Energy Ville

Time-slice tool for capturing the characteristics of intermittent renewables

ETSAP Workshop Sophia Antipolis

Kris Poncelet
Project motivation

- Intermittent renewables:
  - ? Need for back-up capacity?
  - ? Curtailment?
  - ? Need for flexibility?
  - ? Role of storage and demand side?

- How to set-up the time-slices?
  - Endogenous decision making
  - Variability not captured by traditional approaches

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Poncelet K., Delarue E., Six D., Duerinck J., D’haeseleer W., Impact of the level of temporal and operational detail, Applied energy, accepted October 2015
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Different TS approaches

<table>
<thead>
<tr>
<th>Temporal representation</th>
<th>Seasonal</th>
<th>Daily</th>
<th>Number of time slices</th>
<th>IRES</th>
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<tr>
<td>Integral TS low</td>
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Integral increased # time slices
Integral with separate time slice level for RES availability

Different TS approaches

Integral Traditional

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Integral with separate time slice level for RES availability
Representative days (12)

Poncelet K., Delarue E., Six D., Duerinck J., D'haeseleer W., Impact of the level of temporal and operational detail, Applied energy, accepted October 2015
Results – 2 representative days
Results – 8 representative days
Results – 24 representative days
Endogenous trade-off between #days and resolution

Poncelet K., Höschle H., Delarue E., Duerinck J., D’haeseleer W.,
*Selecting representative days for investment planning models*,
TME Working paper,
Results – 2 representative days

24 time slices
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LOAD

PV

WIND

RESIDUAL LOAD

288 time slices
Project deliverables

💡 Time slice Tool:

.invite Input:

- Data for different time series (e.g., load, wind, PV, etc.)
- Maximum number of time slices

.invite Output:

- (Number of time slices)
- Weight (G_YRFR) of every time slice
- Value for load (COM_FR) and RES (NCAP_AF) in every time slice
- Figures of the approximation of the duration curve of every time series

.invite Software:

- Excel, Access, GAMS

.invite To be made available on the ETSAP website

_manual for use of the tool
Cost and timeline

- Draft version: May 2016, presented in Cork
- Final version: ETSAP meeting autumn 2016
- Estimated costs: €24850