



**MID-OHIO ENERGY
COOPERATIVE, INC.**

A Touchstone Energy[®]
Cooperative



Policies for Interconnection and Operation of Distributed Resources



Updated May 2021



Congratulations! You are taking an important step in promoting energy conservation and awareness by exploring renewable sources of power. The intent of this manual is to help guide cooperative members with the processes for interconnection and operation of distributed resources.

This manual contains policies, procedures, guidelines and agreements for interconnection to Mid-Ohio Energy's distribution system. Within this manual you will find the following sections:

- **Guide to Interconnection** - A step by step guide to interconnecting a distributed generation resource with Mid-Ohio Energy's distribution system.
- **Operational Policies** -
 - Policy 521 "Distributed Generation" regarding interconnections to the Mid-Ohio Energy system.
 - Policy 525 "*Interconnection and Operation of Distributed Resources*".
 - Policy 507 "*Qualifying Cogeneration and Small Power Production Facilities*" determining whether a load is distributed for purchase by either Mid-Ohio Energy or Buckeye Power.
 - Policy 508 "*Line Extension and New Service Installations*" providing guidelines and fee requirements for net metering service classifications.
- **Technical Guidelines** - This section includes the definitions and technical specifications for all Distributed Resource connections.
- **Net Metering** - This section is a rate schedule "NM" for residential loads of 25 kW and below, OR for non-residential loads that are 100 kW and below.
- **Application for Distributed Resource** - This is the application containing information relevant for your interconnection project. Please note there is a \$250.00 application fee to be paid before the application will be reviewed by the cooperative, and a \$300.00 fee for engineering inspection (total of \$550.00) before the project is cleared to be energized.

In addition to the documents contained in this manual, all interconnected resources and facilities must complete the required agreements and, if necessary, have a system impact study performed. Specifics required will be determined depending on the size and intended purpose of each installation.

If you have questions upon your review of this manual, please contact one of our offices and we will be glad to assist you. Good luck with your project!



John Metcalf
President & CEO

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Step by Step Guide to Distributed Generation Interconnection

- Contact Mid-Ohio Energy to inform us of your distributed generation project.
- Return the signed and completed “Application for Distributed Resource” form along with a \$250 application fee.
 - The \$250 application fee offsets the Cooperative’s administrative, initial engineering, and pre-installation inspection expenses.
 - If the pre-installation inspection reveals any deficiencies with the service location, Mid-Ohio Energy will notify the member of the necessary repairs that must be completed and inspected before an interconnection with Mid-Ohio Energy’s distribution system can be finalized.
 - Mid-Ohio Energy strongly encourages members to postpone construction until the receipt of the initial approval for interconnection from Mid-Ohio Energy.
- Following Mid-Ohio Energy’s approval of the project, a \$300 Engineering and Inspection fee must be paid prior to the final inspection.
 - The \$300 Engineering and Inspection Fee offsets the Cooperative’s final engineering and interconnection inspection expenses.
- If the member wishes to participate in net metering, a signed and completed “Net-Metering Agreement” must be returned to the Cooperative.
- After the distributed generation equipment has been installed, the Cooperative must complete a final inspection before an interconnection can be made.
- Upon completion of the Cooperative’s final inspection, the net metering equipment (if desired) will be installed and the member or a representative from the installing company may proceed with the interconnection.

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Operational Policies

POLICY 521

DISTRIBUTED GENERATION

I. POLICY CONTENT

WHEREAS, Ohio's electric distribution cooperatives and their electric power and energy supplier, Buckeye Power, Inc. are supporting research, development and the demonstration of distributed generation (DG) technologies (e.g. fuel cells, micro-turbines) through a variety of approaches including the support of the National Rural Electric Cooperative Association Cooperative Research Network, Energy Co-Opportunity, the Electric Power Research Institute and an Ohio Electric Cooperative DG Task Force; and

WHEREAS, DG technologies may possibly offer environmental benefits such as the reduction of certain emissions; and

WHEREAS, DG technologies may possibly offer economic benefits such as reduced transmission losses, an alternative to the expansion of electric distribution lines, improved overall conversion efficiency of fuel energy to electricity, and a localized source of electricity during interruption of grid supply; and

WHEREAS, the realization of the promise of grid-connected DG technology for Ohio's electric cooperative member-consumers is dependent upon (1) the successful demonstration of DG technology which facilitates the safe operational interconnection with the electric grid; (2) the just and reasonable allocation of costs and benefits without discrimination or preference in accordance with cooperative principles; and (3) compliance with all applicable contractual and other legal requirements; and

WHEREAS, Ohio's electric cooperatives deem it desirable to work with their member-consumers to facilitate demonstration projects in appropriate circumstances for the interconnection of grid-dependent DG technologies to enhance the effort to develop these technologies recognizing that the diversity of the characteristics of each DG technology requires that such interconnection be done on a case-by-case basis;

NOW, THEREFORE, BE IT

RESOLVED, that it shall be the policy of this cooperative to facilitate the integration of DG technologies with the cooperative's electric system through the development of demonstration projects on a case-by-case basis by working

with any of its members that may desire to have interconnected DG facilities installed on their premises; and

RESOLVED FURTHER, that this cooperative will make good faith efforts to resolve and legal, contractual, economic, engineering, safety and operational issues that may arise when the interconnection of DG technology is requested; and

RESOLVED FURTHER, that this cooperative will strive to enhance the opportunities for DG technologies as research, development and demonstration efforts better define the characteristics of DG technologies and assist in resolution of the pertinent issues thereby making it feasible to develop generic procedures, policies, engineering standards, rate designs and contract forms consistent with good utility practices, cooperative principles and the public interest.

POLICY 525

Operational Policy for the Interconnection and Operation of Distributed Resources (DR)

PURPOSE:

- A. To provide compliance by the Cooperative with Rural Utilities Service (RUS) regulations, 7 C.F.R. 1730.60 through 1730.65.
- B. To avoid significant degradation of the safety, quality and reliability of Cooperative's electric power system or other electric power systems interconnected to the Cooperative's electric power system caused by the interconnection or operation of DR.
- C. To offer a fair, reasonable and non-discriminatory procedure through which the Cooperative may permit the interconnection and synchronization of certain electric generation facilities owned or operated by manufacturers and similar large commercial and industrial electric power and energy consumers, in parallel operation with the Cooperative's facilities.

PROCEDURE:

The provisions of this policy will extend to all Distributed Resource facilities, including facilities as defined by the Federal Energy Regulatory Commission as qualifying cogeneration facilities or small power production facilities, located within the service territory of the Cooperative.

- A. Distributed Resources:

Distributed Resources (DR) are sources of electric power that are not directly connected to a bulk power transmission system, connected to the Cooperative's electric power system through a point of common coupling. DR facilities include both generators and energy storage technologies.

- B. Qualifying Cogeneration Facility:

Cogeneration is the combined production of electric energy and useful heat by the sequential use of energy from one fuel source. A Qualifying Cogeneration Facility is one which meets the ownership test as well as the operating and efficiency standards and all other definitional requirements of Sections 201 and 210 of the Public Utility Regulatory Policies Act of 1978, as amended, and all governmental regulations lawfully promulgated thereunder (PURPA).

- C. Qualifying Small Power Production Facility:

A Qualifying Small Power Production Facility is a facility generating not more than 80 megawatts of electric power through the employment of renewable

resources such as water power, solar energy, wind energy, geothermal energy, biomass or waste, as a primary fuel and meeting all other definitional requirements of PURPA.

D. Qualifying Facility:

A Qualifying Facility means any Qualifying Cogeneration Facility or Qualifying Small Power Production Facility.

E. Permitted Synchronized Generation Facilities:

Permitted Synchronized Generation Facilities are electric generation facilities other than Qualifying Facilities owned or operated by manufacturers and similar large commercial and industrial electric power and energy consumers in parallel operation with adjacent electric distribution facilities of the Cooperative under circumstances where (1) such generation facilities are operated for the sole purpose of (a) providing back-up generation when it is anticipated that there is a possibility of interruption of generation service provided by the Cooperative, or (b) minimizing or eliminating the consumer's contribution to a PJM 5-CP System Annual Demand, or (c) testing the consumer's electric facilities, and (B) no electric power and energy will be introduced into the electric system of the Cooperative or any other entity.

F. PJM 5-CP System Annual Demand:

PJM 5-CP System Annual Demand shall mean any of the five highest hourly kW coincident demands of all of the members of PJM Interconnection, LLC (or any successor thereto, "PJM"), as measured and determined by PJM for purposes of determining Buckeye's annual PJM capacity charges, or such other hourly kW demands used by PJM to determine Buckeye's responsibility for annual PJM capacity charges, for the applicable PJM planning year (June 1 – May 31), as determined by Buckeye from time to time.

POLICY:

- A. The Cooperative will permit the interconnection and parallel operation of Qualifying Facilities, consistent with Cooperative Policy 507 and Cooperative rules and regulations.
- B. With respect to DR facilities that are not Qualifying Facilities, the Cooperative will permit the interconnection and parallel operation of Permitted Synchronized Generation Facilities where (1) Buckeye has approved the same, (2) such facilities meet all of the Cooperative's Rules and Regulations, and (3) such facilities are equal to or greater than 25 kW but not more than 10 MVA.

- C. DR facilities are otherwise not permitted to interconnect with and operate in parallel with the Cooperative's electric distribution facilities except as approved by the Cooperative's Board of Trustees on a case by case basis.

POLICY 507

OPERATIONAL POLICY

QUALIFYING CO-GENERATION AND SMALL POWER PRODUCTION FACILITIES

I. OBJECTIVE

- A. To provide compliance by the Cooperative with requirements of Sections 201 and 210 of the Public Utility Regulatory Policies Act of 1978 and all governmental regulations lawfully promulgated thereunder (PURPA).
- B. To encourage the development of co-generation and small power production facilities which will conserve oil, gas, coal and other non-renewable resources in accordance with the requirements of PURPA.
- C. To offer a fair, reasonable and nondiscriminatory procedure through which the Cooperative may interconnect with qualifying co-generation and small power production facilities in accordance with the requirements of PURPA.

II. SCOPE

The provisions of this policy will extend to all facilities as defined by the Federal Energy Regulatory Commission as qualifying co-generation facilities or small power production facilities located within the service territory of the Cooperative.

III. DEFINITIONS

- A. Qualifying Co-generation Facility Co-generation is the combined production of electric energy and useful heat by the sequential use of energy from one fuel source. A qualifying co-generation on facility is one which meets the ownership test as well as operating and efficiency standards and all other definitional requirements of PURPA.
- B. Qualifying Small Power Production Facility – A small power production facility is a facility generating not more than 80 megawatts of electric power through the employment of renewable resources such as water power, solar energy, wind energy, geothermal energy, bio-mass or waste,

as a primary fuel and meeting all other definitional requirements of PURPA.

- C. Qualifying Facility – A qualifying facility means any qualifying co-generation facility or qualifying small power production facility.

IV. POLICY CONTENT

- A. The Cooperative will interconnect with and operate in parallel with any qualifying facility which meets all interconnection requirements as specified in the Cooperative's rules and regulations.
- B. The Cooperative will purchase any energy and the associated capacity available from a qualifying facility having a design capacity of 100 kilowatts or less at rates and upon terms and conditions as set forth in the rules, regulations, policies and applicable rate schedules of the Cooperative. Purchases of electric energy and the associated capacity from a qualifying facility having a design capacity greater than 100 kilowatts shall be at rates and upon terms and conditions to be determined on a case by case basis and provided by contract between the Cooperative and the qualifying facility owner. In either event, purchases of electric energy and the associated capacity from a qualifying facility will be at a rate which reflects at least the Cooperative's actual avoided costs, taking into account all relevant factors.
- C. The Cooperative will sell electric energy and the associated capacity to any qualifying facility at rates upon terms and conditions as specified in the Cooperative's applicable rules, regulations, policies and rate schedules, which rates will be the same as those which apply to other consumers with similar load and other cost related characteristics.
- D. The owner or operator of a qualifying facility who desires to interconnect the facility with the electric system of the Cooperative shall pay all costs associated with the interconnection.
- E. The Cooperative shall develop and administer rules, regulations and one or more rate schedules covering interconnections with and purchases from qualifying facilities which have a capacity of 100 kilowatts or less.

- F. The Cooperative shall cooperate with Buckeye Power, Inc. in developing, on a case by case basis, agreements covering interconnection with any qualifying facility having a design capacity of over 100 kilowatts.



POLICY 508 – LINE EXTENSION AND NEW SERVICE INSTALLATIONS

I. OBJECTIVE

Provide guidelines and fee requirements for line extension and new service installations within the service territory of Mid-Ohio Energy Cooperative (hereinafter the “Cooperative”) as certified by the State of Ohio.

II. POLICY CONTENT

The Cooperative has established a fee schedule and new service requirements for all defined classes of new services: permanent homes, non-permanent homes, non-residence, and net-metering services.

III. PROVISIONS

A. Service Classifications:

1. Permanent Home: Homes constructed at the building site (also referred to as stick-built) or off-site and delivered to the home site (also referred to as manufactured homes), with single phase electrical wiring installed during the process. A permanent home must be built on a permanent foundation and contain modern plumbing such as running water, septic tank, etc.
2. Non-Permanent Home: Homes constructed off-site and delivered to the home site with a portion or all of the electrical wiring pre-installed. A non-permanent home normally does not have a permanent foundation and may have axles and pulling equipment such as a hitch installed. Non-permanent homes include mobile homes, sectional homes placed on piers or blocks, and temporary structures which are lived in for a finite period of time. Such temporary structures include pole buildings or other buildings converted into living areas while a permanent home is being planned or constructed.
3. Non-Residence: Buildings or structures that the member or their tenant does not occupy as a residence. Such non-residence services include agricultural structures such as barns, sheds, and storage structures; commercial buildings;

campers; and any service that qualifies for the Cooperative's general service, large commercial or large power rate schedule.

4. **Net-Metering:** Any generation source interconnected with the Cooperative's distribution facilities for the purpose of off-setting and/or injecting energy onto the Cooperative's distribution network. Net-metering installations may include, but are not limited to solar panels, wind turbines, or battery technology.

B. Fee Schedule for New Installations:

1. A \$300.00 new service fee will be collected prior to installation for a permanent home service. A \$500.00 new service fee will be collected prior to installation for a non-permanent home or non-residence service. The Cooperative will furnish one 200 ampere meter base/disconnect combo at no additional charge.
 - a. A \$250.00 application fee will be collected for net-metering applicants in addition to the above new service fee to offset the cost for the administration, engineering and consultation needed to begin the net-metering process. This fee will also cover up to two trips to the net-metering location by Cooperative employees. Additional trips thereafter will be charged to the applicant's electric account in accordance with the fee schedule in Policy 501.
2. The Cooperative will extend electric service at the rate of \$6.00 per foot of line from the nearest Cooperative owned facility, also known as the 'tap point'.
 - a. The Cooperative will not extend to net-metering installations on the load (member) side of the existing service. All conductors and equipment connected from the service point location to the distributed generation (DG) source must be furnished and installed by the member. Any modifications required by the Cooperative to accommodate the DG source will be charged at the rate per foot listed above.
3. Extensions along a public roadway maintained by the State, County or Township will be constructed at no charge to the member for permanent homes. Road right-of-way extensions will not commence until either a foundation or a well and a septic tank is installed at the building site, or a non-refundable fee of \$6.00 per foot is paid prior to construction. For non-permanent homes, non-residence services, and net-metering installations, such extensions will be constructed at

\$6.00 per foot.

- a. These extensions exclude the costs of trenching, right-of-way clearing, underground protection, permits, and easements, which will be borne 100% by the member.
 - b. Roadway extensions must run parallel with the roadway and placed either immediately within or immediately outside the road right-of-way.
 - c. All extensions must have the cooperation and easements of all affected property owners.
4. Primary single-phase underground installations in excess of 1,000 feet will have primary junction cabinets installed at 1,000-foot intervals. A fee of \$800.00 will be assessed for each junction cabinet installation. The Cooperative will determine the number and placement of the junction cabinets.
 5. A Cooperative provided trench for underground service will be reimbursed by the member at the actual cost of the trenching. A trench provided by the member must meet the Cooperative's specifications, be a minimum of 36 inches below finish grade (excluding joint-use trenches which may need to be deeper depending on the other type(s) of utility in the trench), and be approved by a Cooperative representative prior to installation of service wires.
 6. Any service requiring installation of poly-phase or a service size in excess of 200 amperes will require reimbursement to the Cooperative for any additional costs, up to actual time and material costs, in excess of the charges listed in this policy.
 7. If the member elects to install the meter at the location of the transformer, either on the Cooperative owned pole or at the pad-mount transformer the member is required to install a backer-board to the Cooperative's design specifications. All installations on Cooperative owned poles must be performed by Cooperative personnel.

- b. All installations on Cooperative owned poles will be performed by Cooperative personnel.

C. Other Service Requirements:

1. The Cooperative reserves the right to determine the placement of its facilities on all properties.
2. Meters attached to the structure of a non-permanent home must be installed as overhead service at the location determined by the Cooperative. Underground installations will not be permitted.
3. Easements of right-of-way, when required for line extension, will be obtained by the Cooperative at the cost of the member.

Technical Guidelines

Mid-Ohio Energy Cooperative, Inc.
Technical Guidelines
for Interconnection and Parallel Operation

APPLICABILITY

These rules apply to interconnection and parallel operation of DR (Distributed Resource) equipment that, in sum, is rated less than 10 MVA on radially operated Cooperative distribution lines up to 12.47 Kv three phase (7.2 Kv single phase). Interconnections to higher voltage lines will be made at the discretion of the Cooperative.

1.0 DEFINITIONS

Distributed Resource (DR) / DR Facility – Any source of electric power that is not directly connected to the bulk power transmission system, having an installed capacity of not more than 10 MVA, connected to Cooperative’s electric power system through a point of common coupling, including both generators and energy storage technologies, including any qualifying cogeneration or small power production facility meeting all definitional requirements under the Public Utility Regulatory Policies Act of 1978, as amended, and all governmental regulations lawfully promulgated thereunder (Qualifying Facility), as well as any Permitted Synchronized Generation Facilities.

Flicker – A variation of input voltage sufficient in magnitude and duration to allow visual observation of a change in electric lighting source intensity, as defined in IEEE Standard 141-1993. See Also Exhibit 1, attached, specifically the curve “Border Line of Visibility”.

Facilities Study – An engineering study conducted to determine the modifications to the existing cooperative system that will be needed to accommodate connection and safe operation of the DR Facility.

Harmonic Distortion – Distortion of the normal sine waveform; typically caused by nonlinear loads or by inverters attached to the system on customer premises.

Interconnection Agreement – A legal contract for the connection of the DR Facility to the Cooperative’s lines, specifying the location, size, cost, manner of payment, terms of operation, and respective responsibilities of the Cooperative and the DR Facility owner.

Permitted Synchronized Generation Facilities – Electric generation facilities equal to or greater than 25 kW but not more than 10 MVA, other than Qualifying Facilities,

owned or operated by manufacturers and similar large commercial and industrial electric power and energy consumers in parallel operation with adjacent electric distribution facilities of the Cooperative under circumstances where (A) such generation facilities are operated for the sole purpose of (1) providing back-up generation when it is anticipated that there is a possibility of interruption of generation service provided by the Cooperative, or (2) minimizing or eliminating the consumer's contribution to a PJM 5-CP System Annual Demand, or (3) testing the consumer's electric facilities, and (B) no electric power and energy will be introduced into the electric system of the Cooperative or any other entity.

Point of Common Coupling – The point at which a DR Facility is connected to the Cooperative's electric distribution system.

Radially Operated System – An electric distribution system that is normally operated with only one supplying line connected to a load at any one time.

Single Phasing Condition – Occurs when electric flow through one phase of a three phase supply line or device is interrupted.

Short Circuit Contribution – The result, expressed as a percentage, of dividing the maximum short circuit contribution of the DR Facility (or Facilities) by the short circuit contribution available from the Cooperative's system, without the DR Facility (or Facilities).

Supplemental Review - Review of functional technical requirements to determine acceptability of equipment to be used to connect and safely operate the DR Facility on the Cooperative's lines.

System Impact Study – An engineering study to assess the ability of the existing cooperative system to accommodate connection and safe operation of the DR Facility.

Unintentional Island – An unplanned condition where a portion of the Cooperative's electric distribution system that is physically disconnected from the Cooperative's power supply remains energized as a result of power supplied by one or more DR facilities.

2.0 CUSTOMER DESIGN REQUIREMENTS

For an interconnection to be safe to Cooperative employees and equipment and to other customers, the following minimum conditions are required to be met by DR Facilities. At the discretion of the Cooperative, additional conditions may be required to be met:

- 2.1 DR Facilities must meet all applicable national, state, and local construction, operation and maintenance related safety codes, such as National Electrical Code (NEC), National Electrical Safety Code (NESC), and Occupational Safety and Health Administration (OSHA) requirements. All interconnections of DR Facilities must comply with IEEE 1547 – Standard for Interconnecting Distributed Resources with Electric Power Systems, approved June 12, 2003, and IEEE 1547.1 – Standard Conformance Test Procedures for Equipment Interconnecting Distributed Resources with Electric Power Systems, approved June 9, 2005, which standards are incorporated herein.
- 2.2 DR Facility owner must provide the Cooperative with a one-line diagram showing the configuration of the proposed DR system, including the protection and controls, disconnection devices, nameplate rating of each device, power factor rating, transformer connections, and other information deemed relevant by the DR owner and/or the Cooperative. If the proposed DR system does not pass the screening process for simplified interconnection, Exhibit 2 attached hereto, additional information may be necessary from the DR Facility owner, and Cooperative system changes may be required. In no event, other than from a Qualifying Facility, shall a consumer deliver into the electric distribution system of the Cooperative any of the electric power or energy, ancillary services (including, without limitation, reactive power), or other output of a DR facility. The owner or operator of the DR Facility, other than a Qualifying Facility, shall provide, install, own, operate and maintain, at its own cost and expense, all facilities and equipment as are required to prevent delivery into the Cooperative's electric distribution system of any of the electric power or energy, ancillary services (including, without limitation, reactive power), or other output of the DR Facility.
- 2.3 DR equipment must be equipped with adequate protection and control to trip¹ the unit off line during abnormal² system conditions, according to the following requirements:
 - 2.3.1 Undervoltage or overvoltage within the trip time indicated below. By agreement of both the DR owner and the Cooperative, different settings maybe used for the under voltage and over voltage trip levels or time delays.

¹ To trip is to automatically (without human intervention required) open the appropriate disconnection device to separate the DR equipment from the power system.

² Abnormal system conditions include faults due to adverse weather conditions including but not limited to, floods, lightning, vandalism, and other acts that are not under the control of the Cooperative. This may also result from improper design and operation of customer facilities resulting from non-compliance with accepted industry practices.

V= Nominal System Voltage	Maximum Trip Time
$V < 50\%$	10 cycles
$50\% \leq V < 88\%$	120 cycles
$110\% < V < 120\%$	60 cycles
$V \geq 120\%$	6 cycles

2.3.2 For three phase generation, loss of balanced three-phase voltage or a single phasing condition within the trip times indicated in 2.3.1 when voltage on at least one phase reaches the abnormal voltage levels.

2.3.3 Underfrequency or overfrequency: All DR Facilities shall follow the associated Cooperative distribution line frequency within the range 59.3 Hz to 60.5 Hz. DR Facilities rated at less than 10 kW shall disconnect from the Cooperative within 10 cycles if the frequency goes outside this range. A DR rated more than 10 kW shall (1) disconnect from the Cooperative within 10 cycles if the frequency exceeds 60.5 Hz, and (2) be capable of time delayed disconnection for frequencies in the range 59.3 Hz to 57 Hz. By agreement of both the DR operator and the Cooperative, different settings may be used for the under frequency and over frequency trip levels or time delays.

2.4 DR equipment requires the following additional protection to avoid damage to the Cooperative's system during normal, as well as abnormal system conditions.

2.4.1 Synchronizing controls to insure a safe interconnection with the Cooperative's distribution system. The DR equipment must be capable of interconnection with minimum voltage and current disturbances. Synchronous generator installations, as well as other types of installations, must meet the following: slip frequency less than 0.2 Hz, voltage deviation less than $\pm 10\%$, phase angle deviation less than ± 10 degrees, breaker closure time compensation (not needed for automatic synchronizer that can control machine speed).

2.4.2 A disconnect switch to isolate the DR equipment for purposes of safety during maintenance and during emergency conditions. The Cooperative may require a disconnect device to be provided, installed by, and paid for by the customer, which is readily accessible to and operable and lockable by Cooperative personnel, either at the primary voltage level, which shall include a lockable disconnect and a visible open, may include load-break cutouts, switches and elbows, or on the secondary voltage level, which may include a secondary breaker or switch. The switch must be clearly labeled as a DR disconnect switch.

2.5 DR equipment must have adequate fault interruption and withstand capacity, and adequate continuous current and voltage rating to operate properly³ with the Cooperative's system. A three-phase device shall interrupt all three phases simultaneously. The tripping control of the circuit interrupting device shall be powered independently of the utility AC source, for example by a battery or stored energy device, in order to permit operation upon loss of the Cooperative distribution system connection.

2.6 Test results shall be supplied by the manufacturer or independent testing lab that verify, to the satisfaction of the Cooperative, compliance with the following requirements contained in this document⁴:

- 2.6.1 Over/Under Voltage Trip Settings (ref. 2.3.1)
- 2.6.2 Over/Under Frequency Trip Settings (ref 2.3.3)
- 2.6.3 Synchronization (ref 2.4.1)
- 2.6.4 Harmonic Limits (tested at 25%⁵ of full load rating or at a level as close to the minimum level of rated output the unit is designed to operate as practical and at a level as close to 100% of full load rating as practical) (ref 2.7)
- 2.6.5 DC Current Injection Limits (Inverters) (ref 2.8)
- 2.6.6 Anti-Islanding (Inverters) (2.13)
- 2.6.7 Prevent Connection or Reconnection to De-energized System (ref 2.14)

If test results are acceptable to the Cooperative and if requested by a manufacturer, the Cooperative may supply a letter indicating the protective and control functions for a specific DR Facility model are approved for interconnection with the Cooperative's distribution system, subject to the other requirements in this document. The Cooperative reserves the right to review the suitability of previously approved protective and control functions.

The DR Facility owner shall have the DR Facility inspected by the Cooperative and any required local inspectors (i) to verify correct protective settings and connections of the DR Facility to the Cooperative system prior to the first parallel operation, and (ii) shall have testing performed to the satisfaction of the Cooperative to verify proper operation of the DR Facility.

2.7 Harmonics and Flicker: The DR equipment shall not be a source of excessive harmonic voltage and current distortion and/or voltage flicker. Limits for harmonic distortion (including inductive telephone influence factors) will be as published in the latest issues of ANSI/IEEE 519, "Recommended Practices and Requirements for Harmonic Control in Electrical Power Systems." Flicker occurring at the point

³ Properly, in this context, means within the acceptable Cooperative or industry established practices.

⁴ For photovoltaic systems, a certification that the testing requirements of UL 1741 have been met may be used in place of these tests.

⁵ If the device is not designed to operate at this level, then the test should be at the lowest level at which it is designed to operate.

of compliance shall remain below the Border Line of Visibility curve on the IEEE/GE curve for fluctuations less than 1 per second or greater than 10 per second. However, in the range of 1 to 10 fluctuations per second, voltage flicker shall remain below 0.4%. Refer to Exhibit 1. When there is reasonable cause for concern due to the nature of the generation and its location, the Cooperative may require the installation of a monitoring system to permit ongoing assessment of compliance with these criteria. The monitoring system, if required, will be installed at the DR owner's expense. Situations where high harmonic voltages and/or currents originate from the distribution system are to be addressed in the Interconnection Agreement.

- 2.8 DC Current Injection from inverters shall be maintained at or below 0.5% of full rated inverter output current into the point of common coupling.
- 2.9 The DR Facility's generated voltage shall follow, not attempt to oppose or regulate, changes in the prevailing voltage level of the Cooperative at the point of common coupling, unless otherwise agreed to by the operators of the DR Facility and the Cooperative. DR Facilities installed on the downstream (load) side of the Cooperative's voltage regulators shall not degrade the voltage regulation provided to the downstream customers of the Cooperative to service voltages outside the limits of ANSI 84.1, Range A.
- 2.10 System Grounding: The DR Facility shall be grounded in accordance with applicable codes. The interconnection of the DR equipment with the Cooperative's system shall be compatible with the neutral grounding method in use on the Cooperative's system. For interconnections through a transformer to Cooperative system primary feeders of multi-grounded, four-wire construction, or to tap lines of such systems, the maximum unfaulted phase (line-to-ground) voltages on the Cooperative system primary feeder during single line-to-ground fault conditions with the Cooperative system source disconnected, shall not exceed those voltages which would occur during the fault with the Cooperative system source connected and no DR Facilities connected.
- 2.11 System Protection: The DR owner is responsible for providing adequate protection to Cooperative facilities for conditions arising from the operation of generation under all Cooperative distribution system operating conditions. The owner is also responsible for providing adequate protection to their facility under any Cooperative distribution system operating condition whether or not their DR is in operation. Such conditions may include but are not limited to:
 1. Loss of a single phase of supply,
 2. Distribution system faults,
 3. Equipment failures,
 4. Abnormal voltage or frequency,
 5. Lightning and switching surges,
 6. Excessive harmonic voltages,

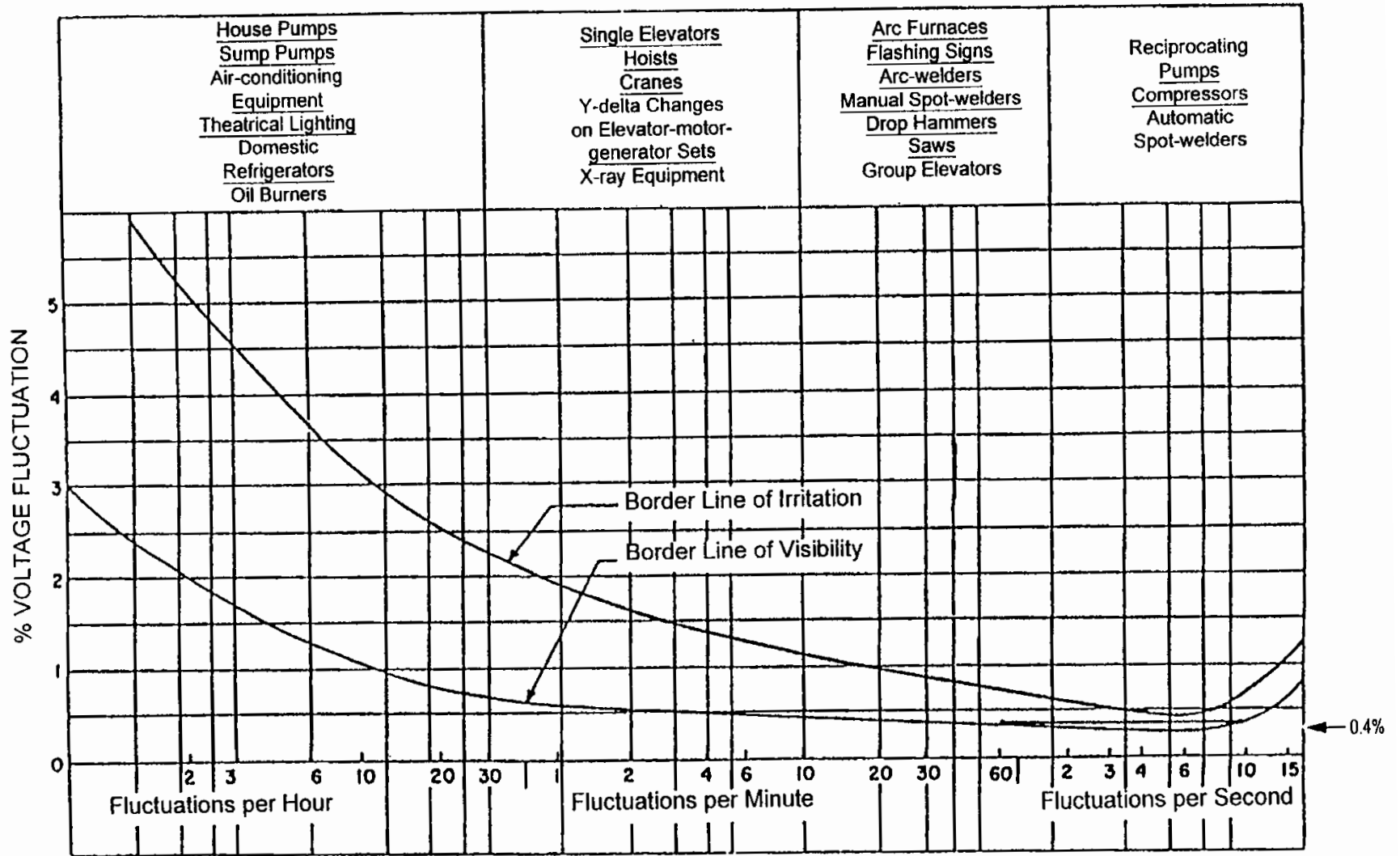
7. Excessive negative sequence voltages,
 8. Separation from supply,
 9. Synchronizing generation, and
 10. Re-synchronizing the Owner's generation after electric restoration of the supply.
- 2.12 Feeder Protective Coordination. In the case of a Cooperative protective function initiating a trip of a Cooperative protective device, the DR Facility protection and controls shall be designed to coordinate with the Cooperative protective device, and shall isolate the DR Facility from the Cooperative's lines.
- 2.13 Unintentional islanding: For an unintentional island in which the DR and a portion of the Cooperative's system remain energized through the point of common coupling, the DR shall cease to energize the Cooperative system.
- 2.14 The DR shall be designed to prevent the DR Facility from being connected to a de-energized Cooperative system. The customer should not reconnect the DR Facility to the Cooperative's system after a trip from a system protection device until the Cooperative's system is re-energized for a minimum of five minutes.
- 2.15 If the customer connects a backup generator directly to the customer's wiring to serve any load on the customer's site, he shall utilize a double-throw transfer switch in order to ensure that no power is fed back onto the Cooperative's distribution system. *This is a critical safety requirement.*
- 2.16 Voltage deviation from normal Cooperative line voltage at the point of common coupling caused by the DR Facility shall not under any condition exceed 3%, calculated by dividing the maximum deviation from average line voltage by the average line voltage, with the result multiplied by 100.

3.0 CUSTOMER OPERATING PROCEDURES

- 3.1 If high-voltage, low-voltage, or voltage flicker complaints arise from other customers due to the operation of customer DR, the customer may be required to disconnect his or her generation equipment from the Cooperative's system until the problem has been resolved.
- 3.2 The operation of the DR equipment must not result in harmonic currents or voltages at the point of common coupling that will interfere with the Cooperative's metering accuracy and/or proper operation of facilities and/or with the loads of other customers. Such adverse effects may include, but are not limited to heating of wiring and equipment, over voltage, communication interference, etc. If such a condition is found, the Cooperative may require the DR Facility to be disconnected from the Cooperative lines until the problem is resolved.

- 3.3 The DR Facility owner must discontinue parallel operation when requested by the Cooperative after prior notice. If the Cooperative has notified the DR Facility owner that an emergency situation exists, the DR Facility owner shall immediately discontinue parallel operation of the DR Facility with the Cooperative's lines.

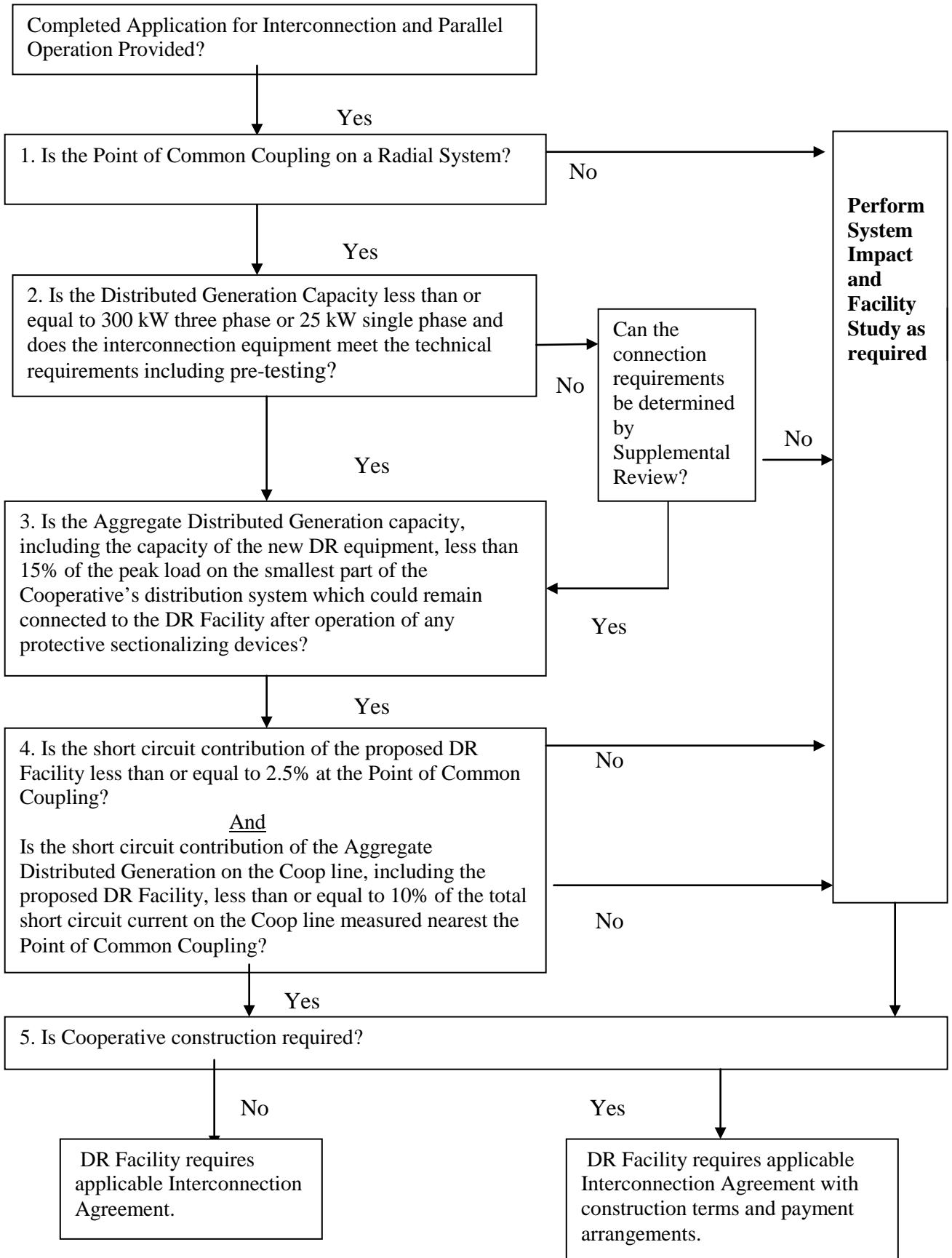
Exhibit 1



Composite curve of voltage flicker studies by General Electric Company, *General Electric Review*, August 1925; Kansas City Power & Light Company, *Electrical World*, May 19, 1934; T&D Committee, EEI, October 24, 1934, Chicago; Detroit Edison Company; West Pennsylvania Power Company; Public Service Company of Northern Illinois.

Relations of Voltage Fluctuations to Frequency of Their Occurrence (Incandescent Lamps)


INTERCONNECTION REQUEST SCREENING PROCESS



Net Metering Rate Schedule & Misc. Docs



**MID-OHIO ENERGY
COOPERATIVE, INC.**

A Touchstone Energy[®]
Cooperative 

SCHEDULE NM NET METERING RATE

AVAILABILITY

Available to consumers contracting for electric service from the Cooperative who, through the operation of qualifying cogeneration or small power production facilities, as defined in the Cooperative's operational policy relating thereto, with a design capacity of 100 kilowatts (kW) or less in the case of non-residential consumers, or with a design capacity of 25 kW or less in the case of residential consumers, have available electric energy and the associated capacity which they desire to sell to the Cooperative in accordance with the requirements of the Public Utility Regulatory Policies Act (PURPA) of 1978, as amended, and all governmental regulations lawfully promulgated thereunder and the Cooperative's applicable rules, regulations, policies and rate schedules, in circumstances where the output of such facility is not reasonably anticipated to exceed the annual electric energy requirements of the consumer and provided that the total aggregate electric generating capacity of all qualifying facilities interconnected to the electric distribution systems of the members of Buckeye Power, Inc. (Buckeye) and net metered does not exceed 1% of Buckeye's aggregate peak electric demand of all of the Buckeye members. For purposes of this rate schedule, the generation facility's output will be presumed to be "not reasonably anticipated to exceed the annual electric energy requirements of the consumer" if the electric generating facility annually generates less than 120% of the consumer's annual electric energy requirements. The consumer's "annual electric requirements" shall be the average amount of electricity consumed annually by the consumer for the electric consuming facilities located on the consumer's premises over the previous three years, using the annual period of June 1 to May 31.

NET METERING

Compliance with applicable rules, regulations, policies and terms of this rate schedule is a condition precedent to purchases hereunder. The consumer shall use the output of the qualifying facility first to meet the requirements of consumer's electric consuming facilities located on the premises on an hourly basis. Any output of the qualifying facility in excess of the requirements of consumer's electric consuming facilities on an hourly basis shall be transferred to the Cooperative and credited on a kilowatt hour (kWh) basis against the consumer's monthly bill for electric service hereunder in the same month in which the kWh billing credit is generated. Consumer shall only be entitled to receive a kWh billing credit for any such output of the qualifying facility in excess of the requirements of the consumer's facilities on an hourly basis; provided, however, that, in the event that the Cooperative has not elected to cease providing net metering, and consumer generates hourly net metering kWh billing credits in any month in excess of consumer's kWh usage for such monthly billing period, (a) the Cooperative will inform Buckeye of the existence of such excess monthly kWh billing credits; (b) Buckeye will purchase such excess kWh monthly billing credits at Buckeye's avoided cost rate, as determined by Buckeye in its sole discretion, and credit the Cooperative's wholesale power bill for such dollar amount; (c) the Cooperative's load shall not be reduced by the amount of such excess monthly kWh billing credits purchased by Buckeye; (d) the Cooperative shall credit consumer's

monthly power bill with the dollar amount of the monthly billing credits paid by Buckeye to the Cooperative; and (e) in the event that at the end of the annual period ending May 31 of each year the aggregate dollar amount of the monthly billing credits for such year exceeds the aggregate dollar amount of the Cooperative's charges to the consumer for such year, the Cooperative shall issue a check to the consumer for such excess dollar amount.

RATE

The components of the rate for electric service shall be the rate for the respective class as established by the Cooperative, and the rate used to calculate any monthly billing credits not to exceed the consumer's electric requirements on a monthly basis, shall be the same and shall be Buckeye's avoided cost rate. In addition, a net metering service charge of \$10.00 per month shall apply. Any remaining credit balance will be applied to the following month's bill until exhausted.

METERING

Net metering will be accomplished using a single meter or pair of meters capable of registering the flow of electricity in each direction from the Cooperative's electric distribution system to consumer's electric consuming facilities located on the premises, and from consumer's qualifying facility to the Cooperative's electric distribution system.

RULES AND REGULATIONS

The Cooperative's rules and regulations relating to the purchases from qualifying cogeneration and small power production facilities as they are now in effect or as they may hereafter be amended from time to time, are incorporated into and made a part of this rate schedule as if contained herein. The consumer shall comply with all the provisions of such rules and regulations.

TERMS OF PAYMENT

The above rates and charges are net. If the total amount as computed above is not paid in accordance with the monthly statement rendered, then the net bill will be increased by five percent (5%).