.952	2.021
2020	2.003	1.983	1.926							1.785	1.844	1.924
2021	2.118	2.304	2.378							2.663	2.724	2.702
2022	2.730	2.846	2.993							2.663	2.675	2.678
2023	2.699	2.703	2.684									

Propane Infrastructure

- There are more than 2,600 propane vehicle fueling stations with locations in all 50 states
- Ease of refueling and potential incentives for adopting propane.

Case Studies

PROPANE
EXCEPTIONAL ENERGY

Barnes, Inc.
Video Case Study

Fleet Manager and Purchasing Agent Troy Grindle took advantage of incentives from PERC to switch all 28 pieces of equipment to propane to help the company's bottom line. The cost savings showed up in terms of fuel and zero downtime with equipment, but the power and performance surprised him the most.

Businesses switching to propane for their fleets of small vehicles.

"WE FOUND PROPANE WOULD GET THE SAME PRODUCTIVITY AND POWER AS CONVENTIONAL FUELS, AS WELL AS A LOW TOTAL COST-OF-OWNERSHIP, WHICH WOULD PLEASE THE SCHOOL'S ADMINISTRATION AND THE STATE'S TAXPAYERS."

AARON BOGGS
ASSISTANT DIRECTOR OF MAINTENANCE AND RENOVATIONS, UNIVERSITY OF LOUISVILLE

Conclusion

- In conclusion, propane-powered mowers present a compelling case for enhancing fleet efficiency, promoting sustainability, and achieving cost savings. By adopting this technology, fleet operators can optimize productivity, reduce emissions, improve air quality, and realize long-term financial benefits.

Q & A