



Commodities and Energy Products  
Proposal for incorporation into FpML Version 4.0  
31st December 2002

## Status of this Document:

This document is a draft proposal to incorporate commodities and energy products into FpML Version 4.0 and is intended to be a starting point for an energy working group.

The primary focus of this document is on energy commodities with the intention that these products may potentially be extended in the future to other commodities such as metals and agricultural products.

The formula price examples and option premium examples in this document are notably bulky to identify complexities that have not yet been fully resolved.

## Revision History:

Version	Date	Author
1.0	16 <sup>th</sup> September 2002	Tom E. Moore
2.0	31 <sup>st</sup> December 2002	Tom E. Moore

Changes from 1.0 to 2.0:

### Changes to Entity Definitions:

FpML\_CommodityForward:

- changed commodityBuyerPrice from an occurrence of entity FpML\_CommodityFormulaPrice to an occurrence of entity FpML\_CommodityBuyerPrice
- changed commodityDeliveryPeriod from one or more occurrences to exactly one occurrence

FpML\_CommodityFormulaPrice:

- renamed index to indexPrice and changed from zero or one occurrence to one or more occurrences
- renamed fixedAmount to fixedPrice
- added averagingTerms

FpML\_CommodityIndexPrice:

- added indexOp for adding or subtracting indices
- changed description of indexPct

FpML\_CommodityFixedAmount:

- added precision

FpML\_CommodityUnits:

- added totalVolume and totalUom
- changed volumePerFreq from zero or one occurrence to exactly one occurrence

FpML\_CommodityDeliveryPeriod:

- redefined

FpML\_CommodityPhysicalSettlement:

- renamed deliveryPt to deliveryPoint
- added new text elements

FpML\_CommodityPremium:

- added precision
- removed payUpFrontFlag

**New Entity Definitions:**

FpML\_CommoditySpreadOption:

- a new product definition for an option containing more than one commodityForward sub-elements

FpML\_CommodityBuyerPrice:

- a new entity definition containing either a formula price, or one or more price tiers

FpML\_CommodityPriceTier

- a new entity definition for specifying price tiers within the buyer price

**Changes to Schemes:**

businessCenterScheme (added exchange and publication holiday calendars)

commodityScheme (added additional commodities for crude and products)

**New Schemes:**

indexScheme

indexOpScheme

**Other:**

fpml-shared-3-0.xsd modified

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# 1 INTRODUCTION

This proposal leverages the existing FpML specification as a basis to establish a standard XML format for exchanging trade data between energy companies. This proposal extends the FpML Version 3.0 Working Draft 17 April 2002 specification to incorporate both physical and financial commodity derivatives. Existing FpML components are reused where possible.

Assumptions are:

- The FpML specification is flexible enough to accommodate and adapt to the peculiarities of new derivative products within asset classes.
- The specification's base framework for its existing asset classes is equally applicable for commodities and energy products.
- Physically-settled (vs. cash-settled) f/x and equity trades in the current specification provides a acceptable precedent for physically-settled commodity trades.

This proposal also assumes FpML's adoption of FpML Version 3.0's proposed implementation of "strategies" necessary to construct composite trades such as option collars. FpML Version 3.0, being only a working draft at this time, is subject to revision or obsolescence.

Disclaimer from FpML Financial products Markup Language, Working Draft 17 April 2002, Version: 3.0:

*This is the FpML Version 3.0 Working Draft for review by the public and by FpML members and working groups. It is a draft document and may be updated, replaced or obsoleted by other documents at any time. It is inappropriate to use FpML Working Drafts as reference material or to cite them as other than "work in progress". There will be a subsequent release of this working draft to include Equity Derivative Products. This is work in progress and does not imply endorsement by the FpML.*

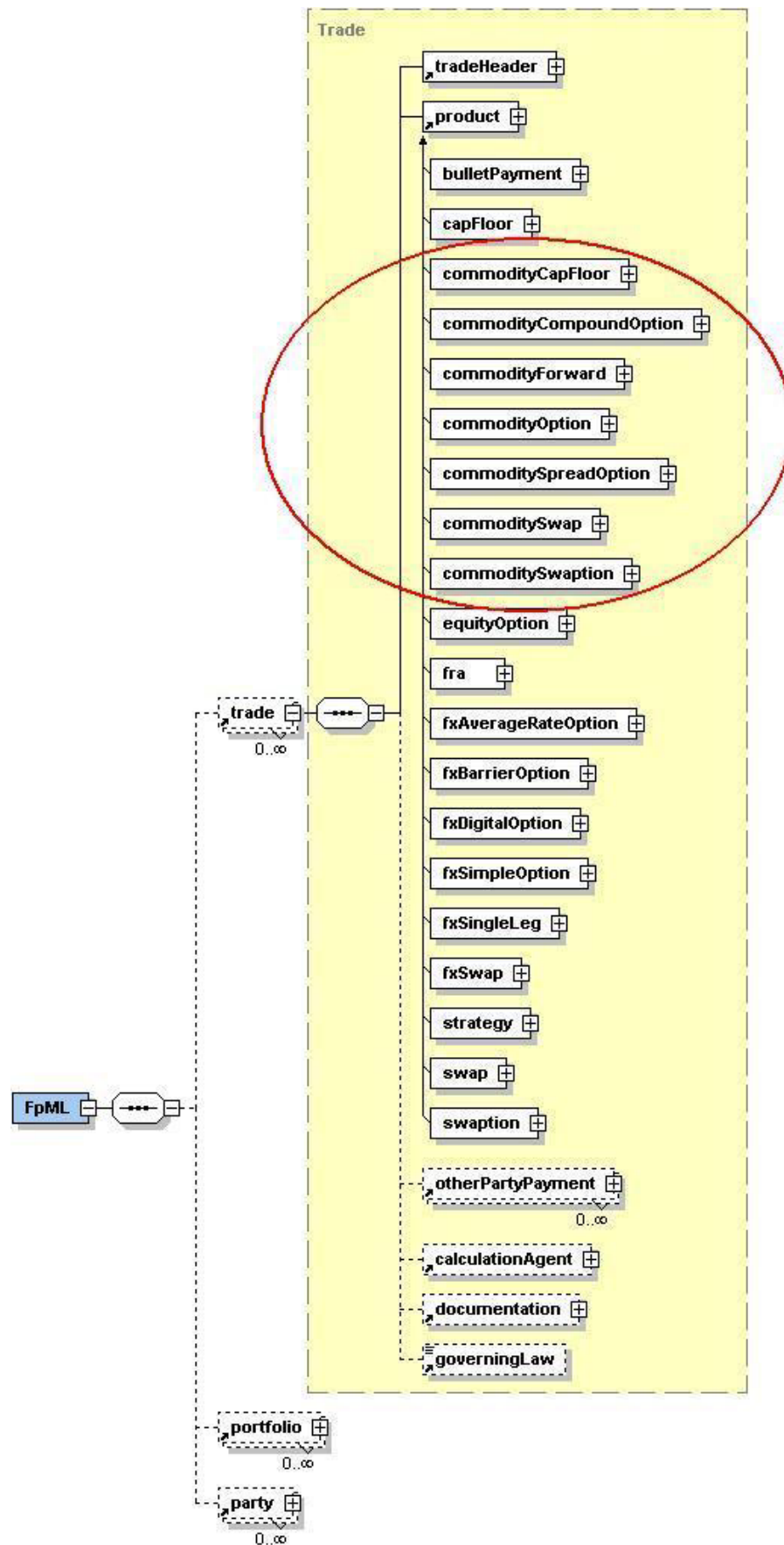
FpML Version 3.0 Working Draft is available online at: <http://www.fpml.org/spec/2002/wd-fpml-3-0-2002-04-17/index.asp>

## **2 COMMODITY PRODUCTS**

The following products are herein defined for commodities and energy:

- commodityForward
- commoditySwap
- commodityOption
- commodityCapFloor
- commoditySwaption
- commodityCompoundOption
- commoditySpreadOption

The commodityForward is the foundational product for the other commodity products.



### 3 ENTITY DEFINITIONS

The following entities are added to the specification within a new XSD. Suggested names for the new XSD are fpml-commodities-3-0.xsd or fpml-ce-3-0.xsd.

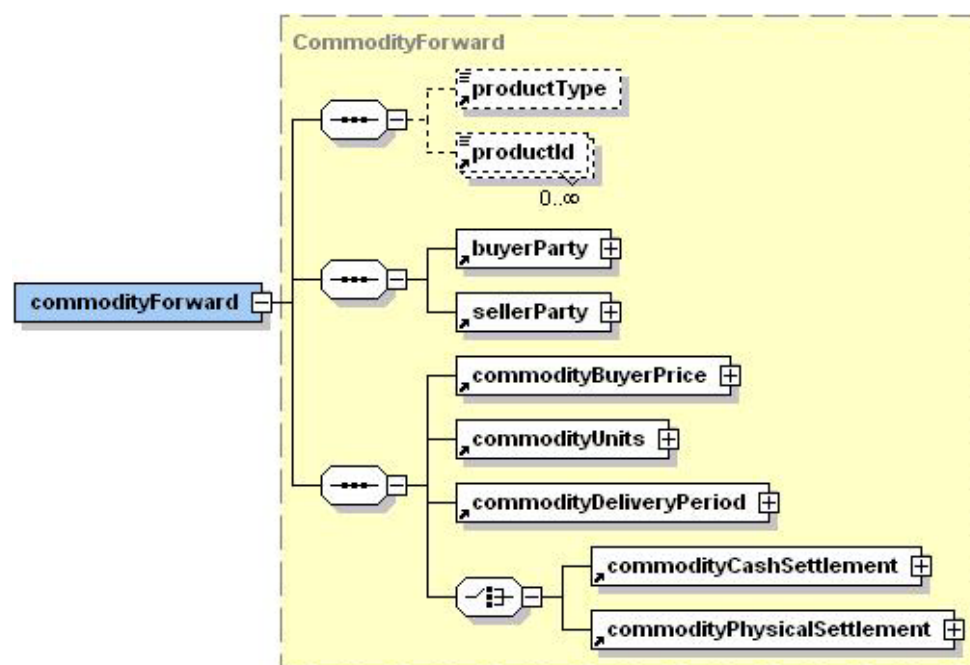
The energy working group will evaluate the following entities to determine 1) whether existing entities can be reused instead of creating new ones, and 2) which new entities might be applicable to other products in which case they could be placed in the shared components XSD.

#### FpML\_CommodityForward

##### Description:

An entity for defining a commodity forward product.

##### Figure:



##### Contents:

**inherited element(s)** (this entity inherits the element(s) defined by exactly one occurrence of the entity FpML\_Product)

- The base entity which all FpML products extend.

**buyerParty** (exactly one occurrence; contains the sub-element(s) defined by exactly one occurrence of the entity FpML\_PartyDetails)

- The party buying the forward.

*(FpML\_PartyDetails is reused from equity derivative components; it is not a "shared" component)*

**sellerParty** (exactly one occurrence; contains the sub-element(s) defined by exactly one occurrence of the entity FpML\_PartyDetails)

- The party selling the forward.

*(FpML\_PartyDetails is reused from equity derivative components; it is not a "shared" component)*

**commodityBuyerPrice** (exactly one occurrence; contains the sub-element(s) defined by exactly one occurrence of the entity FpML\_CommodityBuyerPrice)

- (copy element definition from section 4).

**commodityUnits** (exactly one occurrence; contains the sub-element(s) defined by exactly one occurrence of the entity FpML\_CommodityUnits)

- (copy element definition from section 4).

**commodityDeliveryPeriod** (exactly one occurrence; contains the sub-element(s) defined by exactly one occurrence of the entity FpML\_CommodityDeliveryPeriod)

- (copy element definition from section 4).

Either

**commodityCashSettlement** (exactly one occurrence; contains the sub-element(s) defined by exactly one occurrence of the entity FpML\_CommodityCashSettlement)

- (copy element definition from section 4).

Or

**commodityPhysicalSettlement** (exactly one occurrence; contains the sub-element(s) defined by exactly one occurrence of the entity FpML\_CommodityPhysicalSettlement)

- (copy element definition from section 4).

### **Used by:**

commodityForward

### **XSD Fragment:**

```
<xsd:complexType name="CommodityForward">
  <xsd:complexContent>
    <xsd:extension base="CommodityProduct">
      <xsd:sequence>
        <xsd:element ref="commodityBuyerPrice"/>
        <xsd:element ref="commodityUnits"/>
        <xsd:element ref="commodityDeliveryPeriod" maxOccurs="unbounded"/>
        <xsd:choice>
          <xsd:element ref="commodityCashSettlement"/>
          <xsd:element ref="commodityPhysicalSettlement"/>
        </xsd:choice>
      </xsd:sequence>
    </xsd:extension>
  </xsd:complexContent>
</xsd:complexType>
```

```
</xsd:complexContent>  
</xsd:complexType>
```

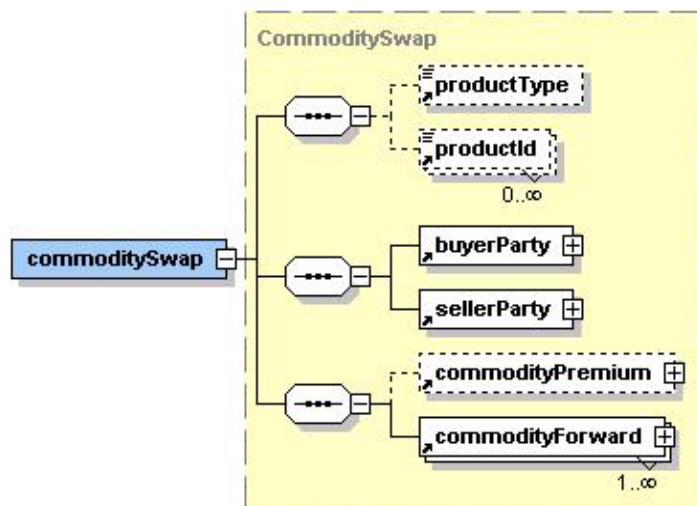
---

## FpML\_CommoditySwap

### Description:

An entity for defining a commodity swap product as a stream of forwards.

### Figure:



### Contents:

**inherited element(s)** (this entity inherits the element(s) defined by exactly one occurrence of the entity FpML\_Product)

- The base entity which all FpML products extend.

**buyerParty** (exactly one occurrence; contains the sub-element(s) defined by exactly one occurrence of the entity FpML\_PartyDetails)

- The party buying the forward.

**sellerParty** (exactly one occurrence; contains the sub-element(s) defined by exactly one occurrence of the entity FpML\_PartyDetails)

- The party selling the forward.

**commodityPremium** (zero or one occurrence; contains the sub-element(s) defined by exactly one occurrence of the entity FpML\_CommodityPremium)

- (copy element definition from section 4).

**commodityForward** (one or more occurrences; contains the sub-element(s) defined by exactly one occurrence of the entity FpML\_CommodityForward)

- (copy element definition from section 4).

### Used by:

commoditySwap

### XSD Fragment:

```
<xsd:complexType name="CommoditySwap">
  <xsd:complexContent>
    <xsd:extension base="CommodityProduct">
      <xsd:sequence>
        <xsd:element ref="commodityPremium" minOccurs="0"/>
        <xsd:element ref="commodityForward" maxOccurs="unbounded"/>
      </xsd:sequence>
    </xsd:extension>
  </xsd:complexContent>
</xsd:complexType>
```

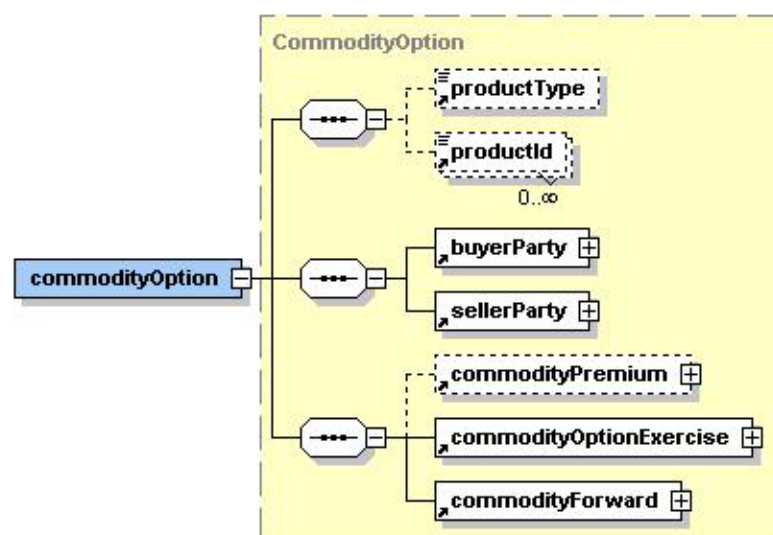
---

## FpML\_CommodityOption

### Description:

An entity for defining an option on a commodity forward product. The option strike price is the buyer price on the underlying forward.

### Figure:



### Contents:

**inherited element(s)** (this entity inherits the element(s) defined by exactly one occurrence of the entity FpML\_Product)

- The base entity which all FpML products extend.

**buyerParty** (exactly one occurrence; contains the sub-element(s) defined by exactly one occurrence of the entity FpML\_PartyDetails)

- The party buying the forward.

**sellerParty** (exactly one occurrence; contains the sub-element(s) defined by exactly one occurrence of the entity FpML\_PartyDetails)

- The party selling the forward.

**commodityPremium** (zero or one occurrence; contains the sub-element(s) defined by exactly one occurrence of the entity FpML\_CommodityPremium)

- (copy element definition from section 4).

**commodityOptionExercise** (exactly one occurrence; contains the sub-element(s) defined by exactly one occurrence of the entity FpML\_CommodityOptionExercise)

- (copy element definition from section 4).

**commodityForward** (exactly one occurrence; contains the sub-element(s) defined by exactly one occurrence of the entity FpML\_CommodityForward)

- (copy element definition from section 4).

**Used by:**

commodityOption

**XSD Fragment:**

```
<xsd:complexType name="CommodityOption">
  <xsd:complexContent>
    <xsd:extension base="CommodityProduct">
      <xsd:sequence>
        <xsd:element ref="commodityPremium" minOccurs="0"/>
        <xsd:element ref="commodityOptionExercise"/>
        <xsd:element ref="commodityForward"/>
      </xsd:sequence>
    </xsd:extension>
  </xsd:complexContent>
</xsd:complexType>
```

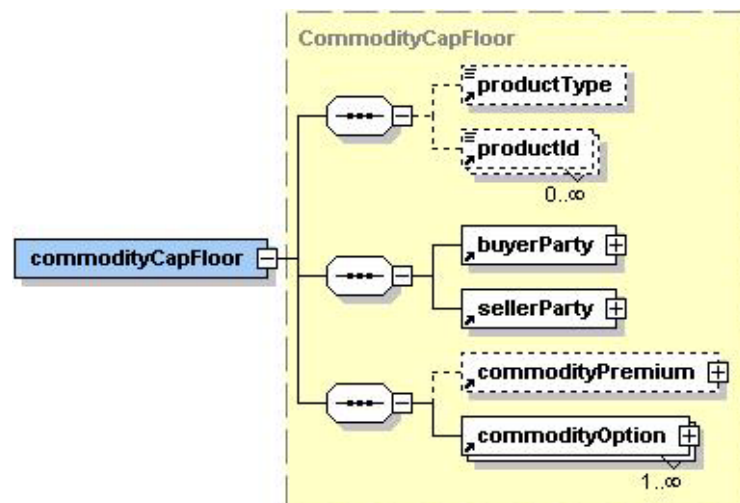
---

## FpML\_CommodityCapFloor

### Description:

An entity for defining a commodity cap/floor product as a stream of options.

### Figure:



### Contents:

**inherited element(s)** (this entity inherits the element(s) defined by exactly one occurrence of the entity FpML\_Product)

- The base entity which all FpML products extend.

**buyerParty** (exactly one occurrence; contains the sub-element(s) defined by exactly one occurrence of the entity FpML\_PartyDetails)

- The party buying the forward.

**sellerParty** (exactly one occurrence; contains the sub-element(s) defined by exactly one occurrence of the entity FpML\_PartyDetails)

- The party selling the forward.

**commodityPremium** (zero or one occurrence; contains the sub-element(s) defined by exactly one occurrence of the entity FpML\_CommodityPremium)

- (copy element definition from section 4).

**commodityOption** (one or more occurrences; contains the sub-element(s) defined by exactly one occurrence of the entity FpML\_CommodityOption)

- (copy element definition from section 4).

### Used by:

commodityCapFloor

### XSD Fragment:

```
<xsd:complexType name="CommodityCapFloor">
  <xsd:complexContent>
    <xsd:extension base="CommodityProduct">
      <xsd:sequence>
        <xsd:element ref="commodityPremium" minOccurs="0"/>
        <xsd:element ref="commodityOption" maxOccurs="unbounded"/>
      </xsd:sequence>
    </xsd:extension>
  </xsd:complexContent>
</xsd:complexType>
```

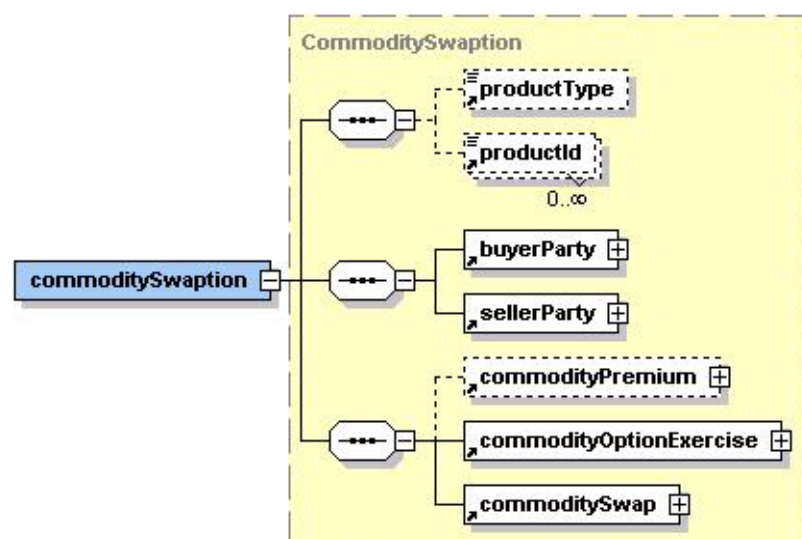
---

## FpML\_CommoditySwaption

### Description:

An entity for defining an option on a commodity swap product. The swaption strike price is the premium on the underlying swap.

### Figure:



### Contents:

**inherited element(s)** (this entity inherits the element(s) defined by exactly one occurrence of the entity FpML\_Product)

- The base entity which all FpML products extend.

**buyerParty** (exactly one occurrence; contains the sub-element(s) defined by exactly one occurrence of the entity FpML\_PartyDetails)

- The party buying the forward.

**sellerParty** (exactly one occurrence; contains the sub-element(s) defined by exactly one occurrence of the entity FpML\_PartyDetails)

- The party selling the forward.

**commodityPremium** (zero or one occurrence; contains the sub-element(s) defined by exactly one occurrence of the entity FpML\_CommodityPremium)

- (copy element definition from section 4).

**commodityOptionExercise** (exactly one occurrence; contains the sub-element(s) defined by exactly one occurrence of the entity FpML\_CommodityOptionExercise)

- (copy element definition from section 4).

**commoditySwap** (exactly one occurrence; contains the sub-element(s) defined by exactly one occurrence of the entity FpML\_CommoditySwap)

- (copy element definition from section 4).

**Used by:**

commoditySwaption

**XSD Fragment:**

```
<xsd:complexType name="CommoditySwaption">
  <xsd:complexContent>
    <xsd:extension base="CommodityProduct">
      <xsd:sequence>
        <xsd:element ref="commodityPremium" minOccurs="0"/>
        <xsd:element ref="commodityOptionExercise"/>
        <xsd:element ref="commoditySwap"/>
      </xsd:sequence>
    </xsd:extension>
  </xsd:complexContent>
</xsd:complexType>
```

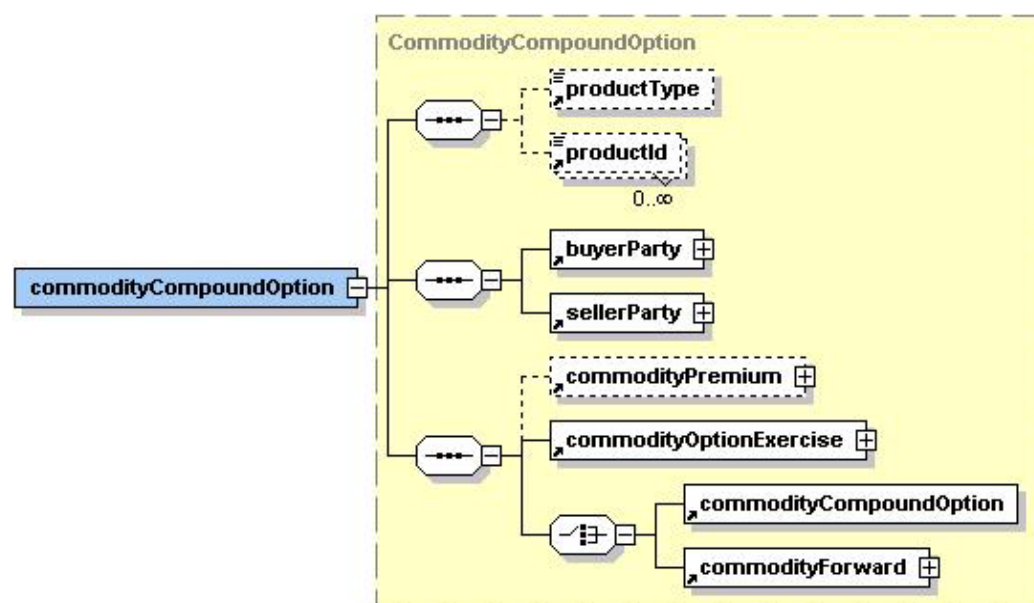
---

## FpML\_CommodityCompoundOption

### Description:

An entity for defining nested commodity option products. The option strike price is the premium on the underlying option.

### Figure:



### Contents:

**inherited element(s)** (this entity inherits the element(s) defined by exactly one occurrence of the entity FpML\_Product)

- The base entity which all FpML products extend.

**buyerParty** (exactly one occurrence; contains the sub-element(s) defined by exactly one occurrence of the entity FpML\_PartyDetails)

- The party buying the forward.

**sellerParty** (exactly one occurrence; contains the sub-element(s) defined by exactly one occurrence of the entity FpML\_PartyDetails)

- The party selling the forward.

**commodityPremium** (zero or one occurrence; contains the sub-element(s) defined by exactly one occurrence of the entity FpML\_CommodityPremium)

- (copy element definition from section 4).

**commodityOptionExercise** (exactly one occurrence; contains the sub-element(s) defined by exactly one occurrence of the entity FpML\_CommodityOptionExercise)

- (copy element definition from section 4).

Either

**commodityCompoundOption** (exactly one occurrence; contains the sub-element(s) defined by exactly one occurrence of the entity FpML\_CommodityCompoundOption)

- (copy *element definition* from section 4).

Or

**commodityForward** (exactly one occurrence; contains the sub-element(s) defined by exactly one occurrence of the entity FpML\_CommodityForward)

- (copy *element definition* from section 4).

**Used by:**

commodityCompoundOption

**XSD Fragment:**

```
<xsd:complexType name="CommodityCompoundOption">
  <xsd:complexContent>
    <xsd:extension base="CommodityProduct">
      <xsd:sequence>
        <xsd:element ref="commodityPremium" minOccurs="0"/>
        <xsd:element ref="commodityOptionExercise"/>
        <xsd:choice>
          <xsd:element ref="commodityCompoundOption"/>
          <xsd:element ref="commodityForward"/>
        </xsd:choice>
      </xsd:sequence>
    </xsd:extension>
  </xsd:complexContent>
</xsd:complexType>
```

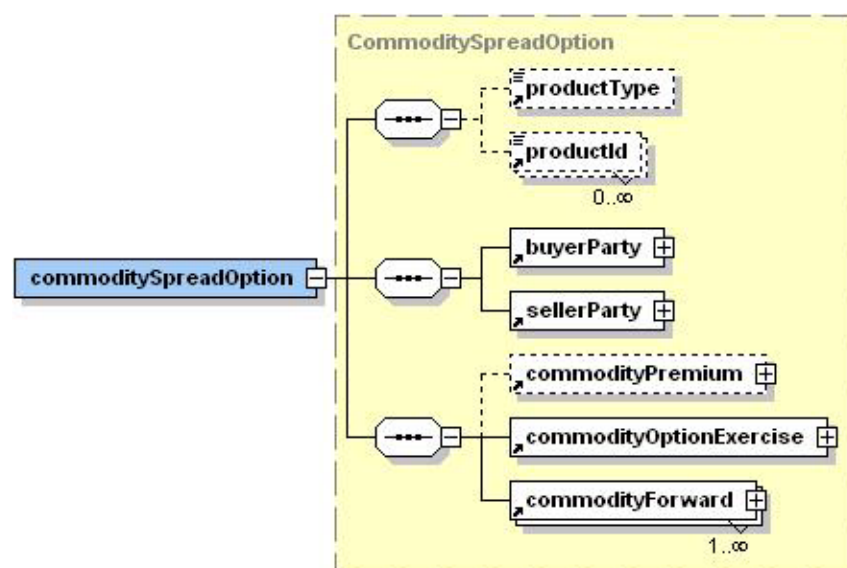
---

## FpML\_CommoditySpreadOption

### Description:

An entity for defining an option on the spread between commodity forward products. The option strike price is the *differential* between the buyer prices on the underlying forwards.

### Figure:



### Contents:

**inherited element(s)** (this entity inherits the element(s) defined by exactly one occurrence of the entity FpML\_Product)

- The base entity which all FpML products extend.

**buyerParty** (exactly one occurrence; contains the sub-element(s) defined by exactly one occurrence of the entity FpML\_PartyDetails)

- The party buying the forward.

**sellerParty** (exactly one occurrence; contains the sub-element(s) defined by exactly one occurrence of the entity FpML\_PartyDetails)

- The party selling the forward.

**commodityPremium** (zero or one occurrence; contains the sub-element(s) defined by exactly one occurrence of the entity FpML\_CommodityPremium)

- (copy element definition from section 4).

**commodityOptionExercise** (exactly one occurrence; contains the sub-element(s) defined by exactly one occurrence of the entity FpML\_CommodityOptionExercise)

- (copy element definition from section 4).

**commodityForward** (one or more occurrences; contains the sub-element(s) defined by exactly one occurrence of the entity FpML\_CommodityForward)

- (copy element definition from section 4).

**Used by:**

commoditySpreadOption

**XSD Fragment:**

```
<xsd:complexType name="CommoditySpreadOption">
  <xsd:complexContent>
    <xsd:extension base="CommodityProduct">
      <xsd:sequence>
        <xsd:element ref="commodityPremium" minOccurs="0"/>
        <xsd:element ref="commodityOptionExercise"/>
        <xsd:element ref="commodityForward" maxOccurs="unbounded"/>
      </xsd:sequence>
    </xsd:extension>
  </xsd:complexContent>
</xsd:complexType>
```

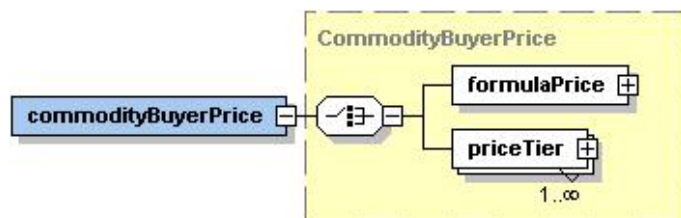
---

## FpML\_CommodityBuyerPrice

### Description:

An entity for....

### Figure:



### Contents:

Either

**formulaPrice** (exactly one occurrence; contains the sub-element(s) defined by exactly one occurrence of the entity FpML\_CommodityFormulaPrice)

- (copy *element definition* from section 4).

Or

**priceTier** (one or more occurrences; contains the sub-element(s) defined by exactly one occurrence of the entity FpML\_CommodityPriceTier)

- (copy *element definition* from section 4).

### Used by:

commodityForward

### XSD Fragment:

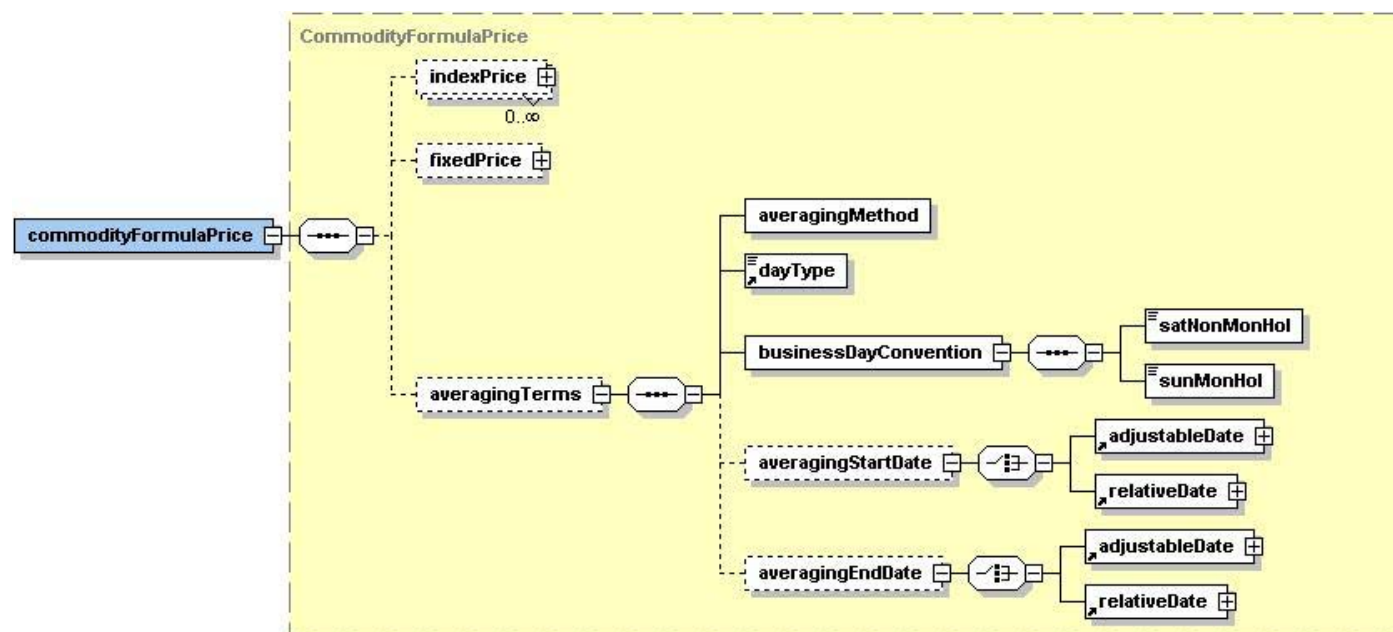
---

## FpML\_CommodityFormulaPrice

### Description:

An entity for....

### Figure:



### Contents:

**indexPrice** (one or more occurrences; contains the sub-element(s) defined by exactly one occurrence of the entity *FpML\_CommodityIndexPrice*)

- (copy element definition from section 4).

**fixedPrice** (zero or one occurrence; contains the sub-element(s) defined by exactly one occurrence of the entity *FpML\_CommodityFixedAmount*)

- (copy element definition from section 4).

**averagingMethod** (exactly one occurrence; of type *string*, an enumerated domain value defined by *averagingMethodScheme*)

- If averaging is applicable, this element specifies whether a weighted or unweighted average method of calculation is to be used.

**dayType** (zero or one occurrence; of type *string*, an enumerated domain value defined by *dayTypeScheme*)

- This element defines whether the averaging period includes calendar or just business days.

**satNonMonHol** (zero or one occurrence; of type *string*, an enumerated domain value defined by *businessDayConventionScheme*)

- The convention for adjusting a date if it would fall on a Saturday or non-Monday holiday.

**sunMonHol** (zero or one occurrence; of type *string*, an enumerated domain value defined by *businessDayConventionScheme*)

- The convention for adjusting a date if it would fall on a Sunday or Monday holiday.

**averagingStartDate** (exactly one occurrence; contains the sub-element(s) defined by exactly one occurrence of the entity *FpML\_AdjustableOrRelativeDate*)

- (*FpML\_AdjustableOrRelativeDate* is not fully sufficient for the needs of this element; see averaging examples for physical crude and refined products, below.)

**averagingEndDate** (exactly one occurrence; contains the sub-element(s) defined by exactly one occurrence of the entity *FpML\_AdjustableOrRelativeDate*)

- (*FpML\_AdjustableOrRelativeDate* is not fully sufficient for the needs of this element; see averaging examples for physical crude and refined products, below.)

**Used by:**

*commodityBuyerPrice*, *commodityPriceTier*

**XSD Fragment:**

**Formula Example ((Index+Index)/2+Offset):**

The following description is from an actual deal: interpolated Platts New York harbor cargo postings for No. 6 Fuel (0.3%S LoPr / 0.7%S Max) plus \$0.20/barrel. I.e., (P.USNY.NO6S03LP.CARGO.MID [Daily] + P.USNY.NO6S07.CARGO.MID [Daily]) / 2 + \$0.20/barrel. In the example below this is implemented as 50% of P.USNY.NO6S03LP.CARGO.MID [Daily] + 50% of P.USNY.NO6S07.CARGO.MID [Daily] + \$0.20/barrel:

```
<commodityBuyerPrice>
  <formulaPrice>
    <indexPrice>
      <indexOp>+</indexOp>
      <index>P.USNY.NO6S03LP.CARGO.MID [Daily]</index>
      <indexPct>50</indexPct>
    </indexPrice>
    <indexPrice>
      <indexOp>+</indexOp>
      <index>P.USNY.NO6S07.CARGO.MID [Daily]</index>
      <indexPct>50</indexPct>
    </indexPrice>
    <fixedPrice>
      <currency>USD</currency>
      <amount>0.20</amount>
      <perUom>U.S. Barrel(s)</perUom>
      <precision>2</precision>
    </fixedPrice>
  </formulaPrice>
</commodityBuyerPrice>
```

```

        </fixedPrice>
        :
    </formulaPrice>
</commodityBuyerPrice>

```

### ***Non-Averaging Example:***

#### **Monthly Natural Gas**

Assuming monthly settlement and a monthly index, no averaging terms are necessary to calculate settlement:

```

<commodityBuyerPrice>
    <formulaPrice>
        <indexPrice>
            <indexOp>+</indexOp>
            <index>IF.ANR.LA.INDEX [Monthly]</index>
            <indexPct>100</indexPct>
        </indexPrice>
    </formulaPrice>
</commodityBuyerPrice>

```

### ***Averaging Examples:***

#### **Unweighted Daily Natural Gas**

Assuming monthly settlement and a daily (or more frequent than monthly) index, in this example the averaging start and end dates are by default the beginning and end of the month. Business days are implicitly defined by the indice(s), in this example by Gas Daily's publishing schedule. The unweighted average for dayType business is the arithmetic mean of all prices published during the settlement period. An unweighted average for dayType calendar can also be calculated, in which case businessDayConvention specifies which prices to use for the non-business days.

```

<commodityBuyerPrice>
    <formulaPrice>
        <indexPrice>
            <indexOp>+</indexOp>
            <index>GD.ANR.LA.MID [Daily]</index>
            <indexPct>100</indexPct>
        </indexPrice>
        <averagingTerms>
            <averagingMethod>Unweighted</averagingMethod>
            <dayType>Business</dayType>
            <businessDayConvention>
                <satNonMonHol>NONE</satNonMonHol>
                <sunMonHol>NONE</sunMonHol>
            </businessDayConvention>
        </averagingTerms>
    </formulaPrice>
</commodityBuyerPrice>

```

#### **Weighted Daily Natural Gas**

A weighted average multiplies the actual delivery each day or hour, etc., by the price published for that day or hour, etc. The dayType must be calendar to establish a price for deliveries on non-business (i.e., non-publishing) days. businessDayConvention specifies which prices to use for the non-business days.

```

<commodityBuyerPrice>
  <formulaPrice>
    <indexPrice>
      <indexOp>+</indexOp>
      <index>GD.ANR.LA.MID [Daily]</index>
      <indexPct>100</indexPct>
    </indexPrice>
    <averagingTerms>
      <averagingMethod>Weighted</averagingMethod>
      <dayType>Calendar</dayType>
      <businessDayConvention>
        <satNonMonHol>MODFOLLOWING</satNonMonHol>
        <sunMonHol>MODFOLLOWING</sunMonHol>
      </businessDayConvention>
    </averagingTerms>
  </formulaPrice>
</commodityBuyerPrice>

```

### ***Common Averaging Structures for Physical Crude and Refined Products Trades:***

The following examples define specific averaging periods within each settlement period. This document has not fully resolved how to best implement each of these structures but identifies them for the consideration of the energy working group.

#### **First Three Business Days of the Month**

- The buyer price is the arithmetic mean of the first three prices published each month.
- The averaging start date for each settlement period is the 1<sup>st</sup> business day of each delivery month. In the example below it is the adjusted first day of the delivery month.
- The averaging end date for each settlement period is the 3<sup>rd</sup> business day of each delivery month. In the example below it is the 2<sup>nd</sup> business day following the averaging start date.

```

<commodityBuyerPrice>
  <formulaPrice>
    <indexPrice>
      <indexOp>+</indexOp>
      <index>P.USNY.NO6S03LP.CARGO.MID [Daily]</index>
      <indexPct>100</indexPct>
    </indexPrice>
    <averagingTerms>
      <averagingMethod>Unweighted</averagingMethod>
      <dayType>Business</dayType>
      <businessDayConvention>
        <satNonMonHol>NONE</satNonMonHol>
        <sunMonHol>NONE</sunMonHol>
      </businessDayConvention>
      <averagingStartDate>
        <adjustableDate> ← replace with: <adjustableDate id="FirstBusDay"/>
        <unadjustedDate>...</unadjustedDate> ← not sure how to specify a recurring date: the first calendar
        day of each delivery month
      </averagingStartDate>
      <dateAdjustments>
        <businessDayConvention>FOLLOWING</businessDayConvention>
      </dateAdjustments>
    </averagingTerms>
  </formulaPrice>
</commodityBuyerPrice>

```

```

        <businessCenters>
            <businessCenter>Platts</businessCenter>
        </businessCenters>
    </dateAdjustments>
</adjustableDate>
</averagingStartDate>
<averagingEndDate>
    <relativeDate>
        <periodMultiplier>2</periodMultiplier>
        <period>D</period>
        <dayType>Business</dayType>
        <businessDayConvention>NONE</businessDayConvention>
        <businessCenters>
            <businessCenter>Platts</businessCenter>
        </businessCenters>
        <dateRelativeTo>...</dateRelativeTo> <← replace with: <dateReference href="#FirstBusDay"/>
    </relativeDate>
</averagingEndDate>
</averagingTerms>
</formulaPrice>
</commodityBuyerPrice>

```

### Last Three Business Days of the Month

- The buyer price is the arithmetic mean of the last three prices published each month.
- The averaging start date for each settlement period is the 3<sup>rd</sup>–to-last business day of each delivery month. In the example below it is the 2<sup>nd</sup> business day preceding the averaging end date.
- The averaging end date for each settlement period is the last business day of each delivery month. In the example below it is the the backwards-adjusted last day of the delivery month.

```

<commodityBuyerPrice>
    <formulaPrice>
        <indexPrice>
            <indexOp>+</indexOp>
            <index>P.USNY.NO6S03LP.CARGO.MID [Daily]</index>
            <indexPct>100</indexPct>
        </indexPrice>
        <averagingTerms>
            <averagingMethod>Unweighted</averagingMethod>
            <dayType>Business</dayType>
            <businessDayConvention>
                <satNonMonHol>NONE</satNonMonHol>
                <sunMonHol>NONE</sunMonHol>
            </businessDayConvention>
            <averagingStartDate>
                <relativeDate>
                    <periodMultiplier>-2</periodMultiplier>
                    <period>D</period>
                    <dayType>Business</dayType>
                    <businessDayConvention>NONE</businessDayConvention>
                    <businessCenters>
                        <businessCenter>Platts</businessCenter>
                    </businessCenters>
                    <dateRelativeTo>...</dateRelativeTo> <← replace with: <dateReference href="#LastBusDay"/>
                </relativeDate>
            </averagingStartDate>
        </averagingTerms>
    </formulaPrice>
</commodityBuyerPrice>

```

```

    </relativeDate>
    </averagingStartDate>
    <averagingEndDate>
      <adjustableDate> ← replace with: <adjustableDate id="LastBusDay"/>
      <unadjustedDate>...</unadjustedDate> ← not sure how to specify a recurring date: the last calendar
day of each delivery month
      <dateAdjustments>
        <businessDayConvention>PRECEDING</businessDayConvention>
        <businessCenters>
          <businessCenter>Platts</businessCenter>
        </businessCenters>
      </dateAdjustments>
    </adjustableDate>
  </averagingEndDate>
</averagingTerms>
</formulaPrice>
</commodityBuyerPrice>

```

***First 15 Calendar Days of the Month:***

- The buyer price is the arithmetic mean of the first 15 calendar days of each month. For Saturdays and non-Monday holidays, the preceding business day's price is used. For Sunday's and Monday holidays, the following business day's price is used.
- The averaging start date for each settlement period is the 1<sup>st</sup> calendar day of each delivery month.
- The averaging end date for each settlement period is the 15<sup>th</sup> calendar day of each delivery month. In the example below it is the 14<sup>th</sup> calendar day following the 1<sup>st</sup> calendar day of each delivery month.

```

<commodityBuyerPrice>
  <formulaPrice>
    <indexPrice>
      <indexOp>+</indexOp>
      <index>P.USNY.NO6S03LP.CARGO.MID [Daily]</index>
      <indexPct>100</indexPct>
    </indexPrice>
    <averagingTerms>
      <averagingMethod>Unweighted</averagingMethod>
      <dayType>Calendar</dayType>
      <businessDayConvention>
        <satNonMonHol>MODPRECEDING</satNonMonHol>
        <sunMonHol>MODFOLLOWING</sunMonHol>
      </businessDayConvention>
      <averagingStartDate>
        <adjustableDate>
          <unadjustedDate>...</unadjustedDate> ← not sure how to specify a recurring date: the first calendar
day of each delivery month
          <dateAdjustments>
            <businessDayConvention>NONE</businessDayConvention>
            <businessCenters>
              <businessCenter>Platts</businessCenter>
            </businessCenters>
          </dateAdjustments>
        </adjustableDate>
      </averagingStartDate>
    </averagingTerms>
  </formulaPrice>
</commodityBuyerPrice>

```

```

    </adjustableDate>
    </averagingStartDate>
    <averagingEndDate>
      <relativeDate>
        <periodMultiplier>14</periodMultiplier>
        <period>D</period>
        <dayType>Calendar</dayType>
        <businessDayConvention>NONE</businessDayConvention>
        <businessCenters>
          <businessCenter>Platts</businessCenter>
        </businessCenters>
        <dateRelativeTo>...</dateRelativeTo> < not sure how to specify a recurring date: the first
calendar day of each delivery month
      </relativeDate>
    </averagingEndDate>
  </averagingTerms>
</formulaPrice>
</commodityBuyerPrice>

```

**First 15 Days of the Month:**

- The buyer price is the arithmetic mean of however many prices are published during the first 15 calendar days of each month.
- The averaging start date for each settlement period is the 1<sup>st</sup> calendar day of each delivery month.
- The averaging end date for each settlement period is the 15<sup>th</sup> calendar day of each delivery month. In the example below it is the 14<sup>th</sup> calendar day following the 1<sup>st</sup> calendar day of each delivery month.

```

<commodityBuyerPrice>
  <formulaPrice>
    <indexPrice>
      <indexOp>+</indexOp>
      <index>P.USNY.NO6S03LP.CARGO.MID [Daily]</index>
      <indexPct>100</indexPct>
    </indexPrice>
    <averagingTerms>
      <averagingMethod>Unweighted</averagingMethod>
      <dayType>Business</dayType>
      <businessDayConvention>
        <satNonMonHol>NONE</satNonMonHol>
        <sunMonHol>NONE</sunMonHol>
      </businessDayConvention>
      <averagingStartDate>
        <adjustableDate>
          <unadjustedDate>...</unadjustedDate> < not sure how to specify a recurring date: the first calendar
day of each delivery month
        </adjustableDate>
        <dateAdjustments>
          <businessDayConvention>NONE</businessDayConvention>
          <businessCenters>
            <businessCenter>Platts</businessCenter>
          </businessCenters>
        </dateAdjustments>
      </averagingStartDate>
    </averagingTerms>
  </formulaPrice>
</commodityBuyerPrice>

```

```

        </adjustableDate>
        </averagingStartDate>
        <averagingEndDate>
        <relativeDate>
        <periodMultiplier>14</periodMultiplier>
        <period>D</period>
        <dayType>Calendar</dayType>
        <businessDayConvention>NONE</businessDayConvention>
        <businessCenters>
        <businessCenter>Platts</businessCenter>
        </businessCenters>
        <dateRelativeTo>...</dateRelativeTo> <← not sure how to specify a recurring date: the first
calendar day of each delivery month
        </relativeDate>
        </averagingEndDate>
    </averagingTerms>
</formulaPrice>
</commodityBuyerPrice>

```

***Last Half of the Month:***

- The buyer price is the arithmetic mean of however many prices are published between the 16<sup>th</sup> and end of each month.
- The averaging start date for each settlement period is the 16<sup>th</sup> calendar day of each delivery month. In the example below it is the 15<sup>th</sup> calendar day following the 1<sup>st</sup> calendar day of each delivery month.
- The averaging end date for each settlement period is the last business day of each delivery month. In the example below it is the last calendar day of the delivery month.

```

<commodityBuyerPrice>
  <formulaPrice>
    <indexPrice>
      <indexOp>+</indexOp>
      <index>P.USNY.NO6S03LP.CARGO.MID [Daily]</index>
      <indexPct>100</indexPct>
    </indexPrice>
    <averagingTerms>
      <averagingMethod>Unweighted</averagingMethod>
      <dayType>Business</dayType>
      <businessDayConvention>
        <satNonMonHol>NONE</satNonMonHol>
        <sunMonHol>NONE</sunMonHol>
      </businessDayConvention>
      <averagingStartDate>
        <relativeDate>
          <periodMultiplier>15</periodMultiplier>
          <period>D</period>
          <dayType>Calendar</dayType>
          <businessDayConvention>NONE</businessDayConvention>
          <businessCenters>
            <businessCenter>Platts</businessCenter>
          </businessCenters>

```

```

        <dateRelativeTo>...</dateRelativeTo> <← not sure how to specify a recurring date: the first
calendar day of each delivery month
    </relativeDate>
    </averagingStartDate>
    <averagingEndDate>
    <adjustableDate>
    <unadjustedDate>...</unadjustedDate> <← not sure how to specify a recurring date: the last calendar
day of each delivery month
    <dateAdjustments>
    <businessDayConvention>NONE</businessDayConvention>
    <businessCenters>
    <businessCenter>Platts</businessCenter>
    </businessCenters>
    </dateAdjustments>
    </adjustableDate>
    </averagingEndDate>
</averagingTerms>
</formulaPrice>
</commodityBuyerPrice>

```

#### **Five-Day Event Wrap (A):**

- The buyer price is the arithmetic mean of five prices published on and around a recurring event. The event is either the bill of lading date, the notice of readiness date, the commencement of discharge date, or the completion of discharge date.
- In this example, the event date is *adjusted* before determining the averaging period. Meaning, for pricing purposes the event date will be deemed to be the *previous* business day if the actual event date is a Saturday or non-Monday holiday (the five prices will then be Wednesday, Thursday, Friday, Monday and Tuesday, assuming no holidays), or the *next* business day if the actual event date is a Sunday or Monday holiday (the five prices will then be Thursday, Friday, Monday, Tuesday and Wednesday, assuming no holidays).
- The averaging start date for each settlement period is the 2<sup>nd</sup> business day preceding the *adjusted* event date for each delivery month.
- The averaging end date for each settlement period is the 2<sup>nd</sup> business day following the *adjusted* event date for each delivery month.

```

<commodityBuyerPrice>
  <formulaPrice>
    <indexPrice>
      <indexOp>+</indexOp>
      <index>P.USNY.NO6S03LP.CARGO.MID [Daily]</index>
      <indexPct>100</indexPct>
    </indexPrice>
    <averagingTerms>
      <averagingMethod>Unweighted</averagingMethod>
      <dayType>Business</dayType>
      <businessDayConvention>
        <satNonMonHol>NONE</satNonMonHol>
        <sunMonHol>NONE</sunMonHol>
      </businessDayConvention>
      <averagingStartDate>
        <relativeDate>

```

```

    <periodMultiplier>-2</periodMultiplier>
    <period>D</period>
    <dayType>Business</dayType>
    <businessDayConvention>NONE</businessDayConvention>
    <businessCenters>
      <businessCenter>Platts</businessCenter>
    </businessCenters>
    <dateRelativeTo>...</dateRelativeTo> <← replace with: <dateReference
href="#AdjustedBillofLadingDay"/>
  </relativeDate>
  <averagingStartDate>
  <averagingEndDate>
    <relativeDate>
      <periodMultiplier>2</periodMultiplier>
      <period>D</period>
      <dayType>Business</dayType>
      <businessDayConvention>NONE</businessDayConvention>
      <businessCenters>
        <businessCenter>Platts</businessCenter>
      </businessCenters>
      <dateRelativeTo>...</dateRelativeTo> <← replace with: <dateReference
href="#AdjustedBillofLadingDay"/>
    </relativeDate>
  </averagingEndDate>
</averagingTerms>
</formulaPrice>
</commodityBuyerPrice>
:
<otherDates>
  <adjustableDate id="AdjustedBillofLadingDate">
    <unadjustedDate>...</unadjustedDate> <← not sure how to specify a recurring event date
    <dateAdjustments>
      <businessDayConvention>..</businessDayConvention> <← need to be able to specify
MODPRECEDING for Saturdays and non-Monday holidays, and MODFOLLOWING for Sundays and
Monday holidays
    <businessCenters>
      <businessCenter>Platts</businessCenter>
    </businessCenters>
  </dateAdjustments>
</adjustableDate>
</otherDates>

```

**Five-Day Event Wrap (B):**

- The buyer price is the arithmetic mean of five prices published on and around a recurring event. The event is either the bill of lading date, the notice of readiness date, the commencement of discharge date, or the completion of discharge date.
- In this example, the event date is *unadjusted*. This is the tricky part: if the event date falls on a non-business (i.e., non-publishing) day, the buyer price will be the arithmetic mean of four business days and one calendar day. If the event date falls on a Saturday or non-Monday holiday, the five prices will be Thursday, Friday, Friday, Monday and Tuesday prices (assuming no holidays); if the event date falls on a Sunday or Monday holiday, the five prices will be Thursday, Friday, Monday, Monday and Tuesday prices (assuming no holidays).

- The averaging start date for each settlement period is the 2<sup>nd</sup> business day preceding the *unadjusted* event date for each delivery month.
- The averaging end date for each settlement period is the 2<sup>nd</sup> business day following the *unadjusted* event date for each delivery month.

```

<commodityBuyerPrice>
  <formulaPrice>
    <indexPrice>
      <indexOp>+</indexOp>
      <index>P.USNY.NO6S03LP.CARGO.MID [Daily]</index>
      <indexPct>100</indexPct>
    </indexPrice>
    <averagingTerms>
      <averagingMethod>Unweighted</averagingMethod>
      <dayType>Business</dayType> ← this is not adequate: if the event date falls on a non-
business day then the average will be all four business days plus one calendar day
      <businessDayConvention>
        <satNonMonHol>NONE</satNonMonHol>
        <sunMonHol>NONE</sunMonHol>
      </businessDayConvention>
      <averagingStartDate>
        <relativeDate>
          <periodMultiplier>-2</periodMultiplier>
          <period>D</period>
          <dayType>Business</dayType>
          <businessDayConvention>NONE</businessDayConvention>
          <businessCenters>
            <businessCenter>Platts</businessCenter>
          </businessCenters>
          <dateRelativeTo>BillOfLadingDate</dateRelativeTo> ← either replace with <dateReference
href="#BillOfLadingDate"/> or add BillOfLadingDate to the dateRelativeToScheme
        </relativeDate>
      </averagingStartDate>
      <averagingEndDate>
        <relativeDate>
          <periodMultiplier>2</periodMultiplier>
          <period>D</period>
          <dayType>Business</dayType>
          <businessDayConvention>NONE</businessDayConvention>
          <businessCenters>
            <businessCenter>Platts</businessCenter>
          </businessCenters>
          <dateRelativeTo>BillOfLadingDate</dateRelativeTo> ← either replace with <dateReference
href="#BillOfLadingDate"/> or add BillOfLadingDate to the dateRelativeToScheme
        </relativeDate>
      </averagingEndDate>
    </averagingTerms>
  </formulaPrice>
</commodityBuyerPrice>

```

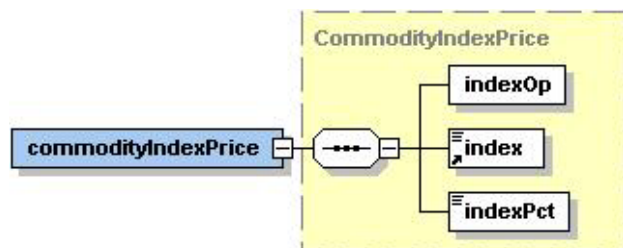
---

## FpML\_CommodityIndexPrice

### Description:

An entity for....

### Figure:



### Contents:

**indexOp** (exactly one occurrence; of type *string*, an enumerated domain value defined by *indexOpScheme*)

- A mathematical operator indicating whether the index is being added or subtracted.

**index** (exactly one occurrence; of type *string*, an enumerated domain value defined by *indexScheme*)

- A reference to a published index price.

**indexPct** (exactly one occurrence; of type *decimal*)

- A percentage of the published index price ("50"=50%; "100"=100%).

### Used by:

commodityFormulaPrice  
commodityCashSettlement

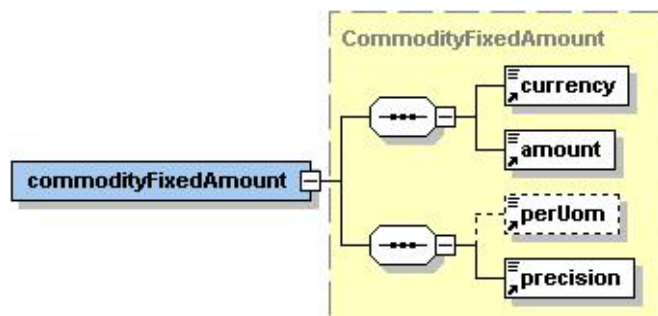
### XSD Fragment:

## FpML\_CommodityFixedAmount

### Description:

An entity for.... (This entity extends FpML\_Money.)

### Figure:



### Contents:

**inherited element(s)** (this entity inherits the element(s) defined by exactly one occurrence of the entity FpML\_Money)

- An entity for defining a currency amount.

**perUom** (zero or one occurrence; of type *string*, an enumerated domain value defined by *uomScheme*)

- Defines the fixed amount as a per unit price relative to the volumetric quantity.

**precision** (zero or one occurrence; of type *nonNegativeInteger*)

- Specifies the rounding precision in terms of a number of decimal places.

### Used by:

`commodityFormulaPrice`

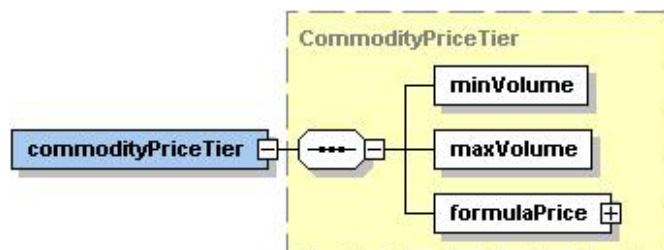
### XSD Fragment:

## FpML\_CommodityPriceTier

### Description:

Need to add volume uoms....

### Figure:



### Contents:

**minVolume** (exactly one occurrence; of type *decimal*)

- The volumetric quantity of the specified commodity.

**maxVolume** (exactly one occurrence; of type *decimal*)

- The volumetric quantity of the specified commodity.

**formulaPrice** (exactly one occurrence; contains the sub-element(s) defined by exactly one occurrence of the entity **FpML\_CommodityFormulaPrice**)

- (copy *element definition* from section 4).

### Used by:

commodityBuyerPrice

### XSD Fragment:

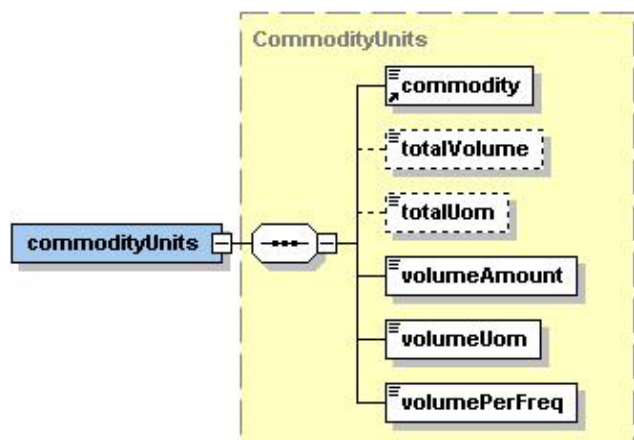
## FpML\_CommodityUnits

### Description:

An entity for....

Note: Whether the commodity is a financial or physical trade is defined by cash settlement or physical settlement.

### Figure:



### Contents:

**commodity** (exactly one occurrence; of type *string*, an enumerated domain value defined by *commodityScheme*)

- The commodity being traded.

**totalVolume** (zero or one occurrence; of type *decimal*)

- The total volumetric quantity of the specified commodity for the full term of the delivery period.

**totalUom** (zero or one occurrence; of type *string*, an enumerated domain value defined by *uomScheme*)

- The unit of measure in which the total volumetric quantity is denominated.

**volumeAmount** (exactly one occurrence; of type *decimal*)

- The volumetric quantity of the specified commodity.

**volumeUom** (exactly one occurrence; of type *string*, an enumerated domain value defined by *uomScheme*)

- The unit of measure in which the volumetric quantity is denominated.

**volumePerFreq** (exactly one occurrence; of type *string*, an enumerated domain value defined by *frequencyScheme*)

- Defines the volumetric quantity as relative to the delivery period. The frequency may be term in which case the volumeAmount is the equal to the totalVolume.

**Used by:**

commodityUnits

**XSD Fragment:**

**Natural Gas Example (from a 12-Month Deal):**

```
<commodityUnits>
  <commodity>NG</ commodity>
  <totalVolume>120,000</totalVolume>
  <totalUom>MMBtu</totalUom>
  <volumeAmount>10,000</ volumeAmount>
  <volumeUom>MMBtu</ volumeUom>
  <volumePerFreq>M</ volumePerFreq>
</commodityUnits>
```

**Power Example (from a 31-Day Around-the-Clock Deal):**

```
<commodityUnits>
  <commodity>Power</ commodity>
  <totalVolume>37,200</totalVolume>
  <totalUom>MWh</totalUom>
  <volumeAmount>50</ volumeAmount>
  <volumeUom>MWh</ volumeUom>
  <volumePerFreq>H</ volumePerFreq>
</commodityUnits>
```

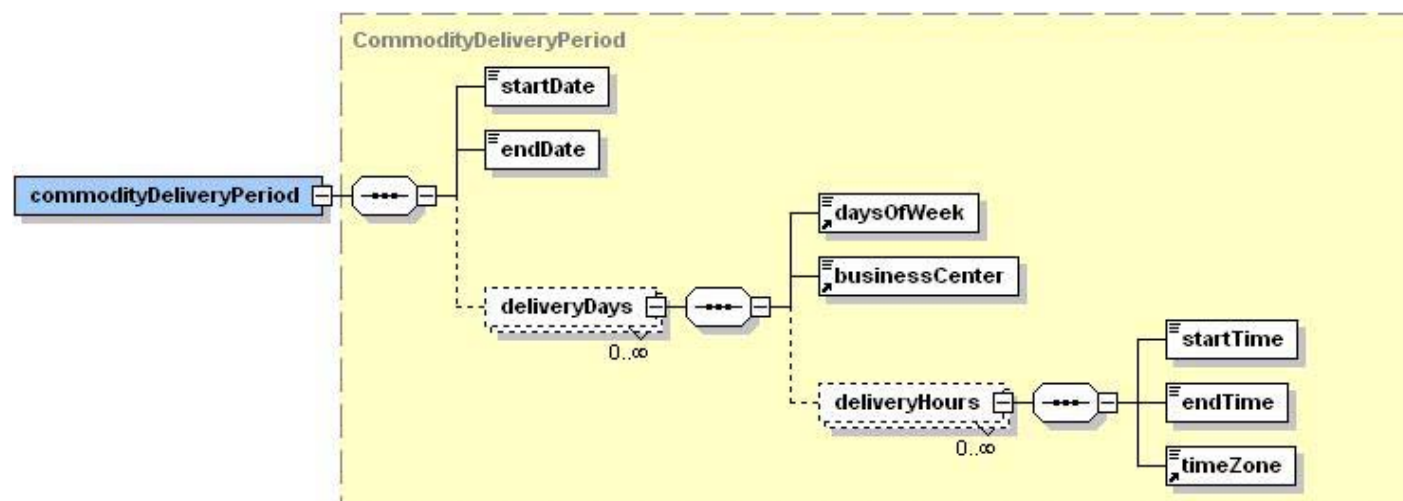
---

## FpML\_CommodityDeliveryPeriod

### Description:

An entity for....

### Figure:



### Contents:

**startDate** (exactly one occurrence; of type *date*)

- The start date of the delivery period.

*(Should startDate be of type FpML\_AdjustableDate or type FpML\_AdjustableOrRelativeDate?)*

**endDate** (exactly one occurrence; of type *date*)

- The end date of the delivery period.

*(Should endDate be of type FpML\_AdjustableDate or type FpML\_AdjustableOrRelativeDate?)*

**daysOfWeek** (zero or more occurrences; of type *string*, an enumerated domain value defined by *daysOfWeekScheme*)

- A mask restricting delivery to specific days of week between the startDate and endDate.

**businessCenter** (zero or more occurrences; of type *string*, an enumerated domain value defined by *businessCenterScheme*)

- A code identifying the days between the startDate and endDate which are holidays.

**startTime** (zero or more occurrences; of type *string*)

- The start time of delivery on each delivery day in the delivery period.

**endTime** (zero or more occurrences; of type *string*)

- The end date of delivery on each delivery day the delivery period.

**timeZone** (zero or more occurrences; of type *string*, an enumerated domain value defined by *timeZoneScheme*)

- Qualifies the *startTime* and *endTime* of the *deliveryPeriod*.

(Other *FpML* asset classes, e.g., *FpML\_BusinessCenterTime*, use *FpML\_BusinessCenter* to indicate time zone, i.e., 'GBLO' to designate "London time".)

### Used by:

*commodityDeliveryPeriod*

### XSD Fragment:

#### Definitions of On-Peak, Off-Peak and ATC for U.S. Power:

	PPT	MPT	CPT	EPT
On-Peak	HE0700-HE2200 -MTWTFS-	HE0800-HE2300 -MTWTFS-	HE0700-HE2200 -MTWTF--	HE0800-HE2300 -MTWTF--
Off-Peak	HE0100-HE0600 -MTWTFS- HE2300-HE2400 -MTWTFS- HE0100-HE2400 S-----H	HE0100-HE0700 -MTWTFS- HE2400-HE2400 -MTWTFS- HE0100-HE2400 S-----H	HE0100-HE0600 -MTWTF-- HE2300-HE2400 -MTWTF-- HE0100-HE2400 S-----SH	HE0100-HE0700 -MTWTF-- HE2400-HE2400 -MTWTF-- HE0100-HE2400 S-----SH
ATC (Around-the-Clock)	HE0100-HE2400 SMTWTFSH	HE0100-HE2400 SMTWTFSH	HE0100-HE2400 SMTWTFSH	HE0100-HE2400 SMTWTFSH

#### Natural Gas Example:

```
<commodityDeliveryPeriod>
  <startDate>2002-09-01</startDate>
  <endDate>2002-09-30</endDate>
</commodityDeliveryPeriod>
```

#### Power Off-Peak PPT Example:

```
<commodityDeliveryPeriod>
  <startDate>2002-09-01</startDate>
  <endDate>2002-09-30</endDate>
  <deliveryDays>
    <daysOfWeek>-MTWTFS</daysOfWeek>
    <businessCenter>NERC</businessCenter>
    <deliveryHours>
      <startTime>HE0100</startTime>
      <endTime>HE0600</endTime>
      <timeZone>PPT</timeZone>
    </deliveryHours>
    <deliveryHours>
      <startTime>HE2300</startTime>
      <endTime>HE2400</endTime>
    </deliveryHours>
  </deliveryDays>
</commodityDeliveryPeriod>
```

```

        <timeZone>PPT</timeZone>
      </deliveryHours>
    </deliveryDays>
  <deliveryDays>
    <daysOfWeek>S-----H</daysOfWeek>
    <businessCenter >NERC</businessCenter >
    <deliveryHours>
      <startTime>HE0100</startTime>
      <endTime>HE2400</endTime>
      <timeZone>PPT</timeZone>
    </deliveryHours>
  </deliveryDays >
</commodityDeliveryPeriod>
```

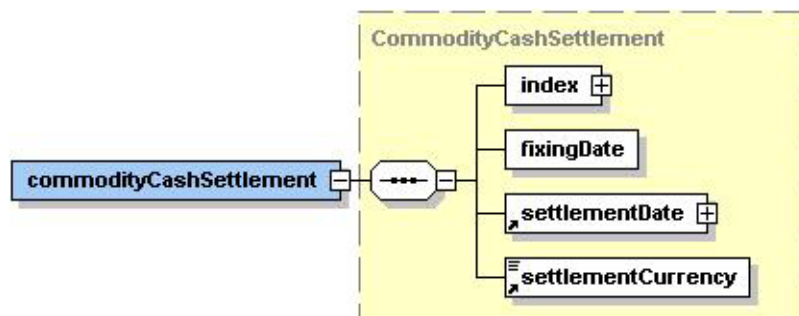
---

## FpML\_CommodityCashSettlement

### Description:

An entity for....

### Figure:



### Contents:

[This entity is still being defined.]

### Used by:

`commodityCashSettlement`

### XSD Fragment:

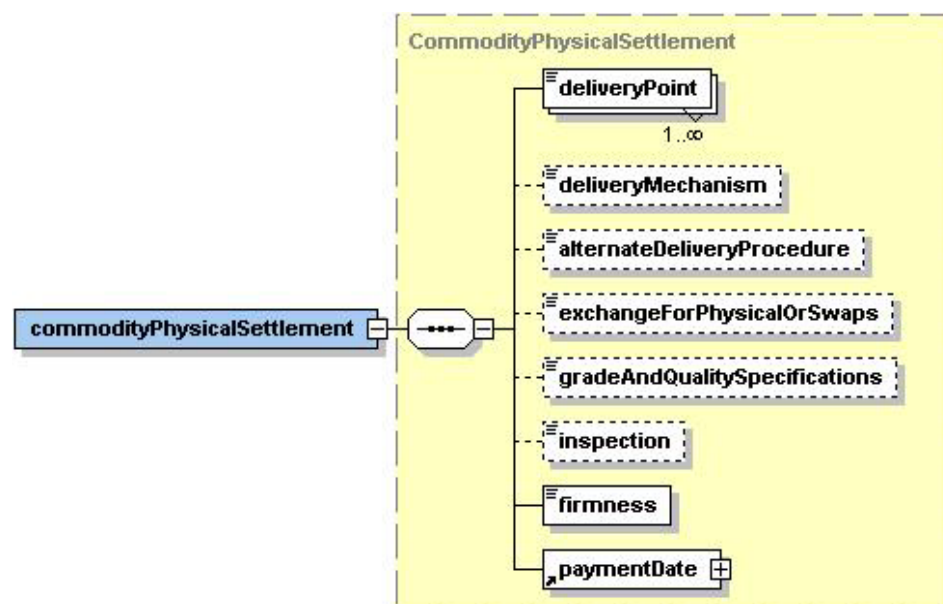
## FpML\_CommodityPhysicalSettlement

### Description:

An entity for defining the physical specifications and logistics terms for a physical commodity trade.

Some of the elements below need to be more fully specified and decomposed into a machine-readable structure in order to facilitate automated processing. Currently they are free-form text placeholders for contractual language. See the examples below for different terms that may be in each of these elements as taken from standard exchange contracts.

### Figure:



### Contents:

**deliveryPoint** (one or more occurrences; of type *string*, an enumerated domain value defined by *deliveryPointScheme*)

- Specifies the location(s) for physical delivery of the commodity.

**deliveryMechanism** (zero or one occurrence; of type *string*)

- Free-form text specifying contractual language.

**alternateDeliveryProcedure** (zero or one occurrence; of type *string*)

- Free-form text specifying contractual language.

**exchangeForPhysicalOrSwaps** (zero or one occurrence; of type *string*)

- Free-form text specifying contractual language.

**gradeAndQualitySpecifications** (zero or one occurrence; of type *string*)

- Free-form text specifying contractual language.

**inspection** (zero or one occurrence; of type *string*)

- Free-form text specifying contractual language.

**firmness** (exactly one occurrence; of type *string*, an enumerated domain value defined by *firmnessScheme*)

- Specifies the degree of firmness or interruptability allowed for physical delivery of the commodity.

**paymentDate** (exactly one occurrence; contains the sub-element(s) defined by exactly one occurrence of the entity *FpML\_AdjustableDate*)

- The buyer's payment date(s). This date is subject to adjustment in accordance with any applicable business day convention.

***Used by:***

commodityPhysicalSettlement

***XSD Fragment:***

***Examples:***

The following pages contain sample physical delivery language from exchange-traded futures contracts.

	<b>NYMEX Natural Gas</b>	<b>MGEX Twin Cities Electricity On-Peak</b>	<b>NYMEX Light, Sweet Crude Oil</b>	<b>NYMEX Central Appalachian Coal</b>	<b>COMEX Silver</b>	<b>CBOT Wheat</b>
<b>deliveryPoint(s)</b>	Sabine Pipe Line Co.'s Henry Hub in Louisiana	TC GEN	Cushing, Oklahoma	Ohio River	COMEX licensed or designated warehouse or vault	Chicago Toledo St. Louis Kansas City Milwaukee Minneapolis Peoria Indianapolis
<b>gradeAndQualitySpecifications</b>	Pipeline specifications in effect at time of delivery.	"Contract Quality Electricity" shall mean firm electric energy in the form of three (3) phase current alternating at a nominal frequency of sixty (60) Hertz which is free from all liens, encumbrances, unpaid taxes, fees, and other charges and delivered in accordance with the Rules of the Contracts, for which the only cause for non-delivery or non-receipt of such shall be approved cases of Force Majeure.	Specific domestic crudes with 0.42% sulfur by weight or less, not less than 37° API gravity nor more than 42° API gravity. The following domestic crude streams are deliverable: West Texas Intermediate, Low Sweet Mix, New Mexican Sweet, North Texas Sweet, Oklahoma Sweet, South Texas Sweet. Specific foreign crudes of not less than 34° API nor more than 42° API. The following foreign streams are deliverable: U.K. Brent and Forties, and Norwegian Oseberg Blend, for which the seller shall receive a \$.30-per-barrel discount below the final settlement price; Nigerian Bonny Light and Colombian Cusiana are delivered at \$.15 premiums; and Nigerian Qua Iboe is delivered at a \$.05 premium.	Heat Content: Minimum 12,000 Btus per pound, gross calorific value, with an analysis tolerance of 250 Btus per pound below.  Ash Content: Maximum of 13.50% by weight with no analysis tolerance.  Sulfur Content: Maximum of 1.00%, with analysis tolerance of 0.050% above.  Moisture Content: Maximum of 10.00%, with no analysis tolerance.  Volatile Matter: minimum of 30.00%, with no analysis tolerance.  Hardness/Grindability: Minimum 41 Hardgrove Index with three point analysis tolerance below. Hardness measures how difficult it is to pulverize coal for injection into the boiler flame.  Size: Three inches topsize, nominal, with a maximum of 55% passing one-quarter-inch-square wire cloth sieve or smaller, to be determined on the basis of the primary cutter of the mechanical sampling system.	In fulfillment of each contract, the seller must deliver 5,000 troy ounces (+/-6%) of refined silver, assaying not less than .999 fineness, in cast bars weighing 1,000 or 1,100 troy ounces each and bearing a serial number and identifying number of a refiner approved and listed by the Exchange. A list of approved refiners and assayers is available from the Exchange upon request.	No. 2 Soft Red, No. 2 Hard Red Winter, No. 2 Dark Northern Spring, and No. 2 Northern Spring at par. Substitutions at differentials established by the exchange.

<p><b>deliveryMechanism</b></p>	<p>Delivery Location: Sabine Pipe Line Co.'s Henry Hub in Louisiana. Seller is responsible for the movement of gas through the Hub; the buyer, from the Hub. The Hub fee will be paid by seller.</p> <p>Delivery Period: Delivery shall take place no earlier than the first calendar day of the delivery month and shall be completed no later than the last calendar day of the delivery month. All deliveries shall be made at as uniform as possible an hourly or daily rate over the course of the delivery month.</p>	<p>On-Peak Hours: The sixteen (16) hours from HE (Hour Ending) 0700 to HE 2200 Central Time each Peak Day.</p> <p>Peak Day: Mondays through Fridays inclusive except those days designated by the NERC as holidays.</p> <p>Par Delivery Region: That portion of the Eastern Interconnection within the control area operated by North States Power Company ("NSP") known among the trade as "TC GEN".</p> <p>The Seller shall agree to pay all costs of delivering Contract Quality Electricity to the Par Delivery Region. The Buyer shall agree to accept Contract Quality Electricity within the Par Delivery Region and is responsible for arranging for and paying all costs for transmission from the Par Delivery Region to the ultimate delivery point.</p> <p>All physical deliveries and receipts of Contract Quality Electricity shall be scheduled and monitored before the fact and after the fact using Mid-Continent Area Power Pool procedures, guidelines, and documentation.</p> <p>For On-Peak Contracts, delivery shall commence with the first On-Peak Hour of the Delivery Month and continue through all subsequent On-Peak Hours of the delivery month at a constant rate of two megawatts per hour.</p> <p>Product Placement Day: The third Business Day preceding the Last Trading Day.</p> <p>Notice Day: The fourth Business Day preceding a First Delivery Day and the day upon which Tender Allocation Notices shall be issued by the Exchange Clearing House (the "Clearing House").</p> <p>First Delivery Day: The first calendar day of the Delivery Month.</p> <p>Last Delivery Day: The last calendar day of the Delivery Month.</p>	<p>Delivery: F.O.B. seller's facility, Cushing, Oklahoma, at any pipeline or storage facility with pipeline access to TEPPCO, Cushing storage, or Equilon Pipeline Co., by in-tank transfer, in-line transfer, book-out, or inter-facility transfer (pumpover).</p> <p>Delivery Period: All deliveries are rateable over the course of the delivery month and must be initiated on or after the first calendar day and completed by the last calendar day of the delivery month.</p>	<p>Contract Delivery Unit: The seller shall deliver 1,550 tons of coal per contract. A loading tolerance of 60 tons or 2%, whichever is greater, over the total number of contracts delivered is permitted.</p> <p>Delivery Location: Delivery shall be made F.O.B. buyer's barge at seller's delivery facility on the Ohio River between Mileposts 306 and 317, or on the Big Sandy River, with all duties, entitlements, taxes, fees and other charges imposed prior to delivery paid by the seller. There will be a discount of \$0.10 per ton below the final settlement price for any delivery to a terminal on the Big Sandy River.</p>	<p>Delivery: Silver delivered against the futures contract must bear a serial number and identifying stamp of a refiner's officially listed brand. Delivery must be made from a warehouse or vault licensed or designated by the Exchange specifically for the storage of silver.</p> <p>Delivery Period: The first delivery day is the first business day of the delivery month; the last delivery day is the last business day of the delivery month.</p>	<p>Last Delivery Day: Last business day of the delivery month For contracts with delivery in March 2000 and subsequent months: Seventh business day following the last trading day of the delivery month.</p>
---------------------------------	---	---	--	---	---	---

<b>alternateDeliveryProcedure</b>	An alternate delivery procedure is available to buyers and sellers who have been matched by the Exchange subsequent to the termination of trading in the spot month contract. If buyer and seller agree to consummate delivery under terms different from those prescribed in the contract specifications, they may proceed on that basis after submitting a notice of their intention to the Exchange.	A Buyer and Seller matched by a Tender Allocation Notice may jointly file a request for an Alternate Delivery Procedure which shall allow them to arrange delivery and receipt of electricity that deviates from the contract terms with the restrictions that: : :	An alternate delivery procedure is available to buyers and sellers who have been matched by the Exchange subsequent to the termination of trading in the spot month contract. If buyer and seller agree to consummate delivery under terms different from those prescribed in the contract specifications, they may proceed on that basis after submitting a notice of their intention to the Exchange.			
<b>exchangeForPhysicalsOrSwaps</b>	The commercial buyer or seller may exchange a futures position for a physical position or a swaps position of equal quantity by submitting a notice to the Exchange. EFPs and EFSs may be used to either initiate or liquidate a futures position.	An Exchange of Futures for Physicals shall be allowed in accordance with existing Exchange Rules and Procedures.	The commercial buyer or seller may exchange a futures position for a physical position of equal quantity by submitting a notice to the Exchange. EFPs may be used to either initiate or liquidate a futures position.	The buyer or seller may exchange a futures position for a physical position of equal quantity/quality by submitting a notice to the Exchange. EFPs may be used either to initiate or liquidate a futures position. The EFP deadline is 10:00 A.M. (New York time) on the first business day following termination of trading.	The buyer or seller may exchange a futures position for a physical position of equal quantity by submitting a notice to the Exchange. EFPs may be used to either initiate or liquidate a futures position.	
<b>inspection</b>			Inspection shall be conducted in accordance with pipeline practices. A buyer or seller may appoint an inspector to inspect the quality of oil delivered. However, the buyer or seller who requests the inspection will bear its costs and will notify the other party of the transaction that the inspection will occur.			
<b>firmness</b>		Firm				
<b>paymentDate</b>		[A Buyer who receives a Tender Allocation Notice shall present such Notice with full payment for the terminal value of the contract which shall be the closing price on the Last Trading Day multiplied by the Delivery Unit prior to 11:00 am Central Time on the first business day following Notice Day. Payment shall be by wire transfer of funds. Funds received shall be deposited by the Clearing House into an interest-bearing account.]				

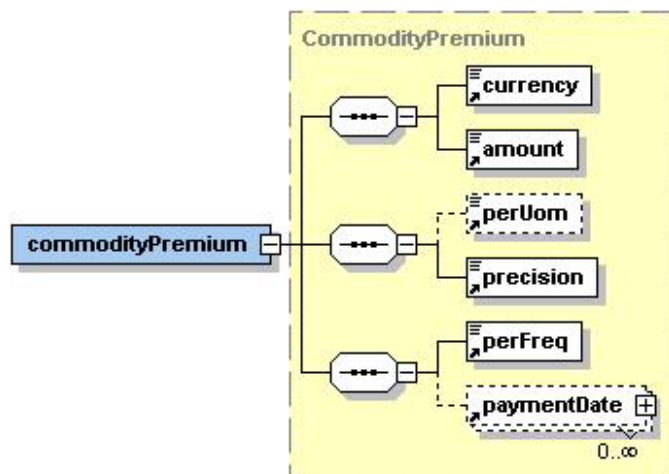


## FpML\_CommodityPremium

### Description:

An entity for....

### Figure:



### Contents:

**inherited element(s)** (this entity inherits the element(s) defined by exactly one occurrence of the entity **FpML\_CommodityFixedAmount**)

- An entity for defining a currency amount per uom.

**perFreq** (exactly one occurrence; of type *string*, an enumerated domain value defined by *frequencyScheme*)

- The frequency with which recurring premium payments are made. For a single premium the frequency should be term.

**paymentDate** (zero or more occurrences; contains the sub-element(s) defined by exactly one occurrence of the entity **FpML\_AdjustableDate**)

- The premium payment date(s). This date is subject to adjustment in accordance with any applicable business day convention.

*(paymentDate is a reused "shared" component. The shared component is currently defined as an adjustable date, but should probably be redefined as an adjustable or relative date.)*

### Used by:

commodityPremium

### XSD Fragment:

### Simple Premium Example:

\$0.0496/gallon to be paid five business days after the trade date:

```
<commodityPremium>
  <currency>USD</currency>
  <amount> 0.0496</amount>
  <perUom>U.S. Gallon(s)</perUom>
  <precision>4</precision>
  <perFreq>T</perFreq>
  <paymentDate>← change paymentDate from FpML_AdjustableDate to FpML_AdjustableOrRelativeDate
    <relativeDate>
      <periodMultiplier>5</periodMultiplier>
      <period>D</period>
      <dayType>Business</dayType>
      <businessDayConvention>NONE</businessDayConvention>
      <businessCenters>
        <businessCenter>...</businessCenter>
      </businessCenters>
      <dateRelativeTo>TradeDate</dateRelativeTo> ← either replace with <dateReference
href="#TradeDate"/> or add TradeDate to the dateRelativeToScheme
    </relativeDate>
  </paymentDate>
</commodityPremium>
```

**Monthly Recurring Premium Example:**

\$3.75/kW/month to be paid on a monthly basis no later than 10 calendar days prior to each month in the delivery period:

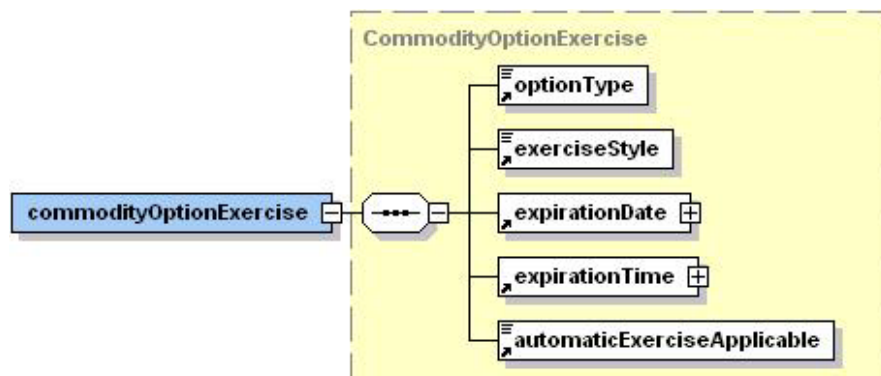
```
<commodityPremium>
  <currency>USD</currency>
  <amount>3.75</amount>
  <perUom>kW</perUom>
  <precision>2</precision>
  <perFreq>M</perFreq>
  <paymentDate>← change paymentDate from FpML_AdjustableDate to FpML_AdjustableOrRelativeDate
    <relativeDate>
      <periodMultiplier>-10</periodMultiplier>
      <period>D</period>
      <dayType>Calendar</dayType>
      <businessDayConvention>NONE</businessDayConvention>
      <businessCenters>
        <businessCenter>...</businessCenter>
      </businessCenters>
      <dateRelativeTo></dateRelativeTo> ← not sure how to specify relative to a recurring date
    </relativeDate>
  </paymentDate>
</commodityPremium>
```

## FpML\_CommodityOptionExercise

### Description:

An entity for....

### Figure:



### Contents:

**optionType** (exactly one occurrence; of type *string*, an enumerated domain value defined by *optionTypeScheme*)

- The type of option transaction.

(*optionType* is reused from equity derivative components; it is not a "shared" component)

**exerciseStyle** (exactly one occurrence; of type *string*, an enumerated domain value defined by *exerciseStyleScheme*)

- The manner in which the option can be exercised.

(*exerciseStyle* is reused from f/x derivative components; it is not a "shared" component)

**expirationDate** (exactly one occurrence; contains the sub-element(s) defined by exactly one occurrence of the entity *FpML\_AdjustableOrRelativeDate*)

- The last day within an exercise period for an American style option. For a European style option it is the only day within the exercise period.

**expirationTime** (exactly one occurrence; contains the sub-element(s) defined by exactly one occurrence of the entity *FpML\_BusinessCenterTime*)

- The latest time for expiration on *expirationDate*.

(*businessCenter* in *expirationTime* is not an adequate substitution for *timeZone*; need *FpML\_BusinessCenterTime* modified for choice of *businessCenter* OR *timeZone*.)

**automaticExerciseApplicable** (exactly one occurrence; of type *boolean*)

- If true then each option not previously exercised will be deemed to be exercised at the expiration time on the expiration date without service of notice unless the buyer notifies the seller that it no longer wishes this to occur.

*(automaticExerciseApplicable is reused from equity derivative components; it is not a "shared" component)*

**Used by:**

commodityOptionExercise

**XSD Fragment:**

**Examples:**

The examples below which illustrate potentially complex date specifications are taken from standard NYMEX, CBOT, LIFFE and COMEX exchange contracts. The examples below also illustrate changes to the FpML specification that have not been formally proposed in this document, including:

- Adding a section for "otherDates" to the FpML "trade" element.
- Allowing relative dates to move forward or backward by particular days of the week (e.g., the Friday preceding or the Saturday following).
- Allowing relative dates to be relative to a date *reference*.
- Allowing adjustable dates to adjust a date *reference*.
- Adding an id attribute to the "adjustableDate" element.
- Replacing "businessCenter" on "expirationTime" with "timeZone."

Although the examples below are functionally equivalent to their corresponding exercise language, additional consideration should be made to how an application might convert the examples back into readable contract language. (In the case of NYMEX WTI, an application is likely to convert the relative date specification "+24 calendar days" into "the 24<sup>th</sup> calendar day following..." whereas the preferred language would be "the 25<sup>th</sup> calendar day of....")

**NYMEX NG Option Example:**

The exercise language on the NYMEX NG option contract is:

Exercise of Options: ...not later than 5:30 P.M. or 45 minutes after the underlying futures settlement price is posted, whichever is later, on any day up to and including the options expiration.

Last Trading Day (Options): Trading terminates at the close of business on the business day immediately preceding the expiration of the underlying futures contract.

Last Trading Day (Futures): Trading terminates three business days prior to the first calendar day of the delivery month.

The example below corresponds as follows:

- The exercise time is 17:30:00 EPT.
- The exercise style is American so that the option can be exercised “any day up to and including” the options expiration date.
- The options expiration date (i.e., last options trading day) is defined relative to the underlying futures expiration date (i.e., last futures trading day): one business day preceding the “LastFutTradingDay.”
- The “LastFutTradingDay” is defined relative to the start of the delivery month: three business days preceding the “DelPeriodStartDate.”
- “DelPeriodStartDate” is the id assigned to the start date of the commodityDeliveryPeriod in the underlying commodityForward, assuming the start date remains unadjusted.

```
<FpML>
<trade>
  <commodityOption>
    <commodityOptionExercise>
      <optionType>Call</optionType>
      <exerciseStyle>American</exerciseStyle>
      <expirationDate>
        <relativeDate id="OptExpDate">
          <periodMultiplier>-1</periodMultiplier>
          <period>D </period>
          <dayType>Business </dayType>
          <businessDayConvention>NONE</businessDayConvention>
          <businessCenters>
            <businessCenter>NYMEX</businessCenter>
          </businessCenters>
          <dateRelativeTo>...</dateRelativeTo> < replace with: <dateReference href="#LastFutTradingDay"/>
        </relativeDate>
      </expirationDate>
      <expirationTime>
        <hourMinuteTime>17:30:00</hourMinuteTime>
        <businessCenter>USNY</businessCenter> < replace with: <timeZone>EPT</timeZone>
      </expirationTime>
    </commodityOptionExercise>
  </commodityOption>
  <commodityForward>
    <commodityDeliveryPeriod>
      <startDate id="DelPeriodStartDate">2003-03-01</startDate>
      <endDate>2003-03-31</endDate>
    </commodityDeliveryPeriod>
  </commodityForward>
  <otherDates>
    <relativeDate id="LastFutTradingDay">
      <periodMultiplier>-3</periodMultiplier>
      <period>D </period>
      <dayType>Business </dayType>
    </relativeDate>
  </otherDates>
</trade>
</FpML>
```

```

        <businessDayConvention>NONE</businessDayConvention>
        <businessCenters>
            <businessCenter>NYMEX</businessCenter>
        </businessCenters>
        <dateRelativeTo>...</dateRelativeTo> < ← replace with: <dateReference href="#DelPeriodStartDate"/>
    </relativeDate>
    </otherDates>
    :
</trade>
:
</FpML>

```

### **CBOT Wheat Option Example:**

The exercise language on the CBOT wheat option contract is:

Exercise: The buyer of a futures option may exercise the option on any business day prior to expiration...by 6:00 p.m. Chicago time.

Expiration: Unexercised options expire at 10:00 a.m. Chicago time on the first Saturday following the last day of trading.

Last Trading Day (For serial option contracts): The last Friday which precedes by at least two business days the last business day of the month preceding the option month. (

The example below corresponds as follows:

- The exercise time is 10:00:00 CPT.
- The exercise style is American so that the option can be exercised “any business day prior to” the options expiration date.
- The options expiration date is defined relative to the last options trading day: first Saturday following the “LastOptTradingDay.”
- The “LastOptTradingDay” is tricky: first, define the “last business day of the month preceding the option month,” i.e., one business day preceding the commodityDeliveryPeriod start date (the “DelPeriodStartDate”). Then define the Friday preceding *that* date by at least two business days, i.e., back up one business day, then back up one Friday. Equivalently (as illustrated below), define two business days preceding the commodityDeliveryPeriod start date, then define one Friday preceding that date.
- “DelPeriodStartDate” is the id assigned to the start date of the commodityDeliveryPeriod in the underlying commodityForward, assuming the start date remains unadjusted.

```

<FpML>
  <trade>
    <commodityOption>
      <commodityOptionExercise>

        <optionType>Call</optionType>
        <exerciseStyle>American</exerciseStyle>
        <expirationDate>
          <relativeDate id="OptExpDate">
            <periodMultiplier>1</periodMultiplier>

```

```

    <period>...</period> ← replace with: <period>SAT</period>
    <businessDayConvention>NONE</businessDayConvention>
    <businessCenters>
      <businessCenter>CBOT</businessCenter>
    </businessCenters>
    <dateRelativeTo>...</dateRelativeTo> ← replace with: <dateReference href="#LastOptTradingDay"/>
  </relativeDate>
</expirationDate>
<expirationTime>
  <hourMinuteTime>10:00:00</hourMinuteTime>
  <businessCenter>USCH</businessCenter> ← replace with: <timeZone>CPT</timeZone>
</expirationTime>
:
</commodityOptionExercise>
<commodityForward>
  <commodityDeliveryPeriod>
    <startDate id="DelPeriodStartDate">2003-03-01</startDate>
    <endDate>2003-03-31</endDate>
  </commodityDeliveryPeriod>
  :
</commodityForward>
:
</commodityOption>
<otherDates>
  <relativeDate id="LastOptTradingDay">
    <periodMultiplier>-1</periodMultiplier>
    <period>...</period> ← replace with: <period>FRI</period>
    <businessDayConvention>NONE</businessDayConvention>
    <businessCenters>
      <businessCenter>CBOT</businessCenter>
    </businessCenters>
    <dateRelativeTo>...</dateRelativeTo> ← replace with: <dateReference href="#XDate"/>
  </relativeDate>
  <relativeDate id="XDate">
    <periodMultiplier>-2</periodMultiplier>
    <period>D</period>
    <dayType>Business </dayType>
    <businessDayConvention>NONE</businessDayConvention>
    <businessCenters>
      <businessCenter>CBOT</businessCenter>
    </businessCenters>
    <dateRelativeTo>...</dateRelativeTo> ← replace with: <dateReference href="#DelPeriodStartDate"/>
  </relativeDate>
</otherDates>
:
</trade>
:
</FpML>

```

**LIFFE Robusta Coffee Option Example:**

The exercise language on the LIFFE Robusta coffee option contract is:

Expiry: 12:30 on the third Wednesday of the calendar month preceding the expiry month.

Exercise Day: Exercise by 17:00 on any business day prior to the expiry day.

The example below corresponds as follows:

- The exercise time is 12:30:00 GMT(?).
- The exercise style is American so that the option can be exercised “any day prior to” the options expiration date.
- The options expiration date (i.e., expiry day) is defined relative to the underlying futures delivery period (i.e., expiry month): the third Wednesday of the calendar month preceding the “DelPeriodStartDate.” First, define one month preceding “DelPeriodStartDate,” then define one calendar day preceding *that* date, then move forward three Wednesdays (moving backward one business day is necessary in case the first day of the month counts as one of the three Wednesdays).
- “DelPeriodStartDate” is the id assigned to the start date of the commodityDeliveryPeriod in the underlying commodityForward, assuming the start date remains unadjusted.

```
<FpML>
  <trade>
    <commodityOption>
      <commodityOptionExercise>

        <optionType>Call</optionType>
        <exerciseStyle>American</exerciseStyle>
        <expirationDate>
          <relativeDate id="OptExpDate">
            <periodMultiplier>3</periodMultiplier>
            <period>...</period> ← replace with: <period>WED</period>
            <businessDayConvention>NONE</businessDayConvention>
            <businessCenters>
              <businessCenter>LIFFE</businessCenter>
            </businessCenters>
            <dateRelativeTo>...</dateRelativeTo> ← replace with: <dateReference href="#XDate"/>
          </relativeDate>
        </expirationDate>
        <expirationTime>
          <hourMinuteTime>10:00:00</hourMinuteTime>
          <businessCenter>GBLO</businessCenter> ← replace with: <timeZone>GMT</timeZone>
        </expirationTime>
      :
    </commodityOptionExercise>
  </commodityForward>
  <commodityDeliveryPeriod>
    <startDate id="DelPeriodStartDate">2003-03-01</startDate>
    <endDate>2003-03-31</endDate>
  </commodityDeliveryPeriod>
  :
</commodityForward>
:
</commodityOption>
<otherDates>
  <relativeDate id="Xdate">
    <periodMultiplier>-1</periodMultiplier>
```

```

    <period>D</period>
    <dayType>Calendar</dayType>
    <businessDayConvention>NONE</businessDayConvention>
    <businessCenters>
      <businessCenter>LIFFE</businessCenter>
    </businessCenters>
    <dateRelativeTo>...</dateRelativeTo> <← replace with: <dateReference href="#YDate"/>
  </relativeDate>
  <relativeDate id="YDate">
    <periodMultiplier>-1</periodMultiplier>
    <period>M</period>
    <dayType>Business </dayType>
    <businessDayConvention>NONE</businessDayConvention>
    <businessCenters>
      <businessCenter>LIFFE</businessCenter>
    </businessCenters>
    <dateRelativeTo>...</dateRelativeTo> <← replace with: <dateReference href="#DelPeriodStartDate"/>
  </relativeDate>
</otherDates>
:
</trade>
:
</FpML>

```

#### ***NYMEX WTI Option Example:***

The exercise language on the NYMEX WTI option contract is:

Exercise of Options: ...not later than 5:30 P.M. or 45 minutes after the underlying futures settlement price is posted, whichever is later, on any day up to and including the option's expiration.

Last Trading Day (Options): Trading ends three business days before the underlying futures contract.

Last Trading Day (Futures): Trading terminates at the close of business on the third business day prior to the 25th calendar day of the month preceding the delivery month. If the 25th calendar day of the month is a non-business day, trading shall cease on the third business day prior to the last business day preceding the 25th calendar day.

The example below corresponds as follows:

- The exercise time is 5:30:00 EPT.
- The exercise style is American so that the option can be exercised “on any day up to and including” the options expiration date.
- The options expiration date (i.e., last options trading day) is defined relative to the underlying futures expiration date (i.e., last futures trading day): three business days preceding the *adjusted* (see last bullet point) “LastFutTradingDay.”
- The “LastFutTradingDay” is defined relative to the start of the delivery month: 25<sup>th</sup> calendar day of the month preceding the “DelPeriodStartDate.” First, define one month preceding “DelPeriodStartDate,” then move forward 25 calendar days.

- “DelPeriodStartDate” is the id assigned to the start date of the commodityDeliveryPeriod in the underlying commodityForward, assuming the start date remains unadjusted.
- The tricky part is that if the 25<sup>th</sup> calendar day is a non-business day, then the options expiration date is the third business day preceding the business day preceding the 25<sup>th</sup> calendar day.

<FpML>

<trade>

<commodityOption>

<commodityOptionExercise>

<optionType>Call</optionType>

<exerciseStyle>American</exerciseStyle>

<expirationDate>

<relativeDate id="OptExpDate">

<periodMultiplier>-3</periodMultiplier>

<period>D</period>

<dayType>Business</dayType>

<businessDayConvention>NONE</businessDayConvention>

<businessCenters>

<businessCenter>NYMEX</businessCenter>

</businessCenters>

<dateRelativeTo>...</dateRelativeTo> ← replace with: <dateReference href="#XDate"/>

</relativeDate>

</expirationDate>

<expirationTime>

<hourMinuteTime>10:00:00</hourMinuteTime>

<businessCenter>USNY</businessCenter> ← replace with: <timeZone>EPT</timeZone>

</expirationTime>

:

</commodityOptionExercise>

<commodityForward>

<commodityDeliveryPeriod>

<startDate id="DelPeriodStartDate">2003-03-01</startDate>

<endDate>2003-03-31</endDate>

</commodityDeliveryPeriod>

:

</commodityForward>

:

</commodityOption>

<otherDates>

<adjustableDate> ← replace with: <adjustableDate id="XDate"/>

<unadjustedDate>...</unadjustedDate> ← replace with: <dateReference href="#LastFutTradingDay"/>

<dateAdjustments>

<businessDayConvention>PRECEDING</businessDayConvention>

<businessCenters>

<businessCenter>NYMEX</businessCenter>

</businessCenters>

</dateAdjustments>

</adjustableDate>

<relativeDate id="LastFutTradingDay">

<periodMultiplier>24</periodMultiplier>

<period>D</period>

<dayType>Calendar</dayType>

<businessDayConvention>NONE</businessDayConvention>

```

    <businessCenters>
      <businessCenter>NYMEX</businessCenter>
    </businessCenters>
    <dateRelativeTo>...</dateRelativeTo> < ← replace with: <dateReference href="#YDate"/>
  </relativeDate>
  <relativeDate id="YDate">
    <periodMultiplier>-1</periodMultiplier>
    <period>M</period>
    <businessDayConvention>NONE</businessDayConvention>
    <businessCenters>
      <businessCenter>NYMEX</businessCenter>
    </businessCenters>
    <dateRelativeTo>...</dateRelativeTo> < ← replace with: <dateReference href="#DelPeriodStartDate"/>
  </relativeDate>
</otherDates>
:
</trade>
</FpML>

```

### **COMEX Silver Option Example:**

The exercise language on the COMEX silver option contract is:

Exercise of Options: Until one hour after the contract market closes, New York time, on any business day for which the option is listed for trading. On expiration day, the buyer has until 4:00 P.M., New York time, to exercise an option.

Last Trading Day (Options): Beginning with the December 2002 contract, options will expire on the fourth to last business day of the month preceding the contract month. If the expiration day falls on a Friday, or is immediately prior to an Exchange holiday, expiration will occur on the prior business day.]

If not for the last bullet point below, an example would follow:

- The exercise time is 16:00:00 EPT.
- The exercise style is American so that the option can be exercised “on any business day for which the option is listed for trading.”
- The expiration day (i.e., last options trading day) is defined relative to the underlying futures expiration date: four business days preceding the “DelPeriodStartDate,” *unless* that day is a Friday or is immediately prior to an Exchange holiday.
- The tricky part is figuring out how to adjust the expiration day so that it is immediately followed by a business day.

## 4 ELEMENT DEFINITIONS

The following elements are added to the specification.

Element/Description	Used By
<b>commodityForward</b> ; entity type: FpML_CommodityForward  A commodity forward product definition.	FpML_ProductSelection FpML_CommoditySwap FpML_CommodityOption FpML_CommodityCompoundOption FpML_SpreadOption
<b>commoditySwap</b> ; entity type: FpML_CommoditySwap  A product definition for a stream of commodity forwards.	FpML_ProductSelection FpML_CommoditySwaption
<b>commodityOption</b> ; entity type: FpML_CommodityOption  A product definition for an option on a commodity forward.	FpML_ProductSelection FpML_CommodityCapFloor FpML_CommodityCompoundOption
<b>commodityCapFloor</b> ; entity type: FpML_CommodityCapFloor  A product definition for a stream of commodity options.	FpML_ProductSelection
<b>commoditySwaption</b> ; entity type: FpML_CommoditySwaption  A product definition for an option on a commodity swap.	FpML_ProductSelection
<b>commodityCompoundOption</b> ; entity type: FpML_CommodityCompoundOption  A product definition for nested commodity options.	FpML_ProductSelection FpML_CommodityCompoundOption

<b>commoditySpreadOption</b> ; entity type: FpML_CommoditySpreadOption  A product definition for an option on the spread between commodity forwards.	FpML_ProductSelection FpML_CommoditySpreadOption
<b>commodityBuyerPrice</b> ; entity type: FpML_CommodityBuyerPrice  (insert element definition).	FpML_CommodityForward
<b>formulaPrice</b> ; entity type: FpML_CommodityFormulaPrice  (insert element definition).	FpML_CommodityBuyerPrice
<b>priceTier</b> ; entity type: FpML_CommodityPriceTier  (insert element definition).	FpML_CommodityBuyerPrice
<b>indexPrice</b> ; entity type: FpML_CommodityIndexPrice  (insert element definition).	FpML_CommodityFormulaPrice FpML_CommodityCashSettlement
<b>fixedPrice</b> ; entity type: FpML_CommodityFixedAmount  (insert element definition).	FpML_CommodityFormulaPrice
<b>commodityUnits</b> ; entity type: FpML_CommodityUnits  (insert element definition).	FpML_CommodityForward
<b>commodityDeliveryPeriod</b> ; entity type: FpML_CommodityDeliveryPeriod  (insert element definition).	FpML_CommodityForward

<b>commodityCashSettlement</b> ; entity type: FpML_CommodityCashSettlement  (insert element definition).	FpML_CommodityForward
<b>commodityPhysicalSettlement</b> ; entity type: FpML_CommodityPhysicalSettlement  (insert element definition).	FpML_CommodityForward
<b>commodityPremium</b> ; entity type: FpML_CommodityPremium  (insert element definition).	FpML_CommoditySwap FpML_CommodityOption FpML_CommodityCapFloor FpML_CommoditySwaption FpML_CommodityCompoundOption
<b>commodityOptionExercise</b> ; entity type: FpML_CommodityOptionExercise  (insert element definition).	FpML_CommodityOption FpML_CommoditySwaption FpML_CommodityCompoundOption

## 5 SCHEME DEFINITIONS

The following coding schemes are added to the specification, with corresponding default scheme attributes added to the FpML root component:

- commodityScheme
- daysOfWeekScheme
- deliveryPointScheme
- firmnessScheme
- frequencyScheme
- indexScheme
- indexOpScheme
- timeZoneScheme
- uomScheme

The following existing coding schemes are amended for additional values:

- businessCenterScheme
- exerciseStyleScheme
- periodScheme

### **businessCenterScheme (amended)**

#### **Definition:**

A financial business center location.

#### **URI:**

<http://www.fpml.org/spec/2000/business-center-1-0>

#### **Description:**

In general, the codes are based on the ISO country code and the English name of the location.

Additional location codes can be built according to the following rules. The first two characters represent the ISO country code, the next two characters represent a) if the location name is one word, the first two letters of the location b) if the location name consists of at least two words, the first letter of the first word followed by the first letter of the second word .

There are exceptions to this rule. For example, the TARGET (Trans-European Automated Real-time Gross settlement Express Transfer system) business center for Euro settlement has a code of EUTA.

This coding scheme is currently consistent with the S.W.I.F.T. Financial Centre scheme used in the MT340/MT360/MT361 message definitions, although FpML controls the Business Center Scheme and it should not be assumed that both schemes will remain synchronized.

**Coding Scheme**

<b>CODE</b>	<b>SOURCE</b>	<b>DESCRIPTION</b>
ARBA	FpML	Buenos Aires
ATVI	FpML	Vienna
AUME	FpML	Melbourne
AUSY	FpML	Sydney
BEBR	FpML	Brussels
BRSP	FpML	Sao Paulo
CAMO	FpML	Montreal
CATO	FpML	Toronto
CHGE	FpML	Geneva
CHZU	FpML	Zurich
CLSA	FpML	Santiago
CNBE	FpML	Beijing
CZPR	FpML	Prague
DEFR	FpML	Frankfurt
DKCO	FpML	Copenhagen
EETA	FpML	Tallinn
ESMA	FpML	Madrid
EUTA	FpML	TARGET (euro 'Business Center')
FIHE	FpML	Helsinki
FRPA	FpML	Paris
GBLO	FpML	London
GRAT	FpML	Athens
HKHK	FpML	Hong Kong
IDJA	FpML	Jakarta
ILTA	FpML	Tel Aviv
ITMI	FpML	Milan
ITRO	FpML	Rome
JPTO	FpML	Tokyo
KRSE	FpML	Seoul
LBBE	FpML	Beirut
LULU	FpML	Luxembourg
MXMC	FpML	Mexico City
MYKL	FpML	Kuala Lumpur
NLAM	FpML	Amsterdam
NOOS	FpML	Oslo
NZAU	FpML	Auckland
NZWE	FpML	Wellington
PAPC	FpML	Panama City
PHMA	FpML	Manila
PLWA	FpML	Warsaw
RUMO	FpML	Moscow
SARI	FpML	Riyadh
SEST	FpML	Stockholm
SGSI	FpML	Warsaw
SKBR	FpML	Bratislava
THBA	FpML	Bangkok

TRAN	FpML	Ankara
TWTA	FpML	Taipei
USCH	FpML	Chicago
USLA	FpML	Los Angeles
USNY	FpML	New York
ZAJO	FpML	Johannesburg
NERC (added)		North American Electric Reliability Council Holidays <a href="http://www.nerc.com/~oc/offpeaks.html">http://www.nerc.com/~oc/offpeaks.html</a>
NYMEX		New York Mercantile Exchange Holiday Schedule <a href="http://www.nymex.com/jsp/resources/holida_schedu.jsp">http://www.nymex.com/jsp/resources/holida_schedu.jsp</a>
CBOT		Chicago Board of Trade Holiday Trading Schedule <a href="http://www.cbot.com/cbot/www/cont_detail/0,1493,10+24+268+9889,00.html">http://www.cbot.com/cbot/www/cont_detail/0,1493,10+24+268+9889,00.html</a>
LIFFE		London International Financial Futures and Options Exchange Market Holidays <a href="http://www.liffe.com/trade/holidays.htm">http://www.liffe.com/trade/holidays.htm</a>
Platts		Platts Holiday Schedule <a href="http://www.platts.com/schedule/holsked2003.shtml">http://www.platts.com/schedule/holsked2003.shtml</a>
(others)		

## commodityScheme

### Definition:

A commodity being traded.

### URI:

<http://www.fpml.org/spec/2002/commodity-scheme-4-0>  
(or, <http://markets.Reuters.com/rfts/int/spec/2002/commodity-scheme-1-0>)

### Coding Scheme

CATEGORY	CODE	SOURCE	DESCRIPTION
Natural Gas	NG		Natural Gas
Power	PWR		Power
Coal	COAL		Coal
Crude Oil	CRUDE <the NYMEX symbol is CL for WTI Crude and SC for Brent Crude>		Crude Oil
Refined Products	ALKYLATE		Alkylate
Refined Products	E4		E4
Refined Products	NO2 <the NYMEX symbol for Heating Oil is HO>		Gasoil/Heating Oil (No. 2 Oil)
Refined Products	JETKERO		Jet/Kerosene (No. 1 Oil)
Refined Products	LSWR		Low Sulfur Waxy Residue-- Mixed/Cracked

Refined Products	M40		M40
Refined Products	MGO		Marine Gasoil
Refined Products	MDO		Marine Diesel Oil
Refined Products	MOGAS <the NYMEX symbol for Unleaded Gasoline is HU >		Motor Gasoline
Refined Products	MTBE		Methyl Tertiary Butyl Ether
Refined Products	NAPH		Naphtha
Refined Products	NO6		Resid Fuel Oil (No. 6 Oil)
Refined Products	RBOB		Reformulated Blendstock for Oxygenated Blending
Refined Products	VGO		Vacuum Gas Oil
Gas Liquids			Ethane
Gas Liquids			Ethane/Propane Mix
Gas Liquids	PN	NYMEX	Propane
Gas Liquids			Butane
Gas Liquids			Isobutane
Gas Liquids			Natural Gasoline
Metals	AL	Periodic Table	Aluminum
Metals	SB	Periodic Table	Antimony
Metals	BE	Periodic Table	Beryllium
Metals	BI	Periodic Table	Bismuth
Metals	CD	Periodic Table	Cadmium
Metals	CR	Periodic Table	Chromium
Metals	CO	Periodic Table	Cobalt
Metals	CU	Periodic Table	Copper
Metals	AU <the COMEX code for gold is GC>	Periodic Table	Gold
Metals	IN	Periodic Table	Indium
Metals	IR	Periodic Table	Iridium
Metals	PB	Periodic Table	Lead
Metals	LI	Periodic Table	Lithium
Metals	MG	Periodic Table	Magnesium
Metals	MN	Periodic Table	Manganese
Metals	HG <HG is the COMEX symbol for copper>	Periodic Table	Mercury
Metals	MO	Periodic Table	Molybdenum
Metals	NI	Periodic Table	Nickel
Metals	OS	Periodic Table	Osmium
Metals	PD	Periodic Table	Palladium
Metals	PT <the NYMEX symbol for platinum is PL>	Periodic Table	Platinum
Metals	PA <PA is the NYMEX symbol for palladium>	Periodic Table	Protactinium
Metals	RE	Periodic Table	Rhenium

Metals	RH	Periodic Table	Rhodium
Metals	RU	Periodic Table	Ruthenium
Metals	SE	Periodic Table	Selenium
Metals	SI <SI is the COMEX symbol for silver>	Periodic Table	Silicon
Metals	AG	Periodic Table	Silver
Metals	TA	Periodic Table	Tantalum
Metals	SN	Periodic Table	Tin
Metals	TI	Periodic Table	Titanium
Metals	W	Periodic Table	Tungsten
Metals	V	Periodic Table	Vanadium
Metals	ZN	Periodic Table	Zinc
Metals			Ferrochrome
Metals			Ferromanganese
Metals			Ferromolybdenum
Metals			Ferrosilicon
Metals			Ferrovandium
Metals			Silicomanganese
Agriculture			Coffee
Agriculture			Wheat
(others)			

## daysOfWeekScheme

### Definition:

A mask specifying the specific days of week on which a commodity will be delivered.

### URI:

<http://www.fpml.org/spec/2002/days-of-week-scheme-4-0>  
(or, <http://markets.Reuters.com/rfts/int/spec/2002/days-of-week-scheme-1-0>)

### Description:

Requires a corresponding business center or holiday calendar specification to define which days are business days and holidays.

### Coding Scheme

CODE	SOURCE	DESCRIPTION
SMTWTFSH		Weekends, weekdays and holidays
-MTWTF--		Weekdays only
-MTWTF-H		Weekdays and holidays
S-----SH		Weekends and holidays
(etc.)		

## deliveryPointScheme

**Definition:**

**URI:**

<http://www.fpml.org/spec/2002/delivery-point-scheme-4-0>  
(or, <http://markets.Reuters.com/rtfs/int/spec/2002/delivery-point-scheme-1-0>)

**Description:**

**Coding Scheme**

CODE	SOURCE	DESCRIPTION
(TBD)		

**exerciseStyleScheme (amended)**

**Definition:**

The specification of how an ~~FX-OTC~~ option will be exercised.

**URI:**

<http://www.fpml.org/spec/2002/exercise-style-scheme-3-0>

**Coding Scheme**

CODE	SOURCE	DESCRIPTION
American	FpML	Option can be exercised on any date up to the expiry date.
European	FpML	Option can only be exercised on the expiry date.
Asian (added)	FpML	

**firmnessScheme**

**Definition:**

**URI:**

<http://www.fpml.org/spec/2002/firmness-scheme-4-0>  
(or, <http://markets.Reuters.com/rtfs/int/spec/2002/firmness-scheme-1-0>)

**Description:**

**Coding Scheme**

CODE	SOURCE	DESCRIPTION
F		Firm
I		Interruptible
Firm(LD)		
(others)		

**frequencyScheme****Definition:**

Same as periodScheme.

[Need to reconsider whether introducing a synonym for period is necessary rather than just using period. See the relative expiration date example within the FpML\_CommodityOptionExercise entity definition in section 3 for an example of period.]

**URI:**

<http://www.fpml.org/spec/2000/period-1-0>

**Root Element Example:**

<FpML ... frequencySchemeDefault = “<http://www.fpml.org/spec/2000/period-1-0>” ...>

**indexScheme****Definition:****URI:**

<http://www.fpml.org/spec/2002/index-scheme-4-0>  
(or, <http://markets.Reuters.com/rdfs/int/spec/2002/index-scheme-1-0>)

**Description:****Coding Scheme**

The following table is a representative sampling to help establish a naming convention.

CATEGORY	CODE	SOURCE	DESCRIPTION

Natural Gas	NYMEX.NG.JAN03.HIGH [Daily] NYMEX.NG.JAN03.LOW [Daily] NYMEX.NG.JAN03.OPEN [Daily] NYMEX.NG.JAN03.CLOSE [Daily]		NYMEX Henry Hub Natural Gas Futures Contract / January 2003
Natural Gas	NYMEX.NG.NEAR.HIGH [Daily] NYMEX.NG.NEAR.LOW [Daily] NYMEX.NG.NEAR.OPEN [Daily] NYMEX.NG.NEAR.CLOSE [Daily]		NYMEX Henry Hub Natural Gas Futures Contract / Near Month
Natural Gas	NYMEX.NG.NEAR+1.HIGH [Daily] NYMEX.NG.NEAR+1.LOW [Daily] NYMEX.NG.NEAR+1.OPEN [Daily] NYMEX.NG.NEAR+1.CLOSE [Daily]		NYMEX Henry Hub Natural Gas Futures Contract / Near Month + 1
Natural Gas	IF.ANR.LA.HIGH [Monthly] IF.ANR.LA.LOW [Monthly] IF.ANR.LA.INDEX [Monthly]		Inside F.E.R.C.'s Gas Market Report / Prices of Spot Gas Delivered to Pipelines / ANR Pipeline Co. / Louisiana / {Range (High), Range (Low), Index}
Natural Gas	NGI.LA.ANRSE.HIGH [Weekly] NGI.LA.ANRSE.LOW [Weekly] NGI.LA.ANRSE.AVG [Weekly]		Natural Gas Intelligence / Weekly Gas Price Index / Spot Gas Prices / Louisiana / ANR SE / {Range (High), Range (Low), Avg.}
Natural Gas	NGW.ANR.LA.THISWEEK [Weekly]		Natural Gas Week / Spot Prices on Interstate Pipeline Systems—Part 1 / ANR Pipeline Co. / Southeast: Patterson, La. / This Week
Natural Gas	GD.ANR.LA.MIDPOINT [Daily] GD.ANR.LA.ABSHIGH [Daily] GD.ANR.LA.ABSLOW [Daily] GD.ANR.LA.COMMONH [Daily] GD.ANR.LA.COMMONL [Daily]		Gas Daily / Daily Price Survey / Louisiana- Onshore South / ANR / {Midpoint, Absolute (High), Absolute (Low), Common (High), Common (Low)}
Power	MD.16HR.ERCOTB.WAI [Daily] MD.16HR.ERCOTB.LOW [Daily] MD.16HR.ERCOTB.HIGH [Daily]		Megawatt Daily's MarketReport / Trades for Standard 16-Hour Daily Products / Central / ERCOT-B / {Weighted Average Index, Absolute Low, Absolute High}
Power	MD.OFFPK.COMED.WAI [Daily]		Megawatt Daily's

	MD.OFFPK.COMED.LOW [Daily] MD.OFFPK.COMED.HIGH [Daily]		MarketReport / Ranges and Indexes of Trades for Standard Off-Peak Products / Central / Com Ed, into / {Weighted Average Index, Absolute Low, Absolute High}
Refined Products	P.AR.GASOLINE84.HIGH [Daily] P.AR.GASOLINE84.LOW [Daily] P.AR.GASOLINE84.MID [Daily]		PLATT's Oilgram Price Report / Product Price Assessments / Latin America, FOB / Argentina / Gasoline 84
Refined Products	P.SG.MOGAS.92UNL.HIGH [Daily] P.SG.MOGAS.92UNL.LOW [Daily] P.SG.MOGAS.92UNL.MID [Daily]		PLATT's Oilgram Price Report / Product Price Assessments / Singapore/Japan Cargoes / Mogas 92 Unl / Singapore
Refined Products	P.EUR.EN590.MEDFOB.HIGH [Daily] P.EUR.EN590.MEDFOB.LOW [Daily] P.EUR.EN590.MEDFOB.MID [Daily]		PLATT's Oilgram Price Report / Product Price Assessments / European Bulk / Gasoil EN590 / Cargoes FOB Med Basis Italy
Refined Products	P.USNY.NO6S03HP.BARGE.HIGH [Daily] P.USNY.NO6S03HP.BARGE.LOW [Daily] P.USNY.NO6S03HP.BARGE.MID [Daily]		PLATT's Oilgram Price Report / Product Price Assessments / NewYork/Boston / No. 6 0.3%S HiPr / Barge
Refined Products	P.USBOS.NO6S22MAX.CARGO.HIGH [Daily] P.USBOS.NO6S22MAX.CARGO.LOW [Daily] P.USBOS.NO6S22MAX.CARGO.MID [Daily]		PLATT's Oilgram Price Report / Product Price Assessments / NewYork/Boston / No. 6 2.2%S Max (Bstn) / Cargo
Refined Products	P.USGC.UNL87RFG.WATER.HIGH [Daily] P.USGC.UNL87RFG.WATER.LOW [Daily] P.USGC.UNL87RFG.WATER.MID [Daily]		PLATT's Oilgram Price Report / Product Price Assessments / U.S. Gulf Coast / Unl 87 RFG / Waterborne
(others)			

## indexOpScheme

### Definition:

The specification of whether to add or subtract an index in a formula price.

### URI:

<http://www.fpml.org/spec/2002/index-op-scheme-4-0>  
(or, <http://markets.Reuters.com/rtfs/int/spec/2002/index-op-scheme-1-0>)

### Coding Scheme

CODE	SOURCE	DESCRIPTION
+		Add
-		Subtract

## periodScheme (amended)

### Definition:

The specification of a time period.

### URI:

<http://www.fpml.org/spec/2000/period-1-0>

### Coding Scheme

CODE	SOURCE	DESCRIPTION
D	n/a	Day
M	n/a	Month
T	n/a	Term
W	n/a	Week
Y	n/a	Year
H (added)	n/a	Hour

## timeZoneScheme

### Definition:

A time zone.

### URI:

<http://www.fpml.org/spec/2002/time-zone-scheme-4-0>  
(or, <http://markets.Reuters.com/rtfs/int/spec/2002/time-zone-scheme-1-0>)

(Is there an existing ISO definition for time zones, which also includes “prevailing” time?)

### Coding Scheme

CODE	SOURCE	DESCRIPTION
GMT		Greenwich Mean Time
UTC		Coordinated Universal Time
CDT		Central Daylight Saving Time

CPT		Central Prevailing Time
CST		Central Standard Time
EDT		Eastern Daylight Saving Time
EPT		Eastern Prevailing Time
EST		Eastern Standard Time
MDT		Mountain Daylight Saving Time
MPT		Mountain Prevailing Time
MST		Mountain Standard Time
PDT		Pacific Daylight Saving Time
PPT		Pacific Prevailing Time
PST		Pacific Standard Time
(others)		

## uomScheme

### Definition:

A unit of measure.

### URI:

<http://www.fpml.org/spec/2002/uom-scheme-4-0>  
(or, <http://markets.Reuters.com/rfts/int/spec/2002/uom-scheme-1-0>)

### Coding Scheme

The following table is more comprehensive than necessary, but is helpful for defining unit of measure codes unambiguously.

The codes proposed in the “CODE” column are distinct and case-insensitive, which is not true for their standard unit symbols in the “SYMBOL” column (ft, for example, is the standard unit symbol for both the international foot and the U.S. survey foot; H is the standard unit symbol for henry, while h is the standard unit symbol for hour).

Most of the uom codes could be made to mirror their standard unit symbols, but that option will require using Ansi/Unicode characters and would not be ASCII-compliant. For example: m<sup>2</sup> instead of m2 for cubic meter(s), and MW·h instead of MWh for megawatt hour(s). The following Ansi and/or Unicode characters would be required: degree sign (#176 or 0x00B0) as in °C and °F; superscript numerals two and three (#178 and #179, or 0x00B2 and 0x00B3) as in m<sup>2</sup> and m<sup>3</sup>; subscript numerals (#8320-8329, or 0x2080-0x2089) as in cal<sub>15</sub> and cal<sub>20</sub>; middle dot (#183 or 0x00B7) as in MW·h and ft·lbf/s; ångström sign (#197 or 0x00C5) Å; Greek omega (#937 or 0x03A9) or ohm sign (#8486 or 0x2126) Ω. Not all of the standard unit symbols, however, are representable in Unicode: Unicode does not (currently) define subscript characters as in cal<sub>IT</sub> and cal<sub>th</sub>.

The U.S. National Institute of Standards and Technology lists six definitions for Btu and MMBtu. I’m not sure whether the NYMEX MMBtu measurement corresponds to one of these, or is effectively a seventh definition.

(Reference: NIST Special Publication 811.)

CATEGORY	CODE	SYMBOL	DESCRIPTION	DEFINITION	SOURCE
Acceleration	m/s <sup>2</sup>	m/s <sup>2</sup>	meter(s) per second squared	1 m/s <sup>2</sup> (exactly)	NIST
Angle	deg	°	degree(s)	0.01745309 rad	NIST
Angle	min(angle)	'	minute(s)	0.002908882 rad	NIST
Angle	r	r	revolution(s)	6.283185 rad	NIST
Angle	rad	rad	radian(s)	1 rad (exactly)	NIST
Angle	s(angle)	"	second(s)	0.000004848137 rad	NIST
Area	acre		acre(s) (based on U.S. survey foot)	4046.873 m <sup>2</sup>	NIST
Area	m <sup>2</sup>	m <sup>2</sup>	square meter(s)	1 m <sup>2</sup> (exactly)	NIST
Area	sq ft	ft <sup>2</sup> <not distinct>	square international foot(feet)	0.09290304 m <sup>2</sup> (exactly)	NIST
Area	sq ft(survey)	ft <sup>2</sup> <not distinct>	square U.S. survey foot(feet)		NIST
Area	sq in	in <sup>2</sup>	square inch(es)	0.00064516 m <sup>2</sup> (exactly)	NIST
Area	sq mi	mi <sup>2</sup> <not distinct>	square international mile(s)	2589988 m <sup>2</sup>	NIST
Area	sq mi(survey)	mi <sup>2</sup> <not distinct>	square U.S. statute mile(s)	2589998 m <sup>2</sup>	NIST
Electricity	amp	A <see also ångström, Å >	ampere(s)	1 amp (exactly)	NIST
Electricity	coul	C <see also degree Celcius, °C >	coulomb(s)	1 coul (exactly)	NIST
Electricity	farad	F <see also degree Fahrenheit, °F>	farad(s)	1 farad (exactly)	NIST
Electricity	henry	H <see also hour, h>	henry(s)	1 henry (exactly)	NIST
Electricity	ohm	Ω	ohm(s)	1 ohm (exactly)	NIST
Electricity	siemens	S <see also second, s>	siemens	1 siemens (exactly)	NIST
Electricity	T	T <see also metric ton, t>	telsa(s)	1 T (exactly)	NIST
Electricity	V	V	volt(s)	1 V (exactly)	NIST
Electricity	Wb	Wb	weber(s)	1 Wb (exactly)	NIST
Energy	Btu(39)	Btu <not distinct>	British thermal unit(s) (39 deg F)	1059.67 J	NIST
Energy	Btu(59)	Btu <not distinct>	British thermal unit(s) (59 deg F)	1054.8 J	NIST
Energy	Btu(60)	Btu <not distinct>	British thermal unit(s) (60 deg F)	1054.68 J	NIST
Energy	Btu(IT)	Btu <sub>IT</sub> <no Unicode subscript I or T>	British thermal unit(s) (International Table)	1055.056 J	NIST
Energy	Btu(mean)	Btu <not distinct>	British thermal unit(s) (mean)	1055.87 J	NIST
Energy	Btu(th)	Btu <sub>th</sub> <no Unicode subscript t or h>	British thermal unit(s) (thermochemical)	1054.35 J	NIST

Energy	cal(15)	cal <sub>15</sub>	calorie(s) (15 deg C)	4.1858 J	NIST
Energy	cal(20)	cal <sub>20</sub>	calorie(s) (20 deg C)	4.1819 J	NIST
Energy	cal(IT)	cal <sub>IT</sub> <no Unicode subscript I or T>	calorie(s) (International Table)	4.1868 J (exactly)	NIST
Energy	cal(mean)	cal	calorie(s) (mean)	4.19002 J	NIST
Energy	cal(th)	cal <sub>th</sub> <no Unicode subscript t or h>	calorie(s) (thermochemical)	4.184 J (exactly)	NIST
Energy	ft lbf	ft·lbf	foot pound-force	1.355818 J	NIST
Energy	J	J	joule(s)	1 J (exactly)	NIST
Energy	kcal(IT)	kcal <sub>IT</sub> <no Unicode subscript I or T>	kilogram, or large, calorie(s) (International Table) (nutrition)	4186.8 J (exactly)	NIST
Energy	kcal(mean)	kcal	kilogram, or large, calorie(s) (mean) (nutrition)	4190.02 J	NIST
Energy	kcal(th)	kcal <sub>th</sub> <no Unicode subscript t or h>	kilogram, or large, calorie(s) (thermochemical) (nutrition)	4184 J (exactly)	NIST
Energy	kWh	kW·h	kilowatt hour(s)	3600000 J (exactly)	NIST
Energy	MMBtu(39)		million British thermal unit(s) (39 deg F)	0.00105967 J	Derived
Energy	MMBtu(59)		million British thermal unit(s) (59 deg F)	0.0010548 J	Derived
Energy	MMBtu(60)		million British thermal unit(s) (60 deg F)	0.00105468 J	Derived
Energy	MMBtu(IT)		million British thermal unit(s) (International Table)	0.001055056 J	Derived
Energy	MMBtu(mean)		million British thermal unit(s) (mean)	0.00105587 J	Derived
Energy	MMBtu(th)		million British thermal unit(s) (thermochemical)	0.00105435 J	Derived
Energy	MWh	MW·h	megawatt hour(s)	3600 J (exactly)	Derived
Energy	therm(EC)		therm(s) (EC)	105506000 J (exactly)	NIST
Energy	therm(US)		therm(s) (U.S.)	105480400 J (exactly)	NIST
Energy	Wh	W·h	watt hour(s)	3600 J (exactly)	NIST
Energy	Ws	W·s	watt second(s)	1 J (exactly)	NIST
Force	lbf	lbf	pound-force	4.448222 N	NIST
Force	N	N	newton(s)	1 N (exactly)	NIST
Force	ton-force		ton-force (2000 lbf)	8896.443 N	NIST
Length	angstrom	Å <see also ampere, A>	ångström(s)	0.0000000001 m (exactly)	NIST
Length	ft	ft <not distinct>	international foot(feet)	0.3048 m (exactly)	NIST
Length	ft(survey)	ft <not distinct>	U.S. survey foot(feet)	0.3048006 m	NIST
Length	in	in	inch(es)	0.0254 m (exactly)	NIST
Length	l.y.	l.y.	light year(s)	9460730000000000 m	NIST

Length	m	m	meter(s)	1 m	NIST
Length	mi	mi <not distinct>	international mile(s)	1609.344 m (exactly)	NIST
Length	mi(nautical)		nautical mile(s)	1852 m (exactly)	NIST
Length	mi(survey)	mi <not distinct>	U.S. statute mile(s)	1609.347 m	NIST
Length	yd	yd	yard(s)	0.9144 m (exactly)	NIST
Light	cd/m2	cd/m <sup>2</sup>	candela(s) per square meter	1 cd/m2 (exactly)	NIST
Light	lx	lx	lux	1 lx (exactly)	NIST
Mass	kg	kg	kilogram(s)	1 kg (exactly)	NIST
Mass	lb(ap)	lb ap	apothecaries' pound(s)	0.3732417 kg	NIST
Mass	lb(avdp)	lb	avordupois pound(s)	0.45359237 kg (exactly)	NIST
Mass	lb(troy)	lb t	troy pound(s)	0.3732417 kg	NIST
Mass	oz(ap)	oz ap	apothecaries' ounce(s)	0.03110348 kg	NIST
Mass	oz(avdp)	oz	avordupois ounce(s)	0.02834952 kg	NIST
Mass	oz(troy)	oz t	troy ounce(s)	0.03110348 kg	NIST
Mass	ton(AT)	AT <see also technical atmosphere, at>	assay ton(s)	0.02916667 kg	NIST
Mass	ton(long)		long ton(s) (2240 lb)	1016.047 kg	NIST
Mass	ton(short)		short ton(s) (2000 lb)	907.1847 kg	NIST
Mass	tonne	t <see also telsa, T>	metric ton(s)	1000 kg (exactly)	NIST
Power	ft lbf/s	ft·lbf/s	foot pound-force per second	1.355818 W	NIST
Power	hp(550)	hp	horsepower (550 ft lbf/s)	745.6999 W	NIST
Power	hp(boiler)		horsepower (boiler)	9809.5 W	NIST
Power	hp(electric)		horsepower (electric)	746 W (exactly)	NIST
Power	hp(metric)		horsepower (metric)	735.4988 W	NIST
Power	hp(UK)		horsepower (U.K.)	745.7 W	NIST
Power	hp(water)		horsepower (water)	746.043 W	NIST
Power	MW	MW	megawatt(s)	0.000001 W (exactly)	Derived
Power	W	W	watt(s)	1 W (exactly)	NIST
Pressure	at	at <see also assay ton, AT>	technical atmosphere(s)	98066.5 Pa (exactly)	NIST
Pressure	atm	atm	standard atmosphere(s)	101325 Pa (exactly)	NIST
Pressure	bar	bar	bar(s)	1 Pa (exactly)	NIST
Pressure	Pa	Pa	pascal(s)	1 Pa (exactly)	NIST
Pressure	psi	psi	pound-force per square inch (lbf/in <sup>2</sup> )	6894.757 Pa	NIST
Radiology	Bq	Bq	becquerel(s)	1 Bq (exactly)	NIST
Radiology	coul/kg	C/kg	coulomb(s) per kilogram	1 coul/kg (exactly)	NIST
Radiology	Gy	Gy	gray(s)	1 Gy (exactly)	NIST
Radiology	Sv	Sv	sievert(s)	1 Sv (exactly)	NIST
Temperature	deg C	°C <see also coulomb, C>	degree(s) Celsius		NIST

Temperature	deg F	°F <see also farad, F>	degree(s) Fahrenheit		NIST
Temperature	K	K	kelvin(s)	1 K (exactly)	NIST
Time	d	d	day(s)	86400 s (exactly)	NIST
Time	d(sidereal)		day(s) (sidereal)	86164.09 s	NIST
Time	h	h <see also henry, H>	hour(s)	3600 s (exactly)	NIST
Time	h(sidereal)		hour(s) (sidereal)	3590.17 s	NIST
Time	min	min	minute(s)	60 s (exactly)	NIST
Time	min(sidereal)		minute(s) (sidereal)	59.83617 s	NIST
Time	s	s <see also siemens, S>	second(s)	1 s (exactly)	NIST
Time	s(sidereal)		second(s) (sidereal)	0.9972696 s	NIST
Time	year(365)		year(s) (365 days)	31536000 s (exactly)	NIST
Time	year(sidereal)		year(s) (sidereal)	31558150 s	NIST
Torque	nm	n·m	newton meter(s)	1 nm (exactly)	NIST
Velocity	m/s	m/s	meter(s) per second	1 m/s (exactly)	NIST
Velocity	mi/h	mi/h	international mile(s) per hour	0.44704 m/s (exactly)	NIST
Velocity	rad/s	rad/s	radian(s) per second	1 rad/s (exactly)	NIST
Velocity	rpm	rpm	revolution(s) per minute	0.1047198 rad/s	NIST
Viscosity	cP	cP	centipoise	0.001 Pas (exactly)	NIST
Viscosity	cSt	cSt	centistoke(s)	0.000001 m <sup>2</sup> /s (exactly)	NIST
Viscosity	m <sup>2</sup> /s	m <sup>2</sup> /s	meter(s) squared per second	1 m <sup>2</sup> /s (exactly)	NIST
Viscosity	P	P	poise	0.1 Pas (exactly)	NIST
Viscosity	Pas	Pa·s	pascal second(s)	1 Pas (exactly)	NIST
Viscosity	St	St	stoke(s)	0.0001 m <sup>2</sup> /s (exactly)	NIST
Volume	bbl(oil)	bbl	barrel(s), petroleum (42 U.S. gallons)	0.1589873 m <sup>3</sup>	NIST
Volume	bu(UK)	bu <not distinct>	British Imperial bushel(s)		
Volume	bu(US)	bu <not distinct>	U.S. bushel(s)	0.03523907 m <sup>3</sup>	NIST
Volume	cord	cord	cord(s) (128 cu ft)	3.624556 m <sup>3</sup>	NIST
Volume	cu ft	ft <sup>3</sup>	cubic international foot(feet)	0.02831685 m <sup>3</sup>	NIST
Volume	dry pt(US)	dry pt	U.S. dry pint(s)	0.00005506105 m <sup>3</sup>	NIST
Volume	dry qt(US)	dry qt	U.S. dry quart(s)	0.001101221 m <sup>3</sup>	NIST
Volume	fl oz(UK)	fl oz	British Imperial fluid ounce(s)	0.000028413 m <sup>3</sup>	NIST
Volume	fl oz(US)	fl oz	U.S. fluid ounce(s)	0.00002957353 m <sup>3</sup>	NIST
Volume	gal(UK)	gal <not distinct>	British Imperial gallon(s)	0.00454609 m <sup>3</sup> (exactly)	NIST
Volume	gal(US)	gal <not distinct>	U.S. gallon(s)	0.003785412 m <sup>3</sup>	NIST
Volume	L	L	liter(s)	0.001 m <sup>3</sup> (exactly)	NIST
Volume	liq pt(US)	liq pt	U.S. liquid pint(s)	0.0004731765 m <sup>3</sup>	NIST
Volume	liq qt(US)	liq qt	U.S. liquid quart(s)	0.0009463529 m <sup>3</sup>	NIST

Volume	m3	m <sup>3</sup>	cubic meter(s)	1 m3 (exactly)	NIST
Volume	pt(UK)		British Imperial pint(s)		
Volume	qt(UK)		British Imperial quart(s)		
Volume	reg ton		register ton(s)	2.831685 m3	NIST

## 6 XSD CHANGES

The following changes to support commodities and energy are based on the FpML Version 3.0 Working Draft XSD.

### 6.1 Changes to *fpml-main-3-0.xsd*

1. A new commodities XSD has been included into *fpml-main-3-0.xsd*:

```
<xsd:include schemaLocation="fpml-commodities-3-0.xsd"/>
```

2. Attributes for new default schemes have been added to the root “FpML” element:

```
<xsd:element name="FpML">
  :
  <xsd:attribute name="commoditySchemeDefault" type="xsd:normalizedString"/>
  <xsd:attribute name="daysOfWeekSchemeDefault" type="xsd:normalizedString"/>
  <xsd:attribute name="deliveryPeriodSchemeDefault" type="xsd:normalizedString"/>
  <xsd:attribute name="firmnessSchemeDefault" type="xsd:normalizedString"/>
  <xsd:attribute name="frequencySchemeDefault" type="xsd:normalizedString"/>
  <xsd:attribute name="indexSchemeDefault" type="xsd:normalizedString"/>
  <xsd:attribute name="indexOpSchemeDefault" type="xsd:normalizedString"/>
  <xsd:attribute name="uomSchemeDefault" type="xsd:normalizedString"/>
  :
</xsd:element>
```

### 6.2 Changes to *fpml-shared-3-0.xsd*

The “href” attribute of element “partyReference” has been changed from type “xsd:normalizedString” to type “xsd:IDREF”:

```
<xsd:element name="partyReference">
  <xsd:annotation>
    <xsd:documentation>A pointer style reference to a party identifier defined
      elsewhere in the document. The party referenced has allocated the trade
      identifier.</xsd:documentation>
  </xsd:annotation>
  <xsd:complexType>
    <xsd:attribute name="href" type="xsd:IDREF" use="required"/>
  </xsd:complexType>
</xsd:element>
```

Complex type “BusinessDayConvention” has been created from the element “businessDayConvention” and the element “businessDayConvention” has been converted from type “xsd:normalizedString” to type “BusinessDayConvention”:

Before:

```
<xsd:element name="businessDayConvention">
  <xsd:annotation>
```

```

    <xsd:documentation>The convention for adjusting a date if it would
    otherwise fall on a day that is not a business day.</xsd:documentation>
  </xsd:annotation>
  <xsd:complexType>
    <xsd:simpleContent>
      <xsd:extension base="xsd:string">
        <xsd:attribute name="businessDayConventionScheme"
          type="xsd:normalizedString" use="optional"/>
      </xsd:extension>
    </xsd:simpleContent>
  </xsd:complexType>
</xsd:element>

```

After:

```

<xsd:element name="businessDayConvention" type="BusinessDayConvention">
  <xsd:annotation>
    <xsd:documentation>The convention for adjusting a date if it would
    otherwise fall on a day that is not a business day.</xsd:documentation>
  </xsd:annotation>
</xsd:element>

<xsd:complexType name="BusinessDayConvention">
  <xsd:simpleContent>
    <xsd:extension base="xsd:string">
      <xsd:attribute name="businessDayConventionScheme"
        type="xsd:normalizedString" use="optional"/>
    </xsd:extension>
  </xsd:simpleContent>
</xsd:complexType>

```

### 6.3 Excerpt from new *fpml-commodities-3-0.xsd*/*fpml-ce-3-0.xsd*

The following is excerpted from a larger file:

```

<?xml version="1.0" encoding="UTF-8"?>
<xsd:schema targetNamespace="http://www.fpml.org/2002/FpML-3-0"
  xmlns:xsd="http://www.w3.org/2001/XMLSchema"
  xmlns="http://www.fpml.org/2002/FpML-3-0"
  elementFormDefault="qualified" attributeFormDefault="unqualified">
  <xsd:include schemaLocation="fpml-shared-3-0.xsd"/>
  <xsd:include schemaLocation="fpml-eqd-3-0.xsd"/>
  <xsd:include schemaLocation="fpml-fx-3-0.xsd"/>
  :
  <xsd:complexType name="CommodityForward">
    <xsd:complexContent>
      <xsd:extension base="CommodityProduct">
        <xsd:sequence>
          <xsd:element ref="commodityBuyerPrice"/>
          <xsd:element ref="commodityUnits"/>
          <xsd:element ref="commodityDeliveryPeriod"/>
          <xsd:choice>
            <xsd:element ref="commodityCashSettlement"/>
            <xsd:element ref="commodityPhysicalSettlement"/>
          </xsd:choice>
        </xsd:sequence>
      </xsd:extension>
    </xsd:complexContent>
  </xsd:complexType>

```

```
        </xsd:choice>
      </xsd:sequence>
    </xsd:extension>
  </xsd:complexContent>
</xsd:complexType>
:
<xsd:element name="commodityForward" type="CommodityForward"
  substitutionGroup="product"/>
:
</xsd:schema>
```