



# EMIX Version 1.0

## Working Draft 02

12 January 2010

### Specification URIs:

#### This Version:

- <http://docs.oasis-open.org/emix/v1.0/v1.0/wd02/emix-1.0-spec-wd-02.html>
- <http://docs.oasis-open.org/emix/v1.0/v1.0/wd02/emix-1.0-spec-wd-02.doc>
- <http://docs.oasis-open.org/emix/v1.0/v1.0/wd02/emix-1.0-spec-wd-02.pdf>

#### Previous Version:

N/A

#### Latest Version:

- <http://docs.oasis-open.org/emix/v1.0/v1.0/wd02/emix-1.0-spec-wd-02.html>
- <http://docs.oasis-open.org/emix/v1.0/v1.0/wd02/emix-1.0-spec-wd-02.doc>
- <http://docs.oasis-open.org/emix/v1.0/v1.0/wd02/emix-1.0-spec-wd-02.pdf>

#### Technical Committee:

OASIS Energy Market Information Exchange TC

#### Chair(s):

Ed Cazalet,  
William T. Cox

#### Editor(s):

Toby Considine

#### Related work:

This specification replaces or supersedes:

- N/A

This specification is related to:

- OASIS Specification WS-Calendar V1.0, in process
- OASIS Specification Energy Interoperation V1.0, in process4

#### Declared XML Namespace(s):

<http://docs.oasis-open.org/emix/2009interim>

#### Abstract:

The data models and XML vocabularies defined by this TC will address issues in energy markets and the Smart Grid, but may be defined so as to support requirements for other markets. The TC will develop a data model and XML vocabulary to exchange prices and product definitions for transactive energy markets.

- Price information
- Bid information
- Time for use or availability
- Units and quantity to be traded
- Characteristics of what is to be traded

41 The definition of a price and of other market information exchanged depends on the market  
42 context in which it exists. It is not in scope for this TC to define specifications for markets or how  
43 prices are determined, or the mechanisms for interoperation. The TC will coordinate with others  
44 to ensure that commonly used market and communication models are supported.

45 **Status:**

46 This document was last revised or approved by the Energy Market Information Exchange  
47 Technical Committee on the above date. The level of approval is also listed above. Check the  
48 “Latest Version” or “Latest Approved Version” location noted above for possible later revisions of  
49 this document.

50 Technical Committee members should send comments on this specification to the Technical  
51 Committee’s email list. Others should send comments to the Technical Committee by using the  
52 “Send A Comment” button on the Technical Committee’s web page at [http://www.oasis-](http://www.oasis-open.org/committees/emix/)  
53 [open.org/committees/emix/](http://www.oasis-open.org/committees/emix/).

54 For information on whether any patents have been disclosed that may be essential to  
55 implementing this specification, and any offers of patent licensing terms, please refer to the  
56 Intellectual Property Rights section of the Technical Committee web page ([http://www.oasis-](http://www.oasis-open.org/committees/emix/ipr.php)  
57 [open.org/committees/emix/ipr.php](http://www.oasis-open.org/committees/emix/ipr.php)).

58 The non-normative errata page for this specification is located at [http://www.oasis-](http://www.oasis-open.org/committees/emix/)  
59 [open.org/committees/emix/](http://www.oasis-open.org/committees/emix/)

---

## 60 Notices

61 Copyright © OASIS® 2010. All Rights Reserved.

62 All capitalized terms in the following text have the meanings assigned to them in the OASIS Intellectual  
63 Property Rights Policy (the "OASIS IPR Policy"). The full Policy may be found at the OASIS website.

64 This document and translations of it may be copied and furnished to others, and derivative works that  
65 comment on or otherwise explain it or assist in its implementation may be prepared, copied, published,  
66 and distributed, in whole or in part, without restriction of any kind, provided that the above copyright notice  
67 and this section are included on all such copies and derivative works. However, this document itself may  
68 not be modified in any way, including by removing the copyright notice or references to OASIS, except as  
69 needed for the purpose of developing any document or deliverable produced by an OASIS Technical  
70 Committee (in which case the rules applicable to copyrights, as set forth in the OASIS IPR Policy, must  
71 be followed) or as required to translate it into languages other than English.

72 The limited permissions granted above are perpetual and will not be revoked by OASIS or its successors  
73 or assigns.

74 This document and the information contained herein is provided on an "AS IS" basis and OASIS  
75 DISCLAIMS ALL WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY  
76 WARRANTY THAT THE USE OF THE INFORMATION HEREIN WILL NOT INFRINGE ANY  
77 OWNERSHIP RIGHTS OR ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A  
78 PARTICULAR PURPOSE.

79 OASIS requests that any OASIS Party or any other party that believes it has patent claims that would  
80 necessarily be infringed by implementations of this OASIS Committee Specification or OASIS Standard,  
81 to notify OASIS TC Administrator and provide an indication of its willingness to grant patent licenses to  
82 such patent claims in a manner consistent with the IPR Mode of the OASIS Technical Committee that  
83 produced this specification.

84 OASIS invites any party to contact the OASIS TC Administrator if it is aware of a claim of ownership of  
85 any patent claims that would necessarily be infringed by implementations of this specification by a patent  
86 holder that is not willing to provide a license to such patent claims in a manner consistent with the IPR  
87 Mode of the OASIS Technical Committee that produced this specification. OASIS may include such  
88 claims on its website, but disclaims any obligation to do so.

89 OASIS takes no position regarding the validity or scope of any intellectual property or other rights that  
90 might be claimed to pertain to the implementation or use of the technology described in this document or  
91 the extent to which any license under such rights might or might not be available; neither does it  
92 represent that it has made any effort to identify any such rights. Information on OASIS' procedures with  
93 respect to rights in any document or deliverable produced by an OASIS Technical Committee can be  
94 found on the OASIS website. Copies of claims of rights made available for publication and any  
95 assurances of licenses to be made available, or the result of an attempt made to obtain a general license  
96 or permission for the use of such proprietary rights by implementers or users of this OASIS Committee  
97 Specification or OASIS Standard, can be obtained from the OASIS TC Administrator. OASIS makes no  
98 representation that any information or list of intellectual property rights will at any time be complete, or  
99 that any claims in such list are, in fact, Essential Claims.

100 The names "OASIS", [insert specific trademarked names and abbreviations here] are trademarks of  
101 OASIS, the owner and developer of this specification, and should be used only to refer to the organization  
102 and its official outputs. OASIS welcomes reference to, and implementation and use of, specifications,  
103 while reserving the right to enforce its marks against misleading uses. Please see [http://www.oasis-  
open.org/who/trademark.php](http://www.oasis-<br/>104 open.org/who/trademark.php) for above guidance.

105

---

106 **Table of Contents**

107 1 Introduction..... 5  
108 1.1 Terminology ..... 5  
109 1.2 Process ..... 5  
110 1.3 Normative References ..... 5  
111 1.4 Non-Normative References ..... 5  
112 2 Information Model..... 6  
113 2.1 Introduction ..... 6  
114 2.2 Required Elements ..... 6  
115 2.3 Defined Optional Elements ..... 8  
116 # Conformance..... 9  
117 A. Acknowledgements ..... 10  
118 B. Non-Normative Text ..... 11  
119 C. Revision History..... 12  
120  
121

---

# 122 1 Introduction

123 This document defines a set of messages to communicate price and product definition for energy  
124 markets. Product definition includes quantity and quality of supply as well as attributes of interest to  
125 consumers distinguishing between energy sources. Energy Market Information Exchange (EMIX) is not  
126 intended as a stand-alone signal, rather it is anticipated to be used as an informational component in a  
127 variety of market oriented interactions.

128 The Energy Market Information Exchange TC is developing this specification in support of the National  
129 Institute of Standards and Technology (NIST) Smart Grid Interoperability Road Map in support of the US  
130 Department of Energy (DOE) as described in the Energy Independence and Security Act of 2007 (EISA  
131 2007).

132 All examples and all Appendices are non-normative.

## 133 1.1 Terminology

134 The key words “MUST”, “MUST NOT”, “REQUIRED”, “SHALL”, “SHALL NOT”, “SHOULD”, “SHOULD  
135 NOT”, “RECOMMENDED”, “MAY”, and “OPTIONAL” in this document are to be interpreted as described  
136 in [RFC2119].

## 137 1.2 Process

138 This information exchange was developed primarily by integrating requirements and use cases for price  
139 and product definition developed by the North American Energy Standards Board (NAESB) as part of its  
140 response to NIST Priority Action Plan 3, Price and Product Definition, which was driven by NIST, Federal  
141 Energy Regulatory Commission, and Department of Energy priority items.

142 Where appropriate, semantic elements from the IEC Power Load Management (TC 57) Common  
143 Information Model. Business and market information was borrowed from the financial instruments  
144 Common Information Models as described in ISO20022 and in the financial trading protocol FIX  
145 (Financial Information Exchange). [NEED NON-NORMATIVE REFS]

146 Energy markets are volatile, so precise time of delivery is always a significant component of product  
147 definition. EMIX incorporates schedule and interval definitions from WS-Calendar to communicate  
148 schedule-related information.

149 Additional guidance was drawn from subject matter experts familiar with the design and implementation of  
150 enterprise and other systems that may interact with smart grids.

## 151 1.3 Normative References

- |     |                    |   |
|-----|--------------------|---|
| 152 | <b>[RFC2119]</b>   | S. Bradner, <i>Key words for use in RFCs to Indicate Requirement Levels</i> ,<br>153 <a href="http://www.ietf.org/rfc/rfc2119.txt">http://www.ietf.org/rfc/rfc2119.txt</a> , IETF RFC 2119, March 1997. |
| 154 | <b>WS-Calendar</b> | [Full reference citation]   |
| 155 | <b>CEFACT</b>      | Currency codes, e.g. USD, GBP,  |

## 156 1.4 Non-Normative References

- |     |                                  |                           |
|-----|----------------------------------|---------------------------|
| 157 | <b>NAESB Price &amp; Product</b> | [Full reference citation] |
|-----|----------------------------------|---------------------------|

158  
159  
160  
161  
162  
163

164

## 2 Information Model

165

### 2.1 Introduction

166 Price and Product Definition is *actionable information*. The information needed to make decisions should  
167 be included in the EMIX artifact exchanged. Present day markets, particularly wholesale markets, may  
168 have deferred charges (e.g. balancing charges) that cannot be determined at point of sale; other markets  
169 may require other purchases to allow the use of the energy purchased (e.g. transmission rights or  
170 pipeline fees).

171 Retail markets and prices generally are all inclusive. The optional **Wholesale** element may be used to  
172 determine whether a price is at retail, hence all inclusive, or at wholesale. The model for market  
173 descriptions needs work.

174

### 2.2 Required Elements

175 The following table specifies the REQUIRED constraints placed by the EMIX v1.0 information model. This  
176 table contains only those elements of EMIX v1.0 for which there is a consensus description. Elements not  
177 included here have no specific constraint or condition for use.

178 *Table 1: EMIX v1.0 Information Model—Required Elements*

EMIX Element	Specification (Normative)	Note (Non-Normative)
<b>Price</b>	The price of a single unit of the product	Price per unit multiplied by units equals total price.  The price may not include normal and customary deferred charges, e.g., balancing charges in wholesale markets, but is intended to be the nominal (and where feasible) all inclusive price for the energy product.
<b>Currency</b>	A code for the currency used.	Need normative reference to UN CEFACT or UBL Examples include USD, CAD, GBP, EUR, CNY.
<b>Units</b>	The units of measure for the product.	
<b>Quantity</b>	The number of units. An integer or fixed point number.	
<b>Schedule</b>	The time interval in which the product was, is, or will be available.	Need normative reference to WS-Calendar; use iCalendar initially
<b>Location</b>	The geospatial location for the product	This may be point of use, point of delivery, or a geospatial polygon

<b>Source</b>	The source of the energy, chosen from an enumeration defined below	Need definition of enumeration. Possible values include “wind”, “solar”, “hydroelectric”, “[natural] gas”, “oil”, “coal” further qualified with type of coal or presence of stack scrubbers.
<b>Type</b>	The type of energy for the product	There are several classes of energy product related to use, e.g. Natural Gas, ElectricReserve, FrequencyRegulation, VoltageSupport, ElectricCapacity.  The details need to be worked out by the Technical Committee.
<b>MarketID</b>	An identification of the market in which the product is priced.	This may include standard financial exchanges, markets managed by or for aggregators and distributors, and an identification of the microgrid in which the product is priced.  The identification of microgrids is an open issue at this time; the <b>Location</b> may be a better way to represent this, e.g. a representative point, a point inside, or a polygon.

179

180

181 **2.3 Defined Optional Elements**

182 The following table specifies defined OPTIONAL elements in the EMIX v1.0 information model. This table  
 183 contains only those elements of EMIX v1.0 for which there is a consensus description. If the information  
 184 as defined here is included in an EMIX v1.0 artifact, it SHALL use these element names and definitions.  
 185 The use of these elements has no specific constraint or condition for use.

186 *Table 2: EMIX v1.0 Information Model—Defined Optional Elements*

<b>EMIX Element</b>	<b>Specification (Normative)</b>	<b>Note (Non-Normative)</b>
<b>Carbon and CarbonUnits</b>	The quantity of carbon released by the production of the energy product in the quantity and units indicated	This could be CO <sub>2</sub> , amount of elemental carbon. Units defined by UnitsML.
<b>SourceDetail</b>	A list of name-value pairs where the name is from the extensible enumeration of <b>Source</b> type and the value is the percent of the product from each enumerated source, represented as a decimal fraction	This corresponds to the common technique of retrospectively or prospectively declaring the source contributions to the product defined.
<b>Class</b>	The broad use and utility of the product defined. Values include “usage”, “load”, “peak”, and “curtailment”.	
<b>GreenContent</b>	The proportion of the product defined that is from non-fossil fuel sources, including but not limited to “hydroelectric”, “solar”, and “wind”.	The nature of the original input to storage is not altered when drawn from storage.
<b>Wholesale</b>	A flag that indicates whether the transaction is wholesale or not.	The definitions used will drive the definition of this flag. Perhaps an enumeration (“wholesale”, “retail”, “local”) should be used? Microgrid sources, if in my microgrid, appear to be local, but on a large scale this may confuse.
<b>Program</b>	A possibly structured name for a program in which the price and product are offered or purchased.	This may be analogous to a contract identifier. The variety of DR “programs” inspired this proposed element.
<b>ContractID</b>	An identification of the contract under which the energy is supplied or consumed.	<b>MarketID</b> and <b>ContractID</b> should perhaps be combined into a single element.

187  
188



---

189 **# Conformance**

190 The last numbered section in the specification must be the Conformance section. Conformance  
191 Statements/Clauses go here.

---

192 **A. Acknowledgements**

193 The following individuals have participated in the creation of this specification and are gratefully  
194 acknowledged:

195 **Participants:**

196 [Participant Name, Affiliation | Individual Member]

197 [Participant Name, Affiliation | Individual Member]

198



200

---

## C. Revision History

201

Revision	Date	Editor	Changes Made
1	2009-12-08	Toby Considine	Initial Draft from templates and outline
2	2010-01-12	William Cox	Inserted information model details from TC discussions

202

203

204