KING GEORGE VIRGINIA

AGENDA

Joint Work Session of the King George County Board of Supervisors and King George County Planning Commission

Tuesday, May 30, 2023 at 6:00 p.m.

CALL TO ORDER

- Board of Supervisors – Chairman Granger
- Planning Commission – Chairman Moss

AMENDMENTS TO THE AGENDA

PUBLIC COMMENT

- Comments will be limited to three minutes per person, in order to afford everyone an opportunity to speak. If comments relate to a specific public hearing item, we ask that you offer those comments at the time of the public hearing.

PRESENTATION BY THE BERKLEY GROUP

- Battery Storage Facilities
- Power Plants

ADJOURNMENT

- Board of Supervisors to Tuesday, June 6, 2023
- Planning Commission to Tuesday, June 13, 2023

Those interested in attending this meeting who may have a need for an interpreter or hearing assistance equipment due to a hearing impairment should please contact our office at 540-775-9181 (TDD 540-775-2049) by noon on the Friday before the meeting.

A final agenda with all supporting documentation will be available on the county's website at www.kinggeorgecountyva.gov.

Battery Energy Storage Systems (BESS)

King George staff requested a review of battery storage system standards, including benchmark communities. Specific concerns included the following items: appearance and screening, safety provisions, and environmental considerations.

The Berkley Group has conducted a review of the existing ordinance text relating to battery energy storage, best practices, Code of Virginia, and several communities and summarized the information below. This information will be presented and offered for further discussion opportunity during the work session.

Industry Overview and Best Practices

- The term "energy storage" applies to a diverse set of technologies that can store energy at one time and make it available during another. Storage technologies range in size, modularity, application, electrical performance characteristics, cost, time to construct, locational flexibility, storage duration provided, grid services offered, and the way in which they operate.
- Electrochemical energy storage technologies, particularly battery energy storage systems (BESS), are growing rapidly (by more than 1,200% between 2016 and 2021) and already play a crucial role in enhancing the electrical grid by supporting the deployment and integration of renewable energy sources.
- The growth of variable renewable energy (VRE) sources, such as solar and wind, calls for a more flexible energy system to ensure that the VRE sources are integrated in an efficient and reliable manner. Battery energy storage systems are emerging as one of the potential solutions to increase system flexibility, due to their unique capability to quickly absorb, hold and then reinject electricity. According to the Energy Storage Association of North America, market applications are commonly differentiated as: in-front of the meter (FTM) or behind-the-meter (BTM).
    - FTM batteries are connected to distribution or transmission networks or in connection with a generation asset. They provide applications required by system operators, such as ancillary services or network load relief.
    - BTM batteries are interconnected behind the utility meter of commercial, industrial or residential customers, primarily aiming at electricity bill savings through demand-side management.
- Electrochemical energy storage technologies include numerous battery technologies that vary in energy density, power performance, cost, and charging durations — among other attributes. The two main categories of batteries are solid state batteries and flow batteries.
    - Solid state batteries are batteries in which chemical energy is stored in solid-based electrodes. Examples include lead acid (e.g. traditional car batteries) and lithium ion (e.g. computer/cell phone batteries and electric vehicle batteries).
    - Flow batteries store energy in liquid electrolyte (an anolyte and a catholyte) solutions, which are pumped through a cell to produce electricity. Flow batteries are advantageous for their storage capacity, fast charging and discharging times, and long cycle life
- Utility-scale battery storage systems have a typical storage capacity ranging from around a few megawatt-hours (MWh) to hundreds of MWh. Different battery storage technologies, such as lithium-ion (Li-ion), sodium sulphur and lead acid batteries, can be used for grid applications. However, in recent years, most of the market growth has been seen in Li-ion batteries due to their decreasing costs, compact size, quick recharge times, and support for wireless charging, along with their use in electric vehicles. They can also be less toxic to the environment than lead-acid batteries as long as they are recycled or disposed of properly.
- Land Use and Zoning Considerations:
    - Screening: In many instances, walls, fences, building façade design, and other features can be utilized to screen an energy storage project or blend it in with its surroundings; however, certain siding materials or enclosures may pose safety risks around battery energy storage systems. In these cases, setbacks and landscape buffers may be needed to appropriately screen these facilities.
    - Sound: Sound levels may vary depending on the scale and type of facility; however, noise impacts akin to other industrial uses (and as discussed at the April 25, 2023 work session) should be considered.

- **Signage:** Warning signage should be provided on entrances to BESS facilities and on BESS outdoor containers. Signage standards are typically ANSI Z535 and/or NFPA 70.
- **Setbacks and Spacing:** Spacing between battery-related units and equipment should be at least 5 feet, with at least 10 feet for egress. Additional spacing may be necessary depending on the type of installation and proximity to combustible materials. For the purposes of compatibility and screening from adjacent properties and roadways, increased setbacks from the property line should be encouraged.
- **Fencing**: Security barriers, fences, and other enclosures are often utilized to prevent access into dangerous high voltage areas. For safety purposes, fencing and enclosures must not inhibit the required air flow to or exhaust from the BESS and related components. Incorporating ventilation breaks in walls and placing security fencing behind landscape buffers can help ensure that security fencing is adequate without negatively impacting the surrounding community character.
- **Vegetation**: Areas within 10 feet of outdoor BESS containers and related equipment must be cleared of combustible vegetation. Vegetated buffers can be encouraged around the site perimeter (in a safe proximity to BESS equipment) to adequately screen facilities from view.
- **Fire Safety:** Ensuring safety and compliance with relevant building and fire codes/standards is crucial in the manufacturing, construction, installation, and operation of BESS.
  - **Explosion Protection/Prevention:** If there are enough batteries in a room to create an explosive atmosphere, then explosion prevention systems or deflagration venting should be installed per the Virginia Statewide Fire Prevention Code and National Fire Protection Association (NFPA) standards.
  - **Fire Suppression System:** Testing has shown water to be the most effective medium for cooling an BESS fire. A sprinkler system that complies with NFPA 13, Standard for the Installation of Sprinkler Systems, should be installed in buildings where a BESS is installed.
  - **Battery Management System:** A system that monitors, controls, and optimizes performance of an individual or multiple battery modules in a BESS and can control the disconnection of the module(s) from the system in the event of abnormal conditions.
  - **Spacing:** BESS units should be grouped into small segments limited to certain kilo-watt hours (kWh) and spaced from other segments and walls to prevent horizontal propagation.
  - **First Responders:** Ensure first responders have the proper training to help keep them safe when responding to an incident involving BESS technology.

Code of Virginia

- Code of Virginia, § 15.2-2280, authorizes localities to adopt zoning provisions that advance and protect the health, safety, and welfare of the community.
- Code of Virginia, § 15.2-2286, authorizes localities to adopt provisions to incorporate generally accepted national environmental protection and product safety standards for the use of solar panels and battery technologies for solar photovoltaic (electric energy) projects, such as those developed for existing product certifications and standards including the National Sanitation Foundation/American National Standards Institute No. 457, International Electrotechnical Commission No. 61215-2, Institute of Electrical and Electronics Engineers Standard 1547, and Underwriters Laboratories No. 61730-2.
- 20VAC5-335 regulates the deployment of energy storage, establishing permitting and licensing procedures for Phase I and II Utilities as well as non-utility energy storage facilities, and registration of storage aggregators.

Comparison Communities

- The table on the following page(s) provides highlights of BESS regulations and standards from three localities:
  - Virginia Beach
  - Hanover County
  - Prince George County

Topic	Virginia Beach	Hanover County	Prince George County
Definitions	Article 1, Section 111 *Energy storage facility.* Energy storage equipment or technology that can absorb energy, store such energy for a period of time, and redeliver energy after it has been stored. This term includes battery storage facilities.	Article 5, Division 8, Section 26-292.1 • *Battery(ies):* A single cell or a group of cells connected together electrically in series, in parallel, or a combination of both, which can charge, discharge, and store energy electrochemically. For the purposes of this article, batteries utilized in consumer products are excluded from these requirements. • *Battery energy storage system:* One (1) or more devices, assembled together, capable of storing energy in order to supply electrical energy at a future time, not to include a stand-alone 12-volt car battery or an electric motor vehicle. A battery energy storage system is classified as a Tier 1 or Tier 2 battery energy storage system as follows: o Tier 1 battery energy storage systems have an aggregate energy capacity less than or equal to six hundred (600) kWh for onsite use only and, if in a room or enclosed area, consist of only a single energy storage system technology. o Tier 2 battery energy storage systems have an aggregate energy capacity greater than six hundred (600) kWh or are comprised of more than one (1) storage battery technology in a room or enclosed area. • *Cell:* The basic electrochemical unit, characterized by an anode and cathode, used to receive, store, and deliver electrical energy. • *Dedicated-use building:* A building that is built for the primary intention of housing battery energy storage system equipment, as defined in the latest adopted editions of the Virginia Uniform Statewide	Article 13, Section 90-1042(c) • *Battery(ies)* means a single cell or a group of cells connected together electrically in series, in parallel, or a combination of both, which can charge, discharge, and store energy electrochemically. For the purposes of this law, batteries utilized in consumer products are excluded from these requirements. • *Battery energy storage management system* means an electronic system that protects energy storage systems from operating outside their safe operating parameters and disconnects electrical power to the energy storage system or places it in a safe condition if potentially hazardous temperatures or other conditions are detected. • *Battery energy storage system* means one or more devices, assembled together, capable of storing energy in order to supply electrical energy at a future time, not to include a stand-alone 12-volt car battery or an electric motor vehicle. A battery energy storage system is classified as a tier 1 or tier 2 battery energy storage system as follows: o Tier 1 battery energy storage systems have an aggregate energy capacity less than or equal to 600 kWh and, if in a room or enclosed area, consist of only a single energy storage system technology. o Tier 2 battery energy storage systems have an aggregate energy capacity greater than 600 kWh or are comprised of more than one storage battery technology in a room or enclosed area.

Topic	Virginia Beach	Hanover County	Prince George County
Definitions		Building Code ("Uniform Code") and the International Building Code, and complies with the following: ○ The building's only use is battery energy storage, energy generation, and other electrical grid-related operations. ○ No other occupancy types are permitted in the building. ○ Occupants in the rooms and areas containing battery energy storage systems are limited to personnel that operate, maintain, service, test, and repair the battery energy storage system and other energy systems. ○ Administrative and support personnel are permitted in areas within the buildings that do not contain battery energy storage system, provided the following: ▪ The areas do not occupy more than ten (10) percent of the building area of the story in which they are located. ▪ A means of egress is provided from the administrative and support use areas to the public way that does not require occupants to traverse through areas containing battery energy storage systems or other energy system equipment.	• *Cell* means the basic electrochemical unit, characterized by an anode and cathode, used to receive, store, and deliver electrical energy. • *Commissioning* means a systematic process that provides documented confirmation that a battery energy storage system functions according to the intended design criteria and complies with applicable code requirements. • *Dedicated-use building* means a building that is built for the primary intention of housing battery energy storage system equipment, is classified as Group F-1 occupancy as defined in the latest adopted editions of the Virginia Uniform Statewide Building Code ("USBC") and the International Building Code, and complies with the following: ○ The building's only use is battery energy storage, energy generation, and other electrical grid-related operations. ○ No other occupancy types are permitted in the building. ○ Occupants in the rooms and areas containing battery energy storage systems are limited to personnel that operate, maintain, service, test, and repair the battery energy storage system and other energy systems. ○ Administrative and support personnel are permitted in areas within the buildings that do not contain battery energy storage system, provided the following: ▪ The areas do not occupy more than ten percent of

Topic	Virginia Beach	Hanover County	Prince George County
Definitions			the building area of the story in which they are located. ▪ A means of egress is provided from the administrative and support use areas to the public way that does not require occupants to traverse through areas containing battery energy storage systems or other energy system equipment.
Use Permission	Conditional Use: • I-1 – Light Industrial District • I-2 – Heavy Industrial District	Tier 1 Permitted in all zoning districts, as accessory to a permitted use. Tier 2 Conditional Use: • A-1 – Agricultural • M-1 – Limited Industrial • M-2 – Light Industrial • M-3 – Heavy Industrial	Tier 1 Permitted in all zoning districts. Tier 2 Special Exception: • A-1 – Agricultural • R-A – Residential Agricultural • M-1 – Limited Industrial • M-2 – General Industrial • M-3 – Heavy Industrial
Use Standards	Use standards are stated in Article 2, Division C, Section 225.02 and highlights are provided below.	Use standards are stated in Article 5, Division 8, Section 292.1 – 292.4 and highlights are provided below.	Use standards are stated in Article 13, Section 90-1042.
Setbacks	Sec. 225.02(b)(5) A one-hundred-foot setback for buildings and battery cabinet containers shall be required along all lot lines.	Tier 1 – Section 26-292.3(a) Setbacks shall be determined by Article 5, Section 2 of the Zoning Ordinance. Tier 2 – Section 26-292.4(a) Tier 2 battery energy storage systems shall comply with the setback requirements of the underlying zoning district for principal structures. • Front - ranges from 35-125’ • Side - ranges from 10-25' • Rear - ranges from 25-40’	Tier 1 Not addressed/subject to underlying zoning district. Tier 2 – Section 90-1042(g)(8)(a) Tier 2 battery energy storage systems shall comply with the setback requirements of the underlying zoning district for principal structures or 100 feet, whichever is greatest.
Lot Size	Not addressed/subject to underlying zoning district.	Not addressed for Tier 1 or 2/subject to underlying zoning district.	Tier 1 Not addressed/subject to underlying zoning district. Tier 2 – Section 90-1042(g)(8)(b) Tier 2 battery energy storage systems shall have a minimum lot size of five acres and maximize buffer areas to adjoining properties regardless of lot topography. Facilities shall be sited to avoid

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Lot Size			wetlands, floodplains, and any other environmental concerns.
Height	Not addressed/subject to underlying zoning district.	Tier 1 Not addressed/subject to underlying zoning district. Tier 2 – Section 26-292.4(b) Tier 2 battery energy storage systems shall comply with the building height limitations for principal structures of the underlying zoning district.	Tier 1 Not addressed/subject to underlying zoning district. Tier 2 – Section 90-1042(g)(8)(c) Tier 2 battery energy storage systems shall comply with the building height limitations for principal structures of the underlying zoning district.
Fencing	Section 225.02(a)(3)(f) Fencing or other methods ensuring public safety are allowed.	Not addressed for Tier 1 or 2.	Tier 1 Not addressed. Tier 2 – Section 90-1042(g)(8)(d) Tier 2 battery energy storage systems, including all mechanical equipment, shall be enclosed by a seven-foot-high security type fence with a self-locking gate to prevent unauthorized access unless housed in a secure, dedicated-use building and not interfering with ventilation or exhaust ports.
Screening	Section 225.02(b)(6) Category VI landscape screening shall be required within the setback. No other uses or structures shall be permitted in the setback.	Not addressed for Tier 1 or 2.	Tier 1 Not addressed. Tier 2 – Section 90-1042(g)(8) Tier 2 battery energy storage systems shall have views minimized from adjacent properties to the extent reasonably practicable using architectural features, earth berms, landscaping, or other screening methods that will harmonize with the character of the property and surrounding area and not interfering with ventilation or exhaust ports.
Safety	Section 225.02(b)(1) Installation and maintenance of any electrical storage system (ESS) shall comply with all applicable provisions of the Virginia Building Codes and the Virginia Statewide Fire Prevention Codes. Section 225.02(c)(3) An onsite fire monitoring system or fire watch prevention plan as	Section 26-292.2.B All battery energy storage systems, all dedicated-use buildings, and all other buildings or structures that (1) contain or are otherwise associated with a battery energy storage system and (2) are subject to the Uniform Code and/or the Energy Code shall be designed, erected, and installed in accordance with all applicable provisions of the Uniform Code, all applicable provisions of the Energy	Section. 90-1042(e) • All battery energy storage systems, all dedicated use buildings, and all other buildings or structures that (1) contain or are otherwise associated with a battery energy storage system and (2) subject to the Uniform Code and/or the Energy Code shall be designed, erected, and installed in accordance with all applicable provisions of the

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Safety	required by the fire chief of the City of Virginia Beach.	Code, and all applicable provisions of the codes, regulations, and industry standards as referenced in the Uniform Code, the Energy Code, and the Code of the County of Hanover.	Uniform Code, all applicable provisions of the Energy Code, and all applicable provisions of the codes, regulations, and industry standards as referenced in the Uniform Code, the Energy Code, and the Code of the County of Prince George. • All battery storage systems which include batteries of various chemistries and types, are classified as hazardous waste upon reaching end-of-life (EOL) or in a condition/state of degradation that requires replacement. Transport and disposal of all such components and solid and hazardous waste shall be in accordance with local, state, and federal hazardous waste disposal regulations. <u>Section 90-1042(g)(7)</u> The following must be submitted with the site plan: • Commissioning plan • Fire safety compliance plan • Operation and maintenance manual • Emergency operations plan <u>Section 90-1042(h)</u> • *System certification.* Battery energy storage systems and equipment shall be listed by a nationally recognized testing laboratory to UL 9540 (standard for battery energy storage systems and equipment) or approved equivalent, with subcomponents meeting each of the following standards as applicable: o UL1973 (standard for batteries for use in stationary, vehicle auxiliary power and light electric rail applications), o UL 1642 (standard for lithium batteries),

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Safety			○ UL 1741 or UL 62109 (inverters and power converters), ○ Certified under the applicable electrical, building, and fire prevention codes as required. ○ Alternatively, field evaluation by an approved testing laboratory for compliance with UL 9540 (or approved equivalent) and applicable codes, regulations and safety standards may be used to meet system certification requirements. • *Site access.* Battery energy storage systems shall be maintained in good working order and in accordance with industry standards. Site access shall be maintained, including access maintenance, repair, and snow removal at a level acceptable to the local fire department. • Battery energy storage systems, components, and associated ancillary equipment shall have required working space clearances, and electrical circuitry shall be within weatherproof enclosures marked with the environmental rating suitable for the type of exposure in compliance with NFPA 70.
Abandonment	Section 225.02(b)(3) and (4) • At such time that a battery storage facility is scheduled to be abandoned, the owner or operator shall notify the city manager or his/her designee. • Within three hundred sixty-five (365) days of the date of abandonment, the owner or operator shall complete the physical removal of the battery storage facility. This period may be extended at the request of the	Not addressed for Tier 1 or 2.	Section 90-1042(i) The battery energy storage system shall be considered abandoned when it ceases to operate consistently for more than 24 months. If the owner and/or operator fails to comply with decommissioning upon any abandonment, the County of Prince George may, as its discretion, enter the property and utilize the available bond and/or security for the removal of a tier 2 battery energy storage system and restoration of the site in accordance with the decommissioning plan.

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	owner or operator, upon approval of the city council.		
		CONDITIONAL USE/SPECIAL EXCEPTION PERMIT APPLICATION REQUIREMENTS All applications shall address at a minimum:	
Utilities	Not addressed.	Tier 2 – Section 26-292.3(b)(1) *Utility lines and electrical circuitry.* All on-site utility lines shall be placed underground to the extent feasible and as permitted by the serving utility, with the exception of the main service connection at the utility company right-of-way and any new interconnection equipment, including without limitation any poles, with new easements and right-of-way.	Tier 2 – Section 90-1042(g)(1) *Utility lines and electrical circuitry*. All on-site utility lines shall be placed underground to the extent feasible and as permitted by the serving utility, with the exception of the main service connection at the utility company right-of-way and any new interconnection equipment, including without limitation any poles, with new easements and right-of-way.
Signage	Not addressed.	Tier 2 – Section 26-292.3(b)(2) No advertising of any type may be placed on a battery energy storage system or related facility, except that a sign shall be required displaying the name, registration number, and emergency contact number of the facility owner. The sign shall not exceed four (4) square feet in size and shall be located on the security fence or other approved location.	Tier 2 – Section 90-1042(g)(2) • The signage shall be in compliance with ANSI Z535 and shall include the type of technology associated with the battery energy storage systems, any special hazards associated, the type of suppression system installed in the area of battery energy storage systems, and 24-hour emergency contact information, including reach-back phone number. • As required by the NEC, disconnect and other emergency shutoff information shall be clearly displayed on a light reflective surface. A clearly visible warning sign concerning voltage shall be placed at the base of all pad-mounted transformers and substations.
Lighting	Not addressed.	Tier 2 – Section 26-292.3(b)(3) Lighting of the battery energy storage systems shall be limited to that minimally required for safety and operational purposes. Any exterior lighting shall comply with Article 5, Division 6 of the Zoning Ordinance.	Tier 2 – Section 90-1042(g)(3) Lighting of the battery energy storage systems shall be limited to that minimally required for safety and operational purposes and shall be reasonably shielded and downcast from abutting properties.
Vegetation/ Landscaping	Section 225.02(c)(1) and (2) Factors relating to approval:	Not addressed for Tier 1 or 2.	Tier 2 – Section 90-1042(g)(4) *Vegetation and tree-cutting.* Areas within 20 feet on each side of tier 2 battery energy storage systems shall be cleared of combustible

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Vegetation/ Landscaping	• The visual impact of the project, in conjunction with landscaping and screening plans. • Impacts to protected environmental features.		vegetation and other combustible growth. Single specimens of trees, shrubbery, or cultivated ground cover such as green grass, ivy, succulents, or similar plants used as ground covers shall be permitted to be exempt provided that they do not form a means of readily transmitting fire. Removal of trees should be minimized to the extent possible.
Noise	Not addressed.	Tier 2 – Section 26-292.3(b)(4) Noise shall be regulated by Chapter 16 of the Hanover County Code.	Tier 2 – Section 90-1042(g)(5) The average noise generated from the battery energy storage systems, components, and associated ancillary equipment at any time shall not exceed a noise level of 20 dBA as measured at the outside wall the property line of any surrounding non-participating residence or occupied community building in the R-A and A Zoning Districts. In M Zoning Districts, the average noise shall not exceed a noise level of 60 dBA at adjoining property lines. Applicants may submit equipment and component manufacturers' noise ratings to demonstrate compliance. The applicant may be required to provide operating sound pressure level measurements from a reasonable number of sampled locations at the perimeter of the battery energy storage system to demonstrate compliance with this standard.
Decommissioning & Surety	Section 225.02(a)(1) and (d) Decommissioning plan and surety required.	Tier 2 – Section 26-292.3(b)(5) Decommissioning plan and surety required.	Tier 2 – Section 90-1042(g)(6) Decommissioning plan and surety required.

Recommendations

Pertinent highlights from King George County's existing and proposed BESS standards are discussed in the table below, along with recommendations.

	King George Existing Battery Storage Standards Section 4.19	King George Currently Proposed Battery Storage Standards Section 7-6-1	Recommendation
Definitions	Section 1.9.3 *Battery energy storage facility.* One or more battery energy storage systems, assembled together, capable of storing energy in order to supply electrical energy at a future time, but not to include a stand-alone, 12-volt car battery or an electric motor vehicle or consumer products.	Section 7-6-1(A) *Battery Energy Storage Facilities*. One or more battery cells for storing electrical energy in a Battery Energy Storage System with a Battery Management System. *Battery Energy Storage System*. A physical container providing secondary containment to battery cells that is equipped with cooling, ventilation, fire suppression, and a Battery Management System. *Battery Management System*. An electronic regulator that manages a Battery Energy Storage System by monitoring individual battery module voltages and temperatures, container temperature and humidity, off-gassing of combustible gas, fire, ground fault and DC surge, and door access and capable of shutting down the system before operating outside safe parameters.	The proposed definitions revise the existing definition and provide two new terms to better define related facilities and systems. ***No changes are recommended to the proposed definitions.***
Use Permission	By Right: • I – Industrial	By Right: • I – Industrial	Since battery storage facilities are often associated with utility-scale solar facilities, the use permissions can be revised for consistency between the two uses. ***Recommended revising use permissions for Battery Energy Storage Facility to Special Exception in the A-1, A-2 and I districts.***
Configuration	Section 4.19.1 Not addressed.	Section 7-6-1(B) All Battery Energy Storage Facilities shall be configured so that battery cells shall be placed in a Battery Energy Storage System ("BESS") with a Battery Management System ("BMS"). The BESS shall	The proposed language clarifies the configuration of battery energy storage facilities, BESS, and BMS. ***No changes are recommended to the proposed text.***

	King George Existing Battery Storage Standards Section 4.19	King George Currently Proposed Battery Storage Standards Section 7-6-1	Recommendation
Configuration		provide a secondary layer of physical containment to the batteries and be equipped with cooling, ventilation, and fire suppression systems.	
Operation	Section 4.19.1 Not addressed.	Section 7-6-1(C) Battery Energy Storage Facilities shall be constructed, maintained, and operated in accordance with applicable codes and standards, including but not limited to applicable fire, electrical, and building codes adopted by the County; National Fire Protection Association (NFPA) 855, Standard for the Installation of Stationary Energy Storage Systems, 2020 Edition and subsequent additions; Underwriters Laboratories (UL) 9540A Ed. 4-2019, Standard for Test Method for Evaluating Thermal Runway Fire Propagation in Battery Energy Storage Systems and subsequent editions.	The proposed language clarifies that facilities must operate in accordance with applicable fire and building codes. ***No changes are recommended to the proposed text.***
Utilities	Section 4.19.1.a Public water, or an existing commercial well, and fire hydrants must be available to the property	Section 7-6-1(D) Public water, or an existing commercial well, and fire hydrants shall be available to the property.	***If additional direction on electric utilities are desired, the following text can be added, consistent with benchmark localities:*** ***Utility lines and electrical circuitry. All on-site utility lines shall be placed underground to the extent feasible and as permitted by the serving utility, with the exception of the main service connection at the utility company right-of-way and any new interconnection equipment, including without limitation any poles, with new easements and right-of-way.***
Screening	Section 4.19.1.b Facilities shall not be visible from any adjacent street, use or building.	Section 7-6-1(E) Screening and/or landscaping shall be necessary to ensure that facilities are not visible. Facilities shall be located as to not be visible from any adjacent street, use, or building. (1) All screening and landscaping shall be in accordance with	The proposed language requires full screening from any adjacent street, use, or building in accordance with Article VIII. There is a chance that a battery storage facility could locate next to an undeveloped lot and would not need to screen on that side. Should that lot develop in the

	King George Existing Battery Storage Standards Section 4.19	King George Currently Proposed Battery Storage Standards Section 7-6-1	Recommendation
Screening		Article VIII, Community Design Standards, of this Ordinance.	future, the battery storage facility may not be adequately screened. Additional screening and landscaping requirements can be added to prevent inadequate screening; however, appropriate spacing between vegetation and battery storage facilities should also be considered for fire safety and prevention. ***Recommend revising the proposed text as follows:*** *Screening and/or landscaping shall be necessary to ensure that facilities are not visible. Facilities shall be* ***fully screened on all sides from view****.* *(1) All screening and landscaping shall be in accordance with Article VIII, Community Design Standards.* ***(2) Vegetation and tree-cutting. Areas within 20 feet on each side of battery energy storage system shall be cleared of combustible vegetation and other combustible growth. Single specimens of trees, shrubbery, or cultivated ground cover such as green grass, ivy, succulents, or similar plants used as ground covers shall be permitted to be exempt provided that they do not form a means of readily transmitting fire. Removal of trees should be minimized to the extent possible.***
Location	Section 4.19.1 Not addressed.	Section 7-6-1(F) Due to their potentially combustible nature, the siting of Battery Energy Storage Facilities shall be to: (1) Buffer the facility from the surrounding areas by siting	The proposed language clarifies appropriate siting and location of the facility, and encourages using the existing conditions and vegetation for screening purposes.

	King George Existing Battery Storage Standards Section 4.19	King George Currently Proposed Battery Storage Standards Section 7-6-1	Recommendation
Location		toward the interior of the lot and (2) Take advantage of existing topography, structures, and vegetation to provide extra screening.	Additional language can be added to further clarify protection of environmentally sensitive areas. ***Recommend adding distance from vegetation in provision (1) and add new provision (3):*** *(1) Buffer the facility from the surrounding areas by siting toward the interior of the lot, **at least 20 feet away from vegetation** and* *(2) Take advantage of existing topography, structures, and vegetation to provide extra screening.* ***(3) Avoid wetlands, floodplains, and any other environmental concerns.***
Emergency Access	Section 4.19.1.c Access to the property for King George County Fire, Rescue and Emergency Services (KGFRES) shall be provided in a manner acceptable to KGCFRES and an approved KNOX Box must be available for fire department access.	Section 7-6-1(G) Access to the property for King George Fire Rescue and Emergency Services (KGFRES) shall be provided in a manner acceptable to KGFRES.	The proposed language retains KGFRES's ability to approve access to the property; a KNOX Box can still be utilized if desired by KGFRES, but is no longer specified which will provide flexibility. ***No changes are recommended to the proposed text.***
Safety Operation Standards	Section 4.19.1 Not addressed.	Section 7-6-1(H) (1) Each individual battery shall have 24/7 automated fire detection and extinguishing technology built in. (2) The Battery Management System shall monitor individual battery module voltages and temperatures, container temperature and humidity, off-gassing of combustible gas, fire, ground fault and DC surge, and door access. (3) The Battery Management System shall be capable of shutting down the system before thermal runaway takes place.	The proposed language adds requirements for safety operation standards. ***No changes are recommended to the proposed text.***

	King George Existing Battery Storage Standards Section 4.19	King George Currently Proposed Battery Storage Standards Section 7-6-1	Recommendation
Warning Signage	Section 4.19.1.d NFPA 704 placards shall be placed on building entrances along with emergency contact information.	Section 7-6-1(I) NFPA 704 placards shall be placed on building entrances along with emergency contact information.	The existing and proposed text are consistent with best practices and benchmark localities. ***No changes are recommended to the proposed text.***
Security Fencing	Section 4.19.1 Not addressed.	Section 7-6-1(J) The facilities shall be enclosed by security fencing. (1) All security fencing shall be a minimum of 6 ft. in height and topped with razor/barbed wire, as appropriate. (2) All security fencing shall be constructed so as to substantially lessen the likelihood of entry by unauthorized individuals. (3) A performance bond reflecting the costs of anticipated security fence maintenance shall be posted and maintained. (4) Failure to maintain the security fencing shall result in revocation of the Zoning Permit and the facility's decommissioning.	The proposed text includes requirements for security fencing that are consistent with best practices and a benchmark locality, but could be enhanced with additional screening requirements. ***Recommend adding provision (5) to ensure that security fencing is placed behind landscaping and screened from view:*** ***(5) All security fencing shall be placed behind the buffer and screened from view.***
Setbacks	Subject to underlying zoning district setbacks. A-1 and A-2 Districts • Front – 35-45 feet • Side – 15 feet • Rear – 30 feet I District • Front – 50 feet • Side – 20 feet • Rear – 20 feet	Subject to underlying zoning district setbacks. A-1 and A-2 Districts • Front – 35-45 feet • Side – 15 feet • Rear – 30 feet I District • Front – 50 feet • Side – 20 feet • Rear – 20 feet	Battery storage facilities and surrounding properties can benefit from increased setbacks for screening purposes as well as fire safety considerations. ***Recommend establishing an increased setback of 100 feet from all property lines.***
Noise	Not addressed.	Not addressed.	Battery-related facilities/systems would be subject to the Industrial Noise standards discussed April 25, 2023, which has a maximum requirement 60 dBA daytime/55 dBA nighttime at the property line when adjacent to residential or

	King George Existing Battery Storage Standards Section 4.19	King George Currently Proposed Battery Storage Standards Section 7-6-1	Recommendation
Noise			agricultural districts and additional noise-sensitive uses. *No changes are recommended to the proposed text.*

In addition to the above highlights, an emergency operations plan, decommissioning plan, and surety are required for battery energy storage facilities. These requirements meet or exceed the benchmark communities and are consistent with industry best practices.

No changes are recommended to the proposed text for these items.

Power Plants

King George staff requested a review of power plant standards, including benchmark communities. Specific concerns included the following items: environmental impacts, safety concerns, and compatibility with community character, particularly from hydrogen-related power plants.

The Berkley Group has conducted a review of the existing ordinance text relating to power plants, industry and government resources, Code of Virginia, and several communities and summarized the information below. This information will be presented and offered for further discussion opportunity during the worksession.

U.S. Department of Energy and Industry Research

- Hydrogen is an energy carrier that can be used to store, move, and deliver energy produced from other sources.
- The U.S. Department of Energy (DOE) seeks to produce hydrogen using methods that are both cost-effective and carbon neutral. Support of hydrogen is reflected in the Inflation Reduction Act's hydrogen production tax credit, which gives tax credits to projects that begin construction before 2033. Localities may begin to see an increasing number of hydrogen-related land use applications.
- To produce hydrogen, it must be separated from the other elements in the molecules where it occurs. There are many different sources of hydrogen and ways for producing it for use as a fuel. The two most common methods for producing hydrogen are steam-methane (natural gas) reforming and electrolysis (splitting water with electricity).
    - Steam-methane reforming currently accounts for nearly all commercially produced hydrogen in the United States, which involves separating hydrogen atoms from carbon atoms in methane. Natural gas is the main methane source for hydrogen production. This technology is cost-effective but does not meet net-zero-carbon goals established by the DOE.
    - Electrolysis is a process that splits hydrogen from water using an electric current. On a large commercial scale, the process may be referred to as power-to-gas, where power is electricity and hydrogen is gas. Electrolysis itself does not produce any byproducts or emissions other than hydrogen and oxygen, but the power source may be derived from renewable sources, nuclear energy, or fossil fuels. This technology can be cost-effective, although the associated carbon emissions will vary depending on the power source.
    - Other methods of producing hydrogen include:
        - Using microorganisms, such as green microalgae or cyanobacteria, to use sunlight to split water into oxygen and hydrogen ions.
        - Converting biomass into gas or liquids and separating the hydrogen.
        - Using solar energy technologies to split hydrogen from water molecules.
- A color code is used to categorize types of hydrogen according to the energy sources used for its production.
    - Hydrogen produced using renewable energy might be referred to as renewable hydrogen or *green hydrogen*.
    - Hydrogen produced from coal may be called *brown hydrogen*.
    - Hydrogen produced from natural gas or petroleum might be referred to as *grey hydrogen*.
    - Brown or grey hydrogen production combined with carbon capture and storage/sequestration (to reduce carbon emissions) might be referred to as *blue hydrogen*.

- Most hydrogen used in the United States is produced at or close to where it is used — typically at large industrial sites. The infrastructure needed for distributing hydrogen to the nationwide network of fueling stations required for the widespread use of fuel cell electric vehicles still needs to be developed. Currently, hydrogen is distributed through three methods: pipeline, high pressure tube trailers, and liquified hydrogen tankers.
- Land Use and Zoning Considerations:
    - Power plants are often grouped with civic or public uses, but can be more akin to industrial uses and impacts. Building appearance, landscaping and buffers, screening, setbacks, nuisances such as noise and light, and safety considerations should be considered.
    - Land and resource Impacts from hydrogen production can vary based on the production method used. For example, water usage may be substantial for production methods utilizing fossil fuels or electrolysis. Water usage may be minimal if using renewable sources such as solar or wind.
    - While hydrogen production is not a new technology and is anticipated to become a more mainstream option for energy consumption in the future, it currently constitutes only 1% of the United States' energy consumption. There is ample guidance on the benefits of hydrogen technology (which can be plentiful when produced safely and using renewable resources), but there is less guidance on these facilities' impacts from a land use and zoning perspective.
    - Due to the evolving nature of power producing technologies – as well as the many different combinations of energy sources and energy production methods – permitting power plants as a Special Exception in all occurrences will ensure that the locality can review each application for its unique merits and site conditions. Conditions to protect community character and adjacent properties can be catered to each proposal.
        - Special Exception applications will benefit from enhanced submittal requirements to address the type and nature of the energy production, related appurtenances, water usage, environmental impacts, viewshed impacts, transmission lines, safety impacts, and emergency operation plans.
    - The Comprehensive Plan can assert preferences for facilities utilizing renewable resources, whether related to hydrogen production or other types of power producing facilities.

<u>Code of Virginia</u>

- Code of Virginia, § 15.2-2232, requires localities to determine if proposed public facilities are substantially in accordance with the adopted Comprehensive Plan.
- Code of Virginia, § 15.2-2280, authorizes localities to adopt zoning provisions that advance and protect the health, safety, and welfare of the community.
- The Virginia Clean Economy Act ordered coal plants in the state to close by 2045.
- The 2022 Virginia Energy Plan specifically calls on the Commonwealth to embrace and invest in hydrogen.

Comparison Communities

- The following table provides related regulations and standards from two localities that currently have power plants:
  - Fauquier County
  - Louisa County

Topic	Fauquier County	Louisa County
Definitions	*Public utility*. A business or service having an appropriate franchise from the State which is engaged in regularly supplying the public with some commodity or service which is of public consequence and need such as electricity, gas, water, transportation or communications.	*Utility Service, Major*. Service of a regional nature which normally entails the construction of new buildings or structures such as generating plants and sources, electrical switching facilities and stations or substations, power generation battery storage facilities, or solar arrays generating two MW or more of electricity which leaves the site boundaries, and similar facilities. Included in this definition are also electric, gas, and other utility transmission lines of a regional nature which are not otherwise reviewed and approved by the Virginia State Corporation Commission. Public and private water and sewer systems are excluded from this definition.
Use Permission	Special Exception: • RA – Agriculture • I-2 – Industrial General	Conditional Use: • A-1 – Agricultural • A-2 – Agricultural • R-1 – Residential Limited • R-2 – Residential General • C-1 – Light Commercial • C-2 – General Commercial • IND – Industrial • I-1 – Industrial Limited • I-2 – Industrial General

Special Exception/ Conditional Use Permit Requirements	Section 5-011.2
	Special Exception Submittal Requirements:
	• Plan showing existing and proposed conditions
	• Statement addressing:
	  ○ Type(s) of operation
	  ○ Hours of operation
	  ○ Estimated number of employees/patrons
	  ○ Traffic impact analysis
	  ○ Description of building façade and architectural style
	  ○ Photos of site
		Section 86-43
		• In determining imposed conditions, the governing body shall take into consideration the intent of this chapter and may impose reasonable conditions that:
		  ○ Abate or restrict noise, smoke, dust or other elements that may affect surrounding property.
		  ○ Establish setback, side and front yard requirements necessary for orderly development and to prevent traffic congestion.

Topic	Fauquier County	Louisa County
Special Exception/ Conditional Use Permit Requirements	Section 5-2001.1 Additional Submittal Requirements for Public Utilities: • Four (4) copies of a map showing the utility system of which the proposed use will be an integral part, together with a written statement outlining the functional relationship of the proposed use to the utility system. • Four (4) copies of a statement, prepared by a certified engineer, giving the basic reasons for selecting the particular site as the location for the proposed facility and certifying that the proposed use will meet the performance standards of the district in which located.	○ Provide for adequate parking and ingress and egress to public streets or roads. ○ Provide adjoining property with a buffer or shield from view of the proposed use if such use is considered detrimental to adjoining property. ○ Tend to prevent such use from changing the character and established pattern of development of the community.
Use Standards	Section 5-2002 – Category 20 Public Uses • Category 20 special permit and special exception uses shall not be required to comply with the lot size requirements or the bulk regulations set forth for the zoning district in which located in Part 4 of Article 3. However, such requirements may be established in the conditions under which such a special permit or special exception is granted. • No land or building in any district other than the Industrial Districts shall be used for the storage of materials or equipment, or for the repair or servicing of vehicles or equipment or for the parking of vehicles, except those needed by employees connected with the operation of the immediate facility. • In all zoning districts, other than the I-2 District, all equipment, machinery and facilities not located within an enclosed building shall be effectively screened.	There are no specific use standards for *Utility Service, Major*. However, the North Anna Power Plant is subject to conditions of approval.
Buffers and Screening	Section 7-604.3.i Non-Residential Buffer Requirements: • Buffer yards will be located along the perimeter of a lot or parcel, except that no side or rear buffer yard shall be required where an industrially zoned property abuts another industrially zoned	Section 86-123 – Civic Uses Within Growth Area Overlay • Landscaping provisions include requirements for street trees, ornamental/shade trees, parking lot trees, and shrubs.

Topic	Fauquier County	Louisa County
Buffers and Screening	property unless specifically required in conjunction with special permit or special exception approval or required pursuant to subsection (j)(2) below. Where a parcel extends to the center line of an existing road, the buffer yard shall begin at and extend inward from the ultimate right-of-way of that road alignment. Buffer yards shall extend to the lot line, parcel boundary or rights-of-way line, except where easements, covenants or natural features may require the buffer yard to be set back from the property line, in that event the buffer yard shall be in addition to such easements, covenants or natural features. • Buffer yards shall be provided within the required minimum yard setback areas. If the minimum buffer width is larger than the yard setback, the minimum buffer width must be provided. • Buffer options include: o Landscape strip – 20-foot width o Woodland strip – 35-foot width o Berm – 30 inches higher than finished grade In addition to landscaping otherwise required herein, where a use is required by any provision of this Zoning Ordinance or any condition of approval to be: • "Completely Screened from View" means Any portion of the use (except buildings) visible from a public street, park or adjoining residential property shall be screened by vegetation consisting of a double staggered row of evergreen trees planted 15 feet on center, or a double staggered row of evergreen shrubs planted 10 feet on center. Vegetation shall be of sufficient height at time of planting to actually screen the items required to be screened. If the items being screened are less than 6 feet in height, a minimum 6' high solid fence and/or wall may be utilized in lieu of the	• Screening provisions include requirements to fully screen all dumpsters, loading areas, and utilities using landscaping, opaque fencing, and extension of the building structure. <u>Section 86-123 – Industrial Uses Within Growth Area Overlay</u> • Industrial uses shall be shielded from primary roads, secondary roads and adjacent properties by the use of buffers and screening. The buffering and screening area shall be no less than 100 feet. The width of the buffering and screening area may be increased by the zoning administrator based on the intensity of the use or the height of structures within the site. Buffering and screening may be accomplished with one or any combination of the following methods provided the purpose of this section is met: o Landscaped berms o Landscaping o Existing trees

Topic	Fauquier County	Louisa County
Buffers and Screening	required screening vegetation. A chain link fence with slats shall not be utilized to satisfy the solid wall requirement. • "Substantially Screened from View" means any portion of the use (except buildings) visible from a public street or adjoining residential property shall be screened by a minimum 6' high solid fence or wall. A chain link fence with slats shall not be utilized to satisfy the solid wall requirement. In addition, the buffer yards required by subsection (i), above, shall be provided between the fence and the adjoining residential properties with such visibility.	
Noise	Section 9-803 Octave Band / Decibels (dB): • 31.5 Hz / 70 dB • 63 Hz / 71 dB • 125 Hz / 69 dB • 250 Hz / 65 dB • 500 Hz / 61 dB • 1,000 Hz / 57 dB • 2,000 Hz / 53 dB • 4,000 Hz / 49 dB • 8,000 Hz / 45 dB Impact Noise Levels at Lot Line: • Residential District – 80 dB • Nonresidential District – 90 dB Impact Noise Levels Beyond Lot Lines: • One Impact Noise Per Day – 120 dB • Between the hours of 8:00 p.m. and 7:00 a.m., all permissible noise levels for Residential Districts shall be reduced by 5 decibels.	Section 51-3 Daytime Level / Nighttime Level (dB): • A-1, A-2 – 65 dB / 55 dB • R-2, R-2 – 65 dB / 55 dB • C-1, C-2 – 70 dB / 60 dB • IND – 75 dB / 65 dB

Current / Proposed King George County Regulations

	King George Adopted Power Plant Standards	King George Proposed Power Plant Standards	Recommendations
Definitions	Power generation facilities are not currently defined.	*Utility Service, Major*. Service of a regional nature which normally entails the construction of new buildings or structures such as electric generating plants and sources; electrical switching facilities and stations or substations; community wastewater treatment plants; water towers; sanitary landfills; and similar facilities. All overhead transmission lines are included in this definition. This use does not include wind generating facilities; nor does it include Data Centers, Battery Energy Storage Facility, or any Solar Energy uses, as defined in this Ordinance.	The proposed definition includes electricity generating plants and sources, and is consistent with a benchmark locality. Electricity generating plants and sources can be pulled as a separate definition/use. ***Recommend revising the existing Utility Service, Major definition and adding a new definition for Electricity Generating Facility:*** *Utility Service, Major*. Service of a regional nature which normally entails the construction of new buildings or structures such as ~~***electric generating plants and sources;***~~ electrical switching facilities and stations or substations; community wastewater treatment plants; water towers; sanitary landfills; and similar facilities. All overhead transmission lines are included in this definition. This use does not include wind generating facilities; nor does it include Data Centers, Battery Energy Storage Facility, or any Solar Energy uses, as defined in this Ordinance. ***Electricity Generating Facility. A stand-alone facility not ancillary to another land use which generates electricity to be distributed to consumers, including but not limited to fossil fuel burning facilities, nuclear facilities, and hydrogen-producing facilities. This usage does not include wind generating facilities,***

	King George Adopted Power Plant Standards	King George Proposed Power Plant Standards	Recommendations
Definitions			***Data Centers, Battery Energy Storage Facilities, or any Solar Energy uses, as defined in this ordinance.***
Use Permissions	Power generation facilities are not currently permitted in any zoning district.	*Utility Service, Major* is permitted as a Special Exception in all districts in the proposed ordinance text.	Due to the intense and varying nature of power plants, which can differ based on the underlying resource (renewable v. nonrenewable), processing methods, storage requirements, and evolving technologies, it is recommended to review all potential power plants as a Special Exception in any district allowed. ***Recommend that electrical generating facilities be permitted by Special Exception in the following districts:*** • ***I – Industrial***
Use Standards	N/A	There are no specific use standards in Article VII, but this use would need to comply with Article VIII, Community Design Standards and would be approved with use conditions specific to the application.	Use standards are currently proposed in Article VII for *Utility Service, Minor*, but not *Utility Service, Major*. Use standards can be added for *Electricity Generating Facility.* Enhanced submittal requirements for Special Exception permits can also be added to review the merits and impacts of individual proposals. Note that while hydrogen production is anticipated to be a more prominent player in the energy sector, use standards would apply to all types of Electricity Generating Facilities (e.g. nuclear, natural gas), but would not apply to solar energy facilities, wind facilities, battery energy storage systems, and data

	King George Adopted Power Plant Standards	King George Proposed Power Plant Standards	Recommendations
Use Standards			centers, as they already have separate use standards proposed. *Recommend establishing use standards for Electricity Generating Facilities in Article VII. See text following this table for specific recommendations.* *It is further recommended to establish guidance and preferences for facilities utilizing renewable energy resources and carbon-neutral methods of production in the Comprehensive Plan.*
Special Exception Application Requirements	N/A	Section 3-4-3 The applicant must provide information and data to: • Demonstrate that the proposed use, when complemented with additional measures, if any, will be in harmony with the purposes of the specific district in which it will be placed; • Demonstrate that there will be no undue adverse impact on the surrounding neighborhood in terms of public health, safety, or general welfare and show measures to be taken to achieve such goals; • Demonstrate that the use will not tend to create congestion in streets, roads, alleys, and other areas; and • Show that the proposal meets the applicable specific and general	*Recommend adding additional application requirements for Electricity Generating Facilities in Article VII. See text following this table for specific recommendations.*

	King George Adopted Power Plant Standards	King George Proposed Power Plant Standards	Recommendations
Special Exception Application Requirements		standards required by this Ordinance.	
Noise	N/A	Per the discussion and review at the April 25, 2023 joint worksession, power plants located in an industrial district would be subject to the proposed industrial noise standards in Article VIII (60 dBA daytime/55 dBA nighttime).	Electricity Generating Facilities are proposed to be permitted by Special Exception in the Industrial district, and would therefore be subject to the Industrial Noise standards discussed on April 25, 2023. ***No changes are recommended to the Industrial Noise standards.***

Additional Recommendations

A new section can be added to Article VII, Division 6, Industrial Uses to address use performance standards and supplementary application requirements for Special Exception Permits for *Electricity Generating Facility*.

1. *Intent.*
    a. *The intent of this Section is to allow electricity generating facilities in a manner that promotes the development of renewable energy sources, while limiting and mitigating impacts on natural resources and existing agricultural, forestry, residential, commercial, industrial, historical, cultural, and recreational uses of property, or the future development of such uses of property within the County.*
    b. *The purpose of this Section is to outline the process and requirements for the construction, installation, operation, and decommissioning of electricity generating facilities that ensures the protection of health, safety, and welfare, while also avoiding adverse impacts on County resources.*
    c. *This Section is not intended to abridge safety, health, environmental, or land use requirements contained in other applicable laws, codes, regulations, standards, or ordinances. This Section does not supersede or nullify any provision of local, State, or Federal law that applies to electricity generating facilities.*
2. *Compliance.*
    a. *All electricity generating facilities shall fully comply with all applicable local regulations, as well as all applicable state and federal regulations, including but not limited to, the U.S. Environmental Protection Agency (EPA), State Corporation Commission ("SCC") or equivalent, any state departments related to environmental quality, parks, and wildlife protection, as well as all the applicable regulations of any other agencies that were in force at the time of the permit approval.*
    b. *The design and installation of all electricity generating facilities shall conform to applicable industry standards, including those of the American National Standards Institute (ANSI), Underwriters Laboratories (UL), the American Society for Testing and Materials (ASTM), or other similar certifying organizations and shall comply with all fire and safety requirements.*

3. *Height limits. Maximum height of the principal structure and accessory structures such as towers or smokestacks may exceed the height requirements of the underlying zoning district as conditioned in the Special Exception permit.*
4. *Setbacks. Minimum setback of the principal structure and all related accessory structures shall be at least 100 ft. from all property lines.*
5. *Buffer. Transitional buffers allowed include Type C and Alternative Buffer Berms as supplied in Article VIII, Community Design Standards.*
    a. *The buffer shall be maintained for the life of the facility.*
    b. *Existing forest resources shall be preserved by maintaining natural buffers to the greatest extent practical.*
6. *Coordination of Local Emergency Services. The owner or operator shall coordinate with the King George County Fire, Rescue and Emergency Services (KGFRES) to provide materials, education, and/or training on how to safely respond to on-site emergencies.*
7. *Groundwater Monitoring. Ground water monitoring to assess the level of groundwater contamination shall take place prior to, and upon completion of construction of the project, throughout the entire area of the electricity generating facility.*
    a. *Ground water monitoring shall take place every 5 years of the operation of the project, and upon completion of decommissioning.*
    b. *Results from said monitoring shall be delivered to the King George County Community Planning Department.*
8. *Security Fencing. The facilities shall be enclosed by security fencing.*
    a. *All security fencing shall be a minimum of 6 ft. in height and topped with razor/barbed wire, as appropriate.*
    b. *All security fencing shall be placed behind the buffer and must be screened from view.*
    c. *All security fencing shall be constructed so as to substantially lessen the likelihood of entry by unauthorized individuals.*
    d. *A performance bond reflecting the costs of anticipated security fence maintenance shall be posted and maintained.*
    e. *Failure to maintain the security fencing shall result in revocation of the Zoning Permit and/or Special Exception Permit, and the facility's decommissioning.*
9. *Warning Signage. Warning signage in conformance with National Fire Protection Association (NFPA), National Electrical Safety Code (NESC), American National Standards Institute (ANSI), and all related state and federal regulations shall be prominently displayed on all applicable structures and site entrances.*
10. *In addition to any requirements of Article III, Permits and Applications, of this Ordinance, applications for electricity generating facilities shall include the following*.
    a. *Pre-application Meeting. A pre-application meeting shall be held with the Administrator to discuss the location, scale, and nature of the proposed use, what will be expected during that process, as well as the potential for a siting agreement*.

b. *Neighborhood Meeting. A public meeting shall be held to give the community an opportunity to hear from the applicant and ask questions regarding the proposed project. The meeting shall adhere to the following*:

   i. *The applicant shall inform the Administrator and adjacent property owners in writing of the date, time, and location of the meeting, at least 14 but no more than 21 days, in advance of the meeting date.*

   ii. *The date, time and location of the meeting shall be advertised in a newspaper of record in the County by the applicant, at least 14 but no more than 21 days, in advance of the meeting date.*

   iii. *The meeting shall be held within the County, at a location open to the public with adequate parking and seating facilities that will accommodate persons with disabilities.*

   iv. *The meeting shall give members of the public the opportunity to review application materials, ask questions of the applicant, and provide feedback.*

   v. *The applicant shall provide the Administrator a summary of any input received from members of the public at the meeting and copies of any written submissions from the public.*

c. Project Narrative. A detailed narrative that:

   i. *Identifies the applicant, facility owner, site owner, and operator;*

   ii. *Describes the proposed facility, including:*

      1. *An overview of the project and its location;*

      2. *The size of the site and the project area;*

      3. *Height of all principal and accessory structures and appurtenances;*

      4. *The current use of the site;*

      5. *The estimated time for construction and proposed date for commencement of operations;*

      6. *The planned maximum rated capacity of the facility;*

      7. *If applicable, how and where electricity will be transmitted, including the location of proposed electrical grid interconnection.*

   iii. *Site Plan. In addition to the Site Plan requirements of Article III, Permits and Applications, of this Ordinance, all Site Plans for electricity generating facilities may also require additional information as determined by the Administrator – such as a scaled elevation view of the property and other supporting drawings, photographs of the proposed site, photo or other realistic simulations or modeling of the proposed project from potentially sensitive locations as deemed necessary by the Administrator to assess the visual impact of the project, landscaping and screening plan, coverage map, and additional information that may be necessary for a technical review of the proposal.*

   iv. *Construction Schedule. An estimated construction schedule.*

   v. *Visual Impact Analysis. The analysis demonstrates project siting and proposed mitigation, if necessary, so that the facility minimizes impact on the visual character of the municipality.*

1. *The applicant shall provide accurate, to scale, photographic simulations showing the relationship of the facility and its associated amenities and development to its surroundings. The photographic simulations shall show such views of all structures from locations such as property lines and roadways, as deemed necessary by the municipality to assess the visual impact of the facility.*
2. *The total number of simulations and the perspectives from which they are prepared shall be established by the Administrator after the pre-application meeting.*

vi. *Community Impact Assessment. An assessment of the impact on the immediate vicinity of the proposed use as well as the greater King George County community.*

1. *The report shall be prepared by a professional acting within his or her competency, shall be presented in written form and shall analyze in specific terms the probable impact of the project on the vicinity and community over time.*
2. *Specific attention, as may be appropriate to the individual proposal, should be given but not be limited to the following elements:*
    a. *Anticipated direct revenues to the County from real estate and personal property taxes;*
    b. *An assessment of employment opportunities to be created by the proposed development;*
    c. *An assessment of the short- and long-term economic impact of the proposed development;*
    d. *If the development is replacing an existing enterprise, including agriculture and forestry, an assessment of the impact the current enterprise has on the local economy and how the local economy will be impacted by the loss of the existing enterprise;*
    e. *Fire, rescue, and law enforcement requirements as compared to existing capacities and facilities;*
3. *The Administrator may waive certain elements of the Community Impact Assessment, where the nature of the proposed facility makes such elements inapplicable.*

vii. *Environmental Impact Assessment. A statement regarding any site and viewshed impacts, including direct and indirect impacts to national or state forests and grasslands, national or state parks, County parks, wildlife management areas, conservation easements, recreational areas, or any known historic or cultural resources within 5 miles of the proposed facility.*

1. *Wetlands, rivers and streams, and floodplains shall be inventoried, delineated, and mapped to provide baseline data for the evaluation of the current proposal and to determine satisfactory decommissioning as required in this Section.*
    a. *The inventory and mapping of floodplain shall not be construed to allow development within regulatory flood plain areas.*

viii. *Traffic Study.*

1. *Information about the proposed facility's traffic impacts, modeling both the construction and decommissioning processes, to include:*

a. *The time of day that transport will occur;*

b. *Characteristics of the loaded vehicles, including:*

i. *Length, height, width, curb weight;*

ii. *Maximum load capacity;*

iii. *Number of axles, including trailers; and*

iv. *Distance between axles.*

c. *The number of vehicles transporting materials;*

d. *The frequency of vehicle arrival at the site; and*

e. *The number of drivers the project will employ.*

2. *The haul route(s) shall be provided and approved for construction impacts.*

3. *After review of the application's traffic impact information, the County may require a full traffic study to be accepted by an engineer approved by the County.*

ix. *Emergency Plan. Applications for electricity generating facilities that relate to the generation of electricity shall include an emergency plan that, at a minimum, contains the following:*

1. *Procedures for safe shutdown, de-energizing, or isolation of equipment and systems under emergency conditions to reduce the risk of fire, electric shock, release of hazardous materials, and personal injuries, and for safe start-up following cessation of emergency conditions.*

2. *Procedures for inspection and testing of associated alarms, interlocks, and controls.*

3. *Procedures to be followed in the event of potentially dangerous conditions, including shutting down equipment, summoning service, and repair personnel, and providing agreed upon notification to fire department personnel for potentially hazardous condition in the event of a system failure.*

4. *Emergency procedures to be followed in case of fire, explosion, release of liquids or vapors, damage to critical moving parts, or other potentially dangerous conditions. Procedures can include sounding the alarm, notifying the fire department, evacuating personnel, de-energizing equipment, and controlling and extinguishing the fire.*

5. *Procedures and schedules for conducting drills of these procedures and for training local first responders on the contents of the plan and appropriate response procedures.*

x. *Decommissioning.*

1. *All applications for electricity generating facilities shall require a Decommissioning Plan.*

2. *Electricity generating facilities which have reached the end of their useful life, have been abandoned, or have not been in active and continuous service for a period of 12 months shall be decommissioned at the owner's or operator's expense, except if the project is being repowered or a force majeure event has or is occurring requiring longer repairs; however, the County may require evidentiary support that a longer repair period is necessary.*

3. *The owner or operator shall notify the Administrator by certified mail of the proposed date of discontinued operations and plans for decommissioning.*
4. *If a facility is abandoned and the owner receives a notice of abandonment from the Administrator, the owner shall either complete all decommissioning activities in accordance with the Decommissioning Plan and all applicable state and federal regulations.*
5. *All Decommissioning Plans shall be certified by an engineer or contractor with demonstrated expertise in energy generating facilities, and shall include the following:*
    a. *The anticipated life of the project.*
    b. *An estimated deconstruction schedule.*
    c. *The estimated decommissioning cost in current dollars.*
    d. *The estimated cost of decommissioning shall be guaranteed by bond, letter of credit, or other security approved by the County.*
        i. *The owner shall deposit the required amount into the approved escrow account before any building permit is issued to allow construction of or improvements to an electricity generating facility.*
        ii. *The escrow account agreement shall prohibit the release of the bond without the written consent of the County. The County shall consent to the release of the bond upon the owner's compliance with the approved Decommission Plan. The County may approve the partial release of the bond as portions of the approved Decommission Plan are performed.*
        iii. *The dollar amount of the bond shall be the full amount of the estimated decommissioning cost without regard to the possibility of salvage value.*
        iv. *The owner or occupant shall recalculate the estimated cost of decommissioning at least every 5 years. If the recalculated estimated cost of decommissioning exceeds the original estimated cost of decommissioning by 10%, then the owner or occupant shall deposit additional funds into the bond to meet the new cost estimate. If the recalculated estimated cost of decommissioning is less than 90% of the original estimated cost of decommissioning, then the County may approve reducing the amount of the bond to the recalculated estimate of decommissioning cost.*
6. *Hazardous material from the property shall be disposed of in accordance with federal and state law.*