InRetEnsys

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Chapter 1

Namespace Index

1.1 Package List

Here are the packages with brief descriptions (if available):

Chapter 2

Hierarchical Index

2.1 Class Hierarchy

This inheritance list is sorted roughly, but not completely, alphabetically:

Chapter 3

Class Index

3.1 Class List

Here are the classes, structs, unions and interfaces with brief descriptions:

Chapter 4

File Index

4.1 File List

Here is a list of all documented files with brief descriptions:

Chapter 5

Namespace Documentation

5.1 common Namespace Reference

Documentation for this package.

5.1.1 Detailed Description

Documentation for this package.

Collection of some tools for the InRetSys.Components. The file 'config.py' contains the BaseClass of the configuration containers.

5.2 components Namespace Reference

Documentation for this package.

5.2.1 Detailed Description

Documentation for this package.

Collection of all possible components.

5.3 InRetEnsys Namespace Reference

Documentation for this package.

5.3.1 Detailed Description

Documentation for this package.

More details.

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Chapter 6

Class Documentation

6.1 InRetEnsys.common.config.InRetEnsysConfigContainer.Config Class Reference

pydantic subclass to add special configurations.

Static Public Attributes

- bool **arbitrary_types_allowed** = True

  Allow arbitrary_types like pandas.DataFrames / pandas.Series which are not allow by default.
- **extra** = Extra.allow

  Without this configuration its impossible to pass extra ∗∗kwargs to pydantic.baseModel-Objects.

6.1.1 Detailed Description

pydantic subclass to add special configurations.

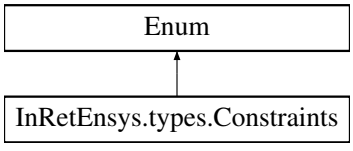
The documentation for this class was generated from the following file:

- InRetEnsys/common/config.py

6.2 InRetEnsys.types.Constraints Class Reference

Enumeration for all selectable Constraints which can be added to an PyOmo-Model.

Inheritance diagram for InRetEnsys.types.Constraints:



Static Public Attributes

- int **shared_limit** = 0
- int **investment_limit** = 1
- int **additional_investment_flow_limit** = 2
- int **generic_integral_limit** = 3
- int **emission_limit** = 4
- int **limit_active_flow_count** = 5
- int **limit_active_flow_count_by_keyword** = 6
- int **equate_variables** = 7

6.2.1 Detailed Description

Enumeration for all selectable Constraints which can be added to an PyOmo-Model.

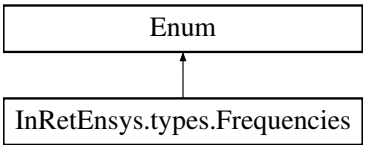
The documentation for this class was generated from the following file:

- InRetEnsys/types.py

6.3 InRetEnsys.types.Frequencies Class Reference

Enumeration for the frequenz of the pandas.date_range needed by the oemof energysystem.

Inheritance diagram for InRetEnsys.types.Frequencies:



Static Public Attributes

- int **quarter_hourly** = 0,
  Timestep is 15 Minutes.
- int **half_hourly** = 1,
  Timestep is 30 Minutes.
- int **hourly** = 2,
  Timestep is 60 Minutes.
- int **daily** = 3,
  Timestep is 24 Hours.
- int **weekly** = 4,
  Timestep is 7 Days.
- int **monthly** = 5
  Timestep is 30 Days.

6.3.1 Detailed Description

Enumeration for the frequenz of the pandas.date_range needed by the oemof energysystem.

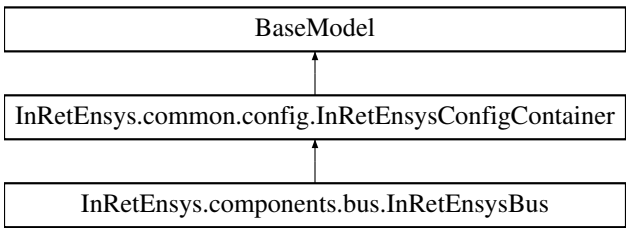
The documentation for this class was generated from the following file:

- InRetEnsys/types.py

6.4 InRetEnsys.components.bus.InRetEnsysBus Class Reference

Container which contains the params for an oemof-Bus.

Inheritance diagram for InRetEnsys.components.bus.InRetEnsysBus:



Public Member Functions

- solph.Bus to_oemof (self, solph.EnergySystem energysystem)

  Returns an oemof-object from the given args of this object.

Static Public Attributes

- **bool**

6.4.1 Detailed Description

Container which contains the params for an oemof-Bus.

Parameters

label	The Label of the Bus, must be named for further references in flows.
balanced	If 'True' the input is equal the output of the bus.

6.4.2 Member Function Documentation

6.4.2.1 to_oemof()

```
solph.Bus InRetEnsys.components.bus.InRetEnsysBus.to_oemof (
              self,
             solph.EnergySystem energysystem )
```

Returns an oemof-object from the given args of this object.

Builts a dictionary with all keywords given by the object and returns the oemof object initialised with these 'kwargs'.

Parameters

self	The Object Pointer
energysystem	The oemof-Energysystem to reference other objects i.e. for flows.

Returns

Solph.Bus-Object (oemof)

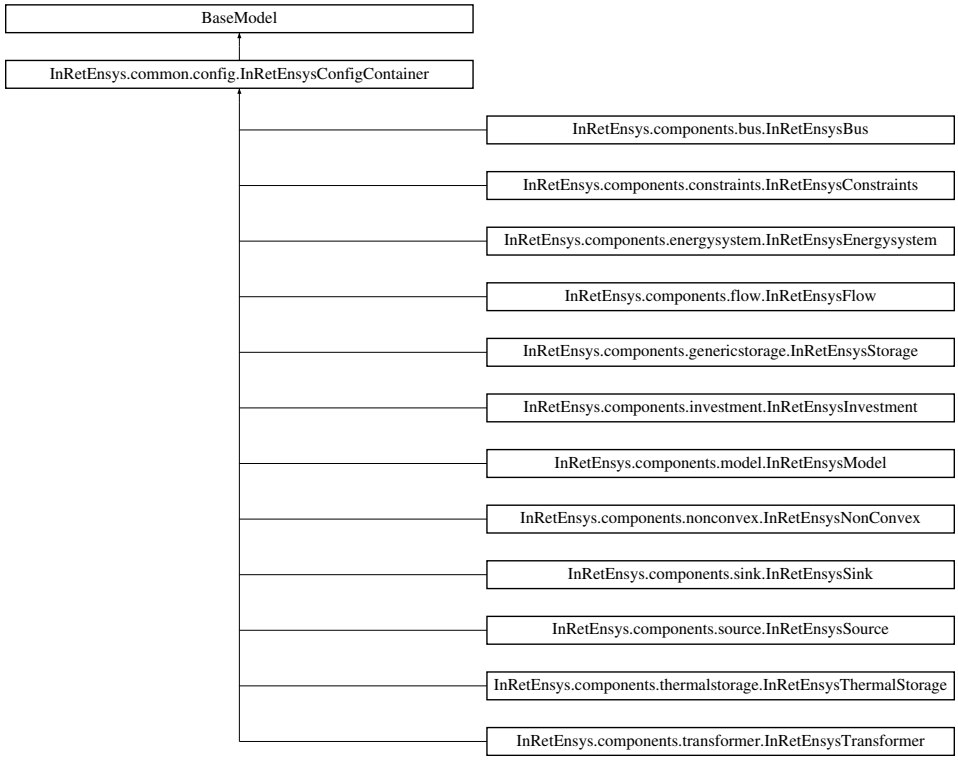
The documentation for this class was generated from the following file:

- InRetEnsys/components/bus.py

6.5 InRetEnsys.common.config.InRetEnsysConfigContainer Class Reference

container for a configuration

Inheritance diagram for InRetEnsys.common.config.InRetEnsysConfigContainer:



Classes

- class Config

  pydantic subclass to add special configurations.

Public Member Functions

- def **check** (cls, values)

  pydantic root validator to check and filter all none-type values.
- Dict[str, dict] build_kwargs (self, solph.EnergySystem energysystem)

  Build a dict of arguments for the init of the oemof objects.

6.5.1 Detailed Description

container for a configuration

6.5.2 Member Function Documentation

6.5.2.1 build_kwargs()

```
Dict[str, dict] InRetEnsys.common.config.InRetEnsysConfigContainer.build_kwargs (
              self,
             solph.EnergySystem energysystem )
```

Build a dict of arguments for the init of the oemof objects.

Returns

Dictionary with all variables of the given object.

Parameters

self	The Object pointer
energysystem	Oemof-Energysystem

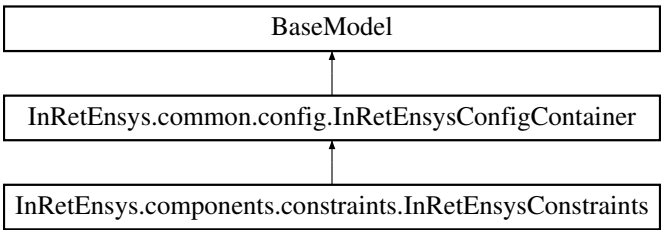
The documentation for this class was generated from the following file:

- InRetEnsys/common/config.py

6.6 InRetEnsys.components.constraints.InRetEnsysConstraints Class Reference

Container which contains the params for constraints.

Inheritance diagram for InRetEnsys.components.constraints.InRetEnsysConstraints:



Public Member Functions

- Dict[str, dict] to_oemof (self)

  Returns an dictionary of the given args of this object.

6.6.1 Detailed Description

Container which contains the params for constraints.

Parameters

typ	Type of the Constraints, all possible types are given in the Enum types.Constraints
var1	
var2	
factor1	
name	
keyword	keyword for the constraints 'generic_limit_by_keyword'
quantity	
limit_name	
components	
weights	
limit	
flows	
constraint_name	
upper_limit	
lower_limit	

6.6.2 Member Function Documentation

6.6.2.1 to_oemof()

```
Dict[str, dict] InRetEnsys.components.constraints.InRetEnsysConstraints.to_oemof (
            self )
```

Returns an dictionary of the given args of this object.

Parameters

self	The Object Pointer

Returns

dictionary of kwargs

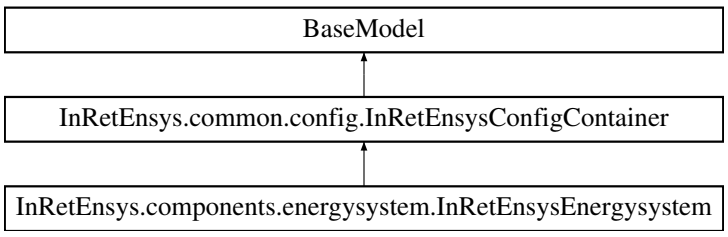
The documentation for this class was generated from the following file:

- InRetEnsys/components/constraints.py

6.7 InRetEnsys.components.energysystem.InRetEnsysEnergysystem Class Reference

Container which contains the params for an InRetEnergysystem.

Inheritance diagram for InRetEnsys.components.energysystem.InRetEnsysEnergysystem:



Static Public Attributes

- **Frequencies**

Additional Inherited Members

6.7.1 Detailed Description

Container which contains the params for an InRetEnergysystem.

Parameters

busses	
sinks	
sources	
transformers	
storages	
constraints	
frequenz	
start_date	
time_steps	

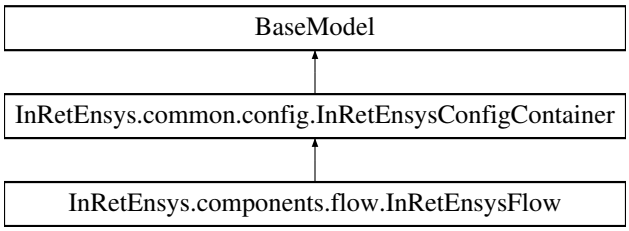
The documentation for this class was generated from the following file:

- InRetEnsys/components/energysystem.py

6.8 InRetEnsys.components.flow.InRetEnsysFlow Class Reference

Container which contains the params for an oemof-flow.

Inheritance diagram for InRetEnsys.components.flow.InRetEnsysFlow:



Public Member Functions

- solph.Flow to_oemof (self, solph.EnergySystem energysystem)

  Returns an oemof-object from the given args of this object.

6.8.1 Detailed Description

Container which contains the params for an oemof-flow.

Parameters

nominal_value	
fix	
min	
max	
positive_gradient	
negative_gradient	
summed_max	
summed_min	
variable_costs	
investement	InRetEnsys-Investment-Object, if the Flow should be optimized for an Investmentlimit.
nonconvex	InRetEnsys-NonConvex-Object, if the Flow should be nonconvex. Non possible if the flow is an Investmentflow.
kwargs	Keyword-Arguments for special Keywords, used by constraints.

6.8.2 Member Function Documentation

6.8.2.1 to_oemof()

```
solph.Flow InRetEnsys.components.flow.InRetEnsysFlow.to_oemof (
              self,
             solph.EnergySystem energysystem )
```

Returns an oemof-object from the given args of this object.

Builts a dictionary with all keywords given by the object and returns the oemof object initialised with these 'kwargs'.

Parameters

self	The Object Pointer
energysystem	The oemof-Energysystem to reference other objects i.e. for flows.

Returns

solph.Flow-Object (oemof)

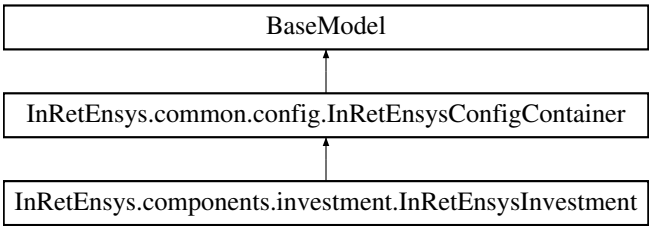
The documentation for this class was generated from the following file:

- InRetEnsys/components/flow.py

6.9 InRetEnsys.components.investment.InRetEnsysInvestment Class Reference

Container which contains the params for an oemof-investment.

Inheritance diagram for InRetEnsys.components.investment.InRetEnsysInvestment:



Public Member Functions

- solph.Investment to_oemof (self, solph.EnergySystem energysystem)

  Returns an oemof-object from the given args of this object.

Static Public Attributes

- **float**
- **bool**

6.9.1 Detailed Description

Container which contains the params for an oemof-investment.

Parameters

maximum	float = float("+inf")
minimum	float = 0.0
ep_costs	float = 0.0
existing	float = 0.0
nonconvex	bool = False
offset	float = 0.0
kwargs	Union[None, Dict] = None

6.9.2 Member Function Documentation

6.9.2.1 to_oemof()

```
solph.Investment InRetEnsys.components.investment.InRetEnsysInvestment.to_oemof (
              self,
             solph.EnergySystem energysystem )
```

Returns an oemof-object from the given args of this object.

Builts a dictionary with all keywords given by the object and returns the oemof object initialised with these 'kwargs'.

Parameters

self	The Object Pointer
energysystem	The oemof-Energysystem to reference other objects i.e. for flows.

Returns

solph.Investment-Object (oemof)

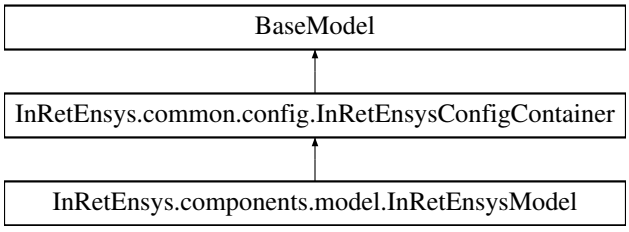
The documentation for this class was generated from the following file:

- InRetEnsys/components/investment.py

6.10 InRetEnsys.components.model.InRetEnsysModel Class Reference

Container which contains the params for an InRetEnsys-Model.

Inheritance diagram for InRetEnsys.components.model.InRetEnsysModel:



Public Member Functions

- def **es_is_not_none** (cls, v)

Static Public Attributes

- **Solver**
- **bool**

6.10.1 Detailed Description

Container which contains the params for an InRetEnsys-Model.

Parameters

energysystem	The Energysystem which should be optimized.
solver	The Solvername for the optimization.
solver_verbose	Set true if the solver should print his output and steps.

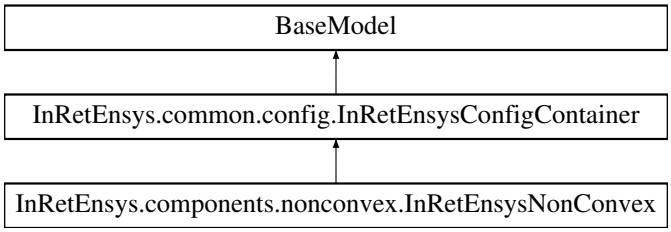
The documentation for this class was generated from the following file:

- InRetEnsys/components/model.py

6.11 InRetEnsys.components.nonconvex.InRetEnsysNonConvex Class Reference

Container which contains the params for an InRetEnsys-NonConvex-Object.

Inheritance diagram for InRetEnsys.components.nonconvex.InRetEnsysNonConvex:



Public Member Functions

- solph.NonConvex to_oemof (self, solph.EnergySystem energysystem)

  Returns an oemof-object from the given args of this object.

Static Public Attributes

- **int**

6.11.1 Detailed Description

Container which contains the params for an InRetEnsys-NonConvex-Object.

Parameters

startup_costs	Union[None, float] = None
shutdown_costs	Union[None, float] = None
activity_costs	Union[None, float] = None
minimum_uptime	Union[None, int] = None
minimum_downtime	Union[None, int] = None
maximum_startups	Union[None, int] = None
maximum_shutdowns	Union[None, int] = None
initial_status	int = 0
positive_gradient	Union[None, Dict] = None
negative_gradient	Union[None, Dict] = None
startup_costs	Union[None, float] = None
shutdown_costs	Union[None, float] = None
activity_costs	Union[None, float] = None
minimum_uptime	Union[None, int] = None
minimum_downtime	Union[None, int] = None
maximum_startups	Union[None, int] = None
maximum_shutdowns	Union[None, int] = None
initial_status	int = 0
positive_gradient	Union[None, Dict] = None
negative_gradient	Union[None, Dict] = None

6.11.2 Member Function Documentation

6.11.2.1 to_oemof()

```
solph.NonConvex InRetEnsys.components.nonconvex.InRetEnsysNonConvex.to_oemof (
              self,
             solph.EnergySystem energysystem )
```

Returns an oemof-object from the given args of this object.

Builts a dictionary with all keywords given by the object and returns the oemof object initialised with these 'kwargs'.

Parameters

self	The Object Pointer
energysystem	The oemof-Energysystem to reference other objects i.e. for flows.

Returns

solph.NonConvex-Object (oemof)

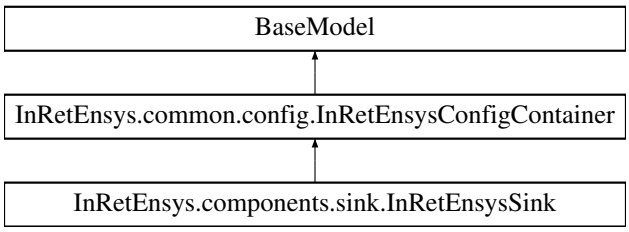
The documentation for this class was generated from the following file:

- InRetEnsys/components/nonconvex.py

6.12 InRetEnsys.components.sink.InRetEnsysSink Class Reference

Container which contains the params for an InRetEnsys-Sink-Object.

Inheritance diagram for InRetEnsys.components.sink.InRetEnsysSink:



Public Member Functions

- solph.Sink to_oemof (self, solph.EnergySystem energysystem)

  Returns an oemof-object from the given args of this object.

Static Public Attributes

- **str**

6.12.1 Detailed Description

Container which contains the params for an InRetEnsys-Sink-Object.

Parameters

label	str = "Default Sink"
inputs	Dict[str, InRetEnsysFlow]

6.12.2 Member Function Documentation

6.12.2.1 to_oemof()

```
solph.Sink InRetEnsys.components.sink.InRetEnsysSink.to_oemof (
              self,
             solph.EnergySystem energysystem )
```

Returns an oemof-object from the given args of this object.

Builts a dictionary with all keywords given by the object and returns the oemof object initialised with these 'kwargs'.

Parameters

self	The Object Pointer
energysystem	The oemof-Energysystem to reference other objects i.e. for flows.

Returns

solph.Sink-Object (oemof)

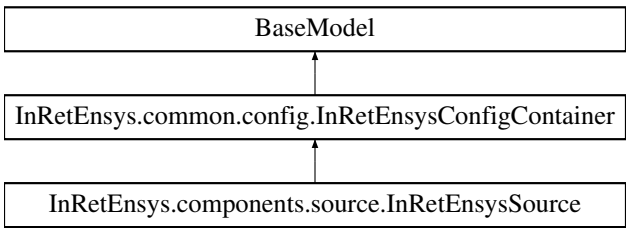
The documentation for this class was generated from the following file:

- InRetEnsys/components/sink.py

6.13 InRetEnsys.components.source.InRetEnsysSource Class Reference

Container which contains the params for an InRetEnsys-Source-Object.

Inheritance diagram for InRetEnsys.components.source.InRetEnsysSource:



Public Member Functions

- solph.Source to_oemof (self, solph.EnergySystem energysystem)

  Returns an oemof-object from the given args of this object.

Static Public Attributes

- **str**

6.13.1 Detailed Description

Container which contains the params for an InRetEnsys-Source-Object.

Parameters

label	str = "Default Sink"
outputs	Dict[str, InRetEnsysFlow]

6.13.2 Member Function Documentation

6.13.2.1 to_oemof()

```
solph.Source InRetEnsys.components.source.InRetEnsysSource.to_oemof (
              self,
             solph.EnergySystem energysystem )
```

Returns an oemof-object from the given args of this object.

Builts a dictionary with all keywords given by the object and returns the oemof object initialised with these 'kwargs'.

Parameters

self	The Object Pointer
energysystem	The oemof-Energysystem to reference other objects i.e. for flows.

Returns

solph.Source-Object (oemof)

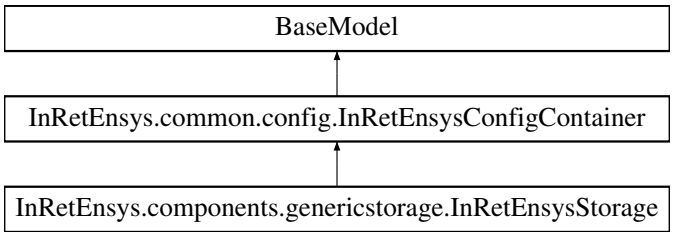
The documentation for this class was generated from the following file:

- InRetEnsys/components/source.py

6.14 InRetEnsys.components.genericstorage.InRetEnsysStorage Class Reference

Container which contains the params for an oemof-genericstorage.

Inheritance diagram for InRetEnsys.components.genericstorage.InRetEnsysStorage:



Public Member Functions

- solph.GenericStorage to_oemof (self, solph.EnergySystem energysystem)

  Returns an oemof-object from the given args of this object.

Static Public Attributes

- **str**
- **bool**
- **float**

6.14.1 Detailed Description

Container which contains the params for an oemof-genericstorage.

Parameters

label	str = "Default Storage"
inputs	Dict[str, InRetEnsysFlow]
outputs	Dict[str, InRetEnsysFlow]
nominal_storage_capacity	Union[None, float] = None
invest_relation_input_capacity	Union[None, float] = None
invest_relation_output_capacity	Union[None, float] = None
invest_relation_input_output	Union[None, float] = None
initial_storage_level	Union[None, float] = None
balanced	bool = True
loss_rate	float = 0.0
fixed_losses_relative	Union[None, float] = None
fixed_losses_absolute	Union[None, float] = None
inflow_conversion_factor	float = 1
outflow_conversion_factor	float = 1
min_storage_level	float = 0
max_storage_level	float = 1
investment	Union[None, InRetEnsysInvestment] = None

6.14.2 Member Function Documentation

6.14.2.1 to_oemof()

```
solph.GenericStorage InRetEnsys.components.genericstorage.InRetEnsysStorage.to_oemof (
              self,
             solph.EnergySystem energysystem )
```

Returns an oemof-object from the given args of this object.

Builts a dictionary with all keywords given by the object and returns the oemof object initialised with these 'kwargs'.

Parameters

self	The Object Pointer
energysystem	The oemof-Energysystem to reference other objects i.e. for flows.

Returns

solph.GenericStorage-Object (oemof)

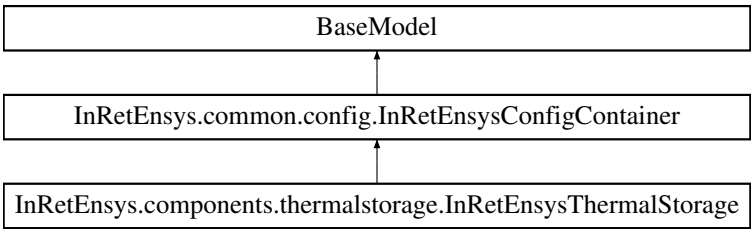
The documentation for this class was generated from the following file:

- InRetEnsys/components/genericstorage.py

6.15 InRetEnsys.components.thermalstorage.InRetEnsysThermalStorage Class Reference

Container which contains the params for an InRetEnsys-ThermalStorage-Object.

Inheritance diagram for InRetEnsys.components.thermalstorage.InRetEnsysThermalStorage:



Public Member Functions

- StratifiedThermalStorage to_oemof (self, solph.EnergySystem energysystem)

  Returns an oemof-object from the given args of this object.

Static Public Attributes

- **str**
- **InRetEnsysBus**
- **float**
- **int**
- **u_value** = None,

6.15.1 Detailed Description

Container which contains the params for an InRetEnsys-ThermalStorage-Object.

Parameters

label	str = "Default Storage"
bus	InRetEnsysBus = None,
diameter	float = 2,
height	float = 5,
temp_h	int = 95,
temp_c	int = 60,

Parameters

temp_env	int = 10,
u_value	= None,
min_storage_level	float = 0.05,
max_storage_level	float = 0.95,
capacity	int = 1,
efficiency	float = 0.9,
marginal_cost	float = 0.0001

6.15.2 Member Function Documentation

6.15.2.1 to_oemof()

```
StratifiedThermalStorage InRetEnsys.components.thermalstorage.InRetEnsysThermalStorage.to_↩
oemof (
              self,
             solph.EnergySystem energysystem )
```

Returns an oemof-object from the given args of this object.

Builts a dictionary with all keywords given by the object and returns the oemof object initialised with these 'kwargs'.

Parameters

self	The Object Pointer
energysystem	The oemof-Energysystem to reference other objects i.e. for flows.

Returns

solph.thermal.StratifiedThermalStorage-Object (oemof)

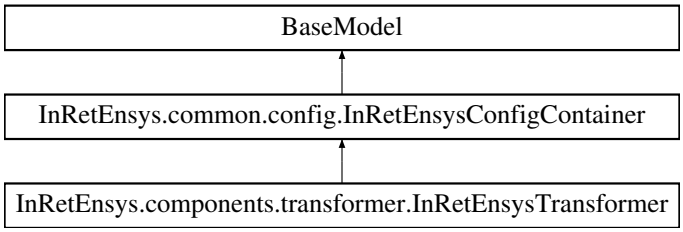
The documentation for this class was generated from the following file:

- InRetEnsys/components/thermalstorage.py

6.16 InRetEnsys.components.transformer.InRetEnsysTransformer Class Reference

Container which contains the params for an InRetEnsys-Transformer-Object.

Inheritance diagram for InRetEnsys.components.transformer.InRetEnsysTransformer:



Public Member Functions

- solph.Transformer to_oemof (self, solph.EnergySystem energysystem)

  Returns an oemof-object from the given args of this object.

Static Public Attributes

- **str**
- **Dict**

6.16.1 Detailed Description

Container which contains the params for an InRetEnsys-Transformer-Object.

Parameters

label	str = "Default Transformer"
inputs	Dict[str, InRetEnsysFlow] = None
outputs	Dict[str, InRetEnsysFlow] = None
conversion_factors	Dict = None

6.16.2 Member Function Documentation

6.16.2.1 to_oemof()

```
solph.Transformer InRetEnsys.components.transformer.InRetEnsysTransformer.to_oemof (
             self,
            solph.EnergySystem energysystem )
```

Returns an oemof-object from the given args of this object.

Builts a dictionary with all keywords given by the object and returns the oemof object initialised with these 'kwargs'.

Parameters

self	The Object Pointer
energysystem	The oemof-Energysystem to reference other objects i.e. for flows.

Returns

solph.Transformer-Object (oemof)

The documentation for this class was generated from the following file:

- InRetEnsys/components/transformer.py

6.17 InRetEnsys.modelbuilder.ModelBuilder Class Reference

Init Modelbuilder, load and optimise the configuration.

Public Member Functions

- None **__init__** (self, str ConfigFile, str DumpFile)

6.17.1 Detailed Description

Init Modelbuilder, load and optimise the configuration.

Parameters

ConfigFile	Path to the Configfile which contains the EnsysConfiguration
DumpFile	Path to the Dumpfile where the oemof-energysystem and the results should be stored.

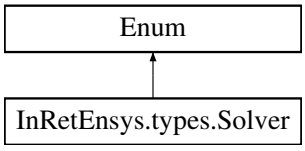
The documentation for this class was generated from the following file:

- InRetEnsys/modelbuilder.py

6.18 InRetEnsys.types.Solver Class Reference

Enumeration for all selectable solvers.

Inheritance diagram for InRetEnsys.types.Solver:



Static Public Attributes

- int **cbc** = 0,

  COIN-OR Branch-and-Cut Solver.
- int **gurobi** = 1,

  Gurobi MILP Solver.
- int **gurobi_direct** = 2,

  Gurobi MILP Solver.
- int **glpk** = 3,

  GNU Linear Programming Kit Solver.
- int **cplex** = 4,

  IBM ILOG CPLEX Optimization.
- int **kiwi** = 5

  kiwisolver from pypi

6.18.1 Detailed Description

Enumeration for all selectable solvers.

gurobi is the default solver of a InRetEnsys-Model, but it requires a license. cbc is freely avaiable but not so performant.

The documentation for this class was generated from the following file:

- InRetEnsys/types.py

6.19 InRetEnsys.common.verfication.Verification Class Reference

Public Member Functions

- None files (cls, str filepathA, str filepathB)

  Verifies two given files.
- None dataframes (cls, List[str] dfList)

  Compares two Dataframes from a given List of Dumpfiles and prints the result to the Console.

6.19.1 Member Function Documentation

6.19.1.1 dataframes()

```
None InRetEnsys.common.verfication.Verification.dataframes (
              cls,
             List[str] dfList )
```

Compares two Dataframes from a given List of Dumpfiles and prints the result to the Console.

:return: None :rtype: None :param dfList: List of 2 Dumpfiles which contains a Dataframe to compare :type dfList: List of String

6.19.1.2 files()

```
None InRetEnsys.common.verfication.Verification.files (
              cls,
             str filepathA,
             str filepathB )
```

Verifies two given files.

:return: Nothing :rtype: None :param filepathA: Filepath of file A to compare :type: filepathA: str :param filepathB: Filepath of file B to compare :type filepathB: str

The documentation for this class was generated from the following file:

- InRetEnsys/common/verfication.py

Chapter 7

File Documentation

7.1 InRetEnsys/types.py File Reference

File which contains all enumeration of the package.

Classes

- class InRetEnsys.types.Constraints

  Enumeration for all selectable Constraints which can be added to an PyOmo-Model.
- class InRetEnsys.types.Frequencies

  Enumeration for the frequenz of the pandas.date_range needed by the oemof energysystem.
- class InRetEnsys.types.Solver

  Enumeration for all selectable solvers.

Namespaces

- namespace InRetEnsys

  Documentation for this package.

7.1.1 Detailed Description

File which contains all enumeration of the package.