

#### OASIS Energy Interoperation with ZigBee Smart Energy 2: a proof sketch for interoperability

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Agenda

- 2 key types of information:
  - Block and Tier Prices
  - and DR Event signals

Gluon									
Currency, Un	its, Scale,								
Interval		Interval		Interval		Interval		Interval	
Interval	0000-1000	Interval	1000-1400	Interval	1400-1800	Interval	1800-2100	Interval	2100-2400
	,	_	1	_		_	$\downarrow$	_	
ConsumptionTier		ConsumptionTier		ConsumptionTier		ConsumptionTier		ConsumptionTier	
price maxValue	0.10 1000	price maxValue	0.20 1000	price maxValue	0.30 1000	price maxValue	0.20 1000	price startValue	0.10 1000
ConsumptionTier		ConsumptionTier		ConsumptionTier		ConsumptionTier		ConsumptionTier	
price maxValue	0.11 1500	price maxValue	0.25 1500	price maxValue	0.50 1500	price maxValue	0.25 1500	price maxValue	0.11 1500
ConsumptionTier		ConsumptionTier		ConsumptionTier		ConsumptionTier		ConsumptionTier	
price maxValue	0.12 2000	price maxValue	0.27 2000	price maxValue	0.60 2000	price maxValue	0.27 2000	price maxValue	0.12 2000
ConsumptionTier		ConsumptionTier		ConsumptionTier		ConsumptionTier		ConsumptionTier	
price maxValue	0.13	price maxValue	0.32	price maxValue	0.65	price maxValue	0.32	price maxValue	0.13

- Expression of each in EMIX/Energy Interoperation and in SEP2.
- Main point: information may be expressed in different ways, but the information can be communicated across the interface.
- But first: some context...



### Relationships of standards



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#### EMIX Information Structure for Block & Tier Example

Grid-Interop 20

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#### SEP2 Information Structure for Block & Tier Example

Grid-Interop 2



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**BTT Summary** 

- EMIX and SEP2 BTT structures are very similar
- BTT information can be mapped cleanly.



- The critical elements in an event signal:
  - Start time, How much, How long
- Energy Interoperation standardizes and extends the OpenADR 1 event type, with input from the IRC via NAESB.
- SEP2 has the same OpenADR concept of a DR Event, and thus can carry Energy Interop event information.
- Energy Interop has an extension point to allow carrying additional application-specific information.



IdentifiedObject									
EndDeviceControl									
+ creationTime: TimeType									
<ul> <li>deviceCategory: EndDeviceCategoryType</li> </ul>									
+ drProgramMandatory: boolean									
+ potentiallySuperseded: boolean									
+ scheduledInterval: RandomizedDateTimeInterval									
::IdentifiedObject									
+ description: String32 [01]									
+ mRID: HexBinary128 [01]									
+ name: HexBinary16 [01]									
«XSDattribute»									
::Resource									
+ href: anyURI [01]									
+ replyTo: anyURI [01]									
+ responseRequired: HexBinary8 [01]									
+ signatureRequired: boolean [01]									
+ subscribable: boolean [01]									

- Start time, duration and randomization are defined in the scheduledInterval attribute.
- For "how much", EDC has a status and optionally a duty cycle, offset, set point, or target reduction.



## Energy Interoperation EiEvent and Event Descriptor

- Start time and duration are defined within the *eiActivePeriod* attribute which is a container for time intervals.
- Event payloads include quantity, multiplier, set point

Grid-Inter



«XSDcomplexType» EiEventType





- We have demonstrated common information elements in SEP2 and EMIX/EI
- Ability to map Block and Tier prices and event signals between SEP2 and EMIX/EI
- Actual implementation specification on how exactly to map EI signals to SEP for a given application, along with any SEP application-specific information to be carried by extending EI, is left as an exercise for the implementer (vendor organization).



- OASIS Energy Market Information Exchange
  - Price and product definition/description
  - Transactional EMIX Notes
  - Committee Specification pending publication
  - http://www.oasis-open.org/committees/emix
- OASIS Energy Interoperation
  - Designed to work to, from, inside, and outside microgrids
  - Committee Specification ballot in process
  - http://www.oasis-open.org/committees/energyinterop



# Thank you!



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