INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

IEC TC57 WG-16
Status & Plans

June 16, 2011

Jim Waight

Convener

WG-16: Deregulated Market Communications

WG-16 Deregulated Market Communications

- **Mission, Scope:**
  - **Develop Standards for Electricity Market Communications**
    - **Market Participants to Market Operator**
    - **Intra Market Operator**
  - **Use of TC 57 Common Information Model (CIM)**

Countries Represented on WG-16

- Australia
- Austria
- China
- France
- Germany
- Japan
- Korea
- Netherlands
- Norway
- Spain
- Sweden
- Switzerland
- USA

Total Countries	14
Active Countries	10
Total Members	38

WG-16 Expertise

- Vendors
- Consultants
- Transmission System Operators
- Research Institutes

WG-16: Recent Meetings

- Last Meetings
  - Santa Clara Jan 31-Feb 2, 2011
  - Geneva June 6-8, 2011

- Next Meetings
  - Austin Nov 30-Dec2, 2011
  - Nice Spring 2012
- Teleconferences: Weekly

Two Sub-teams formed and working

- Two Styles of Markets throughout world
- "European Style" Markets:
  - Day Ahead Markets: Bilateral
  - Intra-day Markets
  - Balancing Markets
  - Collaboration with ENTSO-e
- "US Style" Market
  - Day Ahead Markets with SCUC
  - Hour Ahead Markets
  - Real Time Markets with SCED
  - Collaboration with IRC, and ISO projects
- Beneficiaries will include Market Participants, Market Operators, Vendors

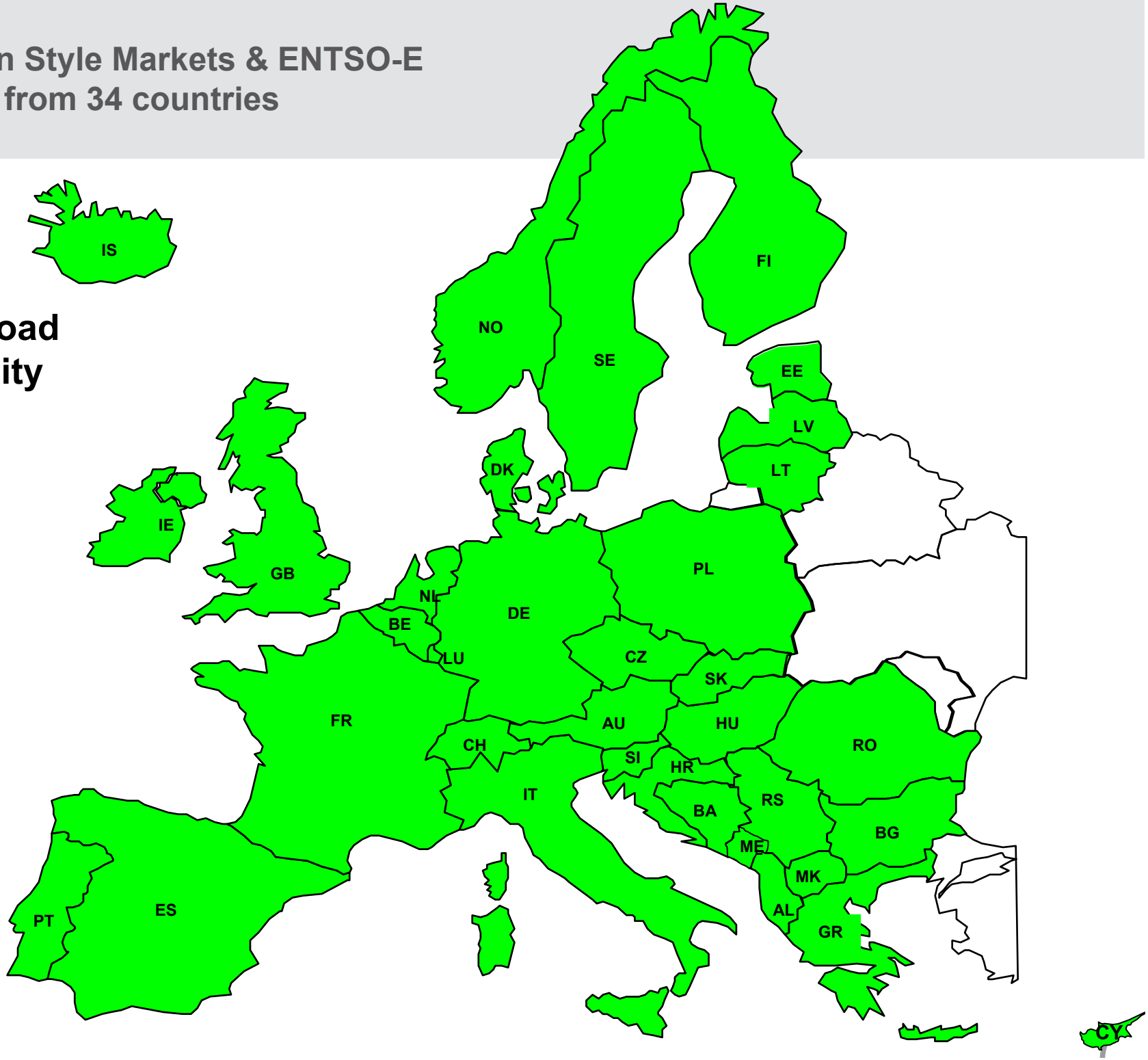
“European Style” Markets:

- Data Exchanges to support Energy Markets
- Derived from ETSO Electronic Data Exchange (EDI)
  - ENTSO-E Scheduling System – ESS
  - ENTSO-E Settlement Process – ESP
  - ENTSO-E Reserve Resource Process – ERRP
  - ENTSO-E Capacity Allocation and Nomination – ECAN
- Mapping of existing data exchanges to CIM-based data exchanges
- IEC WG-16 working in formal liaison with ENTSO-e
- Standardization as IEC 62325

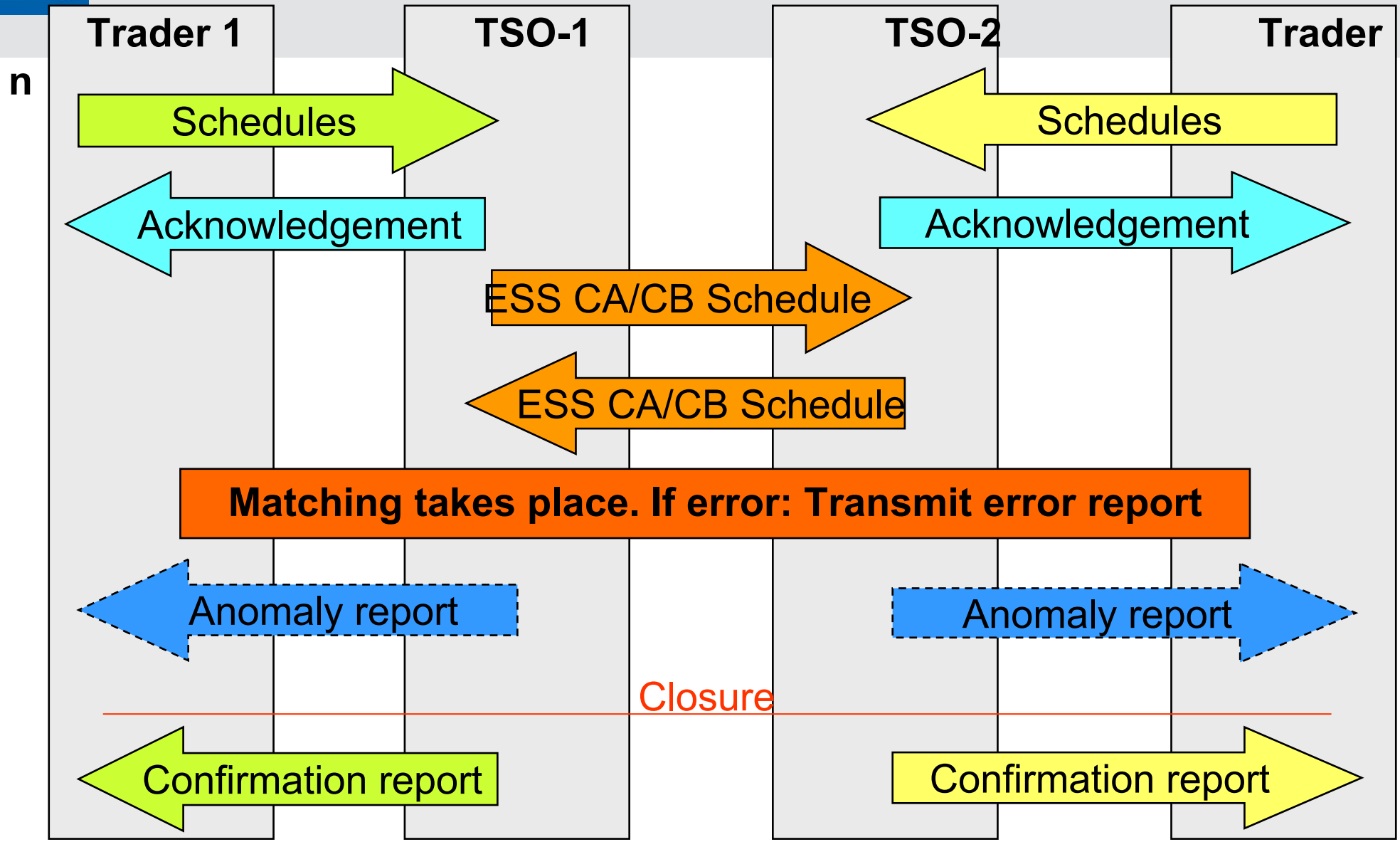
European Style Markets & ENTSO-E
42 TSOs from 34 countries

~540 GW peak load
~900 GW Capacity

**source ENTSO-e 2009



Advanced TSO – TSO scheduling

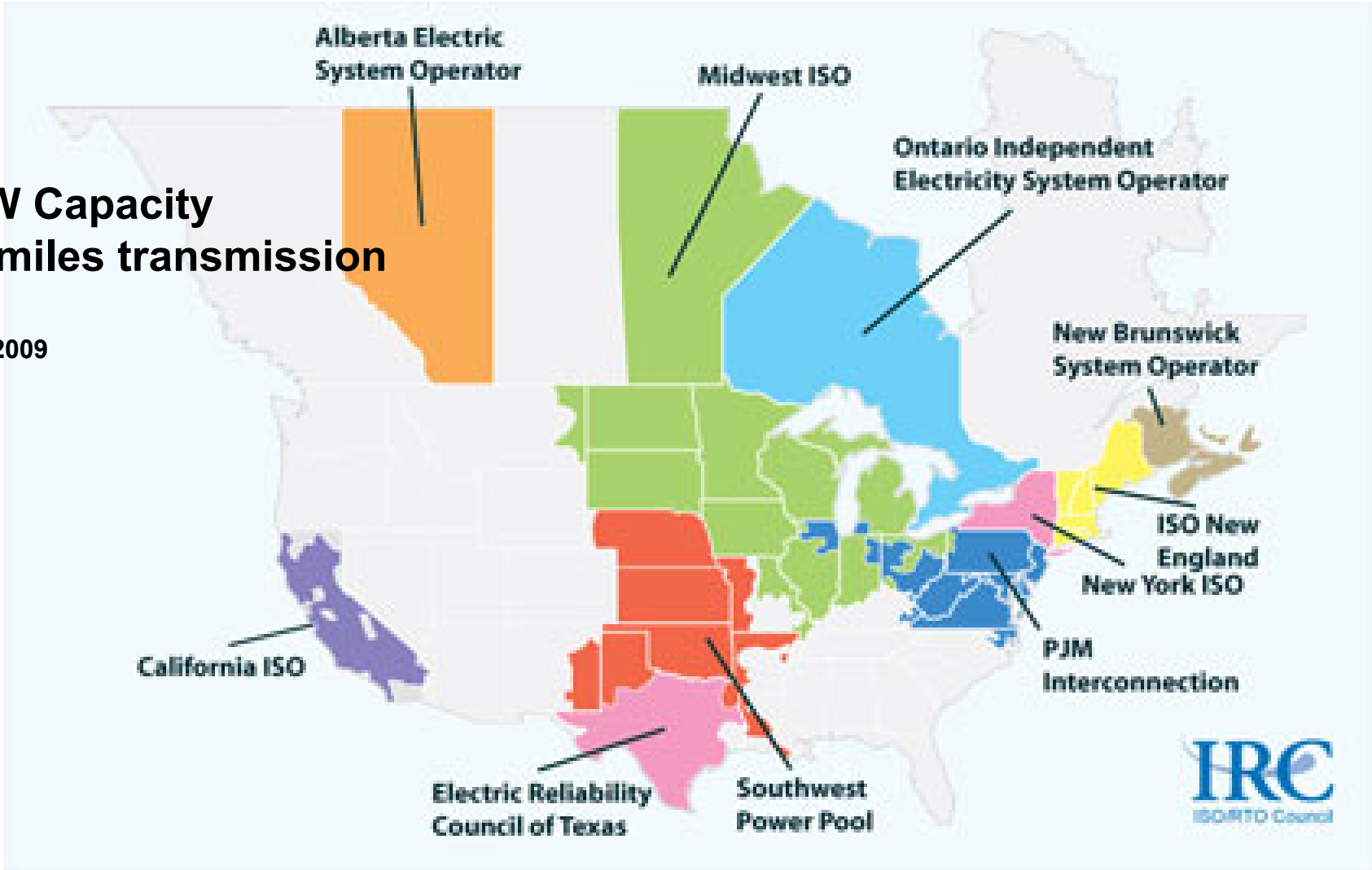


“US Style” Markets:

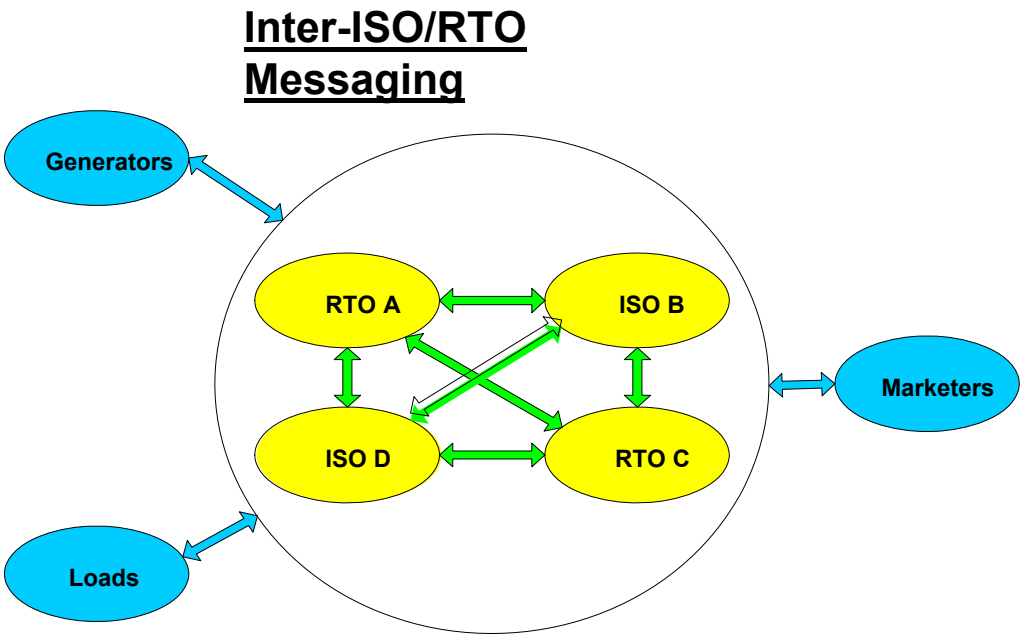
- Data Exchanges to support:
  - Day Ahead Markets
  - Real Time Markets
  - Financial Transmission Rights (CRR)
  - Settlement
- IEC WG-16 picked up results of EPRI CME project
- Working with ISO/RTO Council
- Individual ISO/RTO projects contributed extension to the CIM to support Energy Markets.
- Standardization as IEC 62325

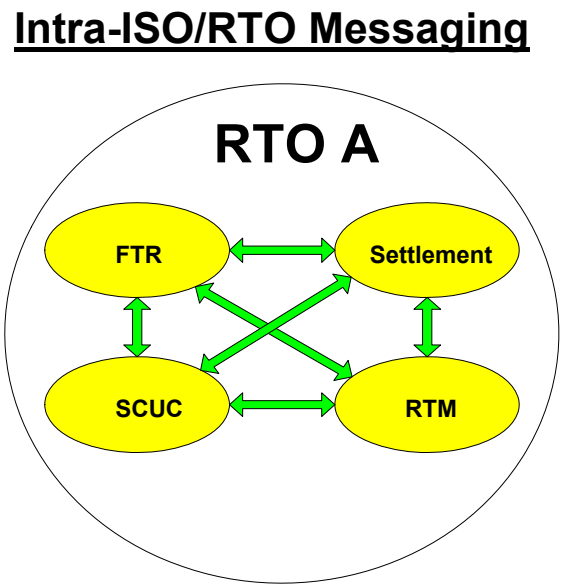
- **662 GW Capacity**
  278,000 miles transmission

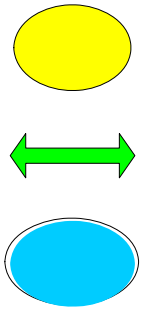
  *** Source IRC 2009**



US Style Market Communications





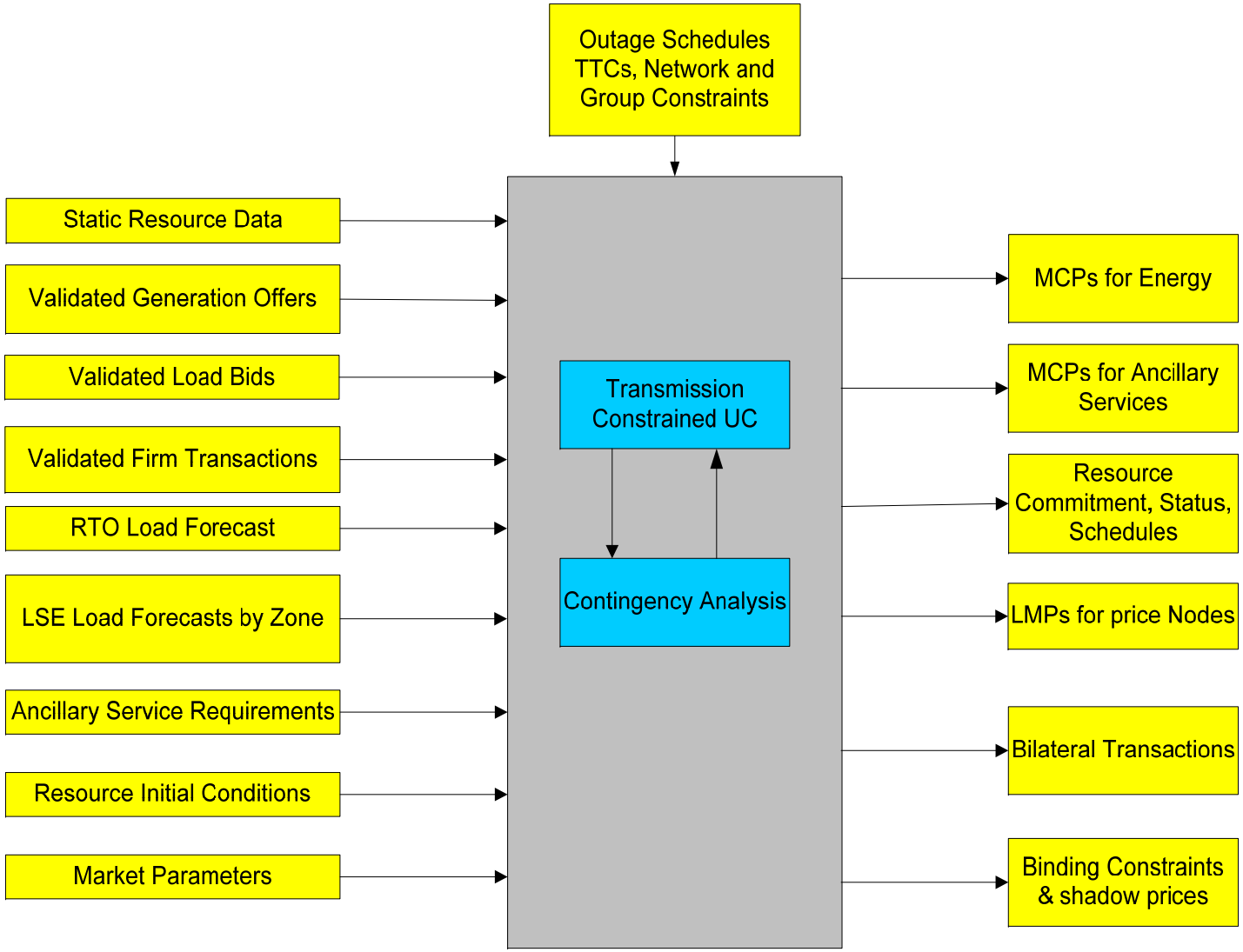


CIM extensions in scope for CME

XML information exchange model and terms database – message standards to be developed as part of RTO/ISO Data Initiative

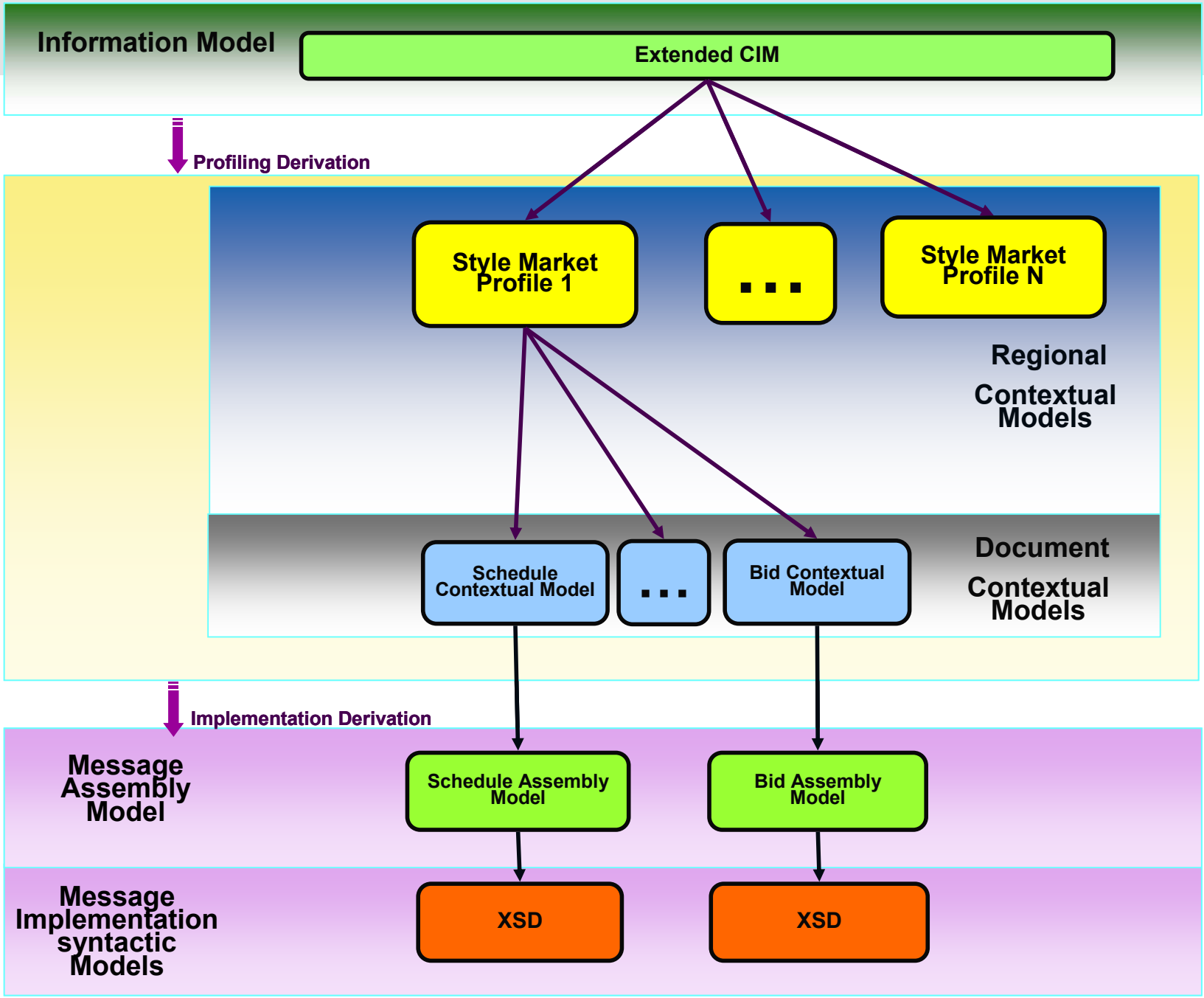
Market, Load, Generation Participants CIM extension and information exchange model – Other Initiatives and/or Future Phase(s)

US Style Markets: SCUC Data Exchanges



IEC WG-16 Standards Methodology

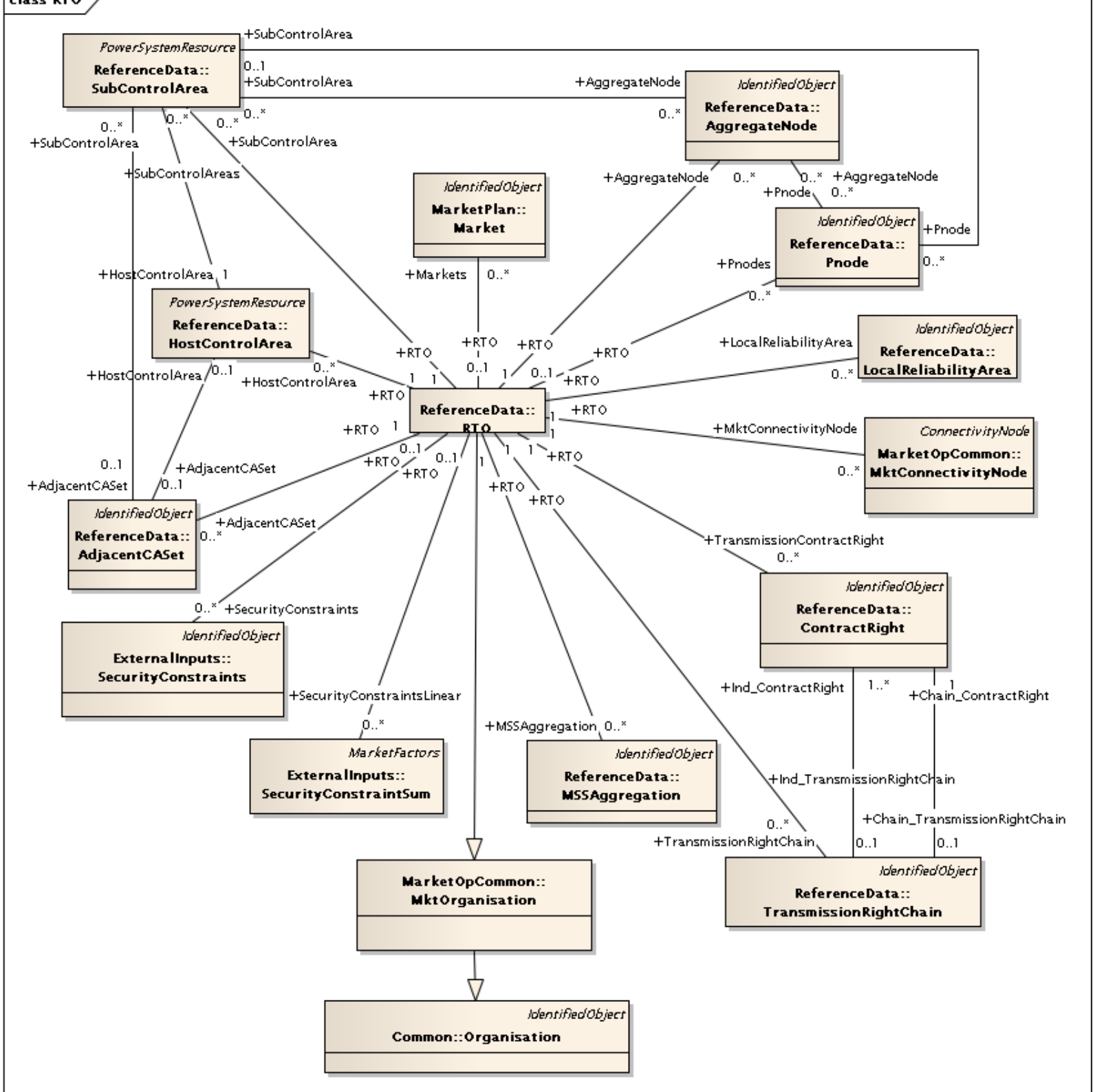
- Documentation of Data Exchange Requirements
  - Use Cases, Workflows, etc
- Mapping to existing CIM UML Model
- Extensions to form new revision of CIM UML Model
- Generation of Contextual Models
- Generation of Data Exchange Profile
- Generation of Data Exchange formats
- Use of Open Source Tools (CIMtool, JcleanCIM)


Information Model
Extended CIM
Profiling Derivation
Style Market Profile 1
. . .
Style Market Profile N
Regional Contextual Models
Schedule Contextual Model
. . .
Bid Contextual Model
Document Contextual Models
Implementation Derivation
Message Assembly Model
Schedule Assembly Model
Bid Assembly Model
Message Implementation syntactic Models
XSD
XSD

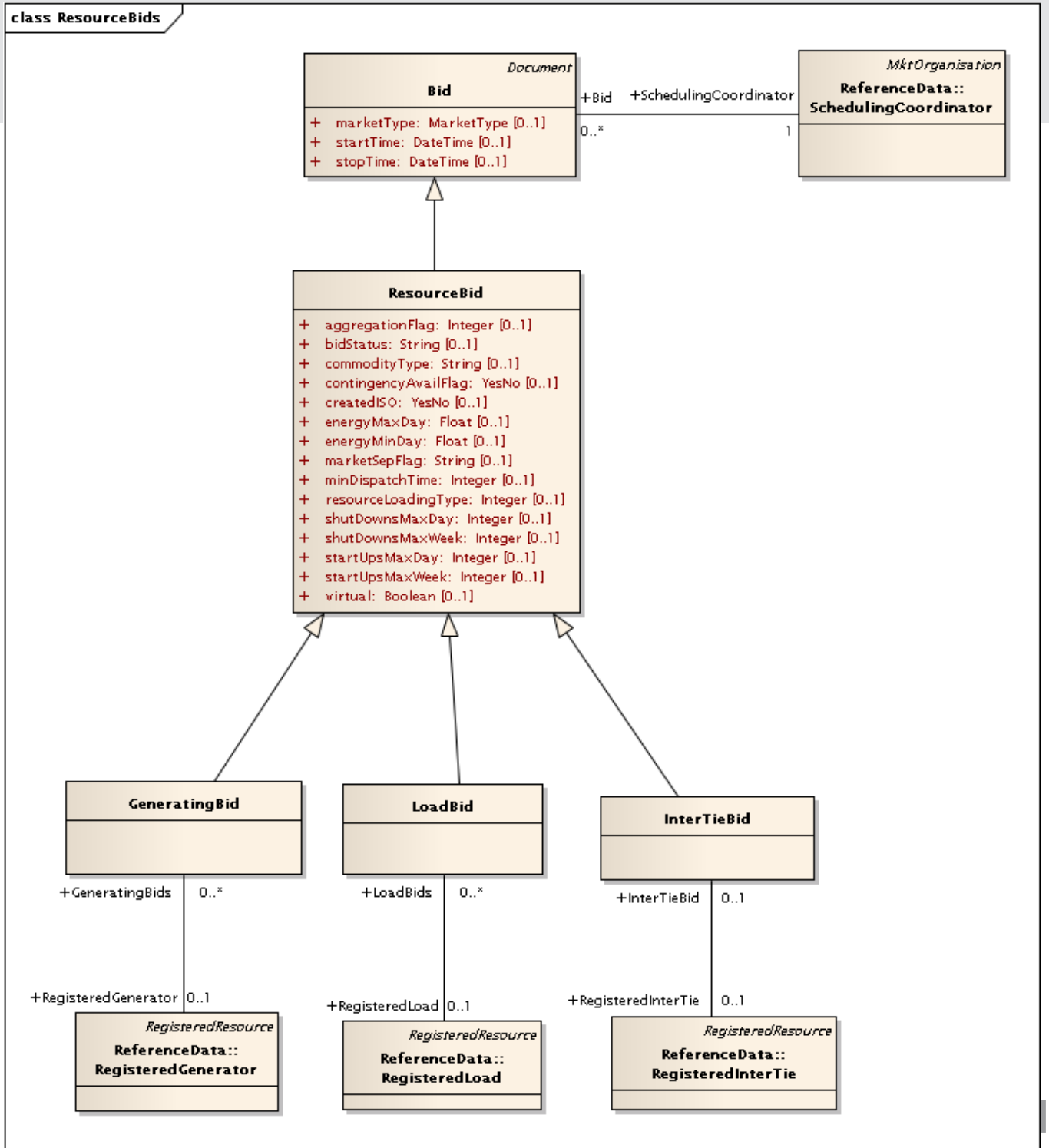
IEC 62325-301: Common Information Model

- Committee Draft 5/1/2011
- Interface Model for Communications
- Model Snippets in following slides

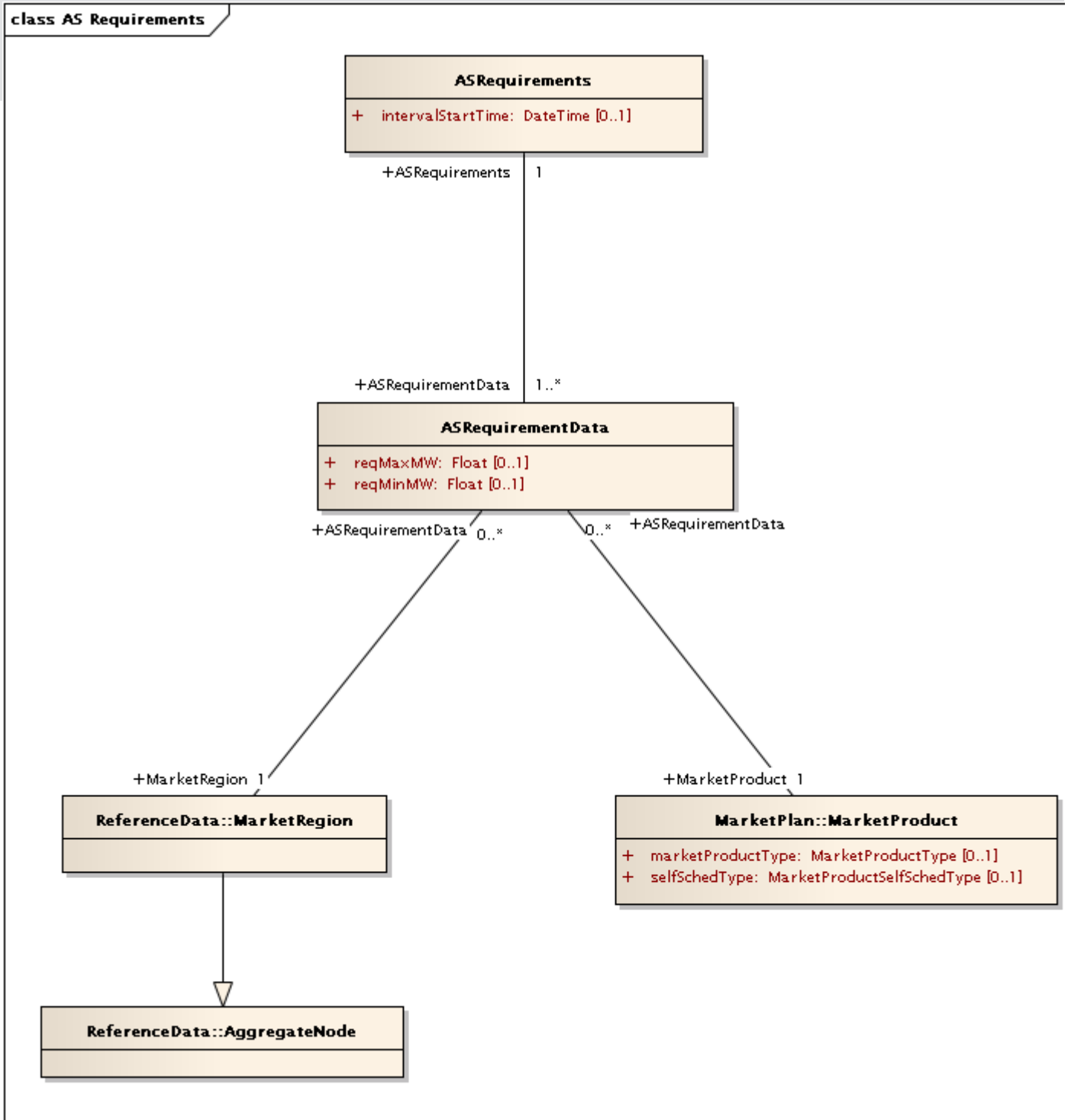
RTO


class RTO
PowerSystemResource
ReferenceData::
SubControlArea
IdentifiedObject
ReferenceData::
AggregateNode
IdentifiedObject
MarketPlan::
Market
IdentifiedObject
ReferenceData::
Pnode
PowerSystemResource
ReferenceData::
HostControlArea
IdentifiedObject
ReferenceData::
LocalReliabilityArea
ReferenceData::
RTO
ConnectivityNode
MarketOpCommon::
MktConnectivityNode
IdentifiedObject
ReferenceData::
AdjacentCASet
IdentifiedObject
ReferenceData::
ContractRight
IdentifiedObject
ExternalInputs::
SecurityConstraints
MarketFactors
ExternalInputs::
SecurityConstraintSum
IdentifiedObject
ReferenceData::
MSSAggregation
IdentifiedObject
ReferenceData::
TransmissionRightChain
MarketOpCommon::
MktOrganisation
IdentifiedObject
Common::Organisation
+SubControlArea
+AggregateNode
+SubControlAreas
+HostControlArea
+Markets
+Pnode
+Pnodes
+LocalReliabilityArea
+RTO
+MktConnectivityNode
+AdjacentCASet
+TransmissionContractRight
+SecurityConstraints
+SecurityConstraintsLinear
+MSSAggregation
+Ind_ContractRight
+Chain_ContractRight
+Ind_TransmissionRightChain
+Chain_TransmissionRightChain
+TransmissionRightChain

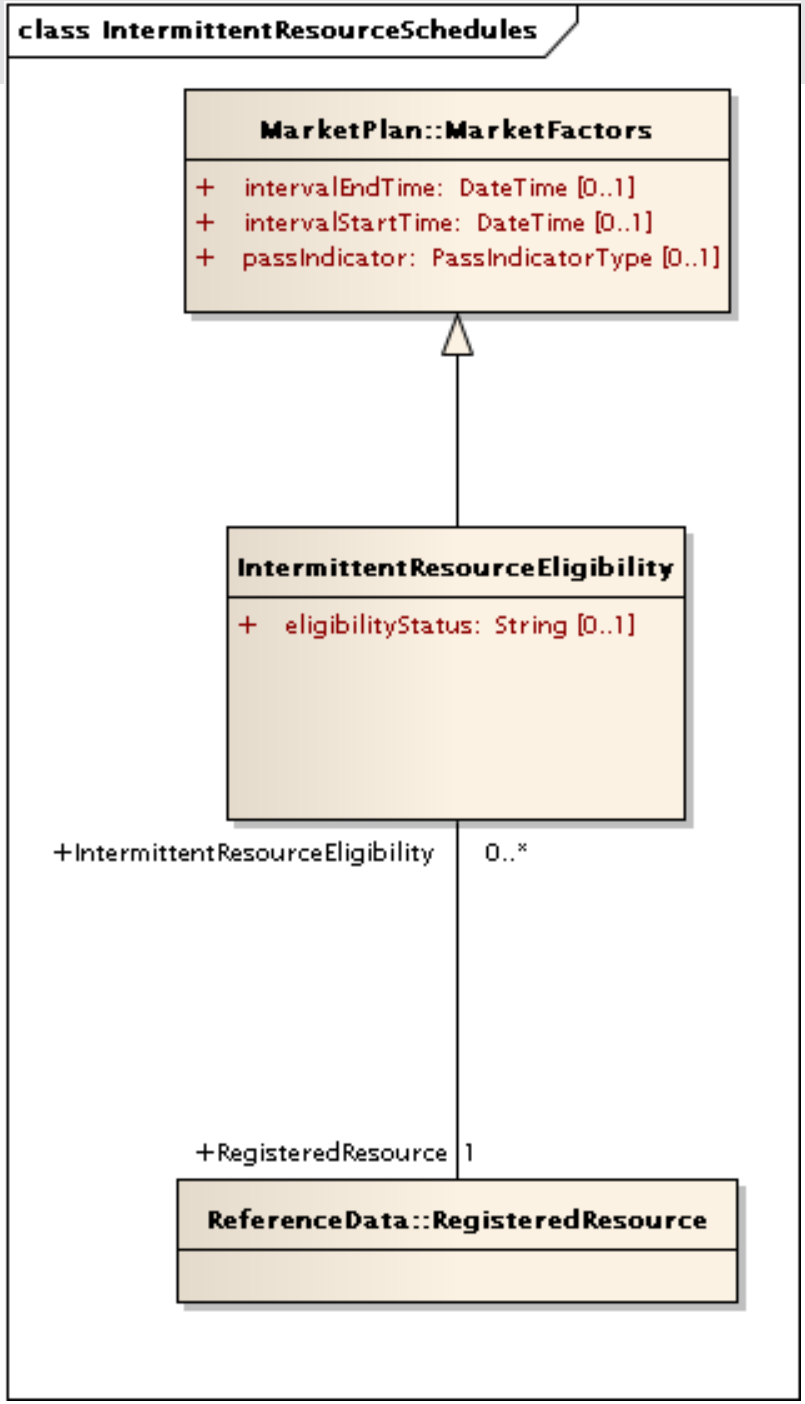
BID


class ResourceBids
Document
Bid
+ marketType: MarketType [0..1]
+ startTime: DateTime [0..1]
+ stopTime: DateTime [0..1]
+Bid
+SchedulingCoordinator
0..*
1
MktOrganisation
ReferenceData::
SchedulingCoordinator
ResourceBid
+ aggregationFlag: Integer [0..1]
+ bidStatus: String [0..1]
+ commodityType: String [0..1]
+ contingencyAvailFlag: YesNo [0..1]
+ createdISO: YesNo [0..1]
+ energyMaxDay: Float [0..1]
+ energyMinDay: Float [0..1]
+ marketSepFlag: String [0..1]
+ minDispatchTime: Integer [0..1]
+ resourceLoadingType: Integer [0..1]
+ shutDownsMaxDay: Integer [0..1]
+ shutDownsMaxWeek: Integer [0..1]
+ startUpsMaxDay: Integer [0..1]
+ startUpsMaxWeek: Integer [0..1]
+ virtual: Boolean [0..1]
GeneratingBid
LoadBid
InterTieBid
+GeneratingBids
0..*
+LoadBids
0..*
+InterTieBid
0..1
+RegisteredGenerator
0..1
+RegisteredLoad
0..1
+RegisteredInterTie
0..1
RegisteredResource
ReferenceData::
RegisteredGenerator
RegisteredResource
ReferenceData::
RegisteredLoad
RegisteredResource
ReferenceData::
RegisteredInterTie

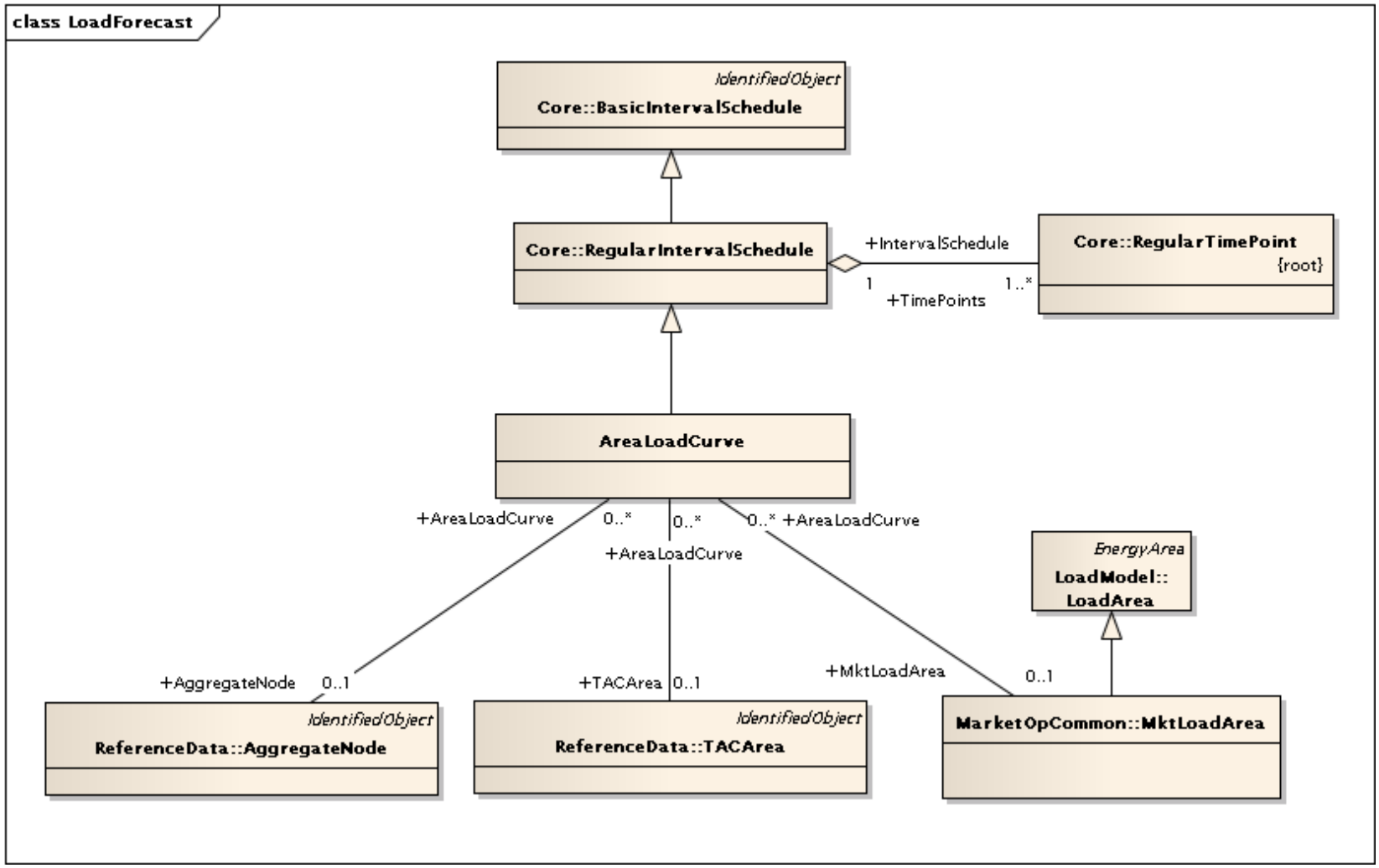
Ancillary Service Requirements



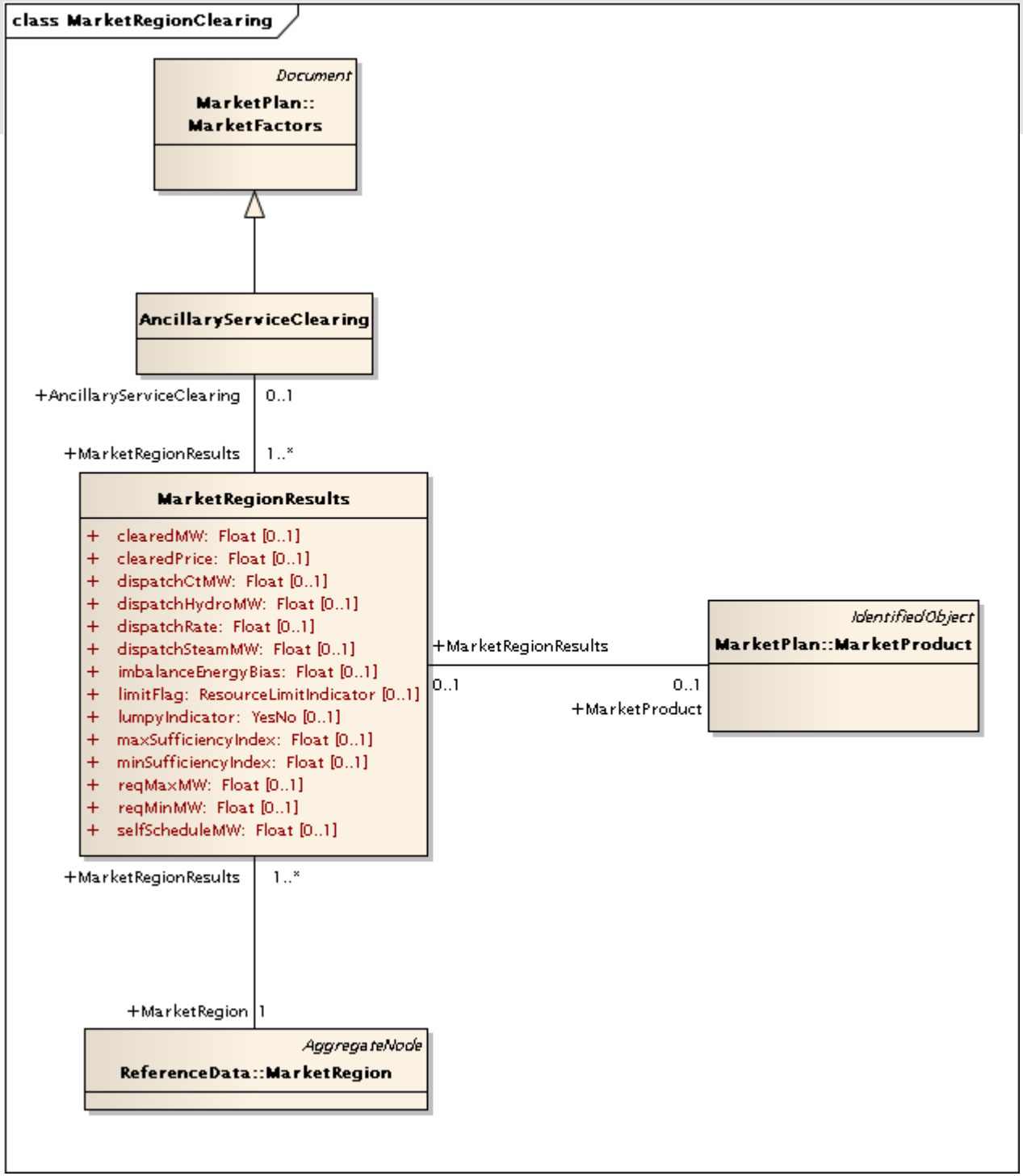
Intermittent Resource Schedules



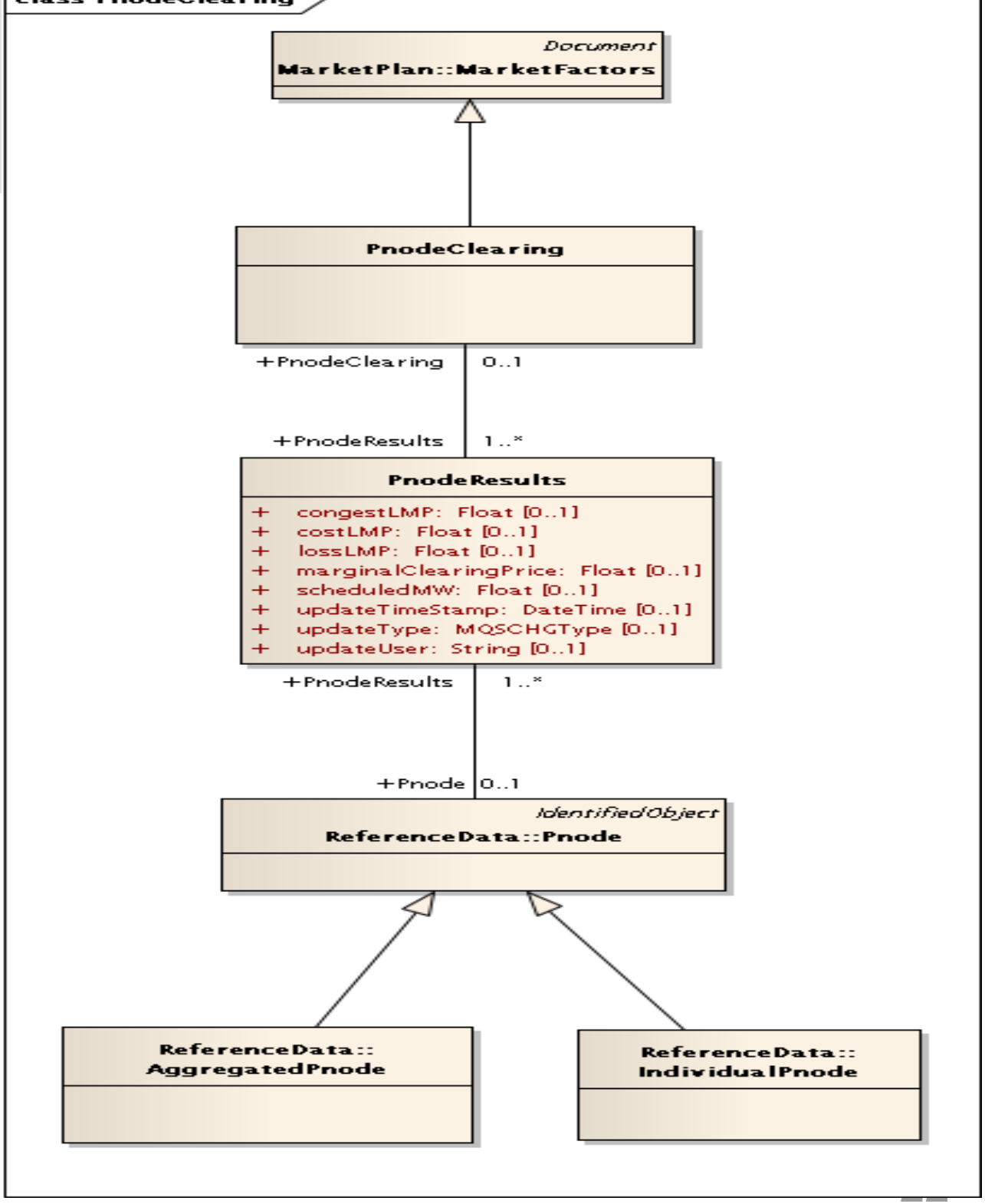
Load Forecast



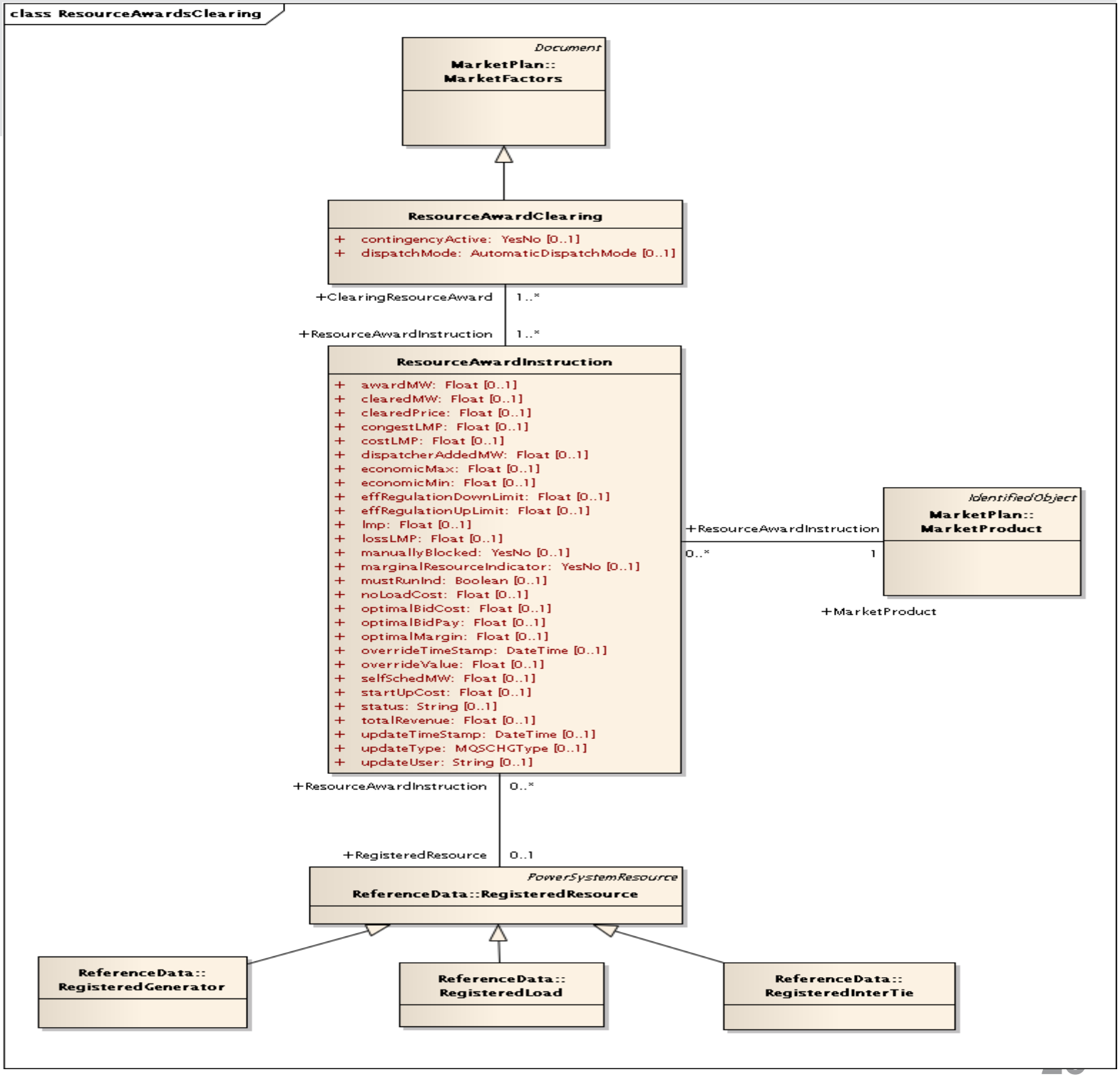
Market Results Clearing



Pnode Clearing



Resource Award Clearing



Structure of Global IEC 62325 Standard

- Part 301: Common Information Model-Extensions for Markets
  - One document with description of UML models with “general modeling”
  - Documents only classes in Market Operations Package.
- Part 351-399: Common Profile for Market Models
- Part 450 Modeling & Messaging Methodology
  - Text document with rules to generate profiles
  - Documents using abstract object language how to generate other parts, starting with 301. May document as UML model, or as a word document from a tool
  - Is a common document
- Part 451-1,2,3,4,5 Acknowledgment BP, ESS, ECAN, ERRP, ESP
- Part 452-1,2,3 DAM, RTM, FTR
  - This is the real profile in UML for messages , basis for InterOp
- Part 550-1 EU style translation rules for UML to XSD
- Part 550-2 NA style translation rules for UML to XSD
  - Text defining rules for generation of 551 & 552,
- Part 552-1,2,3 Implementation for DAM, RTM, FTR, …
  - Contains XSD Implementations

TC57 WG-16 Roadmap

Release	Current Version	1st Release	2nd Release
Features	62325-100: General Requirements and Guidelines	62325-301: CIM for Markets Ed 1	62325-301: CIM for Markets Ed 2
	62325-102: Energy Market Example Model	62325-351: Profile for European Style Markets	62325-352: Profile for US-Style Markets
	62325-501: General Guidelines and ebXML	62325-450 Methodology	62325-450 Methodology
	62325-502: Profile of ebXML	62325-451-1: Acknowledgement Business Process	62325-452-2 Profile for Day Ahead Markets
Time Frame	Published 2004	2011-2012	2012-2013

TC57 WG-16 Roadmap

Release	Future Releases		
	62325-301 CIM for Markets Ed 3		
	62325-451-2,3,4,5 Profiles for ESS, ECAN, ERRP, ESP		
Features	62325-452-2,3: Profiles for RTM and FTR		
	62325-550-1: EU Translation Rules		
	62325-550-2: NA Translation rules		
	62325-552-1, 2,3 Implementation of NA Profiles		
Time Frame	2012-2014		

Summary

- Global Standard for Energy Market Communications
- Based on the Common Information Model
- Profile of CIM support various market designs
  - LMP markets (Day-Ahead, Real-Time)
  - Bilateral Markets
- Next Steps: Profile development and interoperability testing