OpenSG Simulations Working Group

Tool-Inventory

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# Introduction

## Document Purpose

In its current version, this document describes the efforts/the approach of the OpenSG Simulations Working Group (OpenSGSimsWG) to create an inventory of tools that are used to support modeling and simulation in the SmartGrid context. This includes utility companies and other businesses that are involved in the SmartGrid and use modeling and simulation techniques to analyze different scenarios and evaluate developed solutions.

In a later version this document might also contain the tool inventory itself, e.g. as a list of elicited tools with additional information about each tool.

## Definitions

### Inventory versus Repository

An inventory (this document) is a list of items that are to be found somewhere else whereas a repository stores the items itself. (is there an official definition somewhere?)

### Tool-Inventory versus Model-Repository

Another deliverable that is being created by the OpenSGSimsWG in parallel to this tool inventory is a model inventory. To avoid confusion about these deliverables, the meaning of the term “model” in the context of the OpenSGSimsWG needs to be defined first. Figure 1 depicts different ways to study a system, e.g. a complex system like the electricity grid and especially a SmartGrid.

Experiment with the

actual system

Experiment with a model of the system

Physical

model

Mathematical model

Analytical model

Simulation

model

System

Figure 1: Ways to study a system according to [Law, Averill M.]

Experiments with the actual system are not within the scope of the OpenSGSimsWG. The actual system may only be observed to generate data for experiments with models of the real system. In particular, as actual Smart Grids arech ld be aystemthe Smart Grid) is yet to be fer Betrachtung der Elektromobilität stellt die elektrische Infrast still to be developed and are not yet available for experiments.

So we either have a physical model of the system that is used to study effects or mathematical models to experiment with. Additionally, we might also have a hybrid experiment setup including a physical model in a “Hardware in the Loop” fashion.

Existing implementations of physical and mathematical models (the green and orange elements of Figure 1) will be collected and described in the **model inventory**.

While at a first glance it might not make sense to include physical models in the model inventory, at a second thought these physical models might be used across companies as a paid service or used within new project partnerships.

Now that a first definition of the model inventory has been given, the relation to the tool inventory needs to be elaborated. Figure 2 depicts the relations between tools, models and simulation tools.

Tool Inventory

Model Inventory

Mathematical model

Tool

Simulation

Tool

executes

is a

Physical

 model

Model of a system

Figure 2: Relation between model and tool inventory

So the model inventory can contain models that are only available as part of a special tool. This tool shall then be added and referenced in the **tool inventory** and described in detail there.

# Approach to elicit tools that are used

In order to get input for initially setting up the tool inventory, an anonymous survey shall be conducted. The target group for the survey are the members of the OpenSGSimsWG but also other persons in the SmartGrid community to which the survey has been forwarded by the WG members. **Additionally we might want to make advertisement for the survey on the OpenSG website!?**

## Survey Questions

 TBD

# Literature

Law, Averill M. “Simulation Modelling & Analysis”, 2007, 4th ed., McGraw Hill