**Model Smart Grid Tariffs and Contracts** – A Priority Action Plan Proposal Draft

**Purpose and scope**
A standard for the communication of tariff and contract information elements has been described as a standards gap both within the SGIP¹ as well as by the European Smart Grid Coordination Group². We will use the term *tariff* in this proposal to mean regulated rules for determining price and product definition as well as non-regulated contract descriptions.

The SGIP focused on crosscutting actionable price and product information in PAP03 “Common Price Communication Model” and the development of the Energy Market Information Exchange (EMIX) standard. EMIX supports the communication of tariff information elements of some complexity (see e.g. Block and Tier³) as well as dynamic, time of use, and other price information.

While some have suggested the need for a standard to communicate any and all tariffs that exist today, we argue that we should instead provide technical information that will guide the development of simplified tariffs suitable to the smart grid—model tariffs and contracts to support consistent business and regulatory interoperability across regulatory domains and suppliers.

The content of a model tariff itself should be driven by the goal of communicating actionable information, which is to say, clear information to allow the user to know what the next amount of energy usage (at some time) will cost the user so the user may make decisions and tradeoffs relevant to their needs.

The effort would require the participation of regulatory (NARUC), utility (NAESB), consumers, and other stakeholders to succeed, and will be made possible by the commitment and involvement in the SGIP. The goal of this PAP would be first to define the scope of such an effort—what can be accomplished to what benefit—and then provide a recommended path, with requirements, to supply to an SDO to move forward.

**Background:**
The SGIP Governing Board HAN TF included [ref] the following recommendation,

> A common specification for communicating prices and rate structures is needed and under development in PAP 3. The Governing Board should ensure that the information model developed in PAP 3 can adequately characterize the diverse retail rate structures developed to meet the needs of different states, suppliers, consumer classifications and devices connected to the HAN.

While PAP03 did develop a common information model for the communication of price and product information, description of tariffs (“rate structures”) was not part of PAP03. There are serious and

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² SGCG Report on Standardisation Gaps Prioritisation for the Smart Grid; v2.1; 2011-10-19, Appendix A Standardization Gap HB-2: Unified language needed to enable flexible energy consumption or production.
complex issues in attempting to represent the vast array of tariffs. The B2G DEWG Pricing Requirements document (January 2009) recognized that given the extent of human (and lawyer) ingenuity it would be very difficult to represent present-day tariffs/contracts, hence this effort to define characteristics of tariffs and contracts that provide actionable information to facilities and devices.

One major issue is the extent to which tariffs are retroactive in effect, e.g. having prices for today’s energy use calculated after today based on total usage over the month. Another example is the computation of Demand Response value using baselines that are not determined or determinable at the time of curtailment or generation.

Quoting from the referenced B2G Pricing Requirements for Business Context:

- 1.4.1 Legacy pricing models need not be supported by the new interfaces.
- 1.4.2 Legacy business processes need not flow through new interfaces.
- 1.4.3 Requirements to continue traditional business processes may be met outside of the new interface.
- 1.4.4 Consumer (pricing and billing) and Utility (transmission and distribution) contexts must be satisfied by a consistent set of interfaces.

The B2G DEWG at the time (2009) recommended working with policy makers and regulators to build model tariffs and contracts from which to choose. Given the deep business nature, NAESB might be a natural venue, together with OASIS which developed the EMIX (PAP03) standard. B2G was also active in focusing PAP03 on “actionable information” (actual current and future price information) rather than providing a function to compute prices or incremental prices, in large measure due to the modeling and complexity issues.

The approach taken in EMIX, focused on actionable price information, was also taken in SEP 2.0. Beyond simple price streams, both EMIX and SEP 2.0 support representing Block & Tier and TOU tariff structures directly. The fact that the more recent PAP17 Facility Smart Grid Information Model (ASHRAE/NEMA 201P) incorporates the EMIX price stream indicates the understanding of the end-device system vendors that an actionable price is valuable, while the communication of generic tariff data is neither achievable nor useful.

What is really needed?
The deeper question is whether a device needs to know the details of a tariff or contract. A human can sign a contract accepting a tariff that will determine the monthly bill. However, a device/system (Virtual End Node)\(^5\) can only respond (take a DR action) based on actionable information. We believe that price data is the key to automated DR action. The real issue is more like “what’s the next 10 kWh going to cost?” than "what is the complete tariff structure and does it apply to me?"

Tariffs are not the key issue, since tariffs are regulatory contracts that focus on the political process of designing price and behavior. The outcomes—the actionable prices needed for responsive devices—are the critical information. The end device will not understand a complex tariff. Rather, it only needs (and

\(^4\) [http://collaborate.nist.gov/twiki-sggrid/bin/view/SmartGrid/PricingRequirements](http://collaborate.nist.gov/twiki-sggrid/bin/view/SmartGrid/PricingRequirements)

can consume) actionable prices or a simple expression (e.g. TOU, Block&Tier) for determining actionable prices.

**Related issue**
If one were to attempt a model for communicating a tariff, so as to enable distributed price calculation based on communicated complex tariff data, then who would guarantee that the end-device calculation result is correct? The resistance to estimated billing information in PAP10 was very high. Who is responsible if the model is wrong? This raises the stakes – the best approach is to let the entity responsible for defining and communicating the billing information do the computations.

A good approach would be to have a simple interface from the ESI (end device/facility) to the external (e.g. utility) compute engines that do billing calculations. That is, the billing system that computes the monthly bill should also act as the price server providing actionable price information.

**Conclusion and Recommendation**
EMIX provides the foundation for the communication of actionable prices. We recommend an SGIP priority action plan to discuss the requirements for model Smart Grid Supporting Tariffs—tariffs that support the ability to calculate today the prices for today and tomorrow.

**B2G discussion**
Can we flesh out an example “Smart Grid Supporting Tariff”?