

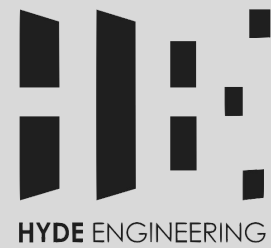


HYDE ENGINEERING

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# Arizona ACC Interconnection Workshop - 4/13/16

## *Agenda*



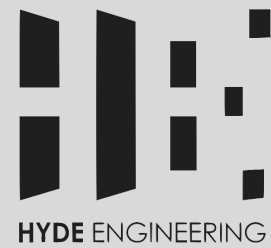
1. Why install non-exporting storage?
2. What does it mean to be “non-exporting”?
3. How do you ensure sites are non-exporting?
4. What are potential safety concerns interconnecting non-exporting storage? How do they compare to other equipment on the distribution system?
5. What challenges exist with storage implementation?
6. Existing rules for interconnecting non-exporting resources
7. Q&A
8. Appendix - Simplified Single Line Diagram

Non-exporting storage offers three primary system benefits:

1. Retail bill management (demand charge reduction, TOU charge reduction)
2. Advanced DR-like response if/when utilities can provide a direct signal to reduce load during system peak
3. Backup (and, with solar, perpetual island) capabilities during power outages

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## *What does “non-export” mean?*



A “non-export” system is defined as:

1. A system that does not generate power past the point of common coupling between the utility and host customer
2. A system where all generation is absorbed by the local customer load, particularly in response to a retail tariff or DR-like signal

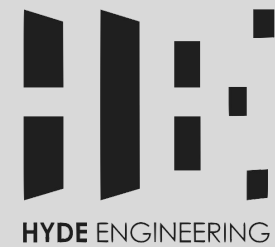
Energy efficiency, regenerative elevators, and solar (or other DG systems) with reverse power flow relays can also be considered “non-export”

Ensuring that a system does not export power across the point of common coupling can be ensured in a few ways:

1. Requiring the system to be no greater than a certain percentage of the host customer's peak or average load (this percentage may be different for radial vs. networked distro systems)
2. Commissioning of an intelligent site controller and control scheme that responds to the utility's price or DR signals
3. It's the law! Customer contracts with the utility through Generating Facility Interconnection Agreement (GFIA) which outlines the rules for operating a non-export system

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## *What are the safety concerns with non-export?*

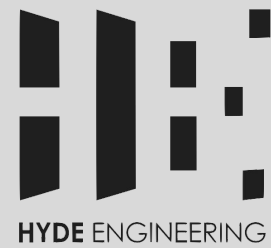


Non-export systems can cause several potential safety and distribution equipment issues:

1. Accidental export could energize distribution equipment during power outage. Satisfied by UL1741/IEEE1547. Only UL-listed (field inspections acceptable) equipment allowed
2. On distribution circuits with high solar penetration, accidental export could exacerbate voltage issues. Satisfied with intelligent control and minimum load requirements
3. Import (i.e., charging) during local peak could overload transformers or other distribution equipment. Satisfied by checking service ratings before installation (same as any other load) per NEC, also with intelligent control

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## *What are some challenges with implementation?*

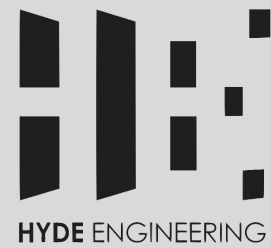


In our experience non-export faces many implementation challenges that can increase costs and upset customers:

1. Jurisdictional permitting - new technology faces greater scrutiny due lack of standards and code; also permitting fees can vary from hundreds to tens of thousands
2. When adding storage to facilities that already have NEM generation, does the non-export or NEM system or both have to be metered?
3. Unclear disconnect type, location, and utility access requirements can cause project delays and cost overruns
4. Secondary networks are more susceptible to accidental export scenarios, but protection schemes can be overly expensive

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## *Resources for non-export interconnection*



- California Rule 21 - fast turnaround for non-export resources, most states appear to be adopting this rule
- UL 1741/IEEE 1547 - safety/technical standard for utility-interactive inverters
- UL 1973 - safety standard for stationary batteries
- UL 9540 - developing standard for energy storage systems (combined inverter and battery)



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# Appendix

## *Simplified Single Line Diagram*

