1 Power Resources

The information model in this section is described in RESOURCE.XSD

The Resource information model describes potential products to offer to others in a power market. The Resource model describes a range of potential operational responses. The model allows parties to describe a wide range operations, both generation and curtailment. Resource descriptions are either tenders to buy or tenders to sell Power products.

When making a tender for products and services, it is useful to describe the operational characteristics of a resource so the counter party can determine if a resource can meet the requirements. A notice of interest MAY specify performance expectations. A Resource MAY compare its own capabilities to those requirements before submitting a bid.

Parties can potentially exchange these models, until they come to an agreement. The rules for exchanging these models are outside the scope of this specification. Resource tenders are less specific than a single transactive request, and one Resource tender may be able present the Resource to more than one market.

Resources may represent a generator or a load responses or aggregations. In interactions involving Resources it may be useful to describe either (1) the proposed or actual operation of a Resources, or (2) the range of capability of a Resource.

1.1 Resource Operational Description

The following curve characterizes the a schedule for operation of a generic Resource

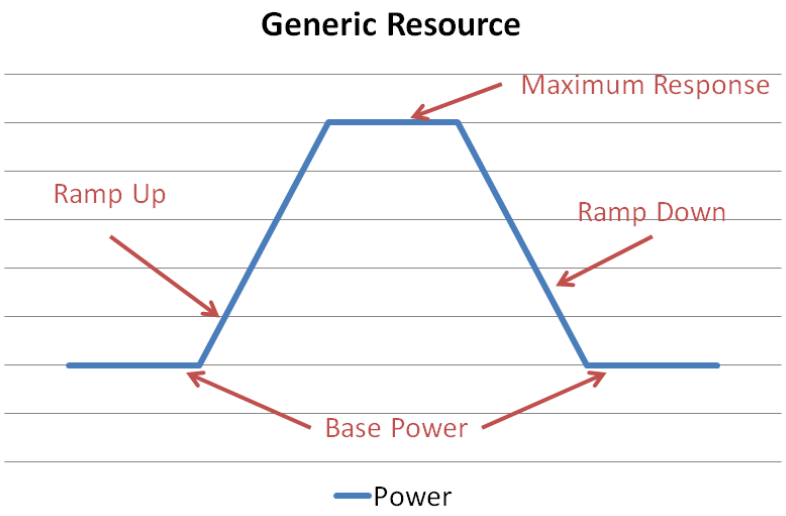

Figure 1-1: Operational Profile of a Generic Resource

In the Resource illustration above, there is some base level of power, a *status quo ante*. When invoked, the resource takes a period of time to change to a different level. If the response is binary, then it can only go up to the maximum response, and that ramp rate takes a fixed time. If a resource is able to provide several layers of response, then the ramp time also varies. The ramp time can be computed from the ramp rate and the difference between the base power and the maximum response.

As electricity is fungible, a critical key element of the information model in Power Resources is that generation, that is the production of power, and load shedding, the reduction of power use are similar products which may be transacted in similar markets.

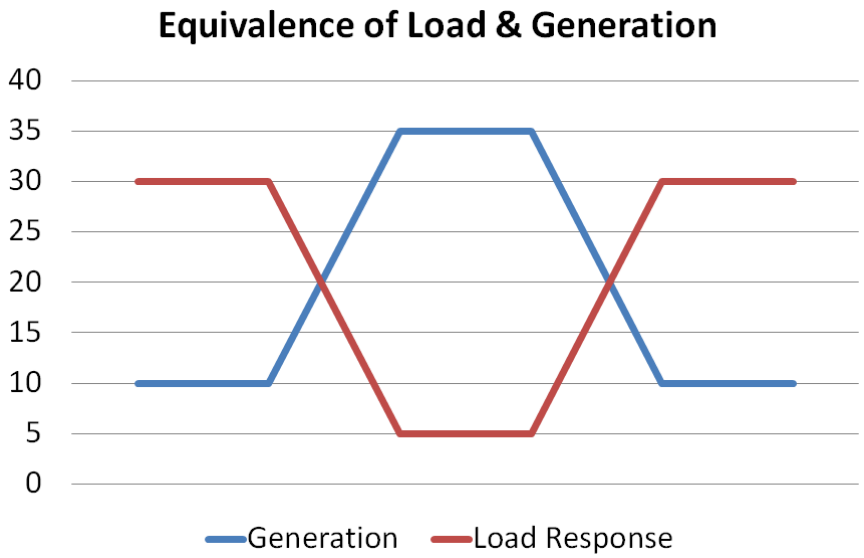

Figure 1-2: Equivalence of Load Shed and Generation

As shown in the example above, generation and load response are similar and can be described using the same language.

Many Resources have capabilities that change over the range of response. A generator may have one ramp speed until it gets up to half speed, and then another as it goes to full. Load response can have similar characteristics. Such resources can be described by combining simple response characteristics.

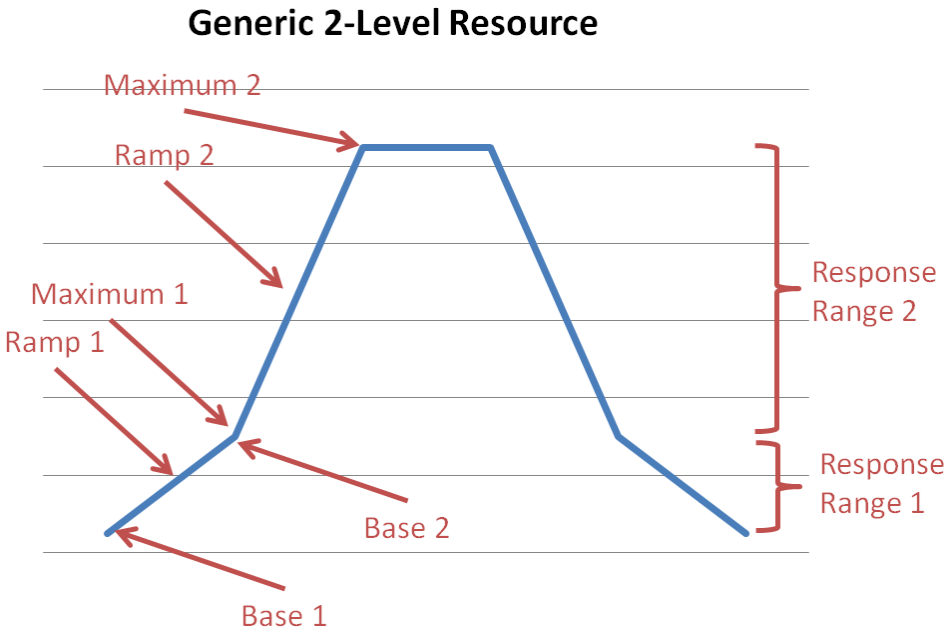

Figure 1-3: Combining Resource Operational Responses

1.2 Resource Capability Description

Resource capability descriptions describe what could be done, as distinguished from a transaction in which specific performance is requested or agreed to.

Resources capabilities may be communicated as an array of ramp up rates, a maximum power offered, and an array of ramp down rates. Between the Base 1 and Maximum 1, expressed in MW, the resource ramps up at Ramp 1 expressed in MW/minute. Between the Base 2 and Maximum 2, expressed in MW, the resource can ramp up at Ramp 2 expressed in MW/minute.

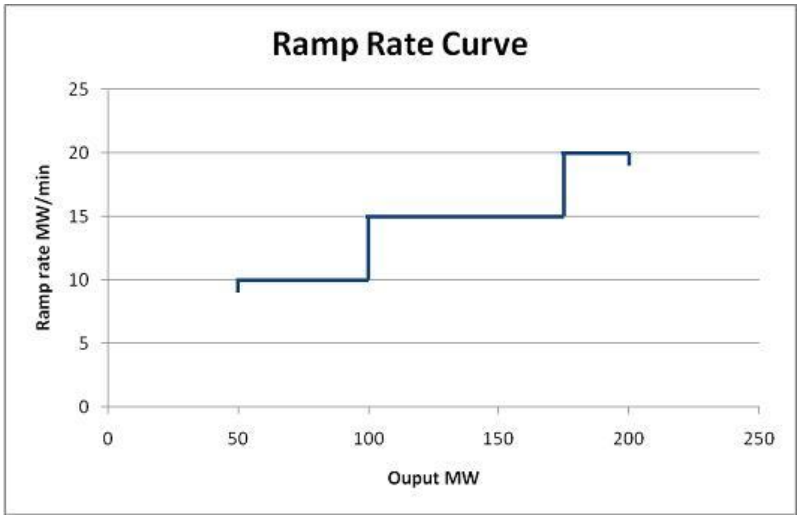

Figure 1-4: Ramp Rate Curve—Capability Description

As described in **[IEC 62325-301],** a given resource may publish multiple ramp rate curves for different circumstances. This resource capability description may be preferred in some interactions to the resource operation description in some interactions.

1.3 Contrasting Operation and Capability Descriptions

Assuming the Resource is operated at the ramp rates as in Figure 1-4 then an operation as described in Figure 1-1 results. A capability description is generally used to guide resource dispatch. Once the dispatch is computed, an operational description is used to tender or transact the power that is the result of the dispatch from the market.

This specification describes market interactions, i.e., the operational profiles. Only the description in Section 13.1 is in this specification. When a single resource offers different ramp rates for different circumstances, this specification considers the resulting operational profiles to be distinct products.

The description in Section 1.2 may be considered at a later date by the committee.