ADE-VALUATION

Towards a CityGML 3D Property Valuation Model based on BIM

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Gist Lunch Seminar | UDelft, Netherlands | 02 July, 2020

What motivated us?

- 3D Modeling techniques
- Variables specifications (in/out)

Our Approach

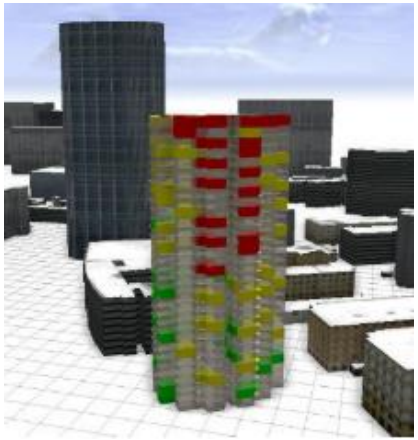
- Why CityGML? Why BIM as an input?
- Generic Workflow

Proposed Model *"ADE-Valuation"*

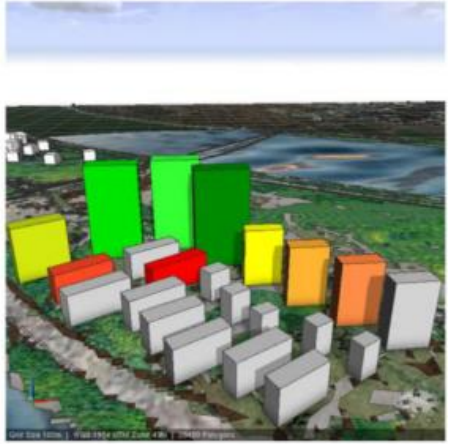
- UML - Variables Model
- LADM-VM vs ADE-Valuation

What's next…

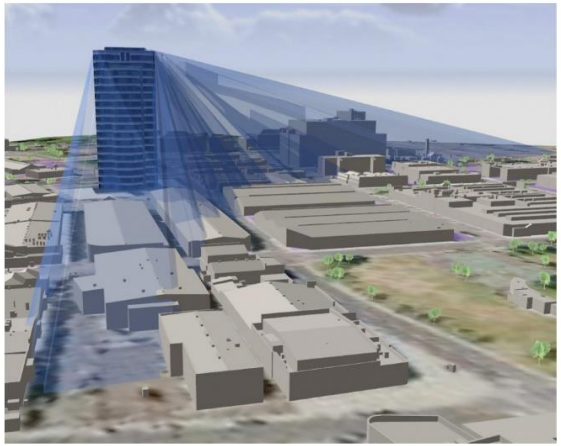
What Motivated Us?



Sunlight Exposure



3D price variation



Viewshed Analysis (View Quality)

3D Modeling techniques / Variables

Property Valuation Models/ Variables Assessment

What Motivated Us?

Indoor variables
Outdoor variables

Real estate Valuers/RICS

Contractors/Developers

Taxation Services/ Administration

3D Property-units Value
- As Conceived-

What Motivated Us?

-CityGML-

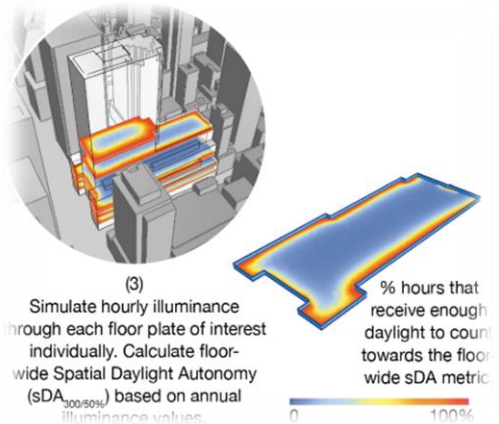
Outdoor variables

-IFC-

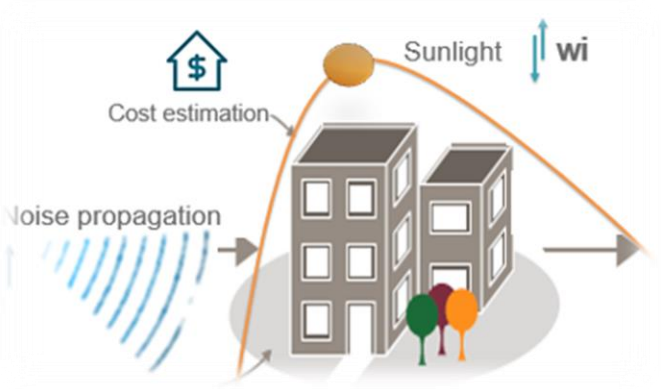
Indoor variables

Why BIM?

Property Cost



Variables simulation (ex. Daylight, etc.)



Indoors variables into outdoors environment

Why CityGML?

Generic Standard
for Urban Environment

-3D Spatial Analysis
-3D Simulations

Extensibility
ADEs

-NoiseADE
-EnergyADE etc.

Different levels of Information content

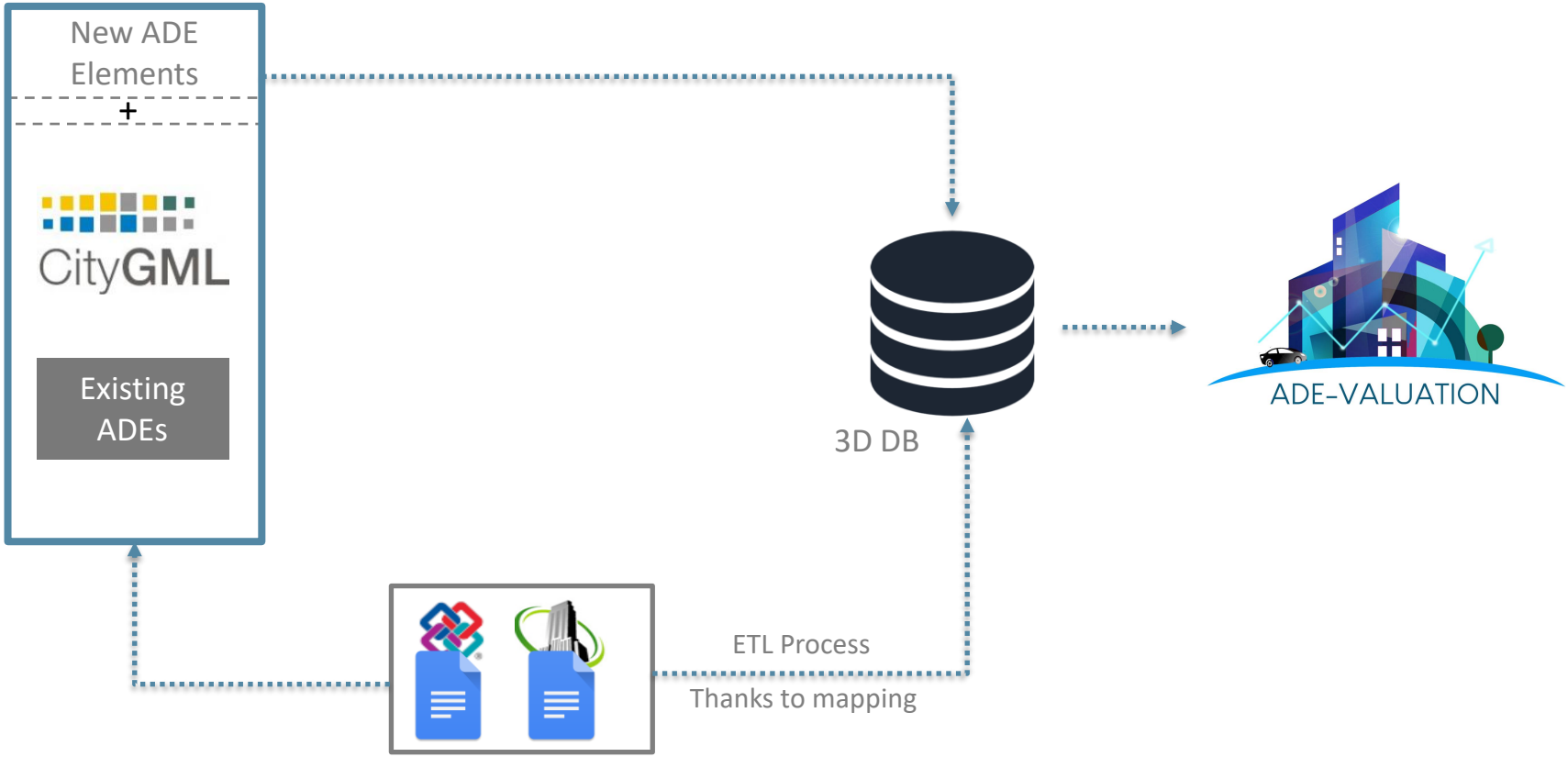
-Hierarchy
-LOD Concept

Better Interoperability

CityGML 3.0
(IFC, etc.)

Our Approach

Generic Workflow



Research Tasks

1 3D Variables Technical Specifications

- Variables identification
- Variables Requirements
- Variables classification (Ifc/CityGML)

2 Develop CityGML ADE-Valuation

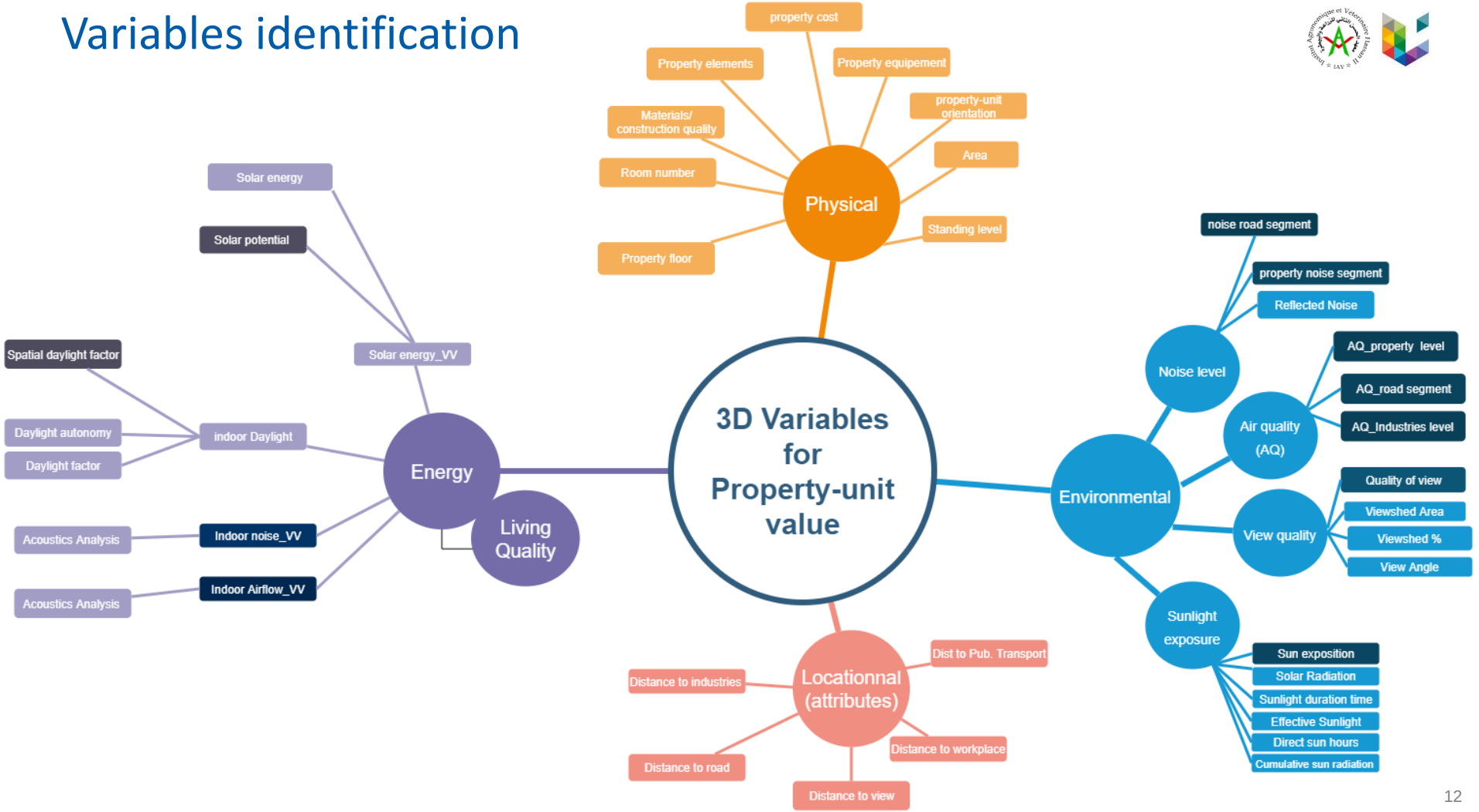
- Property Valuation Model
- Mapping (Existing ADE, CityGML)
- Propose "*ADE-Valuation*''

3 Implementation Phase

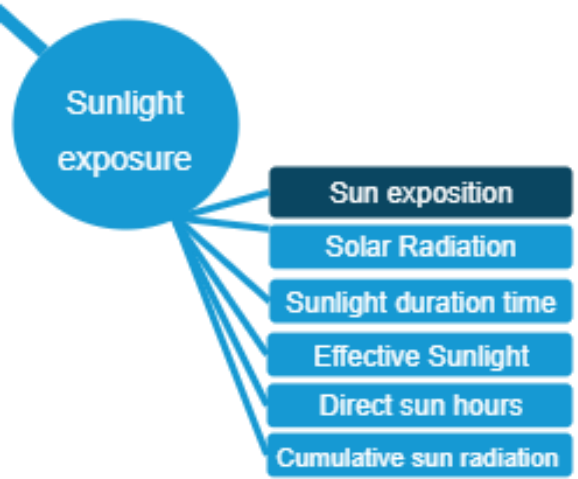
- IFC/BIM integration Model
- Model Validation
- Variables Simulation Tests

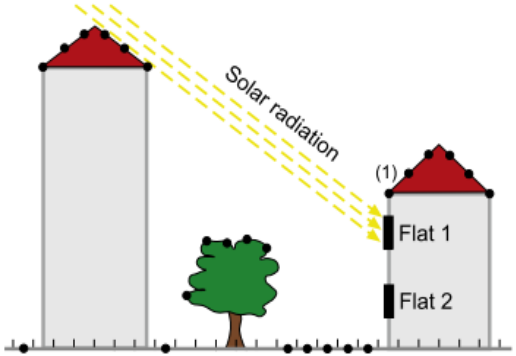
Proposed Variables

Variables identification

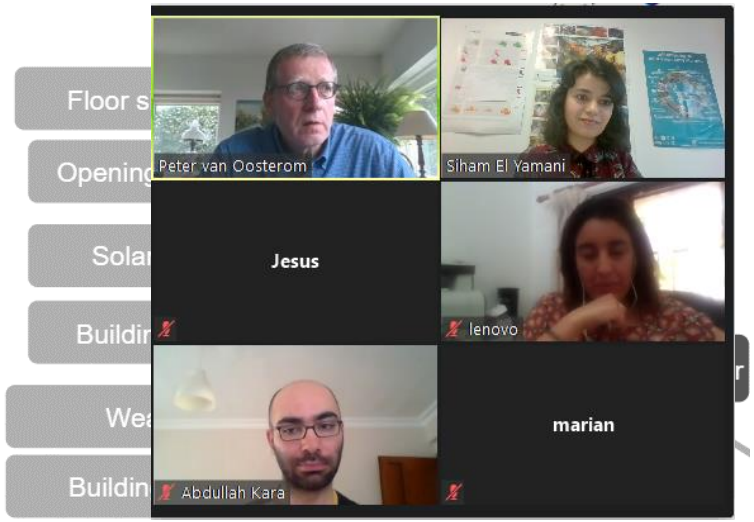


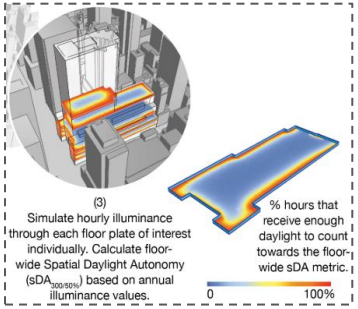
Variables Examples





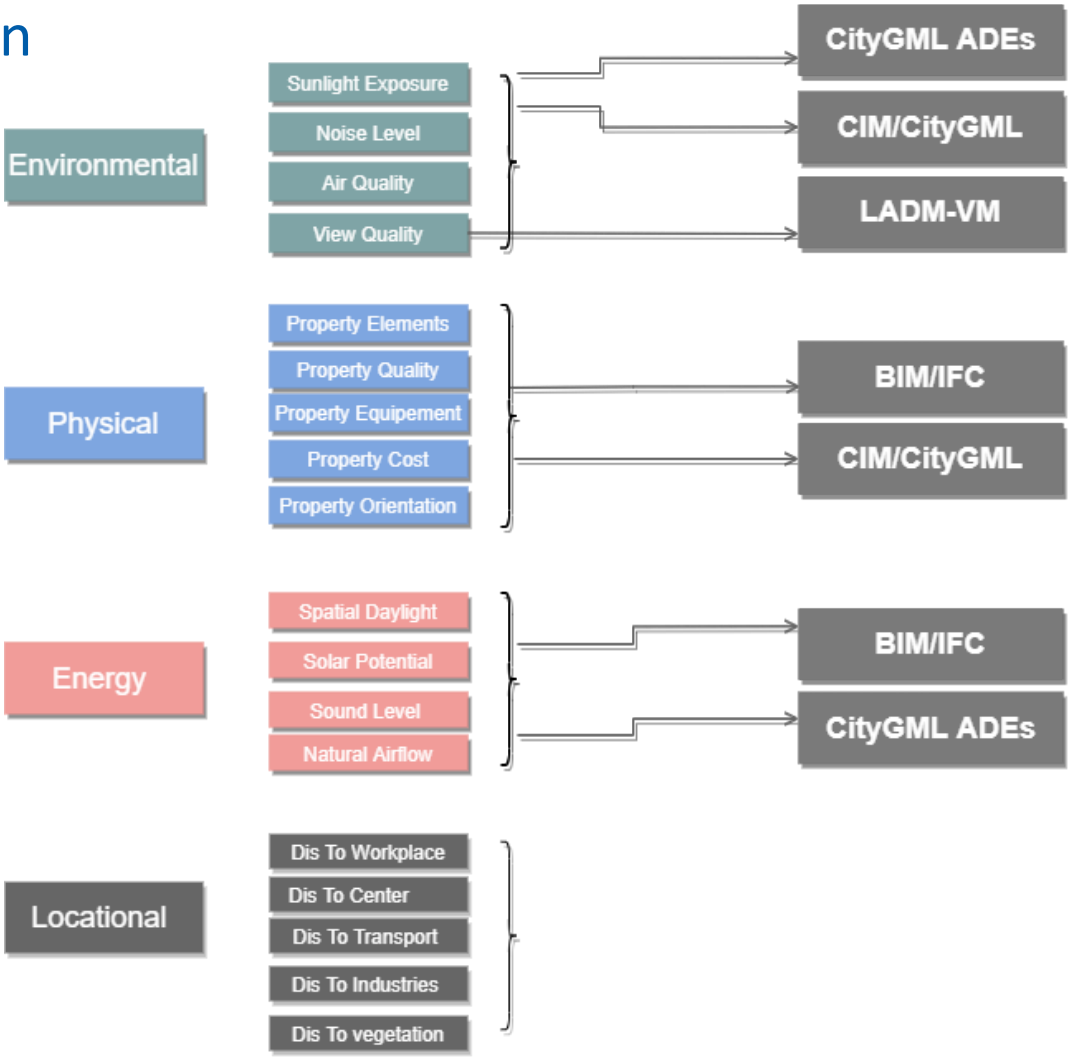
solar radiation (Helbich, 2013)

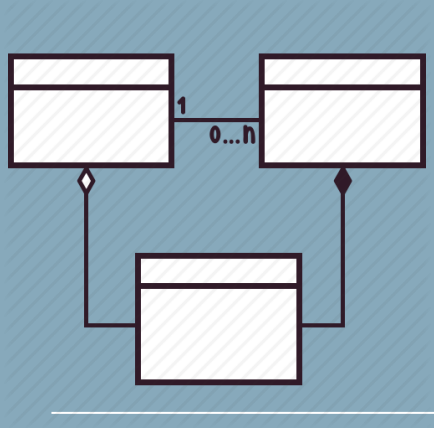




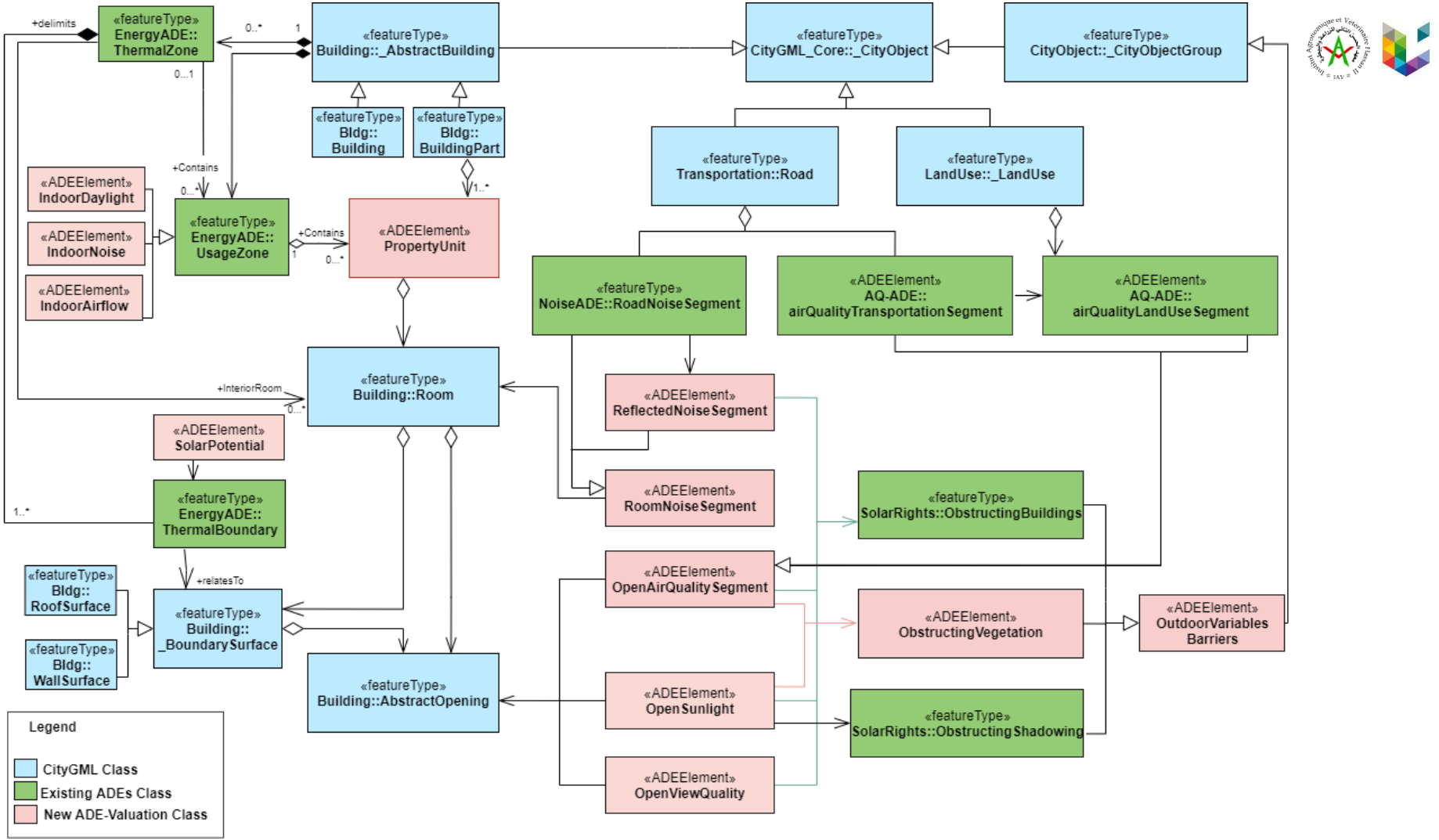
Daylight value for property valuation, I.Turan, 2020

Variables Classification





Proposed Model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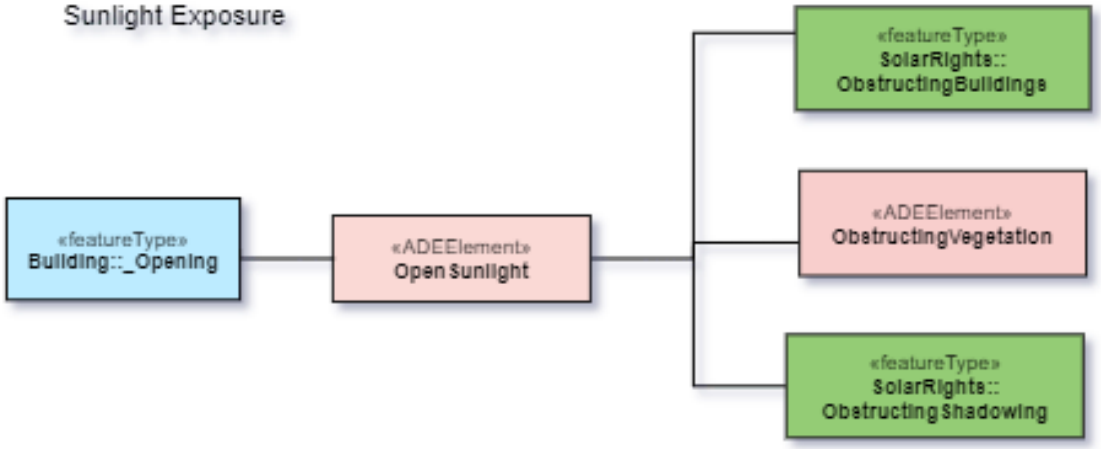
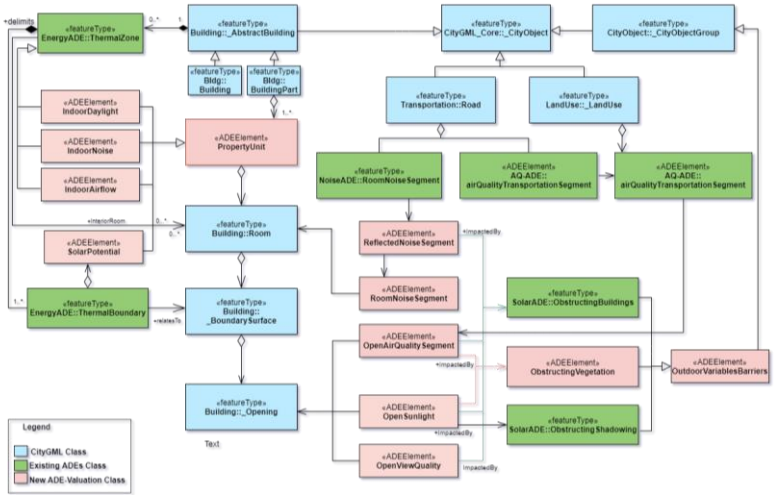
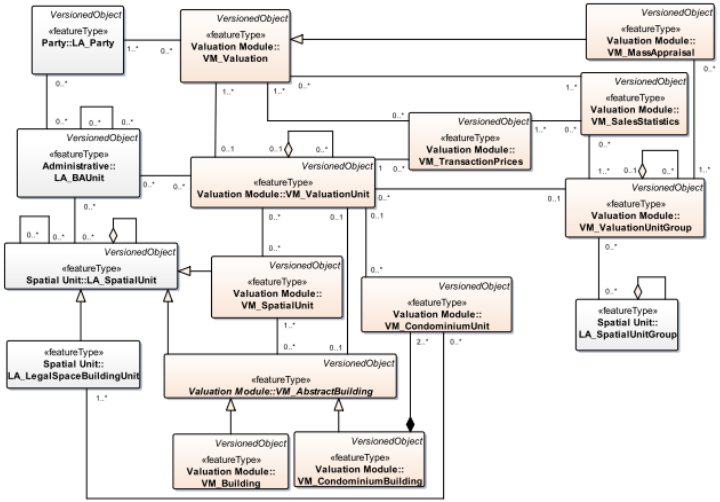
1
«featureType» Building::_AbstractBuilding
«featureType» CityGML_Core::_CityObject
«featureType» CityObject::_CityObjectGroup
0...1
«featureType» Bldg:: Building
«featureType» Bldg:: BuildingPart
+Contains
«ADEElement» IndoorDaylight
«ADEElement» IndoorNoise
«ADEElement» IndoorAirflow
«featureType» EnergyADE:: UsageZone
+Contains
«ADEElement» PropertyUnit
1..*
«featureType» Transportation::Road
«featureType» LandUse::_LandUse
«featureType» NoiseADE::RoadNoiseSegment
«ADEElement» AQ-ADE:: airQualityTransportationSegment
«ADEElement» AQ-ADE:: airQualityLandUseSegment
+InteriorRoom
«featureType» Building::Room
«ADEElement» ReflectedNoiseSegment
«ADEElement» SolarPotential
«ADEElement» RoomNoiseSegment
«featureType» SolarRights::ObstructingBuildings
«featureType» EnergyADE:: ThermalBoundary
«ADEElement» OpenAirQualitySegment
«featureType» Bldg:: RoofSurface
+relatesTo
«featureType» Building:: _BoundarySurface
«ADEElement» ObstructingVegetation
«ADEElement» OutdoorVariables Barriers
«featureType» Bldg:: WallSurface
«featureType» Building::AbstractOpening
«ADEElement» OpenSunlight
«featureType» SolarRights::ObstructingShadowing
«ADEElement» OpenViewQuality
Legend
CityGML Class
Existing ADEs Class
New ADE-Valuation Class



Outdoor Variables

LADM-VM *Vs* ADE-Valuation





LADM-VM, A. Kara, P. Van Oosterom, 2019

How far these two models could be connected ?

ADE-valuation potential to the existing LADM- Valuation model?

What's next?

- IFC/BIM integration Model;
- Model Validation;
- Implementation Phase (ADE/3DCityDB…);
- Next Publications :

  - 3D Technical Specifications - variables
  - First outcomes of the model (*ADE-Valuation*)

- Eventual Collaboration? ☺

Thank You!

Any Questions?

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Hassan II Institute of Agronomy
& Veterinary Medicine | Rabat

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