



Supply Chain Issues Distribution Transformers

Update
6/29/2022



Transformer

- In 2020-21, deliveries of previously ordered transformers were substantially delayed
- Our PUD has not yet received any of our regular transformer orders scheduled for delivery in calendar year 2022
- Quoted delivery dates continue to be pushed out with lead times now as much as 84 weeks
- Primary concern is associated with smaller single phase pad transformers, the most commonly used transformers for new services
- Other electric supplies and equipment also subject to delay



Causes

- The underlying issue is a lack of high grade grain orientated electric steel (GOES) used in manufacture of transformer cores
- Pandemic restrictions curtailed production of GOES for much of 2020, greatly extending lead times scheduled for 2021 delivery
- High efficiency standards increasingly adopted by nations require the highest grade and thinnest sheets of GOES, further restricting supply
- Global exports substantially diminished 2021-2022 as some developing nations reduce exports to maintain domestic supply
- Realignment of global trade in 2022 due to war in eastern Europe further reduced availability of GOES to developed countries
- Transformers production accounts for about 50% of GOES
- Electric vehicle motors has also placed a significant and growing demand of GOES



GOES Supply

- By far, China produces the most GOES, but almost all is kept for domestic use
- Largest exporters of GOES (2019):
 - Japan
 - China
 - Russia
 - South Korea
 - The US is #10
- Only one major US steel company produces large quantities of GOES (Cleveland-Cliffs, through acquisition of AK steel)
 - Production far below current domestic needs
 - On 11/19/21 the US Department of Commerce identified the planned shutdown of two AK plants (GOES) as national security threat to the power grid



Mitigation Efforts

In March and April we presented to our governance the wide variety of efforts previously made to mitigate transformer supply shortage, with frequent updates since

- Specification modifications
- Removal of stainless steel requirement (Mild Steel)
- Removal of tight electric impedance requirement
- Returned all idle 25 KVA pad transformers to stock for use
 - More than 50 Idle transformers retrieved since late last year and were used for new service requests
- Provided Customer option to install pole and overhead transformer for new service (overhead transformers are more readily available)
- Repair and recondition old transformers, as is feasible



Mitigation Efforts

- Projects to consolidate in service transformers
 - Replace multiple in-service 25 KVA transformers with a larger transformer and secondary cable
- Ensure all service applicants and builders fully understand the supply chain issues we are facing (Apr-May)
- Joined APPA eReliability Tracker and lobbying efforts to relax transformer efficiency standards (May)
- Made opportunistic purchase of non-standard single bushing 17 X 25 KVA pad transformers from a canceled order of another utility (May)
- In June obtained 6 transformers from the CoPA (June)



Mitigation Efforts

- Initiated projects to consolidate in service transformers
 - Replace multiple in-service 25 KVA transformers with a larger transformer and secondary cable, return 25 KVA's to stock
- Even though we have more than 200 pad transformers on order with past or near future schedule delivery:
 - June 13th obtained Board approval for emergency procurement of 76 additional transformers that became available due to canceled orders of other utilities (56 received last week)
 - The order also included reconditioned transformers
 - The costs for these transformers are 4 times historic norms and will have cost impacts for future customers
 - Non-standard single bushing transformers will require installation at existing dead-end locations to return dual bushing transformers from field



Going forward



- As of this week we have enough transformers to deal with most of the service request backlog up to the time we stopped taking new requests (Jan-May)
 - Unfortunately this will require a step for field replacement of available radial dead end transformers to return useable dual bushing transformers to stock
 - Expect to compete most of these changeouts in July
 - Installations for previously paid new services will likely commence in August
- By August we also expect to begin taking new service requests and an established order for service
 - Actually providing service will depend on future availability of transformers





Questions?



Update on Other PUD Initiatives

- Work on 2023 Strategic Plan
- Recent or Ongoing Capital Plan Projects
 - Forks Substation Rebuild and Modernization
 - Central Feeder 115KV upgrade
 - Evans Road Circuit Tie
 - Cable Replacement Projects
 - Elwha Bridge Utility Relocations
 - Fish Culvert Utility Relocations
- Broadband Update
- Power Supply Contract Discussions
- Participation in Regional Energy Resilience Discussions and Planning Groups
- Carlsborg UGA Water Update

