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**Session: May 2018**

## PowerHour FAQs

### Learn Burn Natural Gas Generation Sets in Standby/Peak Shaving Applications

The increase in energy demand and the lack of infrastructure to supply it are causing some customers to switch from diesel to natural gas as the fuel of choice. We are seeing more standby applications using lean-burn natural gas generator sets for peak shaving and energy demand response. This course will discuss the relative benefits of both fuels, and highlight some limitations you need to be aware of.

To learn more about lean burn natural gas generation sets in standby/peak shaving applications please join the Cummins PowerHour webinar:

Following this PowerHour participants should be able to:

- Recognize the strengths and limitations of using spark ignited generator sets for standby, peaking, and energy demand response applications
- Identify applications which may benefit from using a lean burn natural gas generator set

#### **What is the best resource for finding the precise definition of life safety or critical loads?**

Those definitions can be found online in NFPA and ISO documentation. Unfortunately, the two organization have slightly different definitions. Even if you are familiar with the NFPA and ISO criteria, you should always consult with your local AHJ just in case they are using some other definition of life safety or critical load.

#### **Is lean-burn natural gas best suited for steady-state base load or peak load applications?**

Actually, you can use lean-burn natural gas for either application. That is one point I wanted to emphasize in my presentation: we're seeing more examples of lean-burn natural gas used for peak shaving applications. You could have the utility supplying your base load, as well as a generator set to produce additional power for peak loads.

Also, as I mentioned at the beginning of the presentation, there are companies that are developing algorithms to detect or predict the cost of your energy. They analyze when the peak

times are and when the energy cost goes up, and they'll send a signal to the generator set onsite to start at the appropriate time.

**Does the increased start time delay for natural gas generator sets affect the starting battery configuration?**

No, nothing really affects it. However, there may be specifications requiring batteries sized for a specific number of starts. We do have CEBs that will tell you how long the typical crank starting sequence would be. That's going to say, "Okay, how long will my crank system last? If it's six seconds, then it will stop and then we'll crank for another six seconds."

So, yes, you should definitely should look at the AEB to ensure that you size the battery properly, as well as meeting any customer requirements. But the size of the battery will depend on the product. It will vary depending on the size of the generator set and whether it's diesel or natural gas.

**A life safety diesel generator set is online in 10 seconds. Can a natural gas generator start that quickly?**

All rich-burn gas generator sets are able to power up in 10 seconds. Some lean-burn generators are able to start that quickly but most cannot. We don't recommend using lean-burn natural gas generator sets for life safety loads; a rich-burn or diesel is preferable. You can use a diesel generator at startup to power life safety loads, but then transfer the power to a natural gas generator when it's up and running.

**Following up on the previous question, is it possible to parallel diesel and natural gas generator sets?**

Yes, we can parallel both types of generators. You just have to design the right scheme for transferring loads from one to the other.

**Do lean-burn natural gas units require onsite propane fuel storage to meet NFPA requirements, or is this requirement only for life safety applications?**

Because the generator set is powered by natural gas delivered via the utility pipeline, you in effect have an unlimited fuel supply. So there's no need for fuel storage onsite. Diesel engines require a fuel tank and the tank has to be sized to run the generator set for a specific number of hours, depending on the application. But that limitation doesn't apply to natural gas.

**Does Cummins offer a natural gas generator that's suitable for a 4160 volt alternator?**

Contact your local Cummins distributor. We have multiple power modes available for a 4160 alternator and I believe that would include natural gas, but your distributor can provide complete information about what's available.

**Are rich-burn generator sets CSA 282 rated?**

I can't say they're certified because that varies from manufacturer to manufacturer, and from model to model. However, CSA 282 requires a 15-second start. NFPA 110 Type 10 requires a 10-second start. All rich-burn generator sets are capable of meeting the NFPA 110 requirement, so they are also able to meet CSA 282.

**Please confirm that rich-burn generator sets are capable of meeting the Type 10 30-second minimum requirement?**

Yes. Rich-burn generator sets are able of meeting the Type 10 requirements, based on the information in the table that shows the differences between stoichiometric and the advanced lean-burn generators. That's why you would typically choose a rich-burn generator if you're planning

to use natural gas as the fuel source. But you should always confirm that this is true for your specific application.

**You mentioned the cost difference between diesel fuel and natural gas. What price was used for the natural gas comparison? Has it changed with the advent of fracking?**

The fuel price I used for the comparison was \$3.00 per gallon of diesel and \$5.00 per million BTU of natural gas. I am not entirely sure what the ratio was before fracking became popular.

**Why can't rich-burn, lean-burn, and varied lean-burn be combined into one system such that the mode is automatically selected and optimized? For example, start with rich-burn to meet NFPA 110 Type 10 and then switch up to lean-burn after stabilization, etc.**

The technology is going to vary depending on the construction of the engine. The solution you describe would be very complex—it's not something that's been developed yet. It would require a very complex, controlled methodology for supplying the fuel: air mixture. It would depend on the design and build of the engine. I am not aware of any manufacturer capable of doing this now, but it is something that might be explored in the future.

**Where can we find specific information on generator set models that can be powered with biogas?**

For starters, you should consult with your local distributor for a specific answer. In general, lean-burn natural gas generator sets can be powered by biogas or digester gas produced by a landfill. You can find more information in PowerSuite by looking at the generator data sheets in the low BTU category.

**How much larger a footprint is the 1 megawatt natural gas genset than the 1 megawatt diesel set?**

Sorry, I can't give you an answer off the top of my head. You would have to look at the outline drawings in PowerSuite. There are multiple engine models capable of producing the same output, and they do vary in size, so you need to look up the dimensional information for the specific generator models you are considering.

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