

Stakeholder Comment Matrix

Energy Storage Draft New and Amended Terms and Definitions



Date of Request for Comment: <u>Month Day, Year</u>	Contact: <u>Justin W. Rangooni</u>
Period of Consultation: <u>Month Day, Year</u> through <u>Month Day, Year</u>	Phone: <u>416 997 3095</u>
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The proposed new and amended ISO rule related definitions are listed below. Please refer back to the Letter of Notice under the “Attachments” section to view materials related to the proposed new and amended ISO rule related definitions. Please place your comments/reasons for position underneath (if any).

Definitions – New	
Proposed	Stakeholder Comments
<p>“energy storage resource” as defined in the Act means the component of an energy storage facility that uses a technology or process that is capable of using electric energy as an input, storing the energy for a period of time and then discharging electric energy as an output, and includes a share of the following associated facilities that are necessary for the safe, reliable, and economic operation of the energy storage resource, which may be used in common with other energy storage resources:</p> <ul style="list-style-type: none"> (i) fuel and fuel handling equipment; (ii) cooling water facilities; (iii) switch yards; and (iv) other items. 	<p>ESC generally supports this definition and believes it encompasses the many varieties of energy storage technology types.</p>
<p>“Fast Frequency Response Service” means a service the ISO contracts to provide a change in real power supplied to the interconnected electric system in response to a change_in system frequency:</p> <ul style="list-style-type: none"> (i) in accordance with the requirements the ISO specifies in the contract; and (ii) which may be in the form of either one or both of a change_in real power consumption or a change in real power production <p>but does not include operating reserves.</p>	<p>ESC supports the new Fast Frequency Response Service proposed by ISO and believes innovations like this service will be required to support net-zero electricity objectives.</p> <p>While ESC supports contracted Fast Frequency Response Service to start, ESC believes that the AESO should consider in the future the ability to procure the</p>

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Definitions – New	
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	service through market activities similar to operating reserve if possible.

Definitions – Amended		
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<p>"acceptable operational reason" means, any one (1) or more of the following:</p> <ul style="list-style-type: none"> (i) a circumstance related to the operation of a generating source asset which if it operated could reasonably be expected to affect the safety of the source asset, the environment, personnel working at the source asset or the public; (ii) re-positioning a generating source asset assets, within the energy market due to the need to meet a dispatch given to that source asset from the ISO to serve the stand-by operating reserves market; (iii) re-positioning a generating source asset within the energy market to manage physical or operational constraints associated with the source asset; (iv) re-positioning a pool asset that is an import asset or an export asset within the energy market to manage physical or operational constraints associated with an interconnection or a neighbouring balancing authority; 	<p>"acceptable operational reason" means:</p> <ul style="list-style-type: none"> (i) any one or more of the following for a pool asset, that is not an import asset or export asset: <ul style="list-style-type: none"> a) a circumstance related to the operation of a pool asset which, if it operated could reasonably be expected to affect the safety of the pool asset, the environment, personnel working at the pool asset or the public; b) re-positioning a pool asset, within the energy market due to the need to meet a dispatch given to that pool asset from the ISO to serve the stand-by operating reserves market; c) re-positioning a pool asset within the energy market to manage physical or operational constraints associated with the pool asset; d) a circumstance directly resulting in the pool asset not being capable of operation, which circumstance was solely caused by an occurrence of force majeure; e) re-positioning a pool asset for electric energy that is: <ul style="list-style-type: none"> A. produced on the property of which a person is the owner or a tenant; and 	<p>A key concern for energy storage resources is the state of charge (SOC) limitations that might restrict the ability to generate (or consume). Specifically for this definition, the inability for energy storage resources to adjust energy bids and energy offers because of unforeseen SOC of charge limitations due to extreme condition dispatch instructions from the AESO.</p> <p>ESC supports the amended definition under the assumption that (i) (c) (i.e., "re-positioning a pool asset within the energy market to manage physical or operational constraints associated with the pool asset") applies to a SOC constraint where the energy storage resource market participant reasonably and in good electricity industry practice is unable to deliver energy in response to a dispatch instruction and took all reasonable means to inform the AESO prior to real-time dispatch instructions.</p>

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<p>(v) a circumstance directly resulting in the generating source asset not being capable of operation, which circumstance was solely caused by an occurrence of force majeure; or</p> <p>(vi) re-positioning a generating source asset for electric energy that is:</p> <p>a) produced on the property of which a person is the owner or a tenant; and</p> <p>b) consumed solely by that person and solely on that property.</p> <p>[Rules (2013-01-08)]</p>	<p>B. consumed solely by that person and solely on that property; or</p> <p>(ii) re-positioning a pool asset that is an import asset or an export asset within the energy market to manage physical or operational constraints associated with an interconnection or a neighbouring balancing authority.</p>	

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<p>"aggregated generating facility" means, unless otherwise designated by the ISO, an aggregation of two (2) or more generating units, including any associated reactive power resources, where:</p> <ul style="list-style-type: none"> (i) each generating unit is rated less than 9 MW; (ii) all generating units are situated in the same proximate location and have a common collector bus or multiple collector busses that can be operated as a common collector bus; and (iii) the aggregated generating facility is connected to the interconnected electric system or the electrical system in the service area of the City of Medicine Hat. <p>[Rules (2018-09-01)]</p>	<p>"aggregated facility" means unless otherwise designated by the ISO, an aggregation of 2 or more generating units or energy storage resources, or a combination thereof, including any associated reactive power resources, where:</p> <ul style="list-style-type: none"> (i) each generating unit or energy storage resource is rated less than 9 MW; (ii) all generating units and energy storage resources are situated in the same proximate location and have a common collector bus or multiple collector busses that can be operated as a common collector bus; and (iii) the aggregated facility is connected to the interconnected electric system or the electrical system in the service area of the City of Medicine Hat. 	<p>ESC is unclear of the applicability of aggregated facility to energy storage resources paired with generating resources and the 9 MW limit.</p> <p>Is the intent of the amended definition to restrict aggregated facilities to only those that have generating units and energy storage resources of less than 9 MW? In the "allowable dispatch variance" the proposed amendment considers a wind or solar aggregated facility of 200 MW maximum capability; would that not exceed the 9 MW limit?</p> <p>Further, some energy storage resources utilize generating technology that have large unit capacities (e.g., compressed air energy storage, pumped storage). Would those facilities be restricted from aggregated facilities with wind or solar generation? For example, would the AESO not allow aggregated facility of 200 MW for a solar + storage solution?</p> <p>Further clarity and application of the 9 MW limit and aggregated facility definition is required for ESC to support the amendment.</p>
<p>"Alberta internal load" means a number in MW:</p> <ul style="list-style-type: none"> (i) that represents, in an hour, system load plus load served by an on-site generating unit or aggregated generating facility, including those within an industrial system and the City of Medicine Hat; and (ii) which the ISO, using SCADA data, calculates as the sum of the output of each generating unit and aggregated generating facility in Alberta and the 	<p>"Alberta internal load" means a number in MW:</p> <ul style="list-style-type: none"> (i) that represents, in an hour, system load plus load served by an on-site generating unit, aggregated facility, or energy storage resource, including those within an industrial system and the City of Medicine Hat; and (ii) which the ISO, using supervisory control and data acquisition data, calculates as the sum of the energy produced by each generating unit, aggregated facility, and energy storage 	<p>ESC supports the changes</p>

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<p>Fort Nelson area in British Columbia, plus import volumes and minus export volumes.</p> <p>[Rules (2020-09-16)]</p>	<p>resource in Alberta and the Fort Nelson area in British Columbia, plus import volumes and minus export volumes.</p>	
<p>"allowable dispatch variance" means:</p> <p>(i) for each generating source asset, other than a wind or solar aggregated generating facility, as measured from the dispatch quantity:</p> <p>(a) plus or minus five (5) MW for a generating source asset with a maximum capability of two hundred (200) MW or less; or</p> <p>(b) plus or minus ten (10) MW for a generating source asset with a maximum capability of greater than two hundred (200) MW;</p> <p>(ii) for each wind or solar aggregated generating facility with a maximum capability of two hundred (200) MW or less:</p> <p>(a) five (5) MW greater than the dispatch quantity and five (5) MW less than the potential real power capability, if the potential real power capability is less than the dispatch quantity; or</p> <p>(b) plus or minus five (5) MW from the dispatch quantity, if the potential real power capability is greater than or equal to the dispatch quantity; and</p>	<p>"allowable dispatch variance" means:</p> <p>(i) for each source asset, excluding an import asset and a wind or solar aggregated facility, as measured from the dispatch quantity:</p> <p>(a) plus or minus 5 MW for a source asset, with a maximum capability of 200 MW or less; or</p> <p>(b) plus or minus 10 MW for a source asset, with a maximum capability greater than 200 MW;</p> <p>(ii) for each wind or solar aggregated facility with a maximum capability of 200 MW or less:</p> <p>(a) 5 MW greater than the dispatch quantity and 5 MW less than the potential real power capability, if the potential real power capability is less than the dispatch quantity; or</p> <p>(b) plus or minus 5 MW from the dispatch quantity, if the potential real power capability is greater than or equal to the dispatch quantity; and</p> <p>(iii) for each wind or solar aggregated facility with a maximum capability greater than 200 MW:</p> <p>(a) 10 MW greater than the dispatch quantity and 10 MW less than the potential real power capability, if the potential real power capability is less than the dispatch quantity; or</p> <p>(b) plus or minus 10 MW from the dispatch quantity, if the potential real power</p>	<p>ESC supports the amended definition.</p>

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<p>(iii) for each wind or solar aggregated generating facility with a maximum capability of greater than two hundred (200) MW:</p> <p>(a) ten (10) MW greater than the dispatch quantity and ten (10) MW less than the potential real power capability, if the potential real power capability is less than the dispatch quantity; or</p> <p>(b) plus or minus ten (10) MW from the dispatch quantity, if the potential real power capability is greater than or equal to the dispatch quantity.</p> <p>[Rules (2018-09-01)]</p>	<p>capability is greater than or equal to the dispatch quantity;</p> <p>(iv) for a single pool asset that is an aggregated facility containing wind or solar, and an energy storage resource, and for which the ISO issues a dispatch within the variable energy resource quantity:</p> <p>(a) 5 MW greater than the dispatch quantity and 5 MW less than the potential real power capability, if the potential real power capability is less than the dispatch quantity; or</p> <p>(b) plus or minus 5 MW from the dispatch quantity, if the potential real power capability is greater than or equal to the dispatch quantity; and</p> <p>(v) for a single pool asset that is an aggregated facility containing wind or solar and an energy storage resource, and for which the ISO issues a dispatch outside the variable energy resource quantity:</p> <p>(a) plus or minus 5 MW from the dispatch quantity for a source asset, excluding an import asset, with a maximum capability of 200 MW or less; or</p> <p>(b) plus or minus 10 MW from the dispatch quantity for a source asset, excluding an import asset, with a maximum capability of greater than 200 MW.</p> <p>Where: “the variable energy resource quantity” means the amount of available capability of a</p>	

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	<p>source asset that could be produced from a variable energy resource.</p>	
<p>"automatic generation control (AGC)" means equipment that adjusts a balancing authority's generation in a balancing authority's area from a central location to maintain the balancing authority's frequency or interchange schedule plus or minus frequency bias. AGC may also accommodate automatic inadvertent payback and time error correction.</p> <p>[Rules (2009-05-28)]</p>	<p>"automatic generation control" means equipment that adjusts electrical energy producing and consuming resources in a balancing authority area from a central location to maintain the balancing authority's frequency or interchange schedule plus or minus frequency bias; and may also accommodate automatic inadvertent payback and time error correction.</p>	<p>ESC supports the definition amendment</p>

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<p>"automatic voltage regulator (AVR)" means the automatic control equipment that adjusts the excitation level of a generating unit to maintain voltage levels.</p> <p>[Rules (2003-06-01), Alberta Reliability Standards (2016-04-01), Tariff (2015 07 01)]</p>	<p>"automatic voltage regulator" means the automatic control equipment that adjusts the excitation level of a generating unit or an energy storage resource to maintain voltage levels.</p>	<p>ESC supports the definition amendment</p>
<p>"available capability" means:</p> <p>(i) for a generating source asset, the maximum MW that the source asset is physically capable of providing; or</p> <p>(ii) for an import source asset, the MW that the pool participant submits in an offer.</p> <p>[Rules (2013-01-08)]</p>	<p>"available capability" means:</p> <p>(i) for a source asset, excluding an import asset, the maximum MW that the source asset is physically capable of providing; or</p> <p>(ii) for an import source asset, the MW that the pool participant submits in an offer.</p>	<p>ESC supports the definition amendment</p>
<p>"black start capability (BSC)" means the ability of a power plant or generating asset to start up without external electric supply and serve to provide power to the AIES.</p> <p>[Rules (2003-06-01)]</p>	<p>"blackstart capability" means the ability of a generating resource to start up without external electric supply and provide power to the interconnected electric system.</p>	<p>ESC believes that energy storage resources that are capable of offering black start services should be allowed to participate. It is not clear to ESC if generating facility restricts the ability of energy storage resources to participate in black start capability.</p>
<p>"bulk transmission line" means a system or arrangement of lines of wire or other conductors and related equipment, wholly in Alberta, whereby electric energy, however produced, is transmitted in bulk, and includes:</p> <p>(i) transmission circuits composed of the conductors that form the minimum set required to so transmit electric energy;</p> <p>(ii) insulating and supporting structures; and</p>	<p>"bulk transmission line" means a system or arrangement of lines of wire or other conductors and related equipment, wholly in Alberta, whereby electric energy is transmitted in bulk and includes:</p> <p>(i) transmission circuits composed of the conductors that form the minimum set required to so transmit electric energy;</p> <p>(ii) insulating and supporting structures; and</p> <p>(iii) all property of any kind used for the purpose of, or in connection with, or incidental to, the operation of such a line;</p>	<p>ESC supports the definition amendment</p>

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<p>(iii) all property of any kind used for the purpose of, or in connection with, or incidental to, the operation of such a line;</p> <p>(iv) but does not include a substation, operational and control devices, a generating unit, an aggregated generating facility or an electric distribution system.</p> <p>[Rules (2012-01-01)]</p>	<p>(iv) but does not include;</p> <p>a. a substation,</p> <p>b. operational and control devices or</p> <p>c. one or more or any combination of;</p> <p>a generating unit, an aggregated facility or an energy storage resource that has not been designated by the Commission as a transmission facility in accordance with the applicable legislation;</p> <p>or</p> <p>d. an electric distribution system.</p>	
<p>"collector bus" means the low voltage side of any step-up transformers connected to the interconnected electric system or the electrical system in the City of Medicine Hat where the real power and reactive power produced by any generating units or reactive power resources, or both of them within an aggregated generating facility, are collected.</p> <p>[Rules (2010-09-07)]</p>	<p>"collector bus" means the low voltage side of any step-up transformer connected to the interconnected electric system or the electrical system in the City of Medicine Hat where real power and reactive power are collected within an aggregated facility.</p>	<p>ESC supports the definition amendment</p>
<p>"commercial operation" means the date upon which a load or generating unit begins to operate on the transmission system in a manner which is acceptable to the ISO and which is expected to be normal for it to so operate, after energization and commissioning.</p> <p>[Rules (2010-12-01)]</p>	<p>"commercial operation" means the date upon which a load, generating unit, aggregated facility, or energy storage resource begins to operate on the transmission system in a manner acceptable to the ISO and which is expected to be normal for it to operate, after energization and commissioning.</p>	<p>ESC supports the definition amendment</p>

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<p>"commissioning" means:</p> <ul style="list-style-type: none"> (i) in the case of a new generating unit or a new aggregated generating facility, the process of carrying out, after connection to the interconnected electric system but before commercial operation, activities designed to test equipment, the facility or a process to confirm that the facility can satisfactorily enter commercial operation and, where applicable, meets the ISO's requirements and other relevant standards; (ii) in the case of an existing generating unit or an existing aggregated generating facility that is being modified, the process of carrying out activities designed to test equipment, the facility or a process to confirm that the facility can satisfactorily continue in commercial operation and, where applicable, continue to meet the ISO's requirements and other relevant standards; (iii) in the case of a new transmission facility or a new load facility, the process of carrying out, after energization but before normal operation, activities designed to test equipment, the facility or a process to confirm that the facility can satisfactorily enter normal operation and, where applicable, meets the ISO's requirements and other relevant standards; and (iv) in the case of an existing transmission facility or an existing load facility that is being upgraded in the form of a 	<p>"commissioning" means:</p> <ul style="list-style-type: none"> (i) in the case of a new generating unit, a new aggregated facility, or a new energy storage resource, the process of carrying out, after connection to the interconnected electric system but before commercial operation, activities designed to test equipment or the facility, or a process to confirm that the facility can satisfactorily enter commercial operation and, where applicable, meets the ISO's requirements and other relevant standards; (ii) in the case of an existing generating unit, an existing aggregated facility, or an existing energy storage resource that is being modified, the process of carrying out activities designed to test equipment or the facility, or confirm that the facility can satisfactorily continue in commercial operation and, where applicable, continue to meet the ISO's requirements and other relevant standards; (iii) in the case of a new transmission facility or a new load facility, the process of carrying out, after energization but before normal operation, activities designed to test equipment or the facility, or confirm that the facility can satisfactorily enter normal operation and, where applicable, meets the ISO's requirements and other relevant standards; and (iv) in the case of an existing transmission facility or an existing load facility that is being upgraded in the form of a requested increase in capacity or revised functionality, the process of carrying out activities designed to test equipment or the facility, or confirm that the facility can satisfactorily 	<p>ESC supports the definition amendment</p>
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<p>requested increase in capacity or revised functionality, the process of carrying out activities designed to test equipment, a facility or a process to confirm that the facility can satisfactorily continue in normal operation and, where applicable, continue to meet the ISO's requirements and other relevant standards.</p> <p>[Rules (2012-12-31)]</p>	<p>continue in normal operation and, where applicable, continue to meet the ISO's requirements and other relevant standards</p>	
<p>"control centre" means one or more facilities hosting operating personnel that monitor and control the bulk electric system in real-time to perform the reliability tasks, including their associated data centres, of: 1) the ISO, 2) an operator of a transmission facility for transmission facilities at two (2) or more locations, or 3) an operator of a generating unit or an operator of an aggregated generating facility for either generating units or aggregated generating facilities at two (2) or more locations.</p> <p>[Rules (2016-08-30), Alberta Reliability Standards (2017-10-01)]</p>	<p>"control centre" means one or more facilities, including their associated data centres, hosting operating personnel that monitor and control the bulk electric system in real-time to perform the reliability tasks of any one or more of:</p> <ul style="list-style-type: none"> (i) the ISO; (ii) an operator of a transmission facility for transmission facilities at 2 or more locations; and (iii) an operator of a generating unit, an aggregated facility, or an energy storage resource for either generating units, aggregated facilities, or energy storage resource at 2 or more locations. 	<p>ESC supports the definition amendment</p>

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<p>“electric distribution system” as defined in the Act means the plant, works, equipment, systems and services necessary to distribute electricity in a service area, but does not include a generating unit or a transmission facility.</p>	<p>“electric distribution system” as defined in the Act, means the plant, works, equipment, systems and services necessary to distribute electricity in a service area, but does not include a</p> <ul style="list-style-type: none"> (i) a generating unit, (ii) a transmission facility, (iii) an energy storage resource that is a component of an energy storage facility, except as approved by the Commission in accordance with section 25.1 of the HEEA. 	<p>ESC supports the definition amendment</p>
<p>“electrical islands” means a condition in the electrical system where geographical areas of the interconnected electric system electrically separate from the interconnected electric system, resulting from system disturbances, such that there exists both generation and load in these separated areas.</p> <p>[Rules (2003-06-01)]</p>	<p>“electrical islands” means a condition in the electrical system where geographical areas of the interconnected electric system electrically separate from the interconnected electric system, resulting from system disturbances, such that there exists both energy production and consumption in these separated areas.</p>	<p>ESC supports the definition amendment</p>
<p>“energy storage facility” means a facility with technologies capable of storing and releasing electric energy.</p> <p>[Rules (2016-04-25)]</p>	<p>Proposed new defined term in the HEEA: “energy storage facility” as defined in the HEEA means a facility that uses any technologies or process that is capable of using electric energy as an input, storing the energy for a period of time and then discharging electric energy as an output.</p>	<p>ESC supports the definition amendment</p>

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<p>"generating asset steady state" means the state of operation that begins the first 10 minute clock period following the period in which a generating source asset's output has reached the allowable dispatch variance for that generating source asset.</p> <p>[Rules (2020-09-16)]</p>	<p>"generating asset steady state" means the state of operation that begins the first 10 minute clock period following the period in which the output of a source asset, excluding an import asset, has reached the allowable dispatch variance for that source asset.</p>	<p>ESC supports the definition amendment</p>
<p>"generating unit" as defined in the Act means the component of a power plant that produces, from any source, electric energy and ancillary services, and includes a share of the following associated facilities that are necessary for the safe, reliable and economic operation of the generating unit, which may be used in common with other generating units:</p> <ul style="list-style-type: none"> (i) fuel and fuel handling equipment; (ii) cooling water facilities; (iii) switch yards; other items. <p>[Rules (2010-12-01), Alberta Reliability Standards (2011-12-31), Tariff (2011-07-01)]</p>	<p>"generating unit" as defined in the Act means the component of a power plant that produces, from any source, electric energy and ancillary services, and includes a share of the following associated facilities that are necessary for the safe, reliable and economic operation of the generating unit, which may be used in common with other generating units:</p> <ul style="list-style-type: none"> (i) fuel and fuel handling equipment; (ii) cooling water facilities; (iii) switch yards; (iv) other items, <p>but does not include an energy storage resource.</p>	<p>ESC supports the definition amendment</p>
<p>"governor or governor system" means automatic control equipment with frequency or speed droop characteristics to control:</p> <ul style="list-style-type: none"> (i) the speed or electric power output of a generating unit, or both; (ii) the electric power input of a load; (iii) the electric power output or input of an energy storage facility, or both; or 	<p>"governor or governor system" means automatic control equipment with frequency or speed droop characteristics to control:</p> <ul style="list-style-type: none"> (i) the speed or electric power output of a generating unit, or both; (ii) the electric power input of a load; (iii) the electric power output or input of an energy storage resource , or both; or 	<p>ESC supports the definition amendment</p>

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<p>(iv) the speed or electric power output of an aggregated generating facility.</p> <p>[Rules (2018-09-01)]</p>	<p>(iv) the speed or electric power output of an aggregated facility.</p>	
<p>"gross real power" means:</p> <p>(i) for aggregated generating facilities with one or more collector busses, the sum of real power delivered by the generating units measured at those collector busses;</p> <p>(ii) for aggregated generating facilities without a collector bus, a real power measurement at the generator terminal for each generating unit;</p> <p>(iii) for a generating unit that is not part of an aggregated generating facility, the real power measurement at the generator terminal; or</p> <p>(iv) for an energy storage facility, the real power measurement at the low voltage side of the transmission system step-up transformer.</p> <p>[Rules (2016-04-25)]</p>	<p>"gross real power" means:</p> <p>(i) for aggregated facilities with one or more collector busses, the sum of real power delivered by the generating units measured at those collector busses;</p> <p>(ii) for aggregated facilities without a collector bus, a real power measurement at the generator terminal for each generating unit;</p> <p>(iii) for a generating unit that is not part of an aggregated facility, the real power measurement at the generator terminal; or</p> <p>(iv) for an energy storage resource, the real power measurement at the low voltage side of the transmission system step-up transformer.</p>	<p>ESC supports the definition amendment</p>

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<p>“in merit” means :</p> <ul style="list-style-type: none"> (i) for the energy market, an operating block whose price is at or below system marginal price; (ii) for dispatch down service and load shed service for imports, starting from the lowest priced operating block, the operating blocks with a sum of MW sufficient to meet the MW requirements for dispatch down service or load shed service for imports as applicable; or (iii) for standby operating reserves, any offer that the ISO accepts. <p>[Rules (2013-01-08)]</p>	<p>“in merit” means:</p> <ul style="list-style-type: none"> (i) for the energy market, an operating block for an offer whose price is at or below the system marginal price or an operating block for a bid whose price is at or above the system marginal price; (ii) for dispatch down service and fast frequency response service, starting from the lowest priced operating block, the operating blocks with a sum of MW sufficient to meet the MW requirements for dispatch down service or fast frequency response service as applicable; or (iii) for standby operating reserves, any offer that the ISO accepts. 	<p>ESC supports the definition amendment</p>
<p>“incremental generation costs” means, where the ISO has issued a directive:</p> <ul style="list-style-type: none"> (i) for energy from a long lead time asset; or (ii) to cancel, in the case of a generating source asset, any one (1) or more of a planned outage, a delayed forced outage or an automatic forced outage, requiring that a long lead time asset or a generating source asset, be made available to, or to actually, operate, exchange electric energy or provide ancillary services, those reasonable costs incurred that are reasonably attributed to compliance with the directive and which would have been avoided but for the directive, and include: (iii) in the case of compliance with a directive for energy from a long lead time asset: 	<p>“incremental generation costs” means, where the ISO has issued a directive:</p> <ul style="list-style-type: none"> (i) for energy from a long lead time asset; or (ii) to cancel, in the case of a source asset, excluding an import asset, any one or more of a planned outage, a delayed forced outage or an automatic forced outage, and (iii) the directive requires that a long lead time asset or a source asset, excluding an import asset, be made available to, or to actually, operate, exchange electric energy, or provide ancillary services, those reasonable costs incurred that are reasonably attributed to compliance with the directive and which would have been avoided but for the directive, and includes: (iv) in the case of compliance with a directive for energy from a long lead time asset: 	<p>ESC supports the definition amendment</p>

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<p>(a) the actual costs of all variable charges from Rate STS of the ISO tariff, including any applicable loss factors charge or credit;</p> <p>(b) variable operational and maintenance charges;</p> <p>(c) fuel costs to start and run the long lead time asset or the generating source asset; and</p> <p>(d) other related reasonable costs;</p> <p>(iv) in the case of compliance with a directive canceling a planned outage, a delayed forced outage or an automatic forced outage for a generating source asset, those costs incurred:</p> <p>(a) to plan, prepare for and execute the outage, from initial planning and inception to the date of the directive canceling the outage;</p> <p>(b) subsequent to the date of the directive cancelling the outage and in accordance with good electric industry practice;</p> <p>(c) for re-scheduling personnel, equipment and other materials required for the performance of the work originally to be completed or performed pursuant to the cancelled outage;</p> <p>(d) in the form of verified damages or liquidated claims dollar amounts or claimed by third parties pursuant or related to:</p> <p>(A) any third party contract terms and conditions for performing</p>	<p>(a) the actual costs of all variable charges from Rate STS of the ISO tariff, including any applicable loss factors charge or credit;</p> <p>(b) variable operational and maintenance charges;</p> <p>(c) fuel costs to start and run the long lead time asset or the source asset, excluding an import asset, and</p> <p>(d) other related reasonable costs;</p> <p>(v) in the case of compliance with a directive canceling a planned outage, a delayed forced outage, or an automatic forced outage for a source asset, excluding an import asset, those costs incurred:</p> <p>(a) to plan, prepare for and execute the outage, from initial planning and inception to the date of the directive canceling the outage;</p> <p>(b) subsequent to the date of the directive cancelling the outage and in accordance with good electric industry practice;</p> <p>(c) for re-scheduling personnel, equipment and other materials required for the performance of the work originally to be completed or performed pursuant to the cancelled outage;</p> <p>(d) in the form of verified damages or liquidated claims dollar amounts or claimed by third parties pursuant or related to:</p> <p>(A) any third party contract terms and conditions for performing repair, retrofit, upgrade or maintenance work on or directly related to the source asset during the outage, which third party work has been cancelled or otherwise cannot be performed due to the outage cancellation; and</p>	

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<p>repair, retrofit, upgrade or maintenance work on or directly related to the source asset during the outage, which third party work has been cancelled or otherwise cannot be performed due to the outage cancellation; and</p> <p>(B) any third party market or hedging transactions directly related to participation in the energy or ancillary services market by the source asset which is the subject of the directive; and</p> <p>(e) as other related reasonable costs.</p> <p>[Rules (2014-07-02)]</p>	<p>(B) any third party market or hedging transactions directly related to participation in the energy or ancillary services market by the source asset which is the subject of the directive; and</p> <p>(e) other related reasonable costs.</p>	
<p>"legal owner" means the person who owns electric industry property including any one or more of:</p> <p>(i) a generating unit;</p> <p>(ii) any aggregated generating facilities;</p> <p>(iii) a transmission facility;</p> <p>(iv) an electric distribution system;</p> <p>(v) an industrial system that has been designated as such by the Commission; and</p> <p>(vi) a load facility with system access service under subsection 101(2) of the Act.</p> <p>[Rules (2010-09-07)]</p>	<p>"legal owner" means the person who owns electric industry property including any one or more of:</p> <p>(i) a generating unit;</p> <p>(ii) an energy storage resource;</p> <p>(iii) an aggregated facility;</p> <p>(iv) a transmission facility;</p> <p>(v) an electric distribution system;</p> <p>(vi) an industrial system that has been designated as such by the Commission; and</p> <p>(vii) a load facility with system access service under subsection 101(2) of the Act.</p>	<p>ESC supports the definition amendment</p>

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<p>"Load Shed Service" means an amount of load contracted by the ISO to provide:</p> <ul style="list-style-type: none"> (i) instantaneous fifty-nine point five (59.5) Hz underfrequency load shedding; or (ii) manual load shedding. <p>[Rules (2003-06-01)]</p>	<p>"Load Shed Service" means a type of fast frequency response service provided by load for which the ISO contracts.</p> <ul style="list-style-type: none"> (i) 	<p>ESC supports the definition amendment</p>
<p>"long lead time asset" means a generating source asset that:</p> <ul style="list-style-type: none"> (i) requires more than one (1) hour to synchronize to the system under normal operating conditions; or (ii) is synchronized but has varying start-up times for distinct portions of its MW and which requires more than one (1) hour to deliver such additional portions of its MW; and <p>which is not delivering all of its energy for reasons other than an outage.</p> <p>[Rules (2014-07-02)]</p>	<p>"long lead time asset" means a source asset, excluding an import asset, that:</p> <ul style="list-style-type: none"> (i) requires more than 1 hour to synchronize to the system under normal operating conditions; or (ii) is synchronized but has varying start-up times for distinct portions of its MW and which requires more than 1 hour to deliver such additional portions of its MW; and which is not delivering all of its energy for reasons other than an outage. 	<p>ESC supports the definition amendment</p>
<p>"loss factor" means the value, in percent, which reasonably represents the contribution to transmission system losses, based on location, of a generating facility, export service, import service, or other opportunity service, and which the ISO establishes in accordance with section 501.10 of the ISO rules, Transmission Loss Factors.</p> <p>[Rules (2017-01-01)]</p>	<p>"loss factor" means the value, in percent, which reasonably represents the contribution to transmission system losses, based on location, of a generating facility, energy storage resource, export service, import service, or other opportunity service, and which the ISO establishes in accordance with Section 501.10 of the ISO rules, Transmission Loss Factors.</p>	<p>ESC generally supports the definition amendment; however, it is unclear what mode of operation that energy storage resources will be considered when determining transmission loss factors. For example, generating from an energy storage resource may result in higher transmission losses while consuming would reduce transmission losses. Further clarity is required on loss factor applicability for energy storage mode of operation expected for calculation of loss factors.</p>

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<p>"market participant" means</p> <p>(i) any person that supplies, generates, transmits, distributes, trades, exchanges, purchases or sells electricity, electric energy, electricity services or ancillary services; or</p> <p>(ii) any broker, brokerage or forward exchange that trades or facilitates the trading of electricity, electric energy, electricity services or ancillary services.</p> <p>[Rules (2020-09-16)]</p>	<p>"market participant" means:</p> <p>(i) any person that supplies, stores, generates, transmits, distributes, trades, exchanges, purchases, or sells electricity, electric energy, electricity services, or ancillary services; or</p> <p>(ii) any broker, brokerage, or forward exchange that trades or facilitates the trading of electricity, electric energy, electricity services, or ancillary services.</p>	<p>ESC supports the definition amendment</p>
<p>"maximum authorized charging power" means, for an energy storage facility, the maximum gross real power that the ISO has authorized each energy storage facility to receive from the interconnected electric system, as measured at the low voltage side of the transmission system step-up transformer.</p> <p>[Rules (2016-04-25)]</p>	<p>"maximum authorized charging power" means, for a battery energy storage resource, the maximum gross real power that the ISO has authorized each battery energy storage resource to receive from the interconnected electric system, as measured at the low voltage side of the transmission system step-up transformer.</p>	<p>ESC supports the definition amendment; however, how does the AESO expect to treat other energy storage technology types (e.g., compressed air energy storage, pumped storage, gravity storage, etc.)</p>
<p>"maximum authorized discharging power" means, for an energy storage facility, the maximum gross real power that the ISO has authorized each energy storage facility to deliver to the interconnected electric system, as measured at the low voltage side of the transmission system step-up transformer.</p> <p>[Rules (2016-04-25)]</p>	<p>"maximum authorized discharging power" means, for a battery energy storage resource, the maximum gross real power that the ISO has authorized each battery energy storage resource to deliver to the interconnected electric system, as measured at the low voltage side of the transmission system step-up transformer.</p>	<p>ESC supports the definition amendment; however, how does the AESO expect to treat other energy storage technology types (e.g., compressed air energy storage, pumped storage, gravity storage, etc.)</p>

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<p>"maximum authorized real power" means:</p> <ul style="list-style-type: none"> (i) for an aggregated generating facility, the sum of the maximum gross real power that may be delivered to the collector busses of the aggregated generating facility; or (ii) for a generating unit that is not part of an aggregated generating facility, the maximum gross real power that may be delivered to the stator winding terminal of the generating unit. <p>[Rules (2018-09-01)]</p>	<p>"maximum authorized real power" means:</p> <ul style="list-style-type: none"> (i) for an aggregated facility, the sum of the maximum gross real power that may be delivered to the collector buses of the aggregated facility; (ii) for a generating unit that is not part of an aggregated facility, the maximum gross real power that may be delivered to the stator winding terminal of the generating unit; (iii) for an energy storage resource that is not a battery energy storage resource and that is not part of an aggregated facility, the maximum gross real power that may be delivered to the stator winding terminal of the energy storage resource; or. (iv) for a battery energy storage resource, the maximum authorized discharging power of the battery energy storage resource that may be delivered to the collector buses of the energy storage resource 	<p>ESC supports the definition amendment; however, how does the AESO expect to treat other energy storage technology types that utilize inverter connection-types and therefore do not have stator winding terminals.</p>
<p>"maximum capability" means:</p> <ul style="list-style-type: none"> (i) for a generating unit or aggregated generating facility, the maximum MW that it is physically capable of providing under optimal operating conditions while complying with all applicable ISO rules and terms and conditions of the ISO tariff; or (ii) for a source asset that is an import asset, the available capability. <p>[Rules (2013-01-08), Tariff (2015-07-01)]</p>	<p>"maximum capability" means:</p> <ul style="list-style-type: none"> (i) for a pool asset, the maximum quantity expressed in MW, that it is physically capable of providing under optimal operating conditions while complying with all applicable ISO rules and terms and conditions of the ISO tariff (ii) for a source asset that is an import asset, the available capability. 	<p>ESC supports the definition amendment</p>

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<p>"merit order" means:</p> <ul style="list-style-type: none"> (i) for the energy market, the dispatch down service market or load shed service for imports, a list of operating blocks sorted by price; or (ii) for standby operating reserves, a list of procured volumes sorted by price <p>[Rules (2013-01-08)]</p>	<p>"merit order" means:</p> <ul style="list-style-type: none"> (i) for the energy market, the dispatch down service market, or fast frequency response service, a list of operating blocks sorted by price; or (ii) for standby operating reserves, a list of procured volumes sorted by price. 	<p>ESC supports the definition amendment</p>
<p>"operational deviation" means:</p> <ul style="list-style-type: none"> (i) a generating source asset is unable to comply with the ramping requirements set out in section 4 of subsection 203.4 of the ISO rules, <i>Delivery Requirements for Energy</i>; or (ii) a generating source asset operating in generating asset steady state varies outside its allowable dispatch variance, due to force majeure or any other circumstances related to the operation of the generating source asset which could reasonably be expected to affect the available capability or safety of the generating source asset, third party facilities, contracts or arrangements, the environment, personnel working at the generating source asset or the public. <p>[Rules (2013-01-08)]</p>	<p>"operational deviation" means a circumstance where:</p> <ul style="list-style-type: none"> (i) a source asset, excluding an import asset, is unable to comply with the ramping requirements set out in subsection 4 of Section 203.4 of the ISO rules, <i>Delivery Requirements for Energy</i>; or (ii) a source asset, excluding an import asset, operating in generating asset steady state varies outside its allowable dispatch variance, due to force majeure or any other circumstances related to the operation of the source asset, which could reasonably be expected to affect the available capability or safety of the source asset, third party facilities, contracts or arrangements, the environment, personnel working at the source asset or the public. 	<p>ESC supports the definition amendment</p>

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<p>"operator" means a person given expressed authority by a legal owner to operate on the legal owner's behalf any one (1) or more of its electric industry properties, including:</p> <ul style="list-style-type: none"> (i) a generating unit; (ii) an aggregated generating facility; (iii) a transmission facility; (iv) an electric distribution system; (v) an industrial system that has been designated as such by the Commission; and (vi) a load facility with system access service under subsection 101(2) of the Act; <p>and includes the legal owner, if no such other person has been so authorized.</p> <p>[Rules (2010-09-07)]</p>	<p>"operator" means a person given express authority by a legal owner to operate on the legal owner's behalf any one or more of its electric industry properties, including:</p> <ul style="list-style-type: none"> (i) a generating unit; (ii) an aggregated facility; (iii) an energy storage resource (iv) a transmission facility; (v) an electric distribution system; (vi) an industrial system that has been designated as such by the Commission; and (vii) a load facility with system access service under subsection 101(2) of the Act; <p>and includes the legal owner, if no such other person has been so authorized.</p>	<p>ESC supports the definition amendment</p>
<p>"point of connection" means a point at which electric energy is transferred between a transmission facility that is not an industrial system, and</p> <ul style="list-style-type: none"> (i) the high voltage side of any aggregated generating facilities or generating unit; (ii) an electric distribution system; (iii) an industrial system that has been designated as such by the Commission; <p>or</p> <ul style="list-style-type: none"> (iv) a load facility with system access service under subsection 101(2) of the Act. <p>[Rules (2010-09-07), Alberta Reliability Standards (2014-10-01)]</p>	<p>"point of connection" means a point at which electric energy is transferred between a transmission facility that is not an industrial system, and</p> <ul style="list-style-type: none"> (i) the high voltage side of any aggregated facility, energy storage resource, or generating unit; (ii) an electric distribution system; (iii) an industrial system that the Commission designates ; or <p>a load facility with system access service under subsection 101(2) of the Act</p>	<p>ESC supports the definition amendment</p>

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<p>"point of supply" means the point at which electricity is transferred to transmission facilities from facilities owned by a market participant receiving system access service under the ISO tariff, including a generating unit, aggregated generating facility or an electric distribution system.</p> <p>[Rules (2020-09-16)]</p>	<p>"point of supply" means the point at which electric energy is transferred to a transmission facility from a facility owned by a market participant receiving system access service under the ISO tariff including a generating unit, aggregated facility or an electric distribution system.</p>	<p>ESC supports the definition amendment</p>
<p>"pool asset" means one (1) or more generating units, aggregated generating facilities, load assets, import assets or export assets, identified by a single pool ID the ISO assigns, and registered to a pool participant.</p> <p>[Rules (2013-01-08)]</p>	<p>"pool asset" means either one (1) or more of a source asset or a sink asset registered to a pool participant and identified by a single pool ID the ISO assigns.</p>	<p>ESC supports the definition amendment</p>
<p>"ramping" means changing the production of a generating source asset and begins at the effective time specified in the most current dispatch and continues until the time the generating source asset's output has reached the allowable dispatch variance for that generating source asset.</p> <p>[Rules (2020-09-16)]</p>	<p>"ramping" means a change in the output of electric energy of a pool asset, beginning at the effective time specified in the most current dispatch and continuing until the time the pool asset has reached the allowable dispatch variance for that pool asset.</p>	<p>ESC supports the definition amendment</p>
<p>"scheduled generator outage" means the period of time as planned by the legal owner of a generating unit or the legal owner of an aggregated generating facility during which that generating unit or aggregated generating facility is partially or fully removed, derated from, or otherwise is not physically or mechanically available for</p>	<p>scheduled generator outage" means the period of time as planned by the legal owner of a generating unit, an energy storage resource, or an aggregated facility during which that generating unit, energy storage resource, or aggregated facility is partially or fully removed, derated from, or otherwise is not physically or mechanically available for service due to planned or scheduled</p>	<p>ESC supports the definition amendment</p>

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<p>service due to planned or scheduled maintenance or repairs to any of the plant, equipment or components of the generating unit.</p> <p>[Rules (2013-01-08)]</p>	<p>maintenance or repairs to any of the plant, equipment or components of the generating unit, energy storage resource, or aggregated facility.</p>	
<p>"sink asset" is a subcategory of pool asset and means one (1) or more load assets or export assets.</p> <p>[Rules (2013-01-08)]</p>	<p>"sink asset" is a pool asset that consumes or exports electricity from the interconnected electric system.</p>	<p>ESC supports the definition amendment</p>
<p>"source asset" is a subcategory of pool asset and means one (1) or more aggregated generating facilities, generating units, or import assets.</p> <p>[Rules (2013-01-08)]</p>	<p>"source asset" is a pool asset that produces or delivers electric energy to the interconnected electric system.</p>	<p>ESC supports the definition amendment</p>
<p>"transmission facility" as defined in the Act means an arrangement of conductors and transformation equipment that transmits electricity from the high voltage terminal of the generation transformer to the low voltage terminal of the step down transformer operating phase to phase at a nominal high voltage level of more than 25,000 volts to a</p>	<p>"transmission facility" as defined in the Act means an arrangement of conductors and transformation equipment that transmits electricity from the high voltage terminal of the generation transformer to the low voltage terminal of the step down transformer operating phase to phase at a nominal high voltage level of more than 25 000 volts to a nominal low voltage level of 25000 volts or less, and includes</p>	<p>ESC supports the definition amendment</p>

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<p>nominal low voltage level of 25,000 volts or less, and includes:</p> <ul style="list-style-type: none"> (i) transmission lines energized in excess of 25,000 volts; (ii) insulating and supporting structures; (iii) substations, transformers and switchgear; (iv) operational, telecommunication and control devices; (v) all property of any kind used for the purpose of, or in connection with, the operation of the transmission facility, including all equipment in a substation used to transmit electric energy from (A) the low voltage terminal, to (B) electric distribution system lines that exit the substation and are energized at 25,000 volts or less, and (vi) connections with electric systems in jurisdictions bordering Alberta, but does not include a generating unit or an electric distribution system. <p>[Rules (2010-04-30), Alberta Reliability Standards (2014-10-01)]</p>	<ul style="list-style-type: none"> (i) transmission lines energized in excess of 25000 volts, (ii) insulating and supporting structures, (iii) substations, transformers and switchgear, (iv) operational, telecommunication and control devices, (v) all property of any kind used for the purpose of, or in connection with, the operation of the transmission facility, including all equipment in a substation used to transmit electric energy from (A) the low voltage terminal, to (B) electric distribution system lines that exit the substation and are energized at 25 000 volts or less, and (vi) connections with electric systems in jurisdictions bordering Alberta, but does not include (vii) a generating unit, (viii) an electric distribution system, or (ix) an energy storage resource, unless it is included in a needs identification document that has been approved by the Commission in accordance with section 34(3)(a); 	
<p>"transmission must-run" means a service whereby a generating source asset that is not in merit may receive a directive to operate at a minimum specified MW output level in order to maintain system security.</p> <p>[Rules (2013-01-08)]</p>	<p>"transmission must-run" means a service whereby a source asset that is not in merit may receive a directive to operate at a minimum specified MW output level in order to maintain system security.</p>	<p>ESC supports the definition amendment</p>