



# FutureGas WP5

November  
2019

WORK IN WP5

## Work in WP5

All outputs from WP5 are available at the FutureGas Sharepoint – WP5 Outputs.

Work carried out in relation to WP5 includes:

- Journal papers
- Conference proceedings
- Presentations
- Workshop
- Project collaborations

### Journal Papers

One paper has been published as a technical report, one (two) paper is published, three papers are submitted, and two more papers are in preparation:

- **Constructing aggregated time series data for energy system model analyses**  
Published as technical report  
-Hardi Koduvere, Stefanie Buchholz, Hans Ravn
- **A Comparative study of Time Aggregation Techniques in relation to Power Capacity-Expansion modelling & Rejoinder on A Comparative study of Time Aggregation ...**  
Published in TOP, Issue 3  
-Stefanie Buchholz, Mette Gamst, David Pisinger
- **Improving solution times of Capacity Expansion Energy System Models using aggregated problem solutions**  
Submitted to 'Applied Energy'  
-Stefanie Buchholz, Mette Gamst, David Pisinger
- **Sensitivity Analysis of Time Aggregation Techniques applied to Capacity Expansion Energy System Models**  
Submitted to 'Applied Energy'  
-Stefanie Buchholz, Mette Gamst, David Pisinger

- **Time Aggregation Techniques applied to a Capacity Expansion Model for Real-Life Integrated Energy System**  
Submitted to 'Applied Energy'  
-Mette Gamst, Stefanie Buchholz, David Pisinger
- **Portfolio of Near Optimal solutions in an Aggregated Framework**  
To be submitted Winter 2019  
-Stefanie Buchholz, Mette Gamst, David Pisinger
- **ADDM Decomposition technique to solve a Stochastic Energy Capacity Expansion problem**  
To be submitted Winter 2019  
-Stefanie Buchholz, Mette Gamst, David Pisinger

### Conference Proceedings

The conference ESCO 2017 was attended but work was not presented. A presentation was given at the EURO 2018 conference and three presentations at the EURO 2019. The topics of the presentations are:

- **Time aggregation in Energy models**  
-Stefanie Buchholz, Mette Gamst, David Pisinger
- **Improving solution times of Capacity Expansion Energy System Models using aggregated problem solution as warm start**  
-Stefanie Buchholz, Mette Gamst, David Pisinger

- ➔ **Time aggregation techniques applied to integrated energy systems (SIFRE)**  
- Mette Gamst, Stefanie Buchholz, David Pisinger
- ➔ **How to Speed-up computing time of Energy System Models: key Findings from the BEAM-ME project**  
- Frieder Borggreffe, Olexandr Balyk, Stefanie Buchholz, Hannes Hobbie, Samir Jeddi, Robin Leisen, Evangelos Oanos, David Schönheit

## Presentations

A long list of presentations have been given at different workshops, meetings, etc. The most important are:

- ➔ **"WP 5 highlights and future plans" – FutureGas Seminar, Helsingør 2017**  
- Stefanie Buchholz, David Pisinger
- ➔ **"Comparison of Time Aggregation techniques " - CITIES/FutureGas Joint Seminar, Copenhagen 2017**  
- Stefanie Buchholz
- ➔ **"Simplification methods to overcome high complexity of energy system models " Seminar, Copenhagen 2017**  
- Stefanie Buchholz
- ➔ **"Balancing solution quality with complexities when aggregating" Energinet.dk, Fredericia 2017**  
- Stefanie Buchholz
- ➔ **"Improving solution times of Capacity Expansion Energy System Models using Aggregated problem solutions", Swiss OR days 2019 & Seminar at DTU 2019.**  
- Stefanie Buchholz

## Workshop

The participants of this WP have participated in different workshops mainly at DTU or at Energinet.dk. This includes:

- ➔ Gas markets
- ➔ Gas modelling in Energinet
- ➔ Investments in energy models

## Project Collaborations

Apart from the collaboration with the FLEX<sub>4</sub>RES project on time aggregation, a collaboration with the BEAM-ME project has also been initiated, as well as a collaboration with DTU Electro. The subject is speed-up strategies of energy models. Several meetings, workshops and presentations are included here. Subjects:

- ➔ Time Aggregation
- ➔ Decomposition of Balmorel
- ➔ Comparing decomposition techniques of capacity expansion models
- ➔ Parameter Tuning
- ➔ Solver related and conceptual speed-up strategies

## INFORMATION

Find all above articles, presentations and reports at the FutureGas Sharepoint – WP<sub>5</sub> Outputs

[https://share.dtu.dk/sites/FutureGas\\_142450/WP%204%20Gas%20im%20the%20integrated%20energy%20system/Forms/AllItems.aspx?RootFolder=%2F%2FFutureGas%5F142450%2FWP%204%20Gas%20im%20the%20integrated%20energy%20system%2FWP4%20Outputs&FolderCTID=0x0120004486220B1A9AD84EAC6B819C74664D8F&View=%7B9D045709%2D3586%2D4EE2%2D8BCA%2D24AA84D5F4D9%7D](https://share.dtu.dk/sites/FutureGas_142450/WP%204%20Gas%20im%20the%20integrated%20energy%20system/Forms/AllItems.aspx?RootFolder=%2F%2FFutureGas%5F142450%2FWP%204%20Gas%20im%20the%20integrated%20energy%20system%2FWP4%20Outputs&FolderCTID=0x0120004486220B1A9AD84EAC6B819C74664D8F&View=%7B9D045709%2D3586%2D4EE2%2D8BCA%2D24AA84D5F4D9%7D)