Supplementary Material

Optimization of Biogas Supply Chains considering Multiple Objectives and Auction Trading Prices of Electricity

Jafaru Egieyaa, Lidija Čučekb, Klavdija Zirngastb, Adeniyi Isafiadea, Zdravko Kravanjab

aDepartment of Chemical Engineering, University of Cape Town, Private Bag X3, Rondebosch 7701, Cape Town, South Africa

bFaculty of Chemistry and Chemical Engineering, University of Maribor, Smetanova ulica 17, 2000 Maribor, Slovenia

Supplementary material includes the following:

Part A: Data

* Auction trading prices of electricity and average electricity prices based on model reduction techniques as considered in the work (see Tables S1 – S24)
* Data related to environmental objective, GHG emissions (see Tables S25 – S27)
* Data related to sustainability profit maximization (see Tables S28 – S31)
* Investment cost for biogas holder which enables storing biogas (see Figure S1)

Part B: Nomenclature

**PART A: Data**

# ****Auction Trading prices of Electricity****

All the data has been applied as described in the paper and Supplementary material by Egieya et al. [1]. Instead of guaranteed purchase prices of electricity as in Egieya et al [1], auction trading prices of electricity are considered which change every hour. For all the data, the exchange rate of 1.33 $/€ is used as in Egieya et al. [2]. Auction trading prices based on 2017 prices are considered, ranging from -57.1 and 264.7 $/MWh and are obtained from the BSP South Pool Energy Exchange [3]. Auction trading prices are shown in Tables S1 – S12 for each month (in €/MWh). Averaged auction trading prices considering 12 monthly, 7 daily and 3 hourly time periods (in $/kWh) are further shown in Tables S13 – S24.

Table S1. Auction Trading Prices for January (in €/MWh)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Delivery Date** | **00 - 01** | **01 - 02** | **02 - 03** | **03 - 04** | **04 - 05** | **05 - 06** | **06 - 07** | **07 - 08** | **08 - 09** | **09 - 10** | **10 - 11** | **11 - 12** | **12 - 13** | **13 - 14** | **14 - 15** | **15 - 16** | **16 - 17** | **17 - 18** | **18 - 19** | **19 - 20** | **20 - 21** | **21 - 22** | **22 - 23** | **23 - 24** |
| **1.01.2017** | 53.00 | 52.00 | 51.00 | 47.27 | 45.49 | 17.67 | 11.10 | 15.47 | 16.88 | 35.10 | 35.10 | 48.02 | 49.57 | 48.69 | 46.91 | 49.43 | 50.45 | 53.30 | 59.07 | 61.71 | 56.26 | 55.00 | 54.00 | 52.00 |
| **2.01.2017** | 51.80 | 32.70 | 28.11 | 27.89 | 27.73 | 32.60 | 47.01 | 57.67 | 64.15 | 62.50 | 61.70 | 61.20 | 55.69 | 55.67 | 61.19 | 59.71 | 60.96 | 73.55 | 63.10 | 63.10 | 70.11 | 59.69 | 54.00 | 49.00 |
| **3.01.2017** | 36.02 | 34.98 | 33.64 | 33.89 | 33.50 | 46.74 | 55.00 | 59.73 | 61.81 | 61.81 | 61.94 | 63.80 | 57.49 | 56.74 | 60.00 | 64.01 | 68.94 | 67.01 | 61.99 | 58.50 | 60.00 | 59.48 | 63.00 | 56.74 |
| **4.01.2017** | 62.36 | 56.04 | 54.10 | 52.00 | 51.36 | 53.02 | 62.40 | 68.00 | 73.01 | 73.00 | 72.85 | 72.51 | 66.42 | 69.16 | 69.00 | 67.13 | 68.26 | 72.15 | 76.80 | 71.01 | 69.84 | 64.74 | 62.36 | 60.62 |
| **5.01.2017** | 51.22 | 48.41 | 50.00 | 47.46 | 42.34 | 45.18 | 54.09 | 65.03 | 68.91 | 70.49 | 71.54 | 70.20 | 65.00 | 63.17 | 67.00 | 70.51 | 69.70 | 73.92 | 73.76 | 65.15 | 64.24 | 63.30 | 62.60 | 56.00 |
| **6.01.2017** | 40.84 | 41.15 | 43.77 | 39.97 | 40.81 | 43.04 | 45.37 | 49.49 | 59.92 | 60.00 | 60.04 | 57.70 | 62.00 | 54.51 | 50.94 | 54.04 | 57.52 | 64.91 | 59.92 | 57.99 | 50.00 | 50.00 | 63.10 | 53.00 |
| **7.01.2017** | 36.83 | 34.37 | 33.84 | 33.83 | 33.62 | 32.96 | 30.07 | 33.58 | 36.02 | 55.51 | 63.10 | 65.70 | 55.60 | 61.90 | 53.74 | 53.26 | 59.08 | 69.99 | 76.52 | 78.28 | 68.00 | 60.00 | 60.00 | 47.00 |
| **8.01.2017** | 54.10 | 34.14 | 33.96 | 50.22 | 47.99 | 48.00 | 49.69 | 50.13 | 51.50 | 54.00 | 55.00 | 56.20 | 55.10 | 56.20 | 54.00 | 53.00 | 54.08 | 60.95 | 70.51 | 75.52 | 73.20 | 68.40 | 63.20 | 57.40 |
| **9.01.2017** | 40.00 | 39.05 | 39.21 | 39.24 | 40.26 | 52.24 | 65.75 | 78.01 | 89.78 | 80.00 | 80.00 | 80.00 | 95.12 | 84.81 | 78.70 | 110.00 | 80.00 | 79.70 | 83.87 | 97.25 | 77.07 | 66.20 | 66.60 | 65.82 |
| **10.01.2017** | 59.99 | 59.60 | 59.09 | 57.99 | 59.10 | 59.84 | 67.71 | 83.60 | 95.00 | 107.55 | 101.92 | 87.63 | 83.11 | 80.00 | 86.09 | 90.00 | 98.00 | 120.00 | 109.04 | 98.32 | 92.66 | 91.58 | 71.01 | 73.15 |
| **11.01.2017** | 66.76 | 64.79 | 62.05 | 58.21 | 58.60 | 62.29 | 75.80 | 103.26 | 112.08 | 110.63 | 103.26 | 130.07 | 88.36 | 82.26 | 79.82 | 87.15 | 97.26 | 160.00 | 112.08 | 97.26 | 85.00 | 80.97 | 77.95 | 77.51 |
| **12.01.2017** | 77.83 | 76.60 | 72.66 | 71.58 | 71.10 | 71.88 | 80.00 | 83.73 | 96.43 | 103.78 | 101.92 | 88.94 | 82.94 | 81.19 | 86.09 | 86.50 | 90.00 | 104.40 | 96.88 | 87.50 | 84.00 | 79.67 | 73.24 | 73.23 |
| **13.01.2017** | 72.28 | 66.99 | 60.70 | 30.97 | 52.94 | 66.99 | 87.84 | 99.00 | 99.34 | 106.39 | 104.48 | 110.32 | 96.48 | 102.16 | 94.75 | 96.02 | 95.00 | 105.44 | 105.82 | 96.02 | 87.76 | 81.67 | 81.90 | 69.26 |
| **14.01.2017** | 75.00 | 65.13 | 59.71 | 55.25 | 50.01 | 52.93 | 55.99 | 36.10 | 70.06 | 72.89 | 73.49 | 69.19 | 67.94 | 61.23 | 59.03 | 58.41 | 59.82 | 72.89 | 85.48 | 81.79 | 75.93 | 69.75 | 72.89 | 70.31 |
| **15.01.2017** | 48.78 | 46.00 | 31.41 | 40.11 | 47.00 | 50.00 | 51.00 | 52.19 | 55.19 | 63.91 | 68.00 | 68.00 | 71.38 | 63.91 | 58.53 | 57.51 | 57.12 | 70.00 | 88.00 | 82.38 | 79.37 | 78.00 | 75.83 | 69.75 |
| **16.01.2017** | 45.07 | 43.25 | 39.08 | 37.57 | 38.24 | 48.98 | 66.83 | 100.38 | 99.76 | 100.88 | 99.97 | 99.56 | 105.00 | 105.59 | 107.70 | 103.84 | 108.43 | 120.00 | 124.83 | 113.69 | 97.20 | 73.59 | 56.00 | 45.06 |
| **17.01.2017** | 80.81 | 69.61 | 72.08 | 58.28 | 57.76 | 69.63 | 94.64 | 127.06 | 135.06 | 135.70 | 129.33 | 124.00 | 111.26 | 106.08 | 108.74 | 113.14 | 120.22 | 142.78 | 143.09 | 124.94 | 110.38 | 93.07 | 94.50 | 72.00 |
| **18.01.2017** | 38.28 | 71.65 | 35.09 | 35.07 | 35.07 | 36.62 | 55.08 | 110.01 | 119.00 | 120.00 | 111.75 | 98.42 | 95.89 | 91.02 | 89.92 | 99.00 | 92.45 | 116.87 | 130.00 | 115.71 | 95.00 | 55.66 | 48.86 | 53.00 |
| **19.01.2017** | 80.27 | 74.60 | 44.03 | 39.70 | 43.10 | 72.35 | 90.78 | 103.00 | 119.10 | 119.10 | 119.06 | 108.86 | 93.00 | 92.73 | 94.80 | 92.00 | 99.00 | 100.10 | 119.10 | 90.75 | 85.31 | 98.20 | 91.80 | 84.54 |
| **20.01.2017** | 81.00 | 82.07 | 79.75 | 75.98 | 69.80 | 85.00 | 102.80 | 118.00 | 144.49 | 122.00 | 117.05 | 105.15 | 95.09 | 94.70 | 95.00 | 100.00 | 99.00 | 100.00 | 120.00 | 115.00 | 98.52 | 94.70 | 94.70 | 94.98 |
| **21.01.2017** | 73.68 | 78.58 | 65.00 | 47.82 | 43.07 | 42.52 | 70.00 | 70.49 | 75.60 | 84.00 | 79.90 | 74.27 | 63.52 | 58.14 | 58.14 | 62.23 | 65.00 | 87.36 | 90.43 | 90.00 | 70.77 | 66.32 | 64.15 | 55.00 |
| **22.01.2017** | 38.60 | 38.22 | 38.60 | 37.43 | 38.27 | 37.83 | 35.97 | 39.24 | 37.76 | 69.02 | 72.69 | 75.00 | 75.19 | 45.00 | 42.10 | 58.53 | 61.19 | 67.33 | 85.38 | 92.12 | 92.00 | 86.35 | 79.00 | 73.00 |
| **23.01.2017** | 45.17 | 40.07 | 39.43 | 37.84 | 38.40 | 44.84 | 80.59 | 120.30 | 129.72 | 125.39 | 117.57 | 105.13 | 96.72 | 95.03 | 90.70 | 98.90 | 101.36 | 109.98 | 131.32 | 114.55 | 101.20 | 90.76 | 86.20 | 80.00 |
| **24.01.2017** | 86.83 | 82.07 | 75.69 | 70.15 | 69.09 | 76.00 | 102.90 | 170.00 | 153.67 | 150.10 | 151.07 | 135.00 | 121.58 | 117.68 | 112.21 | 117.18 | 120.00 | 131.01 | 144.98 | 125.96 | 118.11 | 96.30 | 93.71 | 56.61 |
| **25.01.2017** | 54.69 | 46.58 | 42.39 | 40.94 | 43.25 | 48.03 | 112.40 | 151.14 | 130.00 | 150.10 | 150.10 | 134.23 | 122.90 | 118.14 | 116.87 | 119.56 | 120.00 | 122.90 | 150.00 | 146.80 | 120.00 | 100.67 | 99.18 | 68.00 |
| **26.01.2017** | 47.52 | 91.47 | 41.80 | 41.15 | 41.80 | 78.40 | 54.15 | 150.00 | 164.92 | 150.00 | 126.09 | 120.00 | 101.28 | 88.80 | 96.07 | 113.12 | 123.00 | 134.30 | 139.00 | 121.30 | 99.10 | 90.20 | 88.10 | 83.65 |
| **27.01.2017** | 78.93 | 69.20 | 64.33 | 60.71 | 61.06 | 64.33 | 93.06 | 150.00 | 120.00 | 109.27 | 170.00 | 160.00 | 150.00 | 160.00 | 141.00 | 141.00 | 150.00 | 151.31 | 132.53 | 148.62 | 150.00 | 72.68 | 73.78 | 70.30 |
| **28.01.2017** | 60.49 | 57.36 | 54.00 | 53.00 | 53.00 | 53.82 | 55.00 | 59.59 | 61.17 | 64.08 | 69.88 | 65.92 | 65.00 | 57.71 | 54.11 | 54.15 | 58.09 | 65.00 | 78.36 | 80.00 | 72.03 | 59.59 | 60.77 | 66.00 |
| **29.01.2017** | 57.70 | 54.80 | 52.72 | 47.51 | 45.60 | 45.99 | 50.00 | 51.88 | 53.38 | 60.71 | 66.00 | 66.03 | 68.00 | 54.00 | 52.16 | 52.09 | 54.00 | 62.42 | 75.96 | 79.49 | 80.00 | 69.49 | 66.02 | 58.25 |
| **30.01.2017** | 52.00 | 50.00 | 47.49 | 47.70 | 47.09 | 51.41 | 61.00 | 83.05 | 95.97 | 92.34 | 79.98 | 77.96 | 76.19 | 87.97 | 89.11 | 90.84 | 85.00 | 110.00 | 120.00 | 103.97 | 100.00 | 100.01 | 80.09 | 74.19 |
| **31.01.2017** | 61.23 | 55.00 | 53.30 | 52.00 | 52.00 | 54.00 | 135.00 | 147.20 | 147.21 | 131.32 | 130.10 | 140.54 | 130.10 | 120.01 | 121.32 | 130.01 | 125.37 | 98.34 | 104.33 | 101.25 | 116.35 | 60.92 | 59.62 | 59.20 |

Table S2. Auction Trading Prices for February (in €/MWh)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Delivery Date** | **00 - 01** | **01 - 02** | **02 - 03** | **03 - 04** | **04 - 05** | **05 - 06** | **06 - 07** | **07 - 08** | **08 - 09** | **09 - 10** | **10 - 11** | **11 - 12** | **12 - 13** | **13 - 14** | **14 - 15** | **15 - 16** | **16 - 17** | **17 - 18** | **18 - 19** | **19 - 20** | **20 - 21** | **21 - 22** | **22 - 23** | **23 - 24** |
| 1.02.2017 | 55.00 | 54.99 | 51.81 | 51.10 | 50.00 | 53.00 | 61.10 | 77.70 | 125.64 | 105.00 | 105.00 | 130.10 | 127.47 | 99.92 | 82.90 | 88.47 | 105.47 | 130.10 | 130.10 | 115.00 | 103.52 | 87.28 | 98.73 | 56.91 |
| 2.02.2017 | 53.00 | 51.00 | 51.00 | 50.33 | 51.00 | 52.00 | 64.33 | 90.02 | 103.08 | 98.24 | 100.24 | 98.24 | 73.57 | 64.83 | 71.84 | 72.11 | 94.01 | 89.42 | 93.01 | 92.38 | 80.42 | 63.55 | 59.60 | 54.99 |
| 3.02.2017 | 50.00 | 48.31 | 47.00 | 47.23 | 47.99 | 49.52 | 66.29 | 87.58 | 100.00 | 85.10 | 82.94 | 80.00 | 66.29 | 64.91 | 66.57 | 66.29 | 68.00 | 71.85 | 75.40 | 69.00 | 62.16 | 56.80 | 52.99 | 50.01 |
| 4.02.2017 | 54.98 | 46.78 | 43.89 | 31.93 | 31.89 | 32.09 | 33.82 | 51.00 | 58.00 | 60.73 | 58.00 | 57.23 | 50.00 | 49.12 | 47.22 | 48.54 | 51.00 | 56.37 | 66.18 | 62.19 | 55.79 | 52.15 | 50.00 | 45.70 |
| 5.02.2017 | 49.14 | 44.86 | 37.92 | 36.65 | 33.15 | 37.50 | 39.58 | 36.93 | 37.52 | 51.00 | 54.95 | 56.31 | 55.54 | 41.45 | 40.88 | 39.97 | 40.81 | 54.95 | 65.07 | 62.78 | 58.00 | 50.10 | 51.00 | 48.00 |
| 6.02.2017 | 43.31 | 41.40 | 38.27 | 35.10 | 36.30 | 39.50 | 55.98 | 74.95 | 96.00 | 100.00 | 99.53 | 100.00 | 80.37 | 77.75 | 86.12 | 83.00 | 82.80 | 74.80 | 86.37 | 77.29 | 73.66 | 55.84 | 49.00 | 39.00 |
| 7.02.2017 | 42.01 | 40.40 | 39.01 | 37.78 | 38.03 | 38.09 | 54.00 | 64.90 | 70.10 | 70.10 | 69.55 | 70.50 | 63.94 | 61.84 | 64.68 | 65.65 | 68.44 | 71.37 | 80.35 | 80.70 | 70.73 | 62.28 | 60.00 | 40.01 |
| 8.02.2017 | 34.51 | 34.59 | 34.35 | 33.73 | 35.06 | 35.90 | 50.07 | 69.92 | 71.10 | 70.90 | 72.50 | 71.49 | 70.34 | 66.94 | 67.43 | 68.96 | 69.13 | 73.85 | 88.18 | 84.04 | 72.60 | 62.50 | 47.98 | 45.82 |
| 9.02.2017 | 48.10 | 48.05 | 44.96 | 42.50 | 41.66 | 47.20 | 54.58 | 74.14 | 72.16 | 72.79 | 70.97 | 68.97 | 66.91 | 65.64 | 65.00 | 65.49 | 65.76 | 70.43 | 72.91 | 70.10 | 70.69 | 59.00 | 61.69 | 45.10 |
| 10.02.2017 | 36.67 | 34.31 | 33.46 | 33.10 | 32.55 | 42.20 | 63.95 | 73.83 | 79.27 | 80.00 | 77.30 | 74.51 | 72.17 | 70.60 | 69.30 | 69.31 | 73.00 | 73.69 | 86.00 | 80.07 | 74.00 | 67.47 | 67.27 | 67.11 |
| 11.02.2017 | 62.61 | 53.71 | 50.00 | 39.04 | 32.90 | 49.35 | 39.34 | 52.00 | 57.91 | 65.01 | 64.21 | 61.82 | 59.94 | 53.89 | 51.36 | 49.99 | 51.00 | 59.08 | 69.32 | 67.38 | 62.36 | 53.71 | 52.50 | 50.00 |
| 12.02.2017 | 31.43 | 31.06 | 31.15 | 31.08 | 29.78 | 29.88 | 30.36 | 30.36 | 39.00 | 50.96 | 34.26 | 35.03 | 31.40 | 30.89 | 30.02 | 30.81 | 32.19 | 53.58 | 64.50 | 68.00 | 61.71 | 53.00 | 51.00 | 46.07 |
| 13.02.2017 | 28.83 | 29.68 | 31.12 | 29.85 | 30.76 | 33.01 | 49.50 | 56.98 | 64.68 | 64.68 | 64.68 | 64.68 | 60.86 | 61.44 | 61.07 | 61.65 | 64.68 | 65.00 | 68.80 | 68.23 | 60.75 | 53.64 | 52.00 | 50.57 |
| 14.02.2017 | 47.63 | 42.11 | 40.52 | 39.25 | 39.31 | 41.63 | 51.67 | 63.91 | 68.00 | 65.43 | 64.67 | 62.50 | 60.51 | 57.28 | 56.00 | 56.00 | 63.70 | 63.53 | 66.47 | 67.89 | 61.00 | 54.13 | 51.76 | 40.64 |
| 15.02.2017 | 37.39 | 38.18 | 37.13 | 35.72 | 36.51 | 37.87 | 50.00 | 61.48 | 63.32 | 60.76 | 56.00 | 59.90 | 53.52 | 51.77 | 53.52 | 51.91 | 59.00 | 59.16 | 64.48 | 65.85 | 59.00 | 52.26 | 50.70 | 42.00 |
| 16.02.2017 | 49.98 | 46.50 | 45.32 | 45.00 | 45.00 | 45.85 | 52.00 | 61.87 | 63.15 | 63.63 | 61.90 | 59.80 | 55.41 | 53.37 | 54.03 | 54.45 | 56.42 | 60.01 | 65.65 | 69.62 | 63.94 | 57.40 | 55.59 | 56.40 |
| 17.02.2017 | 48.23 | 48.08 | 45.00 | 39.71 | 39.32 | 45.14 | 53.83 | 60.40 | 65.00 | 65.94 | 64.10 | 62.99 | 60.03 | 58.40 | 55.00 | 56.03 | 56.03 | 57.51 | 61.99 | 62.97 | 60.16 | 49.52 | 46.34 | 42.10 |
| 18.02.2017 | 35.10 | 33.09 | 35.08 | 34.30 | 34.30 | 35.36 | 38.81 | 47.20 | 47.92 | 50.00 | 49.85 | 48.24 | 46.86 | 44.49 | 42.49 | 42.93 | 47.61 | 51.00 | 59.50 | 60.71 | 55.82 | 51.00 | 50.39 | 30.29 |
| 19.02.2017 | 30.81 | 31.50 | 25.00 | 9.93 | 10.00 | 31.50 | 39.70 | 28.23 | 46.20 | 48.18 | 48.51 | 46.94 | 46.07 | 42.10 | 31.41 | 30.34 | 31.99 | 41.37 | 53.65 | 52.80 | 53.00 | 55.82 | 39.70 | 31.50 |
| 20.02.2017 | 39.61 | 40.01 | 41.86 | 41.21 | 44.78 | 48.56 | 60.59 | 68.70 | 77.10 | 69.50 | 61.69 | 59.69 | 56.62 | 54.98 | 57.90 | 61.69 | 67.43 | 81.00 | 96.01 | 91.54 | 80.00 | 91.54 | 66.90 | 52.00 |
| 21.02.2017 | 49.17 | 48.96 | 46.65 | 45.66 | 43.40 | 49.16 | 53.00 | 57.90 | 62.04 | 59.73 | 57.68 | 58.00 | 55.56 | 54.59 | 52.81 | 53.76 | 56.89 | 56.99 | 59.90 | 61.23 | 55.14 | 51.12 | 49.26 | 47.95 |
| 22.02.2017 | 43.00 | 41.19 | 38.88 | 38.32 | 38.02 | 39.99 | 48.76 | 56.51 | 58.55 | 57.79 | 55.92 | 56.12 | 51.57 | 50.77 | 50.90 | 51.99 | 55.55 | 55.41 | 58.16 | 59.20 | 55.16 | 51.44 | 49.28 | 48.30 |
| 23.02.2017 | 45.50 | 42.00 | 40.34 | 18.00 | 18.00 | 45.63 | 49.80 | 57.13 | 58.69 | 55.00 | 53.00 | 57.40 | 52.41 | 51.03 | 53.08 | 55.16 | 55.92 | 55.78 | 58.17 | 58.78 | 54.99 | 53.00 | 48.00 | 46.03 |
| 24.02.2017 | 41.37 | 31.41 | 13.00 | 5.20 | 13.00 | 31.60 | 41.40 | 33.44 | 34.30 | 33.91 | 33.48 | 33.18 | 32.49 | 32.41 | 32.24 | 34.90 | 44.92 | 50.10 | 57.52 | 58.19 | 43.94 | 49.47 | 48.98 | 36.66 |
| 25.02.2017 | 52.26 | 48.62 | 32.11 | 29.45 | 32.11 | 42.82 | 47.77 | 50.00 | 52.00 | 51.00 | 49.85 | 48.61 | 45.08 | 42.59 | 41.94 | 43.07 | 47.26 | 52.01 | 55.00 | 57.69 | 53.01 | 50.15 | 48.72 | 47.50 |
| 26.02.2017 | 46.66 | 42.53 | 41.85 | 39.37 | 38.72 | 39.99 | 29.86 | 41.51 | 19.00 | 10.36 | 12.91 | 12.98 | 9.92 | 9.75 | 9.98 | 10.40 | 12.78 | 28.00 | 35.20 | 54.10 | 35.20 | 24.00 | 20.86 | 10.35 |
| 27.02.2017 | 22.01 | 32.20 | 38.10 | 32.11 | 32.11 | 42.50 | 50.50 | 56.00 | 59.43 | 56.99 | 54.67 | 53.99 | 56.00 | 52.86 | 54.18 | 55.35 | 56.77 | 56.99 | 59.50 | 58.55 | 54.99 | 53.00 | 32.20 | 9.00 |
| 28.02.2017 | 7.84 | 8.00 | 8.00 | 8.56 | 9.79 | 31.41 | 31.50 | 44.10 | 33.20 | 31.02 | 30.76 | 33.00 | 32.99 | 39.80 | 39.86 | 39.17 | 39.52 | 40.13 | 49.20 | 53.12 | 44.10 | 38.78 | 31.50 | 30.06 |

Table S3. Auction Trading Prices for March (in €/MWh)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Delivery Date** | **00 - 01** | **01 - 02** | **02 - 03** | **03 - 04** | **04 - 05** | **05 - 06** | **06 - 07** | **07 - 08** | **08 - 09** | **09 - 10** | **10 - 11** | **11 - 12** | **12 - 13** | **13 - 14** | **14 - 15** | **15 - 16** | **16 - 17** | **17 - 18** | **18 - 19** | **19 - 20** | **20 - 21** | **21 - 22** | **22 - 23** | **23 - 24** |
| 1.03.2017 | 31.05 | 29.57 | 28.61 | 25.52 | 28.65 | 29.98 | 32.40 | 45.10 | 52.90 | 54.04 | 45.10 | 45.10 | 48.50 | 46.00 | 42.30 | 40.00 | 42.30 | 46.82 | 59.14 | 58.45 | 47.10 | 34.90 | 31.93 | 29.70 |
| 2.03.2017 | 29.73 | 29.49 | 26.00 | 26.00 | 26.17 | 26.04 | 31.50 | 50.00 | 55.00 | 47.50 | 47.00 | 47.00 | 47.00 | 31.50 | 29.10 | 30.00 | 31.10 | 47.00 | 57.00 | 57.57 | 55.28 | 47.00 | 31.50 | 25.07 |
| 3.03.2017 | 27.02 | 26.47 | 26.03 | 28.99 | 30.91 | 32.36 | 41.91 | 48.00 | 47.57 | 46.50 | 43.49 | 43.47 | 42.30 | 39.83 | 39.10 | 38.60 | 40.97 | 41.91 | 42.18 | 44.95 | 41.01 | 35.29 | 36.25 | 34.56 |
| 4.03.2017 | 31.60 | 30.25 | 30.04 | 28.44 | 28.26 | 29.22 | 28.16 | 30.00 | 33.96 | 39.34 | 36.73 | 36.69 | 33.76 | 31.44 | 31.81 | 33.67 | 34.90 | 40.44 | 44.69 | 47.25 | 42.01 | 35.07 | 31.87 | 22.68 |
| 5.03.2017 | 21.11 | 15.44 | 11.56 | 10.60 | 9.84 | 8.06 | 9.83 | 9.13 | 9.88 | 11.32 | 9.97 | 10.00 | 10.80 | 9.96 | 9.40 | 9.96 | 17.22 | 30.03 | 33.69 | 37.95 | 35.02 | 32.85 | 32.92 | 31.67 |
| 6.03.2017 | 31.24 | 29.04 | 27.99 | 25.35 | 27.30 | 29.07 | 34.98 | 42.40 | 44.28 | 47.03 | 46.58 | 46.36 | 44.10 | 42.10 | 36.07 | 39.90 | 42.91 | 46.15 | 49.59 | 51.66 | 46.05 | 37.40 | 35.00 | 31.93 |
| 7.03.2017 | 31.07 | 30.01 | 29.99 | 29.64 | 30.60 | 32.98 | 36.00 | 50.19 | 54.25 | 54.10 | 53.93 | 51.54 | 49.90 | 49.07 | 48.69 | 47.75 | 48.00 | 50.31 | 57.52 | 61.05 | 51.93 | 43.93 | 41.94 | 33.73 |
| 8.03.2017 | 33.98 | 32.76 | 32.00 | 31.38 | 31.20 | 32.06 | 41.04 | 49.61 | 49.93 | 43.44 | 41.00 | 38.10 | 38.10 | 33.65 | 35.01 | 33.70 | 34.03 | 35.74 | 55.10 | 55.10 | 54.86 | 44.00 | 32.14 | 28.97 |
| 9.03.2017 | 30.66 | 30.56 | 29.78 | 29.30 | 29.28 | 31.12 | 41.59 | 48.67 | 50.02 | 49.02 | 48.62 | 47.16 | 44.00 | 42.02 | 45.68 | 46.55 | 50.00 | 52.11 | 55.00 | 55.63 | 44.10 | 52.61 | 52.11 | 28.82 |
| 10.03.2017 | 45.00 | 33.10 | 31.10 | 31.01 | 31.10 | 38.10 | 35.50 | 41.98 | 41.93 | 38.10 | 38.10 | 38.10 | 41.63 | 39.90 | 41.94 | 32.11 | 36.07 | 40.37 | 49.17 | 53.56 | 45.88 | 39.67 | 37.71 | 34.25 |
| 11.03.2017 | 33.02 | 31.24 | 30.13 | 29.64 | 29.07 | 30.00 | 31.77 | 32.40 | 35.00 | 35.05 | 33.00 | 31.41 | 31.07 | 30.19 | 29.85 | 29.98 | 30.81 | 34.66 | 43.97 | 45.91 | 38.10 | 32.26 | 32.11 | 30.05 |
| 12.03.2017 | 27.90 | 25.40 | 20.36 | 13.92 | 10.88 | 11.95 | 13.92 | 11.21 | 10.97 | 13.28 | 10.18 | 15.63 | 30.00 | 12.21 | 9.55 | 11.93 | 11.00 | 26.90 | 31.50 | 45.10 | 35.00 | 30.62 | 30.40 | 29.34 |
| 13.03.2017 | 27.04 | 26.82 | 26.90 | 27.02 | 27.77 | 29.64 | 33.83 | 51.00 | 51.99 | 51.00 | 47.47 | 46.55 | 40.49 | 40.39 | 45.57 | 46.72 | 40.10 | 41.82 | 49.90 | 56.99 | 49.51 | 44.94 | 39.96 | 33.55 |
| 14.03.2017 | 29.58 | 28.61 | 27.73 | 27.75 | 28.43 | 29.49 | 37.72 | 44.92 | 47.10 | 43.97 | 41.93 | 41.20 | 38.53 | 37.89 | 40.06 | 41.20 | 35.00 | 41.15 | 45.58 | 45.46 | 35.85 | 28.99 | 28.08 | 23.44 |
| 15.03.2017 | 22.21 | 21.14 | 18.65 | 20.16 | 24.03 | 28.05 | 34.96 | 40.98 | 40.97 | 38.99 | 34.94 | 33.07 | 32.14 | 31.50 | 31.42 | 32.90 | 33.06 | 43.00 | 53.82 | 52.09 | 43.90 | 38.10 | 34.82 | 31.59 |
| 16.03.2017 | 29.99 | 29.84 | 28.14 | 28.29 | 29.37 | 30.00 | 38.48 | 45.48 | 40.95 | 41.93 | 38.71 | 35.49 | 33.15 | 30.93 | 33.51 | 37.88 | 40.20 | 41.99 | 54.00 | 56.46 | 42.92 | 34.81 | 40.00 | 26.36 |
| 17.03.2017 | 21.63 | 18.76 | 18.53 | 20.93 | 24.11 | 28.00 | 39.97 | 50.53 | 51.00 | 46.15 | 42.00 | 39.80 | 38.20 | 36.10 | 39.90 | 44.01 | 49.01 | 54.00 | 58.78 | 58.78 | 55.65 | 51.00 | 45.01 | 44.44 |
| 18.03.2017 | 40.69 | 39.52 | 32.20 | 15.63 | 8.60 | 32.11 | 38.52 | 39.98 | 44.01 | 44.01 | 42.06 | 39.47 | 34.01 | 29.99 | 29.99 | 28.00 | 30.60 | 39.20 | 50.00 | 50.00 | 48.51 | 32.11 | 32.11 | 29.06 |
| 19.03.2017 | 16.62 | 15.79 | 16.12 | 12.67 | 13.43 | 12.47 | 11.62 | 9.64 | 15.90 | 36.54 | 38.65 | 38.02 | 36.54 | 34.28 | 36.18 | 30.60 | 9.42 | 14.68 | 47.10 | 51.00 | 49.67 | 48.00 | 42.00 | 39.85 |
| 20.03.2017 | 10.59 | 13.87 | 10.07 | 16.36 | 32.20 | 37.27 | 44.69 | 47.21 | 49.77 | 48.33 | 47.00 | 49.55 | 46.21 | 46.21 | 49.00 | 50.67 | 52.87 | 63.75 | 90.00 | 108.10 | 69.75 | 52.00 | 49.00 | 44.79 |
| 21.03.2017 | 44.00 | 36.20 | 33.68 | 33.68 | 35.00 | 41.67 | 47.11 | 49.99 | 53.94 | 52.15 | 50.87 | 50.49 | 49.00 | 46.58 | 47.01 | 50.97 | 50.11 | 50.87 | 54.95 | 56.98 | 51.00 | 50.00 | 44.69 | 42.57 |
| 22.03.2017 | 32.01 | 29.98 | 29.20 | 29.05 | 29.05 | 39.00 | 35.19 | 48.00 | 43.02 | 42.00 | 39.70 | 43.00 | 40.75 | 42.40 | 40.00 | 39.70 | 36.90 | 39.60 | 47.00 | 48.00 | 48.00 | 50.00 | 46.99 | 29.17 |
| 23.03.2017 | 29.45 | 29.10 | 28.91 | 28.65 | 28.53 | 30.72 | 37.47 | 45.46 | 45.10 | 45.10 | 42.40 | 45.10 | 39.51 | 39.23 | 41.32 | 42.40 | 33.24 | 37.92 | 47.80 | 52.14 | 47.07 | 39.70 | 39.61 | 30.63 |
| 24.03.2017 | 29.04 | 28.99 | 29.21 | 28.87 | 29.00 | 30.14 | 44.38 | 50.00 | 53.05 | 51.24 | 48.00 | 46.21 | 40.00 | 38.46 | 42.69 | 45.00 | 47.00 | 44.10 | 49.15 | 50.11 | 44.10 | 34.85 | 34.37 | 32.48 |
| 25.03.2017 | 42.36 | 29.14 | 28.32 | 27.13 | 27.02 | 27.56 | 28.55 | 29.92 | 31.50 | 45.00 | 39.70 | 42.36 | 37.99 | 36.68 | 31.10 | 31.00 | 23.47 | 31.10 | 51.00 | 50.07 | 47.44 | 45.00 | 39.95 | 39.53 |
| 26.03.2017 | 40.00 | 27.94 | 26.97 | 26.62 | 24.65 | 26.87 | 27.67 | 28.24 | 28.58 | 26.06 | 24.93 | 25.82 | 22.06 | 18.46 | 16.97 | 17.65 | 22.22 | 30.31 | 35.82 | 42.08 | 43.50 | 38.79 | 38.06 |  |
| 27.03.2017 | 28.25 | 28.27 | 28.30 | 26.88 | 27.06 | 30.10 | 39.31 | 48.00 | 48.16 | 42.00 | 36.56 | 38.10 | 32.68 | 30.98 | 33.98 | 36.68 | 38.66 | 43.88 | 42.00 | 49.57 | 48.16 | 48.16 | 44.01 | 32.40 |
| 28.03.2017 | 28.71 | 28.07 | 27.43 | 27.24 | 27.72 | 32.70 | 42.40 | 49.00 | 50.00 | 48.64 | 43.89 | 39.54 | 36.99 | 35.16 | 38.35 | 39.04 | 42.00 | 33.00 | 47.00 | 52.00 | 49.00 | 36.40 | 33.56 | 43.76 |
| 29.03.2017 | 29.00 | 29.51 | 26.67 | 26.07 | 26.59 | 35.00 | 44.66 | 49.02 | 54.00 | 49.00 | 43.58 | 40.70 | 36.99 | 34.20 | 34.02 | 34.30 | 39.00 | 44.01 | 49.00 | 56.69 | 55.01 | 49.00 | 43.57 | 39.00 |
| 30.03.2017 | 28.73 | 28.02 | 27.30 | 26.38 | 26.78 | 28.53 | 44.01 | 49.02 | 52.08 | 47.50 | 41.45 | 38.42 | 33.01 | 30.98 | 31.51 | 35.00 | 36.68 | 40.10 | 35.93 | 55.63 | 54.00 | 40.10 | 32.96 | 28.94 |
| 31.03.2017 | 26.91 | 24.77 | 24.45 | 23.05 | 26.17 | 36.53 | 44.21 | 50.00 | 52.08 | 49.00 | 44.19 | 42.36 | 43.80 | 39.89 | 36.68 | 37.61 | 42.40 | 47.98 | 51.00 | 65.00 | 60.00 | 50.15 | 44.89 | 40.24 |

Table S4. Auction Trading Prices for April (in €/MWh)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Delivery Date** | **00 - 01** | **01 - 02** | **02 - 03** | **03 - 04** | **04 - 05** | **05 - 06** | **06 - 07** | **07 - 08** | **08 - 09** | **09 - 10** | **10 - 11** | **11 - 12** | **12 - 13** | **13 - 14** | **14 - 15** | **15 - 16** | **16 - 17** | **17 - 18** | **18 - 19** | **19 - 20** | **20 - 21** | **21 - 22** | **22 - 23** | **23 - 24** |
| 1.04.2017 | 27.08 | 28.07 | 28.08 | 26.90 | 27.00 | 27.98 | 29.87 | 32.09 | 34.42 | 35.10 | 28.90 | 27.09 | 25.99 | 26.07 | 25.29 | 24.81 | 25.65 | 27.99 | 33.66 | 38.70 | 39.60 | 38.98 | 37.96 | 31.86 |
| 2.04.2017 | 32.92 | 27.50 | 26.77 | 26.67 | 26.49 | 26.42 | 26.65 | 27.14 | 29.06 | 29.56 | 28.54 | 28.20 | 27.22 | 26.02 | 21.05 | 20.57 | 23.31 | 26.00 | 29.60 | 39.10 | 44.95 | 39.92 | 40.51 | 37.78 |
| 3.04.2017 | 34.38 | 31.95 | 29.88 | 28.75 | 28.44 | 31.64 | 42.77 | 49.28 | 54.02 | 54.00 | 51.00 | 49.00 | 46.00 | 45.00 | 45.00 | 45.00 | 45.50 | 46.18 | 50.00 | 52.00 | 56.14 | 51.83 | 46.01 | 44.18 |
| 4.04.2017 | 38.10 | 36.37 | 30.00 | 30.00 | 30.01 | 39.69 | 50.28 | 52.00 | 66.00 | 58.00 | 55.00 | 54.98 | 54.98 | 54.93 | 53.44 | 51.00 | 49.00 | 49.00 | 50.68 | 52.02 | 60.00 | 52.00 | 46.18 | 42.50 |
| 5.04.2017 | 47.06 | 42.22 | 28.39 | 27.94 | 42.22 | 47.06 | 54.00 | 55.02 | 72.11 | 63.41 | 57.01 | 52.84 | 54.00 | 51.00 | 46.34 | 49.00 | 49.00 | 50.00 | 51.99 | 57.01 | 69.00 | 57.00 | 49.00 | 44.50 |
| 6.04.2017 | 38.69 | 38.63 | 35.49 | 33.89 | 35.69 | 31.46 | 45.98 | 50.00 | 54.35 | 50.00 | 47.92 | 42.00 | 39.90 | 37.58 | 40.03 | 42.20 | 45.50 | 46.30 | 49.59 | 52.00 | 54.00 | 38.04 | 34.27 | 27.79 |
| 7.04.2017 | 24.99 | 23.02 | 18.31 | 19.17 | 20.87 | 27.07 | 32.05 | 51.00 | 52.50 | 50.00 | 47.00 | 46.34 | 39.42 | 37.07 | 36.38 | 38.99 | 41.37 | 45.88 | 48.00 | 51.22 | 51.45 | 50.00 | 45.01 | 40.61 |
| 8.04.2017 | 39.95 | 38.19 | 32.81 | 31.50 | 30.44 | 31.70 | 34.72 | 37.91 | 39.43 | 38.99 | 36.50 | 34.94 | 30.66 | 29.50 | 27.81 | 27.53 | 28.28 | 30.02 | 35.85 | 49.50 | 49.06 | 44.44 | 42.07 | 42.15 |
| 9.04.2017 | 33.98 | 31.06 | 31.04 | 27.54 | 28.46 | 27.79 | 28.48 | 30.52 | 30.63 | 29.44 | 27.78 | 30.10 | 24.04 | 20.79 | 12.98 | 15.00 | 20.07 | 24.44 | 32.40 | 48.43 | 49.62 | 46.66 | 44.81 | 24.08 |
| 10.04.2017 | 26.03 | 23.02 | 20.36 | 12.26 | 19.95 | 37.00 | 44.86 | 47.19 | 50.00 | 46.39 | 40.92 | 38.65 | 36.74 | 40.68 | 42.20 | 37.05 | 40.89 | 44.60 | 46.36 | 49.01 | 52.00 | 49.80 | 44.61 | 40.62 |
| 11.04.2017 | 37.05 | 33.99 | 29.02 | 27.41 | 28.02 | 33.99 | 40.40 | 48.36 | 51.24 | 48.50 | 43.39 | 39.95 | 42.10 | 41.82 | 35.83 | 38.80 | 40.05 | 44.60 | 37.95 | 51.00 | 52.27 | 38.38 | 42.20 | 38.67 |
| 12.04.2017 | 38.29 | 34.34 | 32.90 | 32.90 | 32.90 | 34.34 | 45.99 | 51.00 | 52.76 | 51.00 | 49.50 | 46.69 | 42.10 | 42.10 | 39.17 | 43.00 | 43.00 | 46.28 | 46.78 | 51.69 | 57.00 | 50.00 | 41.29 | 43.00 |
| 13.04.2017 | 38.61 | 36.73 | 32.91 | 32.09 | 32.79 | 36.74 | 41.04 | 47.73 | 51.00 | 47.05 | 43.07 | 42.10 | 47.42 | 42.10 | 34.70 | 35.16 | 37.54 | 39.34 | 42.00 | 45.63 | 51.00 | 45.01 | 39.05 | 37.49 |
| 14.04.2017 | 36.74 | 36.73 | 33.43 | 31.99 | 31.99 | 36.73 | 44.19 | 47.34 | 51.00 | 47.18 | 43.35 | 39.61 | 37.44 | 33.05 | 33.14 | 35.30 | 37.68 | 43.34 | 44.20 | 44.99 | 50.00 | 43.91 | 39.00 | 43.34 |
| 15.04.2017 | 37.18 | 31.84 | 29.62 | 29.69 | 28.34 | 29.65 | 33.79 | 39.81 | 45.66 | 39.05 | 39.66 | 38.00 | 35.96 | 29.98 | 29.56 | 32.01 | 37.50 | 13.00 | 10.03 | 14.03 | 13.03 | 12.04 | 11.07 | 9.23 |
| 16.04.2017 | 15.00 | 28.11 | 5.14 | 1.91 | 7.55 | 14.03 | 9.20 | 15.00 | 15.96 | 19.01 | 19.01 | 30.01 | 24.03 | 19.00 | 18.15 | 17.57 | 15.06 | 25.86 | 31.07 | 42.02 | 49.54 | 42.63 | 31.91 | 30.46 |
| 17.04.2017 | 28.50 | 24.01 | 22.07 | 21.08 | 22.00 | 27.95 | 28.21 | 27.44 | 29.90 | 30.17 | 29.60 | 29.00 | 25.01 | 19.57 | 15.93 | 9.28 | 9.36 | 17.80 | 25.36 | 32.15 | 33.91 | 33.95 | 33.93 | 30.95 |
| 18.04.2017 | 29.54 | 28.36 | 27.77 | 27.26 | 26.97 | 30.91 | 42.97 | 49.12 | 49.29 | 45.10 | 41.36 | 39.81 | 36.11 | 33.83 | 31.04 | 31.99 | 35.00 | 37.02 | 39.82 | 44.81 | 47.97 | 44.15 | 39.82 | 37.95 |
| 19.04.2017 | 38.62 | 34.70 | 31.20 | 30.25 | 30.83 | 36.70 | 39.82 | 47.04 | 50.75 | 48.02 | 43.64 | 40.00 | 50.01 | 50.01 | 39.53 | 39.82 | 39.82 | 39.81 | 41.39 | 50.00 | 52.27 | 50.95 | 50.01 | 39.82 |
| 20.04.2017 | 40.15 | 35.86 | 31.43 | 31.62 | 31.71 | 35.05 | 42.03 | 48.41 | 52.00 | 48.69 | 48.47 | 54.00 | 44.21 | 36.95 | 35.91 | 35.70 | 35.97 | 37.85 | 40.00 | 46.35 | 52.00 | 46.84 | 45.00 | 41.17 |
| 21.04.2017 | 40.15 | 37.09 | 35.25 | 25.25 | 24.05 | 38.48 | 43.27 | 51.04 | 55.00 | 52.76 | 50.25 | 47.89 | 45.22 | 47.06 | 51.00 | 49.00 | 43.54 | 44.65 | 50.75 | 53.15 | 55.00 | 54.00 | 51.23 | 48.79 |
| 22.04.2017 | 51.56 | 45.61 | 40.00 | 39.81 | 39.82 | 40.00 | 39.82 | 49.71 | 54.00 | 70.00 | 70.00 | 70.00 | 70.00 | 35.00 | 32.99 | 38.02 | 40.02 | 46.96 | 57.00 | 54.00 | 56.10 | 55.00 | 43.00 | 39.99 |
| 23.04.2017 | 50.00 | 40.15 | 39.82 | 38.87 | 39.00 | 18.00 | 17.00 | 18.00 | 38.02 | 35.20 | 36.01 | 32.81 | 30.44 | 23.36 | 23.43 | 25.06 | 33.00 | 38.61 | 43.22 | 48.00 | 63.00 | 51.42 | 45.00 | 40.15 |
| 24.04.2017 | 29.19 | 27.65 | 27.42 | 26.48 | 27.46 | 30.26 | 54.00 | 63.00 | 58.97 | 55.52 | 55.66 | 55.66 | 58.00 | 52.98 | 53.00 | 53.15 | 55.00 | 54.61 | 55.00 | 55.00 | 56.01 | 55.00 | 50.00 | 40.15 |
| 25.04.2017 | 39.82 | 38.42 | 31.20 | 29.98 | 30.30 | 39.82 | 40.00 | 45.00 | 43.00 | 41.94 | 39.81 | 38.10 | 35.09 | 33.91 | 31.72 | 31.59 | 32.55 | 36.55 | 39.93 | 43.46 | 45.24 | 41.98 | 43.26 | 33.40 |
| 26.04.2017 | 39.59 | 30.99 | 30.95 | 30.54 | 30.44 | 34.00 | 42.80 | 52.00 | 55.00 | 55.00 | 54.43 | 52.50 | 47.36 | 47.18 | 45.18 | 43.50 | 43.15 | 44.10 | 45.00 | 47.00 | 53.04 | 46.06 | 44.83 | 43.19 |
| 27.04.2017 | 37.90 | 33.33 | 33.29 | 31.04 | 31.52 | 34.80 | 41.31 | 51.53 | 55.34 | 49.00 | 53.00 | 50.99 | 47.30 | 47.12 | 50.99 | 53.04 | 50.99 | 48.00 | 48.00 | 50.99 | 53.04 | 52.50 | 50.00 | 38.06 |
| 28.04.2017 | 31.38 | 31.23 | 30.61 | 30.92 | 31.41 | 33.52 | 41.31 | 50.95 | 54.00 | 53.07 | 50.00 | 47.01 | 42.90 | 39.89 | 39.64 | 37.89 | 39.81 | 40.48 | 40.29 | 43.91 | 49.00 | 37.97 | 32.65 | 31.08 |
| 29.04.2017 | 39.60 | 28.44 | 29.88 | 29.86 | 30.16 | 30.58 | 32.46 | 33.72 | 36.10 | 45.00 | 28.81 | 37.66 | 32.89 | 23.09 | 25.24 | 25.04 | 27.46 | 29.19 | 32.54 | 34.93 | 55.04 | 34.90 | 32.93 | 30.47 |
| 30.04.2017 | 29.29 | 26.02 | 22.06 | 13.13 | 9.63 | 10.06 | 16.80 | 9.60 | 9.56 | 34.00 | 32.71 | 28.38 | 25.27 | 15.00 | 15.00 | 19.91 | 24.10 | 38.69 | 25.00 | 25.00 | 38.00 | 25.00 | 5.00 | 5.00 |

Table S5. Auction Trading Prices for May (in €/MWh)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Delivery Date** | **00 - 01** | **01 - 02** | **02 - 03** | **03 - 04** | **04 - 05** | **05 - 06** | **06 - 07** | **07 - 08** | **08 - 09** | **09 - 10** | **10 - 11** | **11 - 12** | **12 - 13** | **13 - 14** | **14 - 15** | **15 - 16** | **16 - 17** | **17 - 18** | **18 - 19** | **19 - 20** | **20 - 21** | **21 - 22** | **22 - 23** | **23 - 24** |
| 1.05.2017 | 50.00 | 9.99 | 0.10 | 0.09 | 0.09 | 0.09 | 0.00 | 0.00 | 5.00 | 37.38 | 37.08 | 37.08 | 32.89 | 1.30 | 0.30 | 0.00 | 25.00 | 37.08 | 45.95 | 50.00 | 52.06 | 52.06 | 50.22 | 49.00 |
| 2.05.2017 | 13.47 | 12.01 | 10.41 | 12.03 | 9.69 | 42.09 | 50.00 | 51.49 | 51.02 | 50.00 | 49.91 | 50.00 | 64.99 | 64.99 | 60.00 | 60.00 | 50.05 | 50.71 | 51.00 | 51.34 | 53.50 | 51.02 | 50.99 | 49.00 |
| 3.05.2017 | 46.46 | 42.90 | 38.82 | 38.83 | 40.40 | 45.65 | 49.00 | 51.37 | 55.00 | 54.18 | 52.51 | 51.53 | 49.96 | 48.95 | 47.00 | 49.00 | 50.00 | 50.00 | 51.00 | 51.23 | 52.22 | 51.00 | 50.00 | 46.29 |
| 4.05.2017 | 43.29 | 41.56 | 24.57 | 24.82 | 25.80 | 40.60 | 47.00 | 50.28 | 53.34 | 52.91 | 51.00 | 51.23 | 55.00 | 54.00 | 53.00 | 48.00 | 49.00 | 49.00 | 48.23 | 50.89 | 51.33 | 51.00 | 48.23 | 46.95 |
| 5.05.2017 | 40.09 | 36.90 | 35.63 | 39.95 | 40.22 | 42.00 | 50.00 | 53.00 | 52.32 | 49.91 | 47.90 | 46.38 | 42.00 | 40.09 | 38.23 | 40.41 | 43.67 | 46.19 | 46.41 | 48.10 | 52.94 | 49.36 | 46.73 | 34.90 |
| 6.05.2017 | 38.01 | 32.47 | 31.04 | 30.71 | 30.57 | 30.86 | 32.13 | 31.14 | 34.39 | 48.00 | 47.99 | 48.00 | 42.62 | 39.09 | 35.00 | 28.93 | 28.28 | 31.02 | 42.00 | 37.94 | 45.00 | 39.50 | 38.92 | 33.93 |
| 7.05.2017 | 28.31 | 26.73 | 30.00 | 30.00 | 30.00 | 26.25 | 25.43 | 26.66 | 28.66 | 30.06 | 30.33 | 30.18 | 29.50 | 27.06 | 24.00 | 24.15 | 26.15 | 27.40 | 29.80 | 40.10 | 49.38 | 50.28 | 31.26 | 27.00 |
| 8.05.2017 | 27.48 | 26.10 | 25.81 | 24.73 | 25.14 | 27.91 | 39.59 | 47.00 | 51.83 | 51.02 | 50.20 | 49.55 | 42.00 | 41.92 | 50.20 | 50.50 | 50.50 | 51.02 | 51.02 | 52.87 | 58.01 | 47.00 | 35.07 | 32.44 |
| 9.05.2017 | 30.81 | 30.56 | 29.50 | 28.94 | 29.90 | 32.07 | 42.83 | 50.45 | 54.99 | 49.49 | 45.10 | 44.10 | 47.50 | 47.50 | 42.00 | 41.88 | 45.01 | 45.07 | 46.26 | 47.62 | 49.12 | 46.93 | 45.02 | 38.06 |
| 10.05.2017 | 32.06 | 30.99 | 30.75 | 30.72 | 31.03 | 33.11 | 42.04 | 49.98 | 56.03 | 52.47 | 52.47 | 47.06 | 40.18 | 49.20 | 45.93 | 47.06 | 47.47 | 49.46 | 49.45 | 49.10 | 51.00 | 48.04 | 45.46 | 45.44 |
| 11.05.2017 | 38.61 | 34.80 | 30.70 | 30.50 | 34.50 | 34.15 | 40.15 | 48.10 | 45.90 | 41.94 | 38.54 | 46.91 | 45.00 | 45.62 | 48.50 | 50.00 | 49.00 | 46.99 | 42.20 | 34.94 | 45.37 | 32.00 | 31.91 | 30.10 |
| 12.05.2017 | 38.24 | 36.32 | 27.29 | 27.27 | 27.08 | 29.00 | 34.37 | 42.93 | 50.00 | 45.10 | 44.35 | 43.16 | 38.30 | 37.46 | 38.52 | 41.06 | 43.00 | 44.00 | 41.96 | 42.00 | 42.62 | 42.93 | 42.93 | 39.24 |
| 13.05.2017 | 46.00 | 45.00 | 39.69 | 39.08 | 39.19 | 38.02 | 40.00 | 50.10 | 43.96 | 46.03 | 46.32 | 40.15 | 36.69 | 38.60 | 35.00 | 36.39 | 40.00 | 41.15 | 43.87 | 46.57 | 45.99 | 46.95 | 46.03 | 44.54 |
| 14.05.2017 | 27.66 | 26.54 | 25.65 | 25.63 | 25.20 | 25.00 | 25.56 | 25.46 | 25.34 | 26.04 | 25.04 | 31.89 | 30.00 | 26.50 | 25.61 | 20.99 | 23.90 | 27.63 | 32.07 | 35.96 | 42.80 | 44.16 | 42.35 | 31.46 |
| 15.05.2017 | 30.32 | 27.43 | 27.18 | 26.70 | 27.16 | 29.77 | 35.76 | 44.02 | 47.00 | 44.49 | 43.00 | 40.07 | 36.38 | 36.38 | 38.00 | 39.49 | 42.00 | 44.48 | 44.48 | 46.00 | 49.13 | 48.00 | 44.48 | 38.00 |
| 16.05.2017 | 32.30 | 28.01 | 26.70 | 26.53 | 30.00 | 30.79 | 35.95 | 42.53 | 46.41 | 43.68 | 39.88 | 37.19 | 33.04 | 31.98 | 34.28 | 36.86 | 40.26 | 42.79 | 44.24 | 46.93 | 50.01 | 51.01 | 46.99 | 41.55 |
| 17.05.2017 | 37.01 | 31.16 | 29.41 | 28.22 | 28.22 | 27.58 | 36.38 | 46.54 | 49.69 | 46.56 | 40.13 | 39.69 | 36.38 | 37.00 | 37.50 | 39.69 | 45.55 | 44.82 | 46.56 | 50.37 | 50.89 | 51.01 | 46.10 | 44.82 |
| 18.05.2017 | 36.13 | 28.90 | 28.90 | 28.90 | 29.74 | 28.91 | 40.28 | 51.83 | 55.95 | 54.00 | 50.37 | 49.50 | 44.80 | 47.50 | 50.37 | 51.01 | 50.37 | 49.50 | 49.07 | 51.02 | 55.75 | 55.75 | 45.64 | 44.17 |
| 19.05.2017 | 39.70 | 36.39 | 32.19 | 29.17 | 29.90 | 29.90 | 36.39 | 40.90 | 50.37 | 49.10 | 42.00 | 40.17 | 37.72 | 36.38 | 36.39 | 37.36 | 38.46 | 36.01 | 38.50 | 40.23 | 43.19 | 43.89 | 39.19 | 35.88 |
| 20.05.2017 | 37.50 | 34.92 | 33.09 | 33.26 | 33.09 | 24.08 | 30.20 | 31.30 | 31.30 | 39.71 | 31.30 | 31.29 | 34.84 | 30.19 | 31.47 | 34.25 | 35.02 | 36.69 | 30.20 | 33.34 | 38.50 | 39.18 | 38.77 | 36.31 |
| 21.05.2017 | 38.93 | 31.30 | 31.20 | 31.21 | 30.50 | 11.52 | 11.98 | 12.36 | 13.70 | 12.07 | 10.02 | 11.86 | 16.00 | 12.10 | 10.28 | 11.93 | 17.48 | 23.05 | 28.68 | 32.91 | 40.15 | 43.99 | 36.11 | 35.84 |
| 22.05.2017 | 29.84 | 28.01 | 26.90 | 26.01 | 26.86 | 27.38 | 35.49 | 42.28 | 48.80 | 46.68 | 44.75 | 46.61 | 50.00 | 53.00 | 46.42 | 49.88 | 52.72 | 50.53 | 49.88 | 54.53 | 55.00 | 55.15 | 46.20 | 45.01 |
| 23.05.2017 | 38.06 | 32.17 | 30.06 | 29.32 | 29.32 | 29.71 | 38.46 | 49.16 | 52.00 | 46.80 | 44.00 | 44.00 | 41.60 | 45.22 | 46.69 | 49.27 | 46.55 | 45.09 | 47.57 | 50.53 | 53.21 | 51.60 | 46.44 | 44.00 |
| 24.05.2017 | 46.30 | 37.15 | 37.15 | 34.30 | 34.20 | 34.43 | 55.16 | 51.10 | 49.50 | 44.85 | 43.00 | 49.07 | 58.10 | 65.00 | 58.10 | 51.10 | 45.12 | 45.12 | 49.88 | 51.10 | 55.00 | 55.00 | 49.30 | 44.85 |
| 25.05.2017 | 46.00 | 40.44 | 28.07 | 37.00 | 36.00 | 36.00 | 43.08 | 49.83 | 54.02 | 49.88 | 49.83 | 47.14 | 43.10 | 42.09 | 45.89 | 44.40 | 48.75 | 47.14 | 49.83 | 50.53 | 53.00 | 53.00 | 50.30 | 45.35 |
| 26.05.2017 | 40.15 | 35.33 | 34.92 | 33.53 | 34.92 | 35.02 | 37.70 | 56.08 | 60.10 | 60.10 | 55.10 | 54.00 | 54.00 | 54.00 | 50.09 | 54.00 | 54.00 | 51.00 | 49.00 | 49.88 | 50.40 | 50.20 | 48.14 | 45.00 |
| 27.05.2017 | 37.80 | 37.81 | 36.25 | 34.99 | 35.80 | 35.77 | 38.11 | 37.80 | 44.79 | 46.79 | 42.63 | 39.34 | 57.00 | 57.00 | 52.00 | 41.07 | 44.10 | 38.63 | 44.79 | 45.44 | 38.69 | 38.50 | 35.99 | 36.25 |
| 28.05.2017 | 37.60 | 31.08 | 29.98 | 29.30 | 14.25 | 9.91 | 14.36 | 28.84 | 29.98 | 29.98 | 29.99 | 28.09 | 33.90 | 18.71 | 16.43 | 19.19 | 32.22 | 36.53 | 38.50 | 44.00 | 40.09 | 44.10 | 40.66 | 36.92 |
| 29.05.2017 | 29.02 | 28.30 | 26.27 | 25.60 | 25.60 | 26.40 | 35.97 | 42.70 | 43.99 | 45.66 | 41.88 | 42.43 | 39.99 | 39.15 | 39.99 | 45.43 | 45.00 | 44.80 | 46.03 | 47.77 | 45.56 | 45.23 | 45.22 | 43.11 |
| 30.05.2017 | 38.35 | 38.37 | 35.70 | 34.64 | 35.70 | 38.47 | 48.00 | 49.60 | 52.23 | 52.23 | 55.10 | 55.10 | 58.00 | 65.00 | 57.00 | 55.09 | 50.08 | 48.92 | 49.56 | 50.10 | 51.00 | 50.93 | 50.75 | 47.00 |
| 31.05.2017 | 38.78 | 34.92 | 30.00 | 27.36 | 28.31 | 31.60 | 39.37 | 48.92 | 50.34 | 52.69 | 52.69 | 52.69 | 48.63 | 44.50 | 46.71 | 48.92 | 49.58 | 48.92 | 50.34 | 52.30 | 54.20 | 54.10 | 49.56 | 48.00 |

Table S6. Auction Trading Prices for June (in €/MWh)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Delivery Date** | **00 - 01** | **01 - 02** | **02 - 03** | **03 - 04** | **04 - 05** | **05 - 06** | **06 - 07** | **07 - 08** | **08 - 09** | **09 - 10** | **10 - 11** | **11 - 12** | **12 - 13** | **13 - 14** | **14 - 15** | **15 - 16** | **16 - 17** | **17 - 18** | **18 - 19** | **19 - 20** | **20 - 21** | **21 - 22** | **22 - 23** | **23 - 24** |
| 1.06.2017 | 46.08 | 39.38 | 38.73 | 34.66 | 32.80 | 35.80 | 44.50 | 48.92 | 55.65 | 54.00 | 52.26 | 52.26 | 68.00 | 68.00 | 68.00 | 62.00 | 63.69 | 52.26 | 50.34 | 51.78 | 55.10 | 52.26 | 48.87 | 46.13 |
| 2.06.2017 | 45.00 | 43.70 | 39.33 | 39.26 | 36.15 | 37.00 | 35.33 | 40.24 | 41.50 | 39.96 | 38.67 | 37.89 | 37.55 | 35.08 | 33.62 | 36.50 | 39.26 | 39.70 | 42.78 | 45.10 | 45.10 | 41.98 | 47.74 | 36.64 |
| 3.06.2017 | 31.11 | 31.10 | 28.74 | 27.06 | 26.49 | 25.00 | 26.51 | 26.89 | 30.79 | 36.20 | 48.60 | 48.01 | 44.00 | 43.41 | 39.74 | 43.41 | 41.10 | 36.20 | 45.00 | 38.16 | 47.25 | 50.92 | 38.57 | 35.91 |
| 4.06.2017 | 29.93 | 32.99 | 30.00 | 29.95 | 29.90 | 28.01 | 29.95 | 28.20 | 29.98 | 32.10 | 28.00 | 33.31 | 32.99 | 29.90 | 28.01 | 28.01 | 28.01 | 32.10 | 32.10 | 37.50 | 34.91 | 34.99 | 39.91 | 34.90 |
| 5.06.2017 | 28.92 | 29.80 | 23.09 | 22.22 | 22.19 | 23.09 | 34.00 | 40.01 | 45.50 | 56.26 | 50.00 | 55.06 | 49.20 | 49.61 | 56.82 | 57.97 | 57.90 | 56.82 | 50.00 | 51.00 | 51.00 | 56.82 | 38.42 | 30.14 |
| 6.06.2017 | 40.61 | 39.75 | 39.31 | 39.35 | 39.15 | 39.35 | 46.10 | 55.31 | 56.00 | 56.00 | 55.31 | 55.31 | 46.83 | 46.36 | 49.99 | 53.00 | 51.50 | 49.67 | 49.67 | 55.00 | 49.67 | 55.00 | 46.85 | 44.16 |
| 7.06.2017 | 34.00 | 8.80 | 6.82 | 5.00 | 5.00 | 5.26 | 40.49 | 47.08 | 48.23 | 47.49 | 44.72 | 44.05 | 42.77 | 42.77 | 44.00 | 46.70 | 48.89 | 47.49 | 47.70 | 35.20 | 48.89 | 49.78 | 35.20 | 42.00 |
| 8.06.2017 | 35.10 | 38.50 | 32.19 | 32.19 | 30.00 | 32.19 | 36.20 | 46.83 | 48.80 | 49.00 | 46.20 | 44.81 | 39.66 | 39.25 | 39.77 | 43.70 | 46.83 | 46.83 | 46.85 | 48.29 | 45.36 | 37.60 | 36.13 | 30.75 |
| 9.06.2017 | 43.91 | 27.97 | 35.99 | 34.19 | 32.49 | 34.90 | 41.41 | 46.85 | 48.01 | 47.70 | 46.85 | 46.83 | 45.60 | 44.05 | 46.83 | 47.52 | 49.99 | 48.00 | 49.99 | 54.01 | 57.00 | 52.00 | 47.49 | 46.85 |
| 10.06.2017 | 43.30 | 31.92 | 28.90 | 27.68 | 27.06 | 27.05 | 27.79 | 39.87 | 40.92 | 42.44 | 43.08 | 42.10 | 37.96 | 31.15 | 30.57 | 37.55 | 42.10 | 42.44 | 42.44 | 46.85 | 47.01 | 47.01 | 45.23 | 36.94 |
| 11.06.2017 | 29.10 | 38.53 | 21.78 | 18.00 | 15.39 | 12.60 | 12.84 | 16.49 | 37.13 | 18.75 | 37.27 | 36.70 | 39.41 | 23.99 | 28.32 | 33.11 | 37.28 | 23.58 | 43.58 | 46.27 | 47.49 | 48.23 | 47.49 | 45.45 |
| 12.06.2017 | 25.02 | 20.66 | 18.15 | 18.98 | 18.55 | 32.99 | 43.23 | 50.51 | 52.94 | 55.01 | 52.02 | 53.37 | 51.80 | 51.80 | 54.22 | 58.00 | 57.00 | 55.68 | 56.84 | 57.90 | 59.50 | 58.00 | 52.00 | 29.97 |
| 13.06.2017 | 29.95 | 27.00 | 24.63 | 23.47 | 23.95 | 26.60 | 33.12 | 47.37 | 53.00 | 49.00 | 47.82 | 47.65 | 45.74 | 45.77 | 47.82 | 49.47 | 51.50 | 50.00 | 53.00 | 53.00 | 58.65 | 59.00 | 52.00 | 40.00 |
| 14.06.2017 | 32.21 | 29.18 | 28.95 | 27.86 | 27.50 | 28.98 | 34.40 | 50.00 | 67.50 | 59.90 | 57.75 | 58.38 | 54.00 | 55.17 | 58.65 | 59.79 | 64.02 | 62.50 | 62.81 | 52.93 | 52.93 | 63.71 | 55.50 | 35.44 |
| 15.06.2017 | 48.67 | 47.38 | 30.97 | 29.39 | 28.80 | 28.88 | 48.11 | 55.99 | 70.81 | 65.67 | 59.03 | 58.18 | 49.10 | 49.00 | 54.71 | 58.18 | 61.00 | 60.44 | 59.48 | 61.97 | 59.56 | 60.44 | 55.49 | 48.10 |
| 16.06.2017 | 35.11 | 26.23 | 22.00 | 21.07 | 21.05 | 22.41 | 49.11 | 60.00 | 67.31 | 71.96 | 64.15 | 61.00 | 54.52 | 50.00 | 57.98 | 57.98 | 46.60 | 43.21 | 43.21 | 43.21 | 46.51 | 47.50 | 28.67 | 21.83 |
| 17.06.2017 | 47.00 | 45.70 | 45.60 | 38.00 | 18.46 | 19.77 | 24.10 | 42.50 | 48.11 | 48.11 | 48.22 | 46.71 | 44.66 | 40.67 | 40.93 | 43.21 | 43.60 | 43.30 | 34.10 | 35.10 | 35.83 | 36.97 | 38.00 | 35.85 |
| 18.06.2017 | 35.99 | 30.08 | 28.53 | 26.81 | 25.11 | 24.29 | 24.33 | 25.68 | 25.54 | 25.00 | 32.10 | 28.27 | 30.00 | 23.53 | 21.98 | 26.19 | 31.70 | 31.64 | 33.52 | 37.48 | 38.98 | 39.09 | 41.22 | 37.08 |
| 19.06.2017 | 33.88 | 30.20 | 29.10 | 28.67 | 28.57 | 29.10 | 43.93 | 44.10 | 44.03 | 40.98 | 38.24 | 38.49 | 45.11 | 49.94 | 45.66 | 50.00 | 52.00 | 50.51 | 54.60 | 56.89 | 57.00 | 44.13 | 43.68 | 45.01 |
| 20.06.2017 | 32.39 | 32.10 | 30.15 | 28.74 | 28.47 | 30.47 | 38.08 | 54.05 | 65.00 | 70.00 | 61.80 | 56.35 | 50.31 | 51.59 | 55.15 | 64.00 | 68.94 | 68.27 | 61.01 | 61.00 | 70.80 | 65.00 | 56.35 | 34.91 |
| 21.06.2017 | 49.10 | 47.49 | 46.99 | 44.16 | 44.00 | 44.16 | 47.46 | 54.31 | 67.30 | 56.01 | 56.61 | 58.00 | 63.00 | 58.00 | 68.00 | 76.19 | 78.99 | 75.00 | 60.00 | 60.00 | 63.50 | 70.90 | 63.39 | 54.31 |
| 22.06.2017 | 49.00 | 49.00 | 46.70 | 42.60 | 45.20 | 44.86 | 47.46 | 54.70 | 75.20 | 77.07 | 71.00 | 71.00 | 56.88 | 57.00 | 71.00 | 53.15 | 48.01 | 51.00 | 51.00 | 79.50 | 61.07 | 62.21 | 54.70 | 49.38 |
| 23.06.2017 | 55.00 | 51.59 | 48.69 | 47.99 | 47.95 | 47.46 | 48.20 | 55.65 | 77.28 | 74.49 | 73.20 | 73.40 | 69.28 | 69.28 | 70.00 | 69.28 | 76.80 | 70.40 | 65.00 | 65.27 | 64.17 | 63.50 | 52.09 | 50.00 |
| 24.06.2017 | 37.01 | 35.71 | 35.71 | 35.71 | 35.71 | 35.71 | 34.00 | 34.01 | 47.34 | 47.34 | 47.46 | 46.81 | 44.00 | 43.45 | 43.33 | 43.69 | 46.81 | 47.46 | 50.00 | 54.98 | 55.00 | 56.00 | 50.00 | 36.40 |
| 25.06.2017 | 45.00 | 41.81 | 36.10 | 39.24 | 41.70 | 36.01 | 36.10 | 35.80 | 36.10 | 42.16 | 36.01 | 46.56 | 44.20 | 40.33 | 36.01 | 36.00 | 35.70 | 17.01 | 33.19 | 34.77 | 40.60 | 47.34 | 46.81 | 36.40 |
| 26.06.2017 | 33.29 | 30.80 | 28.03 | 26.16 | 23.96 | 26.21 | 43.48 | 46.90 | 55.82 | 54.00 | 54.37 | 55.64 | 61.00 | 61.81 | 60.93 | 64.99 | 66.09 | 70.10 | 52.02 | 54.99 | 55.09 | 55.82 | 45.05 | 39.06 |
| 27.06.2017 | 33.00 | 30.07 | 29.09 | 33.00 | 33.00 | 29.41 | 46.88 | 47.53 | 54.00 | 50.00 | 53.49 | 50.03 | 54.78 | 55.83 | 52.78 | 48.50 | 51.39 | 55.27 | 50.00 | 51.28 | 54.08 | 52.00 | 47.53 | 46.90 |
| 28.06.2017 | 46.82 | 37.10 | 40.28 | 37.10 | 37.10 | 40.00 | 43.30 | 46.00 | 50.28 | 53.27 | 53.11 | 53.59 | 60.00 | 51.49 | 52.78 | 53.00 | 53.27 | 49.59 | 48.87 | 48.27 | 47.53 | 47.53 | 46.00 | 37.10 |
| 29.06.2017 | 33.10 | 36.00 | 29.94 | 29.03 | 33.10 | 33.53 | 39.03 | 46.88 | 48.27 | 48.27 | 47.53 | 47.81 | 50.09 | 48.50 | 44.20 | 45.00 | 46.90 | 47.53 | 47.81 | 50.00 | 50.78 | 50.28 | 45.00 | 36.00 |
| 30.06.2017 | 29.29 | 29.01 | 28.06 | 33.10 | 33.99 | 28.00 | 33.10 | 46.90 | 52.00 | 50.28 | 48.27 | 47.53 | 46.88 | 46.90 | 47.53 | 49.28 | 56.29 | 49.78 | 48.50 | 49.99 | 48.78 | 48.87 | 44.06 | 44.07 |

Table S7. Auction Trading Prices for July (in €/MWh)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Delivery Date** | **00 - 01** | **01 - 02** | **02 - 03** | **03 - 04** | **04 - 05** | **05 - 06** | **06 - 07** | **07 - 08** | **08 - 09** | **09 - 10** | **10 - 11** | **11 - 12** | **12 - 13** | **13 - 14** | **14 - 15** | **15 - 16** | **16 - 17** | **17 - 18** | **18 - 19** | **19 - 20** | **20 - 21** | **21 - 22** | **22 - 23** | **23 - 24** |
| 1.07.2017 | 48.27 | 47.54 | 35.10 | 34.00 | 35.10 | 33.91 | 33.01 | 43.50 | 47.15 | 47.12 | 45.00 | 40.44 | 38.83 | 37.00 | 38.05 | 38.10 | 41.00 | 40.00 | 45.00 | 47.02 | 46.52 | 49.70 | 45.00 | 41.30 |
| 2.07.2017 | 38.39 | 35.10 | 22.73 | 22.63 | 20.27 | 20.59 | 21.30 | 23.07 | 24.76 | 33.06 | 33.45 | 33.91 | 32.70 | 30.42 | 30.53 | 30.50 | 35.71 | 38.00 | 36.23 | 36.23 | 38.89 | 39.79 | 43.33 | 38.48 |
| 3.07.2017 | 26.04 | 23.51 | 22.86 | 22.56 | 24.86 | 26.78 | 34.93 | 41.25 | 45.00 | 45.25 | 44.27 | 42.84 | 43.47 | 44.00 | 45.00 | 44.84 | 46.00 | 44.82 | 45.00 | 46.84 | 40.91 | 39.37 | 44.58 | 32.04 |
| 4.07.2017 | 28.83 | 28.63 | 28.49 | 28.43 | 27.99 | 28.44 | 37.40 | 45.25 | 47.51 | 47.99 | 47.50 | 46.87 | 46.56 | 47.95 | 45.18 | 45.78 | 45.44 | 47.50 | 45.20 | 44.04 | 53.39 | 53.39 | 48.24 | 47.07 |
| 5.07.2017 | 46.87 | 32.51 | 31.02 | 29.07 | 29.54 | 31.89 | 46.84 | 60.51 | 64.75 | 75.00 | 75.00 | 80.00 | 80.00 | 80.00 | 75.00 | 75.00 | 61.00 | 48.68 | 48.79 | 51.38 | 52.91 | 50.38 | 49.12 | 46.84 |
| 6.07.2017 | 46.87 | 44.00 | 33.91 | 37.01 | 39.99 | 41.25 | 45.17 | 46.87 | 48.24 | 53.99 | 53.31 | 53.99 | 49.38 | 49.38 | 49.50 | 48.56 | 49.38 | 48.24 | 53.31 | 53.71 | 53.31 | 53.31 | 53.40 | 50.90 |
| 7.07.2017 | 48.24 | 33.91 | 43.85 | 33.91 | 40.87 | 41.25 | 45.50 | 48.24 | 53.57 | 53.22 | 48.68 | 50.10 | 55.50 | 50.59 | 55.50 | 53.56 | 53.22 | 55.00 | 58.30 | 63.30 | 63.00 | 59.75 | 56.59 | 49.88 |
| 8.07.2017 | 55.00 | 50.03 | 47.01 | 33.91 | 33.91 | 30.01 | 46.43 | 46.84 | 46.84 | 46.84 | 46.84 | 45.50 | 44.43 | 43.00 | 42.50 | 44.43 | 45.75 | 46.87 | 54.56 | 60.87 | 63.97 | 65.70 | 55.54 | 50.92 |
| 9.07.2017 | 48.34 | 46.87 | 40.00 | 38.42 | 38.09 | 34.00 | 37.23 | 39.99 | 43.00 | 56.00 | 57.86 | 57.86 | 57.86 | 57.86 | 56.00 | 56.00 | 42.52 | 45.23 | 47.36 | 48.24 | 52.20 | 56.87 | 51.82 | 47.50 |
| 10.07.2017 | 49.09 | 45.00 | 41.90 | 39.58 | 39.58 | 42.17 | 49.77 | 56.31 | 57.70 | 62.83 | 55.00 | 71.00 | 80.00 | 81.00 | 80.00 | 88.00 | 80.00 | 80.00 | 55.70 | 58.83 | 57.11 | 57.00 | 50.65 | 49.23 |
| 11.07.2017 | 49.18 | 43.47 | 39.67 | 39.55 | 39.67 | 39.67 | 43.01 | 49.59 | 56.80 | 63.98 | 65.80 | 65.80 | 54.00 | 54.00 | 68.20 | 72.81 | 68.20 | 68.20 | 67.10 | 69.43 | 70.00 | 70.00 | 61.50 | 47.73 |
| 12.07.2017 | 49.87 | 49.00 | 39.34 | 38.69 | 43.23 | 43.23 | 45.12 | 74.00 | 88.66 | 75.00 | 79.52 | 75.00 | 61.66 | 72.00 | 73.00 | 75.93 | 96.00 | 89.75 | 86.22 | 82.99 | 75.00 | 74.23 | 55.00 | 50.65 |
| 13.07.2017 | 49.70 | 46.53 | 45.44 | 45.14 | 45.14 | 45.17 | 45.44 | 52.39 | 72.06 | 69.18 | 70.00 | 65.08 | 57.40 | 64.00 | 69.17 | 72.00 | 58.00 | 58.00 | 70.20 | 65.08 | 65.00 | 58.00 | 42.13 | 38.12 |
| 14.07.2017 | 43.21 | 33.91 | 30.36 | 29.08 | 29.55 | 30.41 | 39.94 | 52.76 | 46.00 | 59.70 | 59.70 | 67.00 | 62.00 | 59.48 | 65.00 | 70.00 | 58.00 | 65.00 | 59.70 | 43.30 | 56.31 | 60.00 | 55.00 | 50.65 |
| 15.07.2017 | 54.18 | 49.23 | 49.02 | 44.56 | 43.82 | 42.60 | 41.72 | 41.72 | 42.43 | 41.88 | 41.00 | 40.39 | 43.76 | 37.88 | 36.96 | 37.49 | 37.98 | 42.36 | 44.44 | 37.54 | 46.50 | 49.18 | 45.36 | 36.01 |
| 16.07.2017 | 34.65 | 30.05 | 28.68 | 27.78 | 33.30 | 27.40 | 33.91 | 34.81 | 33.32 | 30.09 | 33.30 | 33.99 | 34.00 | 45.00 | 33.90 | 25.22 | 27.55 | 30.11 | 40.00 | 46.03 | 49.18 | 49.87 | 47.47 | 38.79 |
| 17.07.2017 | 31.47 | 30.11 | 29.32 | 27.57 | 27.92 | 29.21 | 42.65 | 46.99 | 55.00 | 55.00 | 52.10 | 55.00 | 50.50 | 52.14 | 57.00 | 65.20 | 80.00 | 73.71 | 59.40 | 55.32 | 53.00 | 55.00 | 49.04 | 47.47 |
| 18.07.2017 | 43.45 | 41.33 | 39.59 | 39.51 | 39.52 | 40.07 | 43.96 | 49.85 | 65.00 | 63.11 | 61.00 | 53.00 | 47.15 | 48.00 | 55.99 | 62.62 | 66.05 | 64.20 | 60.00 | 60.00 | 61.45 | 61.06 | 50.46 | 49.04 |
| 19.07.2017 | 49.67 | 42.60 | 34.11 | 31.21 | 33.91 | 33.91 | 37.96 | 53.00 | 70.00 | 69.58 | 62.00 | 62.00 | 70.00 | 70.00 | 72.00 | 77.00 | 73.01 | 72.09 | 72.09 | 71.98 | 62.00 | 65.10 | 50.46 | 49.04 |
| 20.07.2017 | 48.99 | 41.72 | 40.55 | 40.21 | 40.39 | 40.45 | 43.00 | 49.04 | 58.00 | 59.95 | 66.62 | 70.00 | 60.00 | 63.50 | 73.30 | 73.19 | 74.00 | 70.00 | 65.80 | 69.02 | 68.93 | 75.72 | 53.30 | 53.30 |
| 21.07.2017 | 52.00 | 49.67 | 42.50 | 42.50 | 42.50 | 45.20 | 49.67 | 82.00 | 87.72 | 87.09 | 78.25 | 75.79 | 90.00 | 75.00 | 71.92 | 55.00 | 49.85 | 55.00 | 58.60 | 69.00 | 55.00 | 58.51 | 58.29 | 49.67 |
| 22.07.2017 | 49.67 | 47.00 | 43.30 | 43.01 | 43.01 | 42.90 | 43.01 | 43.08 | 45.00 | 45.00 | 41.48 | 52.51 | 62.09 | 58.00 | 38.10 | 38.10 | 39.55 | 43.01 | 45.47 | 48.99 | 48.99 | 49.04 | 45.74 | 43.66 |
| 23.07.2017 | 47.58 | 43.30 | 43.29 | 43.01 | 42.71 | 41.47 | 38.14 | 41.09 | 49.94 | 62.00 | 67.00 | 66.99 | 66.99 | 62.00 | 56.20 | 70.00 | 66.00 | 41.09 | 44.50 | 47.01 | 49.04 | 51.94 | 49.67 | 45.85 |
| 24.07.2017 | 43.00 | 41.01 | 40.64 | 39.71 | 40.15 | 47.00 | 44.28 | 48.86 | 50.32 | 53.70 | 53.01 | 56.20 | 82.96 | 85.00 | 73.00 | 58.00 | 60.79 | 55.00 | 51.40 | 54.07 | 52.46 | 55.00 | 48.86 | 45.89 |
| 25.07.2017 | 31.01 | 33.10 | 27.09 | 27.47 | 26.04 | 34.71 | 42.50 | 46.79 | 48.86 | 47.01 | 46.65 | 45.00 | 42.50 | 43.97 | 48.29 | 48.29 | 40.40 | 34.99 | 36.95 | 40.40 | 50.10 | 50.10 | 42.50 | 29.01 |
| 26.07.2017 | 25.74 | 25.24 | 22.64 | 21.12 | 21.23 | 26.16 | 47.50 | 49.80 | 60.50 | 49.54 | 49.20 | 61.00 | 61.00 | 66.00 | 65.65 | 65.65 | 56.00 | 52.58 | 52.96 | 56.00 | 53.94 | 51.80 | 49.50 | 47.22 |
| 27.07.2017 | 52.00 | 48.90 | 44.61 | 43.29 | 43.44 | 43.73 | 48.86 | 49.54 | 63.27 | 61.20 | 60.15 | 61.50 | 51.50 | 54.00 | 60.00 | 73.58 | 65.56 | 66.07 | 61.00 | 60.00 | 56.00 | 56.40 | 50.32 | 49.64 |
| 28.07.2017 | 48.90 | 45.56 | 43.43 | 41.00 | 41.09 | 43.48 | 45.90 | 49.54 | 52.82 | 54.90 | 51.87 | 49.54 | 48.90 | 49.10 | 51.12 | 51.18 | 53.12 | 49.92 | 52.00 | 55.00 | 55.00 | 54.60 | 49.90 | 48.90 |
| 29.07.2017 | 46.13 | 42.50 | 18.99 | 14.17 | 11.54 | 43.89 | 48.86 | 48.90 | 49.54 | 49.54 | 49.00 | 48.86 | 45.15 | 42.41 | 42.09 | 42.74 | 44.50 | 48.90 | 50.00 | 55.00 | 55.00 | 59.75 | 50.32 | 49.54 |
| 30.07.2017 | 49.54 | 48.90 | 48.86 | 43.26 | 43.26 | 43.00 | 40.49 | 40.49 | 40.49 | 41.50 | 40.00 | 39.86 | 39.26 | 37.00 | 35.39 | 37.13 | 40.49 | 43.26 | 47.58 | 49.25 | 50.32 | 55.00 | 50.00 | 48.86 |
| 31.07.2017 | 32.00 | 34.00 | 39.87 | 37.87 | 25.00 | 26.57 | 45.00 | 78.00 | 82.31 | 95.63 | 86.00 | 86.00 | 76.50 | 73.01 | 86.00 | 80.38 | 89.99 | 86.00 | 76.76 | 83.27 | 86.00 | 82.00 | 65.50 | 49.41 |

Table S8. Auction Trading Prices for August (in €/MWh)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Delivery Date** | **00 - 01** | **01 - 02** | **02 - 03** | **03 - 04** | **04 - 05** | **05 - 06** | **06 - 07** | **07 - 08** | **08 - 09** | **09 - 10** | **10 - 11** | **11 - 12** | **12 - 13** | **13 - 14** | **14 - 15** | **15 - 16** | **16 - 17** | **17 - 18** | **18 - 19** | **19 - 20** | **20 - 21** | **21 - 22** | **22 - 23** | **23 - 24** |
| 1.08.2017 | 50.19 | 48.73 | 43.54 | 40.41 | 40.41 | 42.53 | 47.38 | 56.10 | 55.00 | 60.00 | 55.00 | 101.00 | 101.00 | 101.00 | 90.11 | 72.57 | 90.00 | 100.06 | 100.80 | 104.21 | 100.80 | 100.80 | 59.19 | 53.10 |
| 2.08.2017 | 58.80 | 49.41 | 42.80 | 40.10 | 40.10 | 42.80 | 47.91 | 49.41 | 75.20 | 95.63 | 100.80 | 100.57 | 76.66 | 76.66 | 79.98 | 100.80 | 100.80 | 110.00 | 110.00 | 109.45 | 115.33 | 110.25 | 100.80 | 82.48 |
| 3.08.2017 | 85.00 | 58.99 | 50.19 | 48.78 | 48.78 | 49.41 | 58.94 | 95.63 | 105.82 | 118.46 | 128.97 | 129.35 | 129.40 | 130.00 | 150.01 | 150.00 | 150.01 | 150.01 | 150.04 | 150.04 | 150.02 | 150.02 | 129.44 | 117.66 |
| 4.08.2017 | 85.00 | 60.50 | 54.47 | 50.19 | 50.19 | 52.74 | 58.96 | 100.74 | 104.66 | 107.80 | 120.10 | 117.55 | 103.00 | 100.80 | 120.00 | 119.31 | 117.66 | 120.10 | 122.00 | 121.09 | 119.31 | 117.17 | 113.00 | 87.65 |
| 5.08.2017 | 60.00 | 52.72 | 50.00 | 49.41 | 49.41 | 48.78 | 47.25 | 47.25 | 48.78 | 49.00 | 56.10 | 56.56 | 56.56 | 46.99 | 46.78 | 46.99 | 48.78 | 49.41 | 58.56 | 76.83 | 85.00 | 72.00 | 53.00 | 48.50 |
| 6.08.2017 | 41.10 | 41.10 | 18.03 | 27.08 | 28.33 | 10.87 | 29.15 | 12.60 | 16.32 | 44.41 | 43.91 | 43.41 | 43.65 | 42.50 | 42.10 | 40.02 | 43.41 | 44.15 | 47.25 | 49.41 | 53.70 | 54.00 | 41.01 | 34.94 |
| 7.08.2017 | 31.10 | 28.00 | 26.11 | 24.80 | 40.41 | 40.00 | 43.07 | 46.00 | 54.10 | 56.10 | 56.10 | 56.10 | 56.10 | 56.10 | 56.10 | 49.90 | 50.54 | 54.10 | 56.10 | 68.00 | 72.27 | 70.00 | 42.00 | 41.10 |
| 8.08.2017 | 40.40 | 35.00 | 25.34 | 24.59 | 40.31 | 35.00 | 46.39 | 46.60 | 49.00 | 49.90 | 49.90 | 49.90 | 54.30 | 53.50 | 53.50 | 54.30 | 53.50 | 51.33 | 51.80 | 55.00 | 55.00 | 55.00 | 51.33 | 47.75 |
| 9.08.2017 | 40.40 | 42.20 | 42.20 | 42.20 | 42.20 | 47.99 | 49.90 | 55.00 | 56.78 | 85.10 | 78.90 | 78.90 | 75.00 | 75.00 | 75.00 | 74.99 | 75.00 | 76.54 | 90.00 | 90.10 | 96.27 | 90.10 | 72.60 | 52.01 |
| 10.08.2017 | 45.83 | 40.31 | 29.90 | 29.52 | 29.95 | 41.30 | 43.65 | 54.50 | 57.55 | 51.60 | 47.83 | 47.25 | 51.60 | 54.30 | 53.56 | 54.30 | 54.30 | 54.30 | 56.50 | 51.60 | 54.30 | 51.65 | 50.00 | 46.81 |
| 11.08.2017 | 46.75 | 40.41 | 39.01 | 31.00 | 31.00 | 39.50 | 40.41 | 102.00 | 135.00 | 135.00 | 135.00 | 135.00 | 135.00 | 111.11 | 111.11 | 111.11 | 111.11 | 111.11 | 102.00 | 102.00 | 98.00 | 99.44 | 51.41 | 42.69 |
| 12.08.2017 | 42.20 | 39.49 | 40.00 | 38.74 | 39.49 | 45.80 | 45.80 | 49.02 | 49.90 | 49.02 | 49.56 | 44.99 | 42.19 | 83.21 | 100.00 | 100.00 | 96.69 | 100.00 | 100.00 | 55.61 | 50.51 | 49.56 | 50.51 | 51.00 |
| 13.08.2017 | 41.10 | 35.10 | 39.06 | 38.00 | 35.10 | 11.95 | 35.01 | 35.10 | 36.61 | 35.10 | 36.64 | 35.01 | 32.63 | 32.40 | 32.40 | 32.61 | 36.93 | 40.04 | 43.28 | 46.80 | 50.54 | 51.33 | 42.20 | 32.00 |
| 14.08.2017 | 28.69 | 26.37 | 25.24 | 25.17 | 25.28 | 27.64 | 32.90 | 37.90 | 38.44 | 40.04 | 40.40 | 40.31 | 40.04 | 40.00 | 40.00 | 40.04 | 42.20 | 40.31 | 39.64 | 45.10 | 51.90 | 42.20 | 42.20 | 40.31 |
| 15.08.2017 | 28.00 | 23.05 | 40.60 | 38.10 | 19.25 | 21.47 | 26.23 | 38.10 | 40.04 | 40.00 | 40.04 | 38.62 | 36.61 | 32.40 | 29.70 | 34.20 | 38.00 | 40.50 | 43.13 | 46.14 | 49.98 | 50.62 | 49.98 | 46.80 |
| 16.08.2017 | 28.93 | 27.99 | 27.11 | 26.79 | 27.64 | 28.72 | 34.98 | 42.10 | 49.98 | 49.98 | 50.62 | 49.98 | 56.00 | 56.00 | 47.00 | 49.98 | 51.42 | 51.75 | 53.56 | 65.00 | 80.00 | 59.00 | 55.00 | 51.75 |
| 17.08.2017 | 41.00 | 41.00 | 26.96 | 26.83 | 39.45 | 41.01 | 42.10 | 46.76 | 58.00 | 67.00 | 59.89 | 59.90 | 59.90 | 46.76 | 59.90 | 59.90 | 59.90 | 50.62 | 52.06 | 55.50 | 64.00 | 55.61 | 51.42 | 40.11 |
| 18.08.2017 | 42.41 | 42.81 | 41.01 | 26.35 | 40.92 | 41.14 | 41.56 | 46.05 | 53.53 | 47.01 | 53.53 | 55.55 | 55.55 | 53.53 | 55.55 | 72.86 | 70.67 | 73.75 | 70.61 | 78.16 | 58.50 | 55.61 | 53.00 | 50.62 |
| 19.08.2017 | 50.62 | 49.98 | 48.16 | 43.97 | 43.97 | 44.10 | 45.00 | 46.67 | 46.50 | 47.50 | 43.19 | 43.19 | 43.19 | 39.50 | 39.42 | 40.04 | 43.00 | 45.00 | 49.98 | 51.42 | 54.00 | 51.42 | 49.99 | 42.20 |
| 20.08.2017 | 10.84 | 10.10 | 9.77 | 9.01 | 5.18 | 8.51 | 8.17 | 5.06 | 26.62 | 39.29 | 39.86 | 37.99 | 36.00 | 32.09 | 32.09 | 32.09 | 27.19 | 28.99 | 41.98 | 47.63 | 50.62 | 50.55 | 29.06 | 23.18 |
| 21.08.2017 | 19.55 | 12.34 | 10.96 | 9.74 | 9.96 | 20.34 | 41.14 | 45.14 | 45.67 | 45.28 | 44.64 | 71.00 | 85.69 | 102.00 | 85.00 | 44.45 | 47.00 | 50.04 | 51.48 | 57.61 | 80.00 | 57.61 | 51.06 | 50.04 |
| 22.08.2017 | 47.00 | 43.50 | 37.04 | 37.89 | 39.80 | 40.40 | 48.65 | 50.68 | 52.28 | 65.00 | 66.00 | 69.00 | 90.00 | 90.00 | 82.00 | 69.00 | 66.00 | 54.00 | 54.90 | 57.61 | 96.00 | 60.01 | 54.00 | 50.68 |
| 23.08.2017 | 50.04 | 47.77 | 42.00 | 41.14 | 42.00 | 44.51 | 50.00 | 51.50 | 51.48 | 50.68 | 47.77 | 45.99 | 44.14 | 43.92 | 44.14 | 47.00 | 48.31 | 50.68 | 54.90 | 60.00 | 75.00 | 62.09 | 51.50 | 50.04 |
| 24.08.2017 | 50.00 | 48.90 | 45.32 | 43.09 | 43.00 | 46.50 | 53.10 | 199.00 | 150.00 | 87.65 | 82.34 | 103.00 | 160.00 | 160.00 | 160.00 | 160.00 | 97.69 | 96.00 | 82.34 | 73.20 | 123.00 | 54.48 | 50.04 | 47.34 |
| 25.08.2017 | 47.05 | 43.50 | 41.14 | 41.11 | 41.11 | 43.00 | 49.99 | 54.56 | 80.19 | 80.19 | 53.53 | 61.77 | 53.53 | 51.48 | 54.54 | 56.52 | 53.55 | 53.01 | 57.61 | 65.00 | 74.42 | 57.61 | 52.00 | 49.00 |
| 26.08.2017 | 50.68 | 50.04 | 45.01 | 43.00 | 43.00 | 41.11 | 46.51 | 46.55 | 50.68 | 50.68 | 51.48 | 50.68 | 50.04 | 48.15 | 48.00 | 48.15 | 48.15 | 50.04 | 52.27 | 59.11 | 72.00 | 57.78 | 52.01 | 41.20 |
| 27.08.2017 | 50.04 | 47.96 | 43.50 | 42.22 | 42.22 | 39.71 | 42.22 | 42.22 | 41.98 | 41.98 | 45.72 | 41.98 | 41.98 | 41.07 | 41.10 | 41.19 | 41.20 | 49.02 | 50.04 | 52.27 | 62.00 | 59.00 | 52.27 | 50.04 |
| 28.08.2017 | 33.54 | 30.94 | 30.64 | 30.40 | 30.42 | 31.99 | 43.00 | 58.00 | 92.75 | 96.91 | 96.91 | 104.19 | 95.00 | 96.00 | 150.00 | 138.03 | 117.19 | 88.00 | 69.00 | 79.55 | 90.00 | 64.00 | 38.99 | 32.00 |
| 29.08.2017 | 35.47 | 35.01 | 33.08 | 32.03 | 32.44 | 35.01 | 39.71 | 42.07 | 59.02 | 42.99 | 41.49 | 39.80 | 54.99 | 39.80 | 39.80 | 39.71 | 39.71 | 45.47 | 64.00 | 71.17 | 88.00 | 46.68 | 42.00 | 50.00 |
| 30.08.2017 | 39.71 | 30.26 | 29.83 | 29.56 | 29.60 | 40.61 | 58.15 | 62.01 | 68.98 | 79.52 | 68.05 | 79.44 | 54.49 | 56.43 | 70.00 | 79.74 | 83.59 | 87.99 | 87.00 | 96.27 | 97.55 | 94.95 | 60.00 | 52.37 |
| 31.08.2017 | 51.35 | 41.91 | 40.11 | 40.11 | 45.91 | 48.00 | 51.35 | 58.15 | 65.00 | 68.00 | 61.76 | 65.00 | 55.00 | 54.01 | 62.00 | 71.70 | 72.66 | 59.90 | 58.15 | 65.00 | 74.30 | 55.00 | 52.34 | 50.56 |

Table S9. Auction Trading Prices for September (in €/MWh)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Delivery Date** | **00 - 01** | **01 - 02** | **02 - 03** | **03 - 04** | **04 - 05** | **05 - 06** | **06 - 07** | **07 - 08** | **08 - 09** | **09 - 10** | **10 - 11** | **11 - 12** | **12 - 13** | **13 - 14** | **14 - 15** | **15 - 16** | **16 - 17** | **17 - 18** | **18 - 19** | **19 - 20** | **20 - 21** | **21 - 22** | **22 - 23** | **23 - 24** |
| 1.09.2017 | 33.09 | 31.07 | 29.89 | 29.64 | 29.65 | 31.71 | 50.00 | 54.50 | 75.79 | 80.29 | 75.79 | 75.79 | 60.95 | 58.00 | 65.53 | 74.75 | 74.75 | 55.15 | 42.20 | 43.74 | 55.01 | 39.40 | 36.21 | 34.51 |
| 2.09.2017 | 32.22 | 31.73 | 30.06 | 29.64 | 29.48 | 29.99 | 39.71 | 32.39 | 49.86 | 48.00 | 45.12 | 42.50 | 41.47 | 36.46 | 35.50 | 38.64 | 39.78 | 42.32 | 41.30 | 49.86 | 49.86 | 38.02 | 35.65 | 31.02 |
| 3.09.2017 | 32.85 | 27.84 | 29.80 | 28.12 | 27.60 | 27.64 | 28.08 | 27.63 | 34.10 | 35.05 | 36.85 | 33.30 | 32.70 | 26.26 | 25.95 | 25.00 | 26.46 | 29.73 | 34.15 | 50.10 | 50.10 | 39.91 | 38.42 | 33.43 |
| 4.09.2017 | 31.03 | 29.72 | 29.41 | 27.77 | 28.09 | 30.40 | 39.67 | 52.00 | 52.10 | 42.50 | 49.23 | 51.00 | 47.00 | 46.15 | 47.76 | 50.05 | 49.32 | 42.50 | 42.91 | 45.48 | 59.25 | 42.30 | 38.93 | 33.22 |
| 5.09.2017 | 31.92 | 29.93 | 29.70 | 29.62 | 32.37 | 43.26 | 51.78 | 54.04 | 80.85 | 77.04 | 62.00 | 65.00 | 53.93 | 51.00 | 57.52 | 60.95 | 54.82 | 55.15 | 52.42 | 55.04 | 55.43 | 51.70 | 47.99 | 46.08 |
| 6.09.2017 | 29.47 | 29.06 | 27.83 | 26.19 | 26.42 | 43.00 | 51.64 | 52.64 | 52.64 | 52.64 | 52.00 | 51.64 | 47.45 | 47.45 | 51.63 | 52.30 | 55.75 | 52.30 | 52.64 | 53.64 | 56.50 | 52.42 | 47.50 | 46.07 |
| 7.09.2017 | 42.11 | 42.11 | 38.20 | 35.00 | 40.24 | 42.11 | 51.64 | 52.63 | 58.00 | 51.10 | 46.40 | 51.10 | 51.09 | 61.60 | 70.04 | 67.09 | 51.10 | 51.09 | 52.63 | 55.15 | 55.00 | 42.20 | 42.20 | 33.99 |
| 8.09.2017 | 38.21 | 38.21 | 23.95 | 38.20 | 42.11 | 47.99 | 52.42 | 53.25 | 54.00 | 55.15 | 52.42 | 51.70 | 48.00 | 47.17 | 47.58 | 48.89 | 51.64 | 51.78 | 53.25 | 58.15 | 57.20 | 52.64 | 48.00 | 47.61 |
| 9.09.2017 | 47.15 | 39.01 | 45.04 | 44.00 | 43.87 | 44.00 | 45.04 | 45.88 | 47.14 | 47.14 | 44.87 | 42.17 | 38.99 | 35.99 | 35.18 | 37.78 | 42.15 | 44.48 | 47.14 | 51.70 | 51.78 | 47.28 | 42.20 | 36.81 |
| 10.09.2017 | 31.06 | 29.56 | 28.23 | 25.90 | 23.73 | 23.17 | 25.92 | 26.08 | 31.30 | 40.70 | 42.50 | 45.45 | 42.50 | 40.49 | 40.10 | 40.49 | 40.70 | 40.70 | 43.28 | 48.28 | 51.30 | 48.08 | 31.20 | 9.40 |
| 11.09.2017 | 32.60 | 26.60 | 4.00 | 4.00 | 26.60 | 26.60 | 45.00 | 49.59 | 58.15 | 58.07 | 55.15 | 52.54 | 49.59 | 52.25 | 41.60 | 38.30 | 42.20 | 38.90 | 51.00 | 58.97 | 57.06 | 49.59 | 32.29 | 9.36 |
| 12.09.2017 | 21.00 | 9.03 | 6.49 | 5.33 | 8.71 | 14.90 | 42.20 | 47.27 | 51.00 | 53.10 | 50.24 | 49.59 | 47.27 | 47.27 | 50.50 | 53.99 | 55.10 | 50.51 | 42.80 | 63.00 | 67.35 | 46.00 | 40.40 | 37.00 |
| 13.09.2017 | 19.02 | 12.08 | 10.71 | 5.48 | 8.33 | 25.36 | 51.78 | 58.00 | 67.00 | 58.10 | 53.09 | 51.78 | 46.93 | 46.08 | 49.17 | 51.80 | 53.31 | 55.15 | 64.81 | 75.65 | 85.00 | 60.00 | 51.78 | 42.20 |
| 14.09.2017 | 6.30 | 5.13 | 8.00 | 5.00 | 5.00 | 40.33 | 47.32 | 51.49 | 52.50 | 51.86 | 51.06 | 48.96 | 42.17 | 42.54 | 44.16 | 47.32 | 49.35 | 51.06 | 51.78 | 54.33 | 54.10 | 49.31 | 42.80 | 19.03 |
| 15.09.2017 | 40.15 | 14.00 | 14.00 | 16.69 | 37.75 | 40.36 | 40.40 | 53.59 | 68.13 | 67.75 | 55.58 | 55.00 | 50.02 | 46.87 | 49.05 | 49.01 | 51.35 | 52.01 | 45.47 | 57.08 | 56.00 | 50.10 | 37.91 | 31.40 |
| 16.09.2017 | 39.90 | 32.00 | 31.57 | 31.01 | 30.82 | 31.44 | 31.94 | 41.17 | 47.66 | 47.37 | 43.92 | 42.88 | 38.27 | 35.29 | 32.99 | 34.00 | 37.69 | 43.00 | 47.37 | 51.86 | 49.95 | 43.54 | 40.33 | 35.01 |
| 17.09.2017 | 32.27 | 30.40 | 30.06 | 29.43 | 29.18 | 29.38 | 29.98 | 30.09 | 32.04 | 38.55 | 39.89 | 37.58 | 32.72 | 31.41 | 30.45 | 30.24 | 36.10 | 42.50 | 47.66 | 53.49 | 55.52 | 45.10 | 38.27 | 33.09 |
| 18.09.2017 | 32.77 | 32.08 | 32.10 | 31.42 | 32.00 | 32.60 | 46.66 | 52.07 | 55.79 | 55.79 | 52.07 | 51.96 | 51.01 | 51.01 | 52.07 | 54.79 | 54.79 | 54.00 | 52.07 | 55.01 | 55.00 | 52.01 | 47.76 | 46.87 |
| 19.09.2017 | 33.10 | 32.13 | 31.28 | 30.80 | 31.07 | 33.22 | 40.00 | 50.02 | 53.76 | 52.00 | 50.27 | 49.50 | 46.69 | 47.00 | 50.27 | 51.95 | 50.59 | 52.07 | 52.95 | 56.50 | 54.11 | 50.27 | 45.15 | 35.74 |
| 20.09.2017 | 29.97 | 29.49 | 28.47 | 25.99 | 26.56 | 31.05 | 39.49 | 51.55 | 54.00 | 53.37 | 49.73 | 49.73 | 46.34 | 44.53 | 44.55 | 42.20 | 40.40 | 43.94 | 48.93 | 54.37 | 51.03 | 43.91 | 39.44 | 34.61 |
| 21.09.2017 | 32.61 | 30.80 | 29.66 | 29.49 | 29.98 | 32.11 | 40.00 | 47.97 | 50.97 | 47.03 | 43.47 | 40.31 | 42.20 | 40.40 | 40.40 | 38.51 | 37.52 | 43.48 | 48.73 | 53.78 | 50.75 | 42.20 | 38.33 | 34.73 |
| 22.09.2017 | 32.24 | 31.67 | 30.40 | 30.02 | 30.30 | 31.90 | 40.06 | 48.18 | 49.80 | 49.71 | 47.17 | 45.34 | 46.79 | 38.07 | 36.58 | 36.57 | 37.31 | 43.27 | 45.92 | 48.92 | 47.21 | 43.30 | 39.51 | 37.95 |
| 23.09.2017 | 34.67 | 31.99 | 31.94 | 31.91 | 31.43 | 31.81 | 33.40 | 39.03 | 41.54 | 42.93 | 41.91 | 40.39 | 35.23 | 32.17 | 32.12 | 32.00 | 32.77 | 37.22 | 42.44 | 45.20 | 44.93 | 39.08 | 35.79 | 31.72 |
| 24.09.2017 | 31.76 | 30.51 | 31.03 | 30.77 | 30.55 | 31.06 | 31.82 | 32.09 | 34.90 | 40.30 | 39.70 | 40.30 | 42.20 | 39.35 | 31.52 | 31.37 | 31.62 | 39.70 | 49.00 | 55.21 | 56.00 | 42.20 | 41.08 | 32.45 |
| 25.09.2017 | 32.97 | 31.69 | 31.10 | 31.02 | 30.50 | 32.49 | 44.42 | 57.01 | 62.01 | 59.64 | 58.00 | 56.05 | 51.04 | 51.00 | 56.01 | 56.05 | 54.74 | 55.00 | 56.01 | 77.00 | 50.44 | 41.96 | 34.90 | 34.85 |
| 26.09.2017 | 35.37 | 32.42 | 31.36 | 31.33 | 31.88 | 33.61 | 42.52 | 51.78 | 55.20 | 50.81 | 46.03 | 41.10 | 39.80 | 38.80 | 34.83 | 35.90 | 39.53 | 46.05 | 49.93 | 59.40 | 49.42 | 36.34 | 33.93 | 35.43 |
| 27.09.2017 | 33.42 | 32.12 | 32.03 | 31.56 | 32.14 | 33.70 | 45.07 | 54.40 | 57.00 | 51.59 | 46.10 | 51.01 | 39.80 | 39.80 | 49.00 | 35.96 | 38.94 | 45.08 | 53.09 | 61.42 | 47.99 | 42.95 | 38.43 | 32.94 |
| 28.09.2017 | 32.08 | 31.77 | 31.58 | 31.01 | 31.05 | 33.40 | 40.20 | 49.21 | 49.43 | 47.08 | 45.27 | 44.35 | 39.20 | 39.20 | 38.45 | 41.67 | 44.12 | 46.93 | 47.51 | 49.78 | 47.49 | 38.50 | 34.96 | 32.96 |
| 29.09.2017 | 33.85 | 32.88 | 31.50 | 31.10 | 30.97 | 31.91 | 40.67 | 49.91 | 51.20 | 49.99 | 47.99 | 47.08 | 38.65 | 39.13 | 36.86 | 38.45 | 41.23 | 45.17 | 47.93 | 73.00 | 39.10 | 32.21 | 36.94 | 30.60 |
| 30.09.2017 | 23.88 | 26.09 | 26.65 | 28.73 | 29.03 | 30.02 | 31.96 | 38.60 | 39.00 | 42.49 | 42.57 | 43.20 | 38.75 | 32.82 | 31.84 | 33.00 | 37.52 | 41.77 | 45.06 | 48.25 | 45.01 | 37.49 | 32.18 | 29.06 |

Table S10. Auction Trading Prices for October (in €/MWh)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Delivery Date** | **00 - 01** | **01 - 02** | **02 - 03** | **03 - 04** | **04 - 05** | **05 - 06** | **06 - 07** | **07 - 08** | **08 - 09** | **09 - 10** | **10 - 11** | **11 - 12** | **12 - 13** | **13 - 14** | **14 - 15** | **15 - 16** | **16 - 17** | **17 - 18** | **18 - 19** | **19 - 20** | **20 - 21** | **21 - 22** | **22 - 23** | **23 - 24** |
| 1.10.2017 | 12.95 | 14.84 | 19.05 | 22.15 | 22.90 | 23.10 | 25.66 | 27.40 | 32.71 | 38.11 | 38.39 | 38.58 | 38.29 | 29.68 | 26.09 | 26.64 | 27.84 | 37.00 | 46.13 | 56.50 | 45.98 | 31.95 | 26.08 | 13.94 |
| 2.10.2017 | 18.64 | 12.90 | 5.72 | 1.00 | 2.90 | 9.37 | 53.47 | 55.97 | 50.10 | 50.10 | 54.10 | 53.47 | 52.99 | 51.03 | 53.36 | 53.70 | 54.10 | 56.56 | 59.27 | 79.99 | 60.39 | 40.40 | 15.18 | 9.39 |
| 3.10.2017 | 45.09 | 42.60 | 40.31 | 40.31 | 41.33 | 45.09 | 53.47 | 60.03 | 63.99 | 61.50 | 62.21 | 60.10 | 60.10 | 60.10 | 55.91 | 58.00 | 62.02 | 55.91 | 57.93 | 75.00 | 59.50 | 53.47 | 48.07 | 45.14 |
| 4.10.2017 | 40.40 | 18.65 | 20.88 | 18.06 | 22.63 | 42.20 | 54.95 | 61.24 | 65.50 | 56.10 | 59.35 | 59.00 | 57.69 | 53.25 | 52.90 | 53.90 | 53.98 | 54.95 | 58.50 | 83.20 | 66.06 | 56.00 | 53.47 | 50.82 |
| 5.10.2017 | 52.09 | 49.09 | 45.12 | 45.11 | 45.11 | 49.09 | 58.00 | 63.99 | 73.24 | 67.59 | 62.00 | 55.20 | 51.04 | 51.03 | 53.25 | 57.91 | 61.50 | 61.83 | 61.50 | 80.40 | 62.07 | 53.47 | 52.48 | 46.09 |
| 6.10.2017 | 45.84 | 42.43 | 41.33 | 41.32 | 41.32 | 42.01 | 52.98 | 64.40 | 76.74 | 71.09 | 63.99 | 64.00 | 55.22 | 54.41 | 57.24 | 61.79 | 63.99 | 65.33 | 64.00 | 78.00 | 62.17 | 53.36 | 51.53 | 48.46 |
| 7.10.2017 | 42.71 | 42.71 | 10.72 | 11.04 | 9.00 | 11.24 | 40.31 | 42.20 | 42.80 | 50.50 | 42.80 | 44.76 | 44.00 | 41.21 | 37.02 | 35.00 | 38.99 | 43.60 | 52.98 | 61.84 | 57.06 | 52.79 | 53.36 | 42.80 |
| 8.10.2017 | 40.60 | 35.01 | 35.01 | 35.01 | 35.01 | 35.01 | 35.01 | 24.48 | 35.10 | 42.80 | 46.97 | 45.14 | 42.80 | 41.39 | 39.74 | 40.51 | 35.01 | 35.00 | 52.10 | 64.00 | 59.94 | 42.80 | 42.80 | 42.40 |
| 9.10.2017 | 32.06 | 30.64 | 30.02 | 30.09 | 30.01 | 40.31 | 54.28 | 64.73 | 64.05 | 64.79 | 64.12 | 63.04 | 60.58 | 59.19 | 57.11 | 58.00 | 64.31 | 74.00 | 80.00 | 91.48 | 67.91 | 61.00 | 51.77 | 50.54 |
| 10.10.2017 | 49.64 | 46.46 | 44.21 | 44.23 | 44.25 | 48.78 | 67.81 | 70.59 | 87.58 | 72.00 | 67.09 | 66.46 | 64.72 | 64.22 | 64.10 | 76.00 | 65.23 | 75.38 | 86.64 | 106.00 | 74.10 | 75.00 | 61.00 | 56.28 |
| 11.10.2017 | 55.00 | 50.00 | 44.15 | 44.15 | 44.15 | 47.60 | 56.20 | 69.25 | 69.10 | 68.32 | 66.87 | 64.88 | 58.42 | 56.28 | 55.81 | 56.30 | 60.00 | 60.36 | 77.79 | 100.00 | 77.86 | 62.54 | 58.67 | 51.77 |
| 12.10.2017 | 49.50 | 44.00 | 43.91 | 18.15 | 43.91 | 45.93 | 54.57 | 66.39 | 66.46 | 64.99 | 64.05 | 63.00 | 59.14 | 58.00 | 57.29 | 56.54 | 57.29 | 61.00 | 64.10 | 73.54 | 69.02 | 59.29 | 54.57 | 49.60 |
| 13.10.2017 | 38.00 | 29.38 | 28.34 | 28.46 | 29.03 | 31.47 | 58.00 | 63.00 | 67.60 | 64.30 | 58.00 | 56.47 | 53.50 | 50.80 | 52.61 | 54.23 | 54.57 | 59.02 | 65.00 | 68.84 | 67.33 | 54.83 | 54.37 | 48.20 |
| 14.10.2017 | 52.72 | 49.02 | 44.12 | 43.42 | 43.06 | 42.74 | 48.37 | 53.50 | 51.15 | 47.84 | 47.78 | 47.84 | 42.95 | 44.40 | 41.62 | 40.40 | 42.38 | 46.43 | 50.64 | 63.16 | 54.57 | 48.37 | 47.10 | 43.90 |
| 15.10.2017 | 42.03 | 41.00 | 37.00 | 29.27 | 29.04 | 28.91 | 31.18 | 35.90 | 40.77 | 41.38 | 42.00 | 30.97 | 30.70 | 37.37 | 35.00 | 26.63 | 28.03 | 39.38 | 45.05 | 45.04 | 36.94 | 51.12 | 45.00 | 42.67 |
| 16.10.2017 | 22.99 | 21.26 | 21.86 | 21.79 | 22.93 | 28.90 | 51.35 | 55.73 | 64.05 | 64.96 | 60.29 | 56.80 | 48.31 | 51.35 | 53.83 | 58.00 | 62.00 | 58.00 | 63.47 | 86.00 | 62.19 | 54.97 | 51.34 | 46.10 |
| 17.10.2017 | 28.95 | 27.02 | 26.99 | 27.04 | 28.06 | 30.57 | 53.47 | 65.04 | 67.48 | 66.00 | 65.04 | 65.04 | 63.98 | 64.05 | 63.22 | 58.60 | 59.00 | 62.00 | 65.20 | 80.54 | 68.71 | 64.05 | 55.13 | 48.17 |
| 18.10.2017 | 43.21 | 34.02 | 34.02 | 31.89 | 31.81 | 44.64 | 54.45 | 66.00 | 69.94 | 67.91 | 65.04 | 63.43 | 64.48 | 61.97 | 61.99 | 62.95 | 65.48 | 65.66 | 73.41 | 83.02 | 67.03 | 57.95 | 55.05 | 46.01 |
| 19.10.2017 | 52.58 | 34.26 | 33.59 | 33.74 | 34.00 | 44.10 | 53.71 | 69.70 | 73.46 | 68.12 | 67.01 | 67.66 | 62.58 | 57.70 | 56.50 | 56.45 | 58.00 | 65.00 | 70.68 | 77.55 | 70.00 | 62.65 | 58.00 | 46.01 |
| 20.10.2017 | 47.27 | 41.11 | 41.11 | 41.11 | 43.87 | 45.99 | 67.50 | 67.09 | 74.97 | 71.60 | 63.99 | 63.99 | 60.39 | 56.50 | 55.60 | 56.99 | 63.99 | 65.00 | 69.70 | 88.04 | 66.00 | 58.76 | 53.69 | 51.48 |
| 21.10.2017 | 50.39 | 48.29 | 46.14 | 46.29 | 46.29 | 48.29 | 52.87 | 65.00 | 77.00 | 59.99 | 56.14 | 70.00 | 80.10 | 65.00 | 44.35 | 47.00 | 56.20 | 50.69 | 69.70 | 72.90 | 73.50 | 56.76 | 50.39 | 46.13 |
| 22.10.2017 | 44.58 | 21.65 | 16.90 | 12.98 | 9.24 | 5.23 | 9.86 | 42.50 | 13.04 | 12.93 | 42.60 | 52.39 | 50.75 | 49.19 | 49.15 | 49.10 | 51.06 | 50.34 | 60.00 | 62.82 | 64.03 | 56.23 | 32.24 | 42.50 |
| 23.10.2017 | 28.61 | 27.86 | 26.43 | 23.07 | 22.22 | 30.33 | 42.36 | 51.95 | 50.00 | 45.39 | 46.02 | 50.97 | 50.46 | 50.26 | 48.55 | 46.01 | 46.08 | 60.00 | 67.05 | 71.00 | 57.50 | 45.48 | 37.70 | 36.00 |
| 24.10.2017 | 31.68 | 32.41 | 32.09 | 31.67 | 32.07 | 34.30 | 43.56 | 46.59 | 53.91 | 48.42 | 57.10 | 66.12 | 63.50 | 64.30 | 62.62 | 63.00 | 57.90 | 51.20 | 70.00 | 72.01 | 61.95 | 42.60 | 39.91 | 35.00 |
| 25.10.2017 | 39.91 | 15.05 | 12.79 | 13.99 | 17.03 | 39.91 | 58.00 | 69.91 | 63.20 | 69.91 | 68.04 | 67.05 | 63.59 | 64.00 | 63.49 | 64.05 | 64.36 | 67.90 | 81.88 | 87.21 | 70.89 | 69.91 | 63.01 | 62.05 |
| 26.10.2017 | 51.27 | 32.18 | 32.21 | 32.25 | 32.25 | 45.70 | 62.25 | 70.22 | 73.21 | 70.22 | 66.05 | 63.35 | 60.00 | 58.38 | 56.52 | 57.65 | 60.00 | 65.97 | 80.65 | 85.00 | 70.22 | 53.50 | 42.60 | 53.00 |
| 27.10.2017 | 52.43 | 21.71 | 12.90 | 12.81 | 19.04 | 49.19 | 66.11 | 70.89 | 87.68 | 80.67 | 66.00 | 87.75 | 85.81 | 63.20 | 56.97 | 61.90 | 62.94 | 65.59 | 68.26 | 70.22 | 67.00 | 60.64 | 50.80 | 48.59 |
| 28.10.2017 | 48.15 | 45.00 | 42.94 | 41.53 | 39.89 | 42.44 | 45.32 | 52.40 | 53.79 | 56.00 | 56.01 | 54.50 | 50.00 | 46.38 | 41.54 | 41.61 | 44.40 | 46.60 | 66.00 | 70.89 | 62.00 | 52.50 | 48.00 | 45.00 |
| 29.10.2017 | 57.00 | 46.57 | 44.04 | 43.67 | 42.10 | 41.79 | 43.67 | 43.52 | 46.38 | 43.44 | 41.51 | 43.51 | 46.57 | 46.57 | 44.67 | 42.10 | 44.04 | 46.57 | 47.89 | 59.58 | 63.30 | 63.15 | 54.72 | 55.00 |
| 30.10.2017 | 0.75 | 0.01 | 0.08 | 4.05 | 2.95 | 18.09 | 50.63 | 60.54 | 62.16 | 59.19 | 56.52 | 54.99 | 50.99 | 51.44 | 54.56 | 56.78 | 67.00 | 68.76 | 70.09 | 57.11 | 48.13 | 47.18 | 46.05 | 41.97 |
| 31.10.2017 | 30.08 | 30.89 | 30.01 | 29.09 | 30.29 | 32.24 | 38.94 | 37.90 | 41.09 | 39.92 | 37.98 | 39.97 | 36.95 | 39.54 | 39.55 | 39.24 | 55.49 | 70.38 | 72.01 | 72.17 | 68.76 | 59.46 | 56.44 | 31.01 |

Table S11. Auction Trading Prices for November (in €/MWh)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Delivery Date** | **00 - 01** | **01 - 02** | **02 - 03** | **03 - 04** | **04 - 05** | **05 - 06** | **06 - 07** | **07 - 08** | **08 - 09** | **09 - 10** | **10 - 11** | **11 - 12** | **12 - 13** | **13 - 14** | **14 - 15** | **15 - 16** | **16 - 17** | **17 - 18** | **18 - 19** | **19 - 20** | **20 - 21** | **21 - 22** | **22 - 23** | **23 - 24** |
| 1.11.2017 | 26.91 | 23.06 | 22.27 | 22.97 | 26.66 | 27.03 | 29.07 | 31.00 | 36.06 | 42.10 | 32.37 | 33.08 | 38.38 | 29.06 | 29.18 | 30.01 | 58.29 | 87.83 | 68.21 | 75.00 | 70.38 | 60.46 | 42.01 | 18.97 |
| 2.11.2017 | 20.18 | 12.62 | 12.61 | 10.96 | 14.04 | 35.60 | 53.00 | 60.43 | 65.94 | 62.58 | 61.61 | 60.53 | 59.43 | 59.07 | 60.43 | 65.60 | 86.00 | 92.00 | 84.05 | 71.60 | 67.86 | 60.00 | 56.26 | 50.55 |
| 3.11.2017 | 36.07 | 36.09 | 36.13 | 36.09 | 38.24 | 46.51 | 56.10 | 81.88 | 92.67 | 83.98 | 82.24 | 106.80 | 95.00 | 81.54 | 95.00 | 77.96 | 82.97 | 96.00 | 92.80 | 85.01 | 78.42 | 58.60 | 53.22 | 51.40 |
| 4.11.2017 | 54.59 | 46.98 | 45.87 | 33.61 | 45.87 | 46.06 | 48.00 | 50.00 | 53.40 | 54.00 | 54.30 | 49.67 | 46.30 | 46.06 | 46.18 | 50.00 | 59.95 | 70.38 | 65.30 | 64.40 | 58.14 | 53.14 | 49.73 | 47.40 |
| 5.11.2017 | 48.64 | 49.48 | 47.50 | 45.87 | 45.87 | 47.50 | 48.44 | 48.99 | 49.72 | 50.39 | 54.40 | 54.06 | 51.59 | 48.64 | 49.48 | 52.98 | 65.00 | 71.05 | 70.38 | 65.34 | 59.85 | 50.00 | 49.48 | 46.46 |
| 6.11.2017 | 31.74 | 33.73 | 33.02 | 27.61 | 28.10 | 32.99 | 51.52 | 64.83 | 69.60 | 69.10 | 66.89 | 65.81 | 86.00 | 86.00 | 75.00 | 75.00 | 77.49 | 99.36 | 95.01 | 87.00 | 75.00 | 65.00 | 61.52 | 57.10 |
| 7.11.2017 | 44.44 | 35.05 | 36.87 | 36.02 | 37.04 | 46.31 | 58.10 | 71.20 | 75.99 | 73.50 | 73.13 | 71.30 | 68.09 | 65.94 | 68.00 | 70.61 | 73.31 | 84.20 | 91.83 | 82.83 | 71.20 | 60.33 | 55.00 | 37.86 |
| 8.11.2017 | 33.70 | 33.62 | 33.64 | 33.62 | 35.53 | 36.15 | 54.07 | 75.76 | 79.28 | 89.40 | 89.06 | 93.47 | 85.59 | 91.95 | 89.90 | 85.00 | 88.20 | 111.40 | 120.00 | 94.71 | 79.15 | 52.32 | 48.05 | 38.57 |
| 9.11.2017 | 38.61 | 39.30 | 38.48 | 40.53 | 39.90 | 43.95 | 58.65 | 72.10 | 84.73 | 61.99 | 61.37 | 72.10 | 90.76 | 90.00 | 89.98 | 72.10 | 72.10 | 128.64 | 132.48 | 72.10 | 99.67 | 43.11 | 43.11 | 33.61 |
| 10.11.2017 | 26.41 | 40.90 | 26.60 | 27.31 | 27.10 | 40.91 | 70.71 | 98.01 | 109.10 | 72.10 | 98.01 | 93.70 | 93.70 | 85.93 | 72.10 | 74.21 | 99.75 | 117.17 | 111.30 | 84.55 | 79.83 | 71.20 | 67.05 | 57.00 |
| 11.11.2017 | 63.74 | 60.34 | 55.48 | 52.36 | 52.33 | 41.11 | 43.11 | 43.11 | 43.20 | 54.00 | 54.00 | 57.97 | 57.07 | 56.81 | 54.00 | 55.20 | 69.18 | 71.86 | 55.20 | 55.20 | 41.00 | 35.82 | 37.06 | 28.29 |
| 12.11.2017 | 14.07 | 15.99 | 13.80 | 13.53 | 15.25 | 21.86 | 22.52 | 27.06 | 30.94 | 33.03 | 42.79 | 47.65 | 48.13 | 44.28 | 38.43 | 38.92 | 41.00 | 53.91 | 53.94 | 46.54 | 41.00 | 33.11 | 33.17 | 29.73 |
| 13.11.2017 | 31.06 | 30.41 | 29.64 | 29.66 | 29.79 | 31.68 | 42.76 | 58.99 | 54.33 | 48.15 | 54.00 | 74.00 | 65.83 | 71.10 | 71.10 | 69.69 | 65.26 | 70.08 | 62.30 | 58.71 | 61.03 | 49.00 | 41.00 | 36.55 |
| 14.11.2017 | 37.83 | 36.01 | 34.03 | 33.54 | 33.90 | 34.04 | 38.12 | 43.52 | 49.58 | 43.00 | 43.00 | 43.00 | 43.00 | 36.60 | 36.86 | 40.07 | 49.06 | 51.71 | 52.94 | 51.25 | 44.92 | 39.44 | 37.60 | 36.36 |
| 15.11.2017 | 33.50 | 34.06 | 33.42 | 35.62 | 33.74 | 37.00 | 58.50 | 77.40 | 78.01 | 68.87 | 61.65 | 71.76 | 64.10 | 70.77 | 72.81 | 79.18 | 89.95 | 112.09 | 124.29 | 86.34 | 76.13 | 62.01 | 51.91 | 39.03 |
| 16.11.2017 | 37.04 | 37.06 | 36.13 | 36.59 | 37.04 | 36.87 | 51.61 | 61.89 | 68.63 | 64.10 | 64.10 | 64.10 | 76.35 | 75.76 | 54.00 | 98.01 | 100.00 | 64.10 | 53.93 | 46.30 | 42.90 | 42.90 | 45.00 | 42.00 |
| 17.11.2017 | 45.00 | 41.10 | 33.16 | 34.06 | 34.05 | 41.10 | 55.01 | 70.00 | 53.93 | 82.62 | 83.05 | 79.90 | 75.50 | 73.30 | 74.40 | 79.90 | 79.20 | 85.00 | 85.01 | 85.10 | 79.85 | 65.01 | 42.91 | 42.91 |
| 18.11.2017 | 43.01 | 50.01 | 50.01 | 28.16 | 44.14 | 48.83 | 52.95 | 56.92 | 57.00 | 61.07 | 61.20 | 60.53 | 59.50 | 58.96 | 55.87 | 56.62 | 58.48 | 71.05 | 74.76 | 73.88 | 68.26 | 65.00 | 64.67 | 48.70 |
| 19.11.2017 | 48.70 | 56.52 | 46.10 | 45.01 | 45.01 | 45.01 | 46.10 | 52.00 | 53.02 | 52.81 | 53.53 | 54.40 | 53.80 | 51.00 | 51.39 | 55.20 | 56.45 | 67.00 | 74.76 | 77.91 | 74.19 | 71.39 | 69.72 | 59.00 |
| 20.11.2017 | 46.51 | 12.51 | 11.00 | 11.00 | 14.96 | 53.90 | 70.10 | 81.18 | 88.92 | 80.40 | 48.70 | 72.42 | 69.74 | 68.05 | 69.74 | 50.99 | 80.00 | 85.00 | 53.38 | 74.10 | 74.10 | 68.50 | 49.01 | 48.60 |
| 21.11.2017 | 52.00 | 35.46 | 35.63 | 35.73 | 45.00 | 47.52 | 54.62 | 70.00 | 79.15 | 75.26 | 72.45 | 69.40 | 68.72 | 64.91 | 70.53 | 70.53 | 79.15 | 98.00 | 99.19 | 86.20 | 71.52 | 63.44 | 56.06 | 53.53 |
| 22.11.2017 | 54.30 | 48.61 | 47.01 | 46.51 | 47.14 | 50.78 | 62.08 | 74.00 | 88.00 | 75.76 | 70.10 | 68.15 | 78.01 | 74.00 | 74.00 | 85.56 | 102.92 | 103.11 | 99.36 | 84.20 | 71.52 | 67.15 | 57.49 | 53.08 |
| 23.11.2017 | 52.50 | 48.41 | 47.40 | 47.02 | 46.81 | 52.50 | 62.82 | 70.00 | 87.85 | 85.85 | 80.82 | 81.11 | 72.21 | 76.43 | 79.32 | 96.91 | 114.64 | 107.32 | 91.32 | 81.07 | 71.88 | 67.85 | 61.10 | 56.31 |
| 24.11.2017 | 54.00 | 53.00 | 51.70 | 51.12 | 51.37 | 53.89 | 61.50 | 81.50 | 90.00 | 88.63 | 85.00 | 85.78 | 87.26 | 85.00 | 79.90 | 72.28 | 79.15 | 85.00 | 79.00 | 74.82 | 70.53 | 59.46 | 55.60 | 46.81 |
| 25.11.2017 | 56.59 | 52.50 | 49.54 | 47.08 | 38.95 | 46.86 | 50.00 | 55.49 | 56.90 | 57.90 | 58.95 | 57.05 | 55.31 | 52.70 | 50.50 | 52.83 | 56.48 | 63.10 | 67.76 | 68.50 | 64.30 | 53.75 | 56.70 | 55.13 |
| 26.11.2017 | 43.25 | 12.59 | 11.56 | 11.45 | 15.74 | 12.85 | 11.41 | 9.77 | 46.81 | 50.79 | 52.34 | 53.20 | 56.70 | 49.00 | 50.45 | 50.65 | 55.20 | 62.80 | 69.55 | 70.53 | 64.60 | 56.70 | 46.90 | 45.01 |
| 27.11.2017 | 46.81 | 46.81 | 46.81 | 40.00 | 44.00 | 47.36 | 55.00 | 71.04 | 76.15 | 75.44 | 71.04 | 71.40 | 69.40 | 67.93 | 68.74 | 79.15 | 89.00 | 85.00 | 81.00 | 76.44 | 69.84 | 62.68 | 46.81 | 21.00 |
| 28.11.2017 | 53.31 | 16.07 | 45.91 | 16.29 | 22.04 | 24.70 | 61.97 | 79.15 | 90.20 | 93.16 | 86.00 | 105.61 | 77.50 | 80.19 | 94.18 | 103.05 | 117.68 | 109.35 | 92.53 | 81.36 | 75.00 | 66.07 | 63.09 | 60.56 |
| 29.11.2017 | 61.32 | 56.07 | 45.91 | 35.06 | 45.91 | 57.48 | 66.00 | 84.97 | 117.31 | 114.75 | 100.00 | 86.00 | 82.18 | 82.40 | 89.21 | 90.40 | 99.99 | 120.00 | 122.28 | 99.99 | 78.00 | 69.00 | 64.11 | 47.71 |
| 30.11.2017 | 58.44 | 46.50 | 36.97 | 36.10 | 38.47 | 48.60 | 53.99 | 83.75 | 88.16 | 85.25 | 86.79 | 86.70 | 84.07 | 83.34 | 82.81 | 84.22 | 89.15 | 100.12 | 95.10 | 87.24 | 78.81 | 51.96 | 48.60 | 48.60 |

Table S12. Auction Trading Prices for December (in €/MWh)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Delivery Date** | **00 - 01** | **01 - 02** | **02 - 03** | **03 - 04** | **04 - 05** | **05 - 06** | **06 - 07** | **07 - 08** | **08 - 09** | **09 - 10** | **10 - 11** | **11 - 12** | **12 - 13** | **13 - 14** | **14 - 15** | **15 - 16** | **16 - 17** | **17 - 18** | **18 - 19** | **19 - 20** | **20 - 21** | **21 - 22** | **22 - 23** | **23 - 24** |
| 1.12.2017 | 35.82 | 38.59 | 37.18 | 37.00 | 37.42 | 36.14 | 55.97 | 81.69 | 75.01 | 72.89 | 70.38 | 74.87 | 74.91 | 73.18 | 72.50 | 74.42 | 76.60 | 85.69 | 82.57 | 77.38 | 61.95 | 52.93 | 41.58 | 37.94 |
| 2.12.2017 | 40.01 | 39.02 | 37.89 | 37.82 | 34.70 | 36.75 | 34.08 | 37.01 | 46.17 | 63.15 | 62.27 | 59.80 | 68.52 | 59.80 | 56.64 | 46.13 | 70.82 | 80.00 | 65.10 | 59.10 | 36.79 | 59.01 | 39.92 | 35.68 |
| 3.12.2017 | 33.17 | 31.93 | 30.43 | 28.30 | 30.44 | 29.87 | 29.81 | 44.70 | 50.07 | 47.66 | 60.87 | 54.76 | 64.92 | 52.77 | 46.71 | 37.33 | 41.10 | 46.47 | 50.10 | 50.10 | 50.10 | 62.39 | 38.08 | 28.25 |
| 4.12.2017 | 49.81 | 17.69 | 15.31 | 12.75 | 17.18 | 58.57 | 55.60 | 83.32 | 49.90 | 49.90 | 60.00 | 60.00 | 62.20 | 62.20 | 90.50 | 108.50 | 106.50 | 112.04 | 111.36 | 62.20 | 49.81 | 45.90 | 33.53 | 30.03 |
| 5.12.2017 | 28.69 | 28.01 | 26.88 | 27.93 | 28.23 | 30.73 | 69.34 | 107.27 | 135.56 | 120.86 | 99.21 | 110.00 | 102.68 | 103.39 | 106.18 | 108.75 | 117.93 | 111.23 | 45.13 | 74.90 | 83.63 | 35.51 | 28.06 | 13.45 |
| 6.12.2017 | 80.00 | 75.69 | 73.12 | 71.18 | 70.90 | 71.18 | 79.30 | 74.90 | 60.00 | 60.00 | 100.93 | 100.36 | 88.99 | 88.00 | 88.08 | 53.10 | 62.00 | 62.20 | 62.00 | 62.00 | 84.97 | 75.81 | 74.05 | 57.00 |
| 7.12.2017 | 60.91 | 49.91 | 49.91 | 49.91 | 49.90 | 60.91 | 61.00 | 74.90 | 64.20 | 61.00 | 61.00 | 64.20 | 79.99 | 79.99 | 84.99 | 95.00 | 92.35 | 105.26 | 64.20 | 74.90 | 81.49 | 74.99 | 73.02 | 60.91 |
| 8.12.2017 | 53.11 | 53.11 | 49.91 | 49.91 | 54.81 | 59.36 | 62.16 | 66.08 | 68.20 | 61.00 | 62.20 | 70.62 | 71.01 | 67.90 | 63.56 | 62.20 | 65.36 | 61.20 | 53.20 | 60.10 | 66.71 | 53.20 | 67.21 | 49.91 |
| 9.12.2017 | 65.67 | 40.01 | 19.90 | 10.05 | 19.90 | 47.10 | 47.10 | 62.20 | 57.10 | 55.10 | 55.10 | 65.00 | 65.00 | 58.01 | 48.60 | 33.15 | 35.37 | 50.10 | 51.00 | 37.89 | 31.99 | 19.60 | 25.91 | 10.16 |
| 10.12.2017 | 60.15 | 58.21 | 46.00 | 29.00 | 45.91 | 45.91 | 21.70 | 30.10 | 45.91 | 54.19 | 53.37 | 49.60 | 46.00 | 28.24 | 25.07 | 22.58 | 49.60 | 57.10 | 49.60 | 49.60 | 60.20 | 49.60 | 59.80 | 12.13 |
| 11.12.2017 | 15.03 | 10.87 | 12.59 | 11.75 | 12.78 | 23.22 | 47.95 | 62.00 | 63.01 | 60.20 | 62.93 | 61.95 | 64.98 | 58.23 | 53.84 | 51.91 | 53.38 | 55.81 | 55.90 | 48.00 | 40.70 | 34.43 | 47.10 | 27.35 |
| 12.12.2017 | 24.52 | 22.21 | 14.58 | 12.31 | 14.20 | 26.14 | 30.89 | 44.71 | 46.60 | 44.71 | 34.75 | 35.75 | 40.73 | 39.90 | 43.16 | 45.00 | 70.00 | 81.97 | 70.00 | 47.10 | 70.52 | 40.95 | 36.74 | 27.96 |
| 13.12.2017 | 22.55 | 20.00 | 15.96 | 12.74 | 14.20 | 18.02 | 32.93 | 95.00 | 70.00 | 70.00 | 70.00 | 79.00 | 85.00 | 70.00 | 70.00 | 60.00 | 89.02 | 89.10 | 69.55 | 69.10 | 46.60 | 27.79 | 34.10 | 8.45 |
| 14.12.2017 | 8.84 | 8.80 | 8.84 | 9.01 | 10.79 | 14.44 | 35.00 | 45.94 | 42.14 | 38.51 | 35.72 | 36.20 | 31.54 | 31.46 | 32.53 | 41.40 | 45.27 | 49.94 | 51.55 | 48.06 | 41.90 | 39.31 | 34.94 | 28.96 |
| 15.12.2017 | 32.01 | 30.93 | 29.00 | 28.97 | 29.57 | 33.17 | 46.95 | 57.17 | 54.31 | 53.93 | 52.09 | 52.51 | 48.49 | 47.92 | 48.93 | 52.94 | 60.92 | 74.54 | 59.32 | 53.91 | 50.13 | 42.23 | 37.04 | 33.23 |
| 16.12.2017 | 35.07 | 33.08 | 32.96 | 31.96 | 32.00 | 31.76 | 31.58 | 31.39 | 34.01 | 41.56 | 44.34 | 44.03 | 41.69 | 38.10 | 36.48 | 40.00 | 46.17 | 48.93 | 46.90 | 42.00 | 39.00 | 33.62 | 33.01 | 29.02 |
| 17.12.2017 | 28.90 | 28.20 | 28.20 | 27.94 | 28.21 | 28.38 | 28.58 | 29.40 | 31.38 | 34.78 | 38.12 | 43.64 | 41.57 | 40.02 | 39.08 | 41.50 | 45.74 | 46.96 | 45.91 | 42.91 | 36.42 | 32.92 | 30.66 | 28.59 |
| 18.12.2017 | 30.43 | 29.90 | 28.15 | 27.39 | 28.71 | 33.73 | 46.20 | 63.95 | 64.42 | 64.08 | 64.28 | 69.65 | 68.23 | 69.97 | 69.49 | 71.32 | 73.50 | 79.72 | 75.84 | 68.87 | 63.31 | 56.58 | 45.03 | 37.29 |
| 19.12.2017 | 44.34 | 38.07 | 29.40 | 36.50 | 38.89 | 41.01 | 53.67 | 68.17 | 76.91 | 77.06 | 75.30 | 74.00 | 70.85 | 70.57 | 70.20 | 70.32 | 75.82 | 78.28 | 75.16 | 75.06 | 66.29 | 52.01 | 48.86 | 41.18 |
| 20.12.2017 | 44.47 | 40.10 | 37.83 | 37.27 | 40.85 | 45.79 | 57.35 | 75.98 | 76.70 | 76.69 | 76.61 | 76.56 | 76.35 | 76.03 | 74.89 | 72.05 | 76.06 | 82.42 | 77.26 | 77.78 | 64.16 | 46.03 | 42.01 | 37.63 |
| 21.12.2017 | 33.09 | 35.26 | 31.88 | 33.04 | 33.60 | 35.05 | 43.80 | 71.69 | 85.85 | 83.00 | 59.91 | 59.91 | 65.11 | 57.42 | 65.00 | 68.31 | 80.15 | 80.15 | 75.29 | 53.99 | 45.90 | 36.26 | 38.72 | 34.84 |
| 22.12.2017 | 27.76 | 26.45 | 26.20 | 26.36 | 27.59 | 31.93 | 38.61 | 47.52 | 48.00 | 50.00 | 48.99 | 46.55 | 47.86 | 46.96 | 39.00 | 39.37 | 46.06 | 47.34 | 41.50 | 40.66 | 42.91 | 42.06 | 37.40 | 30.62 |
| 23.12.2017 | 44.54 | 39.55 | 39.09 | 14.30 | 12.40 | 36.24 | 40.40 | 46.40 | 48.59 | 49.54 | 47.06 | 48.87 | 48.42 | 45.87 | 43.69 | 46.40 | 50.19 | 57.64 | 60.00 | 60.00 | 54.50 | 52.26 | 51.11 | 49.15 |
| 24.12.2017 | 50.00 | 35.01 | 35.01 | 1.00 | -3.00 | -36.05 | -42.93 | 0.01 | 35.00 | 5.07 | 5.03 | 6.82 | 2.17 | 2.93 | 0.10 | 1.09 | 6.75 | 45.00 | 50.00 | 50.00 | 50.00 | 50.00 | 50.00 | 49.46 |
| 25.12.2017 | 49.46 | 47.56 | 39.00 | 34.30 | 35.00 | 35.00 | 45.88 | 34.30 | 49.46 | 51.91 | 55.00 | 55.31 | 47.10 | 34.30 | 12.97 | 17.97 | 17.99 | 26.45 | 42.10 | 48.10 | 57.64 | 51.91 | 49.66 | 47.95 |
| 26.12.2017 | 29.10 | 29.01 | 29.01 | 29.00 | 29.00 | 19.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.20 | 5.49 | 10.66 | 13.35 | 11.19 | 19.00 | 21.40 | 29.00 | 13.46 |
| 27.12.2017 | 25.37 | 15.09 | 13.93 | 13.48 | 12.74 | 13.29 | 20.03 | 28.62 | 32.00 | 34.91 | 35.30 | 42.46 | 46.11 | 46.01 | 46.40 | 46.48 | 50.90 | 56.09 | 57.57 | 51.33 | 42.40 | 48.64 | 44.86 | 31.27 |
| 28.12.2017 | 28.87 | 28.12 | 27.20 | 26.00 | 26.33 | 28.89 | 30.74 | 35.98 | 38.43 | 39.93 | 40.12 | 39.97 | 40.16 | 39.24 | 36.42 | 40.03 | 42.98 | 43.01 | 42.16 | 34.93 | 29.61 | 19.99 | 19.22 | 5.86 |
| 29.12.2017 | 9.73 | 0.72 | -0.93 | 1.07 | 1.00 | 2.91 | 3.60 | 15.97 | 29.69 | 30.20 | 29.83 | 29.47 | 29.20 | 29.45 | 30.02 | 31.00 | 32.98 | 34.95 | 32.79 | 30.23 | 28.49 | 26.51 | 26.90 | 15.06 |
| 30.12.2017 | 16.40 | 37.00 | 33.52 | 29.52 | 25.57 | 32.85 | 9.83 | 12.07 | 50.70 | 51.40 | 48.00 | 46.81 | 45.88 | 45.18 | 45.88 | 48.50 | 51.90 | 57.90 | 56.50 | 16.18 | 52.66 | 51.00 | 47.18 | 45.10 |
| 31.12.2017 | 4.90 | 1.00 | 0.02 | -3.71 | 0.08 | 1.16 | -0.86 | 4.09 | 4.17 | 4.21 | 9.05 | 9.20 | 4.90 | 2.04 | 0.06 | 1.00 | 1.46 | 6.14 | 9.96 | 7.92 | 4.06 | 5.30 | 1.86 | -0.92 |

Table S13. Considered (Averaged) Auction Trading Prices for January (in $/kWh)

|  |  |  |  |
| --- | --- | --- | --- |
|  | **h1** | **h2** | **h3** |
| **d1** | **0.06986490** | 0.08722506 | 0.06583034 |
| **d2** | **0.11378083** | 0.12206740 | 0.06322221 |
| **d3** | **0.14402603** | 0.13518153 | 0.08210921 |
| **d4** | **0.13438320** | 0.13092270 | 0.07384492 |
| **d5** | **0.12669580** | 0.12293979 | 0.08460504 |
| **d6** | **0.13577388** | 0.12955197 | 0.08618524 |
| **d7** | **0.08240347** | 0.09116942 | 0.07239938 |

Table S14. Considered (Averaged) Auction Trading Prices for February (in $/kWh)

|  |  |  |  |
| --- | --- | --- | --- |
|  | **h1** | **h2** | **h3** |
| **d1** | 0.09426042 | 0.09694578 | 0.05926646 |
| **d2** | 0.08912163 | 0.08821723 | 0.06214924 |
| **d3** | 0.08271103 | 0.08143756 | 0.05464887 |
| **d4** | 0.06784205 | 0.07127262 | 0.05606241 |
| **d5** | 0.04770369 | 0.05679154 | 0.04613192 |
| **d6** | 0.08817027 | 0.09144332 | 0.05082512 |
| **d7** | 0.07289106 | 0.07666785 | 0.04960684 |

Table S15. Considered (Averaged) Auction Trading Prices for March (in $/kWh)

|  |  |  |  |
| --- | --- | --- | --- |
|  | **h1** | **h2** | **h3** |
| **d1** | 0.05578585 | 0.05842258 | 0.04023316 |
| **d2** | 0.05680962 | 0.05878733 | 0.03979559 |
| **d3** | 0.05815192 | 0.06057252 | 0.04104646 |
| **d4** | 0.04712024 | 0.05045563 | 0.04025536 |
| **d5** | 0.02582286 | 0.03913999 | 0.02873673 |
| **d6** | 0.05840820 | 0.06660432 | 0.03886260 |
| **d7** | 0.06142896 | 0.06114467 | 0.04338086 |

Table S16. Considered (Averaged) Auction Trading Prices for April (in $/kWh)

|  |  |  |  |
| --- | --- | --- | --- |
|  | **h1** | **h2** | **h3** |
| **d1** | 0.05161564 | 0.04498060 | 0.04395899 |
| **d2** | 0.03316840 | 0.04230863 | 0.03521561 |
| **d3** | 0.05856946 | 0.05686037 | 0.04023998 |
| **d4** | 0.06053038 | 0.05697554 | 0.04563479 |
| **d5** | 0.06716874 | 0.06346095 | 0.04966760 |
| **d6** | 0.06232671 | 0.05969248 | 0.04755789 |
| **d7** | 0.06110352 | 0.05926521 | 0.04414311 |

Table S17. Considered (Averaged) Auction Trading Prices for May (in $/kWh)

|  |  |  |  |
| --- | --- | --- | --- |
|  | **h1** | **h2** | **h3** |
| **d1** | 0.05154814 | 0.05981908 | 0.03793925 |
| **d2** | 0.06389054 | 0.06454091 | 0.04407211 |
| **d3** | 0.06450201 | 0.06553043 | 0.05012903 |
| **d4** | 0.06401124 | 0.06462262 | 0.04786088 |
| **d5** | 0.06156985 | 0.05918500 | 0.04834217 |
| **d6** | 0.05356575 | 0.05176443 | 0.04845107 |
| **d7** | 0.03148983 | 0.04172501 | 0.03887557 |

Table S18. Considered (Averaged) Auction Trading Prices for June (in $/kWh)

|  |  |  |  |
| --- | --- | --- | --- |
|  | **h1** | **h2** | **h3** |
| **d1** | 0.07105259 | 0.07135051 | 0.05201364 |
| **d2** | 0.06863498 | 0.06846241 | 0.04978622 |
| **d3** | 0.05391529 | 0.05769124 | 0.04581850 |
| **d4** | 0.04150930 | 0.04591368 | 0.04389457 |
| **d5** | 0.06517665 | 0.07424268 | 0.03969052 |
| **d6** | 0.06842891 | 0.07337485 | 0.04703670 |
| **d7** | 0.06926099 | 0.07478798 | 0.04666608 |

Table S19. Considered (Averaged) Auction Trading Prices for July (in $/kWh)

|  |  |  |  |
| --- | --- | --- | --- |
|  | **h1** | **h2** | **h3** |
| **d1** | 0.05991583 | 0.06156969 | 0.05575027 |
| **d2** | 0.05625867 | 0.05906397 | 0.05277573 |
| **d3** | 0.07849593 | 0.08439415 | 0.05017491 |
| **d4** | 0.06709684 | 0.07376304 | 0.05072537 |
| **d5** | 0.08612332 | 0.08878207 | 0.05110650 |
| **d6** | 0.07547791 | 0.08284819 | 0.05983088 |
| **d7** | 0.07814041 | 0.07621565 | 0.05799049 |

Table S20. Considered (Averaged) Auction Trading Prices for August (in $/kWh)

|  |  |  |  |
| --- | --- | --- | --- |
|  | **h1** | **h2** | **h3** |
| **d1** | 0.07180304 | 0.08296340 | 0.05288146 |
| **d2** | 0.08244803 | 0.10312820 | 0.05964917 |
| **d3** | 0.10701911 | 0.11482621 | 0.06497482 |
| **d4** | 0.10946398 | 0.11681182 | 0.06532295 |
| **d5** | 0.06532336 | 0.08090140 | 0.06226436 |
| **d6** | 0.04649518 | 0.05880803 | 0.04117081 |
| **d7** | 0.07884531 | 0.08675507 | 0.03978903 |

Table S21. Considered (Averaged) Auction Trading Prices for September (in $/kWh)

|  |  |  |  |
| --- | --- | --- | --- |
|  | **h1** | **h2** | **h3** |
| **d1** | 0.07023397 | 0.06566077 | 0.04442366 |
| **d2** | 0.05410506 | 0.05515743 | 0.04491576 |
| **d3** | 0.04662606 | 0.05453041 | 0.03986825 |
| **d4** | 0.06880755 | 0.06791894 | 0.03980623 |
| **d5** | 0.06811512 | 0.06826183 | 0.04038000 |
| **d6** | 0.06709725 | 0.06923606 | 0.04000029 |
| **d7** | 0.06308148 | 0.06465171 | 0.04006916 |

Table S22. Considered (Averaged) Auction Trading Prices for October (in $/kWh)

|  |  |  |  |
| --- | --- | --- | --- |
|  | **h1** | **h2** | **h3** |
| **d1** | 0.04991523 | 0.06079596 | 0.04392275 |
| **d2** | 0.07324044 | 0.08050889 | 0.03171695 |
| **d3** | 0.07673634 | 0.08578001 | 0.05166717 |
| **d4** | 0.08367861 | 0.08883278 | 0.05182802 |
| **d5** | 0.08405226 | 0.08463538 | 0.05783380 |
| **d6** | 0.08764035 | 0.08395251 | 0.05297515 |
| **d7** | 0.06953032 | 0.06913880 | 0.05506283 |

Table S23. Considered (Averaged) Auction Trading Prices for November (in $/kWh)

|  |  |  |  |
| --- | --- | --- | --- |
|  | **h1** | **h2** | **h3** |
| **d1** | 0.09324996 | 0.11170470 | 0.05384937 |
| **d2** | 0.09542650 | 0.10571771 | 0.05361130 |
| **d3** | 0.10970214 | 0.10849932 | 0.05730679 |
| **d4** | 0.07163006 | 0.07922186 | 0.06407690 |
| **d5** | 0.06023686 | 0.07646253 | 0.04790577 |
| **d6** | 0.09001689 | 0.09657836 | 0.04790868 |
| **d7** | 0.08833486 | 0.09752058 | 0.05298387 |

Table S24. Considered (Averaged) Auction Trading Prices for December (in $/kWh)

|  |  |  |  |
| --- | --- | --- | --- |
|  | **h1** | **h2** | **h3** |
| **d1** | 0.06960355 | 0.06977047 | 0.06977047 |
| **d2** | 0.06274704 | 0.06382637 | 0.06382637 |
| **d3** | 0.03567893 | 0.04548364 | 0.04548364 |
| **d4** | 0.07682454 | 0.07957307 | 0.07957307 |
| **d5** | 0.07236114 | 0.07470431 | 0.07470431 |
| **d6** | 0.08736978 | 0.08486148 | 0.08486148 |
| **d7** | 0.06957770 | 0.07553402 | 0.07553402 |

# ****Data related to GHG emissions****

Table S25 shows GHG emission coefficients related to avoided GHG emissions for materials. Table S26 further shows GHG emission coefficients (burdening) related to acquisition and consumption of materials and Table S27 coefficients for transport burdens.

All the data in this section were obtained from the website of Delft University of Technology, The Model of the Eco-costs / Value Ratio (EVR) [4] and checked also with SimaPro software [5], IPCC 2007 database [6]. Regarding unburdening, the following substitution factors are considered: electricity 0.9, dry digestate 1/25 and wet digestate 1/34. For storage it is assumed that burdening is equal to 5 % of the burden of product stored.

Table S25. Coefficient for avoided GHG emissions for material *p*

|  |  |
| --- | --- |
| Material *p* | (t CO2 eq./t *p*) |
| Cattle manure | 0.13884 |
| Dry digestate | 3.09184 |
| Electricity\* | 0.12333 |
| Pig manure | 0.03330 |
| Poultry bedding | 0.02812 |
| Poultry manure | 0.00321 |
| Poultry slurry | 0.02801 |
| Wet digestate | 0.26885 |

\*kt CO2 eq./GWh electricity

Table S26 GHG emission coefficient of acquisition and consumption of material *p*

|  |  |
| --- | --- |
| Material *p* | (t CO2 eq./t *p*) |
| Corn grain | 0.609417674 |
| Corn silage | 0.052661749 |
| Corn stover | 0.042034859 |
| Electricity\* | 0.06 |
| Electricity mix\* | 0.123326296 |
| Grass silage | 0.133487711 |
| Triticale grain | 0.567333970 |
| Triticale silage | 0.052661749 |
| Water | 0.001370500 |
| Wheat grain | 0.052661749 |
| Wheat silage | 0.567333970 |
| Wheat straw | 0.042034859 |

\*t CO2 eq./MWh electricity

Table S27. GHG emission coefficient for transport of material *p*

|  |  |  |  |
| --- | --- | --- | --- |
| Material *p*  (t CO2 eq./(t∙km) | Road | Pipeline | Transmission |
| All materials | 0.0000704430 | N.A. | N.A. |
| Biogas | N.A. | 0.0000467195 | N.A. |
| Electricity\* | N.A. | N.A. | 0 |
| Heat\* | N.A. | 0.0000467195 | N.A. |
| Manure | 0.0000704430 | 0.0000467195 | N.A. |
| Water | 0.0000704430 | 0.0000467195 | N.A. |
| Wet Digestate | 0.0000704430 | 0.0000467195 | N.A. |

N.A. – Not available

\*Unit t CO2 eq./(MWh∙km)

# ****Data related to Sustainability Profit Maximization****

The environmental part of the sustainability objective [7] follows the same principle of evaluation as the environmental calculation. Table S28 shows eco-benefit (unburdening) coefficients of materials, Table S29 eco-cost (burdening) coefficients related to acquisition and consumption of materials and Table S30 eco-cost coefficients for transport burdens. The data for eco-cost and eco-benefit coefficients were obtained from the website of Delft University of Technology, The Model of the Eco-costs / Value Ratio (EVR) [4]. The same substitution factors are considered as for GHG emissions. For storage it is assumed that burdening is equal to 5 % of the burden of product stored.

Table S28. Eco-benefit coefficient of material *p*

|  |  |
| --- | --- |
| Material *p* | ($/kg) |
| Cattle manure | 0.001007924 |
| Dry digestate | 1.090969142 |
| Electricity a | 0.052747801 |
| Electricity mix a | 0.166369701 |
| Glycerin | 0.036309001 |
| Pig manure | 0.001007924 |
| Poultry bedding | 0.009039562 |
| Poultry manure | 0.046704833 |
| Poultry slurry | 0.046704833 |
| Water | 0.000319200 |
| Wet digestate | 0.008249294 |

1. Unit is $/kWh

Table S29. Eco-cost coefficient of material *p*

|  |  |
| --- | --- |
| Material *p* | ($/kg) |
| Corn grain | 0.351359905 |
| Corn silage | 0.036093822 |
| Corn stover | 0.036093822 |
| Grass silage | 0.088058981 |
| Triticale grain | 0.450118922 |
| Triticale silage | 0.036093822 |
| Wheat grain | 0.450118922 |
| Wheat silage | 0.036093822 |
| Wheat straw | 0.036093822 |

Table S30. Eco-cost coefficient related to transport of material

|  |  |  |  |
| --- | --- | --- | --- |
| Material *p* | Road | Pipeline | Transmission |
| All materialsa | 0.0000342028 | 0.000013044 | N.A. |
| Biogasa | N.A. | 0.000013044 | N.A. |
| Electricityc | N.A | N.A. | 0 |

a. Unit $/(kg·km), b. Unit $/(kWh·km), N.A. – not available

Parameters used to calculate social profit are shown in Table S31 [7]. It is assumed that the biogas plant is operational for approximately 8200 h/y.

Table S31. Parameters used to calculate Social Profit [7]

|  |  |
| --- | --- |
| **Parameter** ($/month) | **Value** |
|  | 3,425 |
|  | 2,120 |
|  | 500 |
|  | 50 |
|  | 25 |

# ****Capital Costs of Biogas Holder****

Besides technologies such as anaerobic digestion, cogeneration and dewatering, biogas storage is assumed which enables electricity production at higher prices, while simultaneously storing biogas when electricity prices are low. Capital costs of biogas holder is obtained from Aspen Capital Cost Estimator, where Low pressure gas storage vessel is selected. Gas volumes between 1,000 and 5,000 m3 are considered and the capacity as “Known” capacity with 3,000 m3 was selected. The “Known” investment cost of 701,600 $ is assumed with the capacity exponent of 0.57053. Such exponent is obtained using “Power” trendline option in Microsoft Excel. Figure S1 shows the relation between capital cost and capacity for biogas holder.

Figure S1. Correlation for capital cost for biogas holder

# ****References****

1. Egieya JM, Čuček L, Zirngast K, Isafiade AJ, Pahor B, Kravanja Z: Synthesis of biogas supply networks using various biomass and manure types. *Computers & Chemical Engineering* 2019, 122:129-151.

2. Egieya J, Čuček L, Isafiade A, Kravanja Z: Synthesis of Supply Networks over Multiple Time Frames: A Case Study of Electricity Production from Biogas. In: *Computer Aided Chemical Engineering.* vol. 40: Elsevier; 2017: 1447-1452.

3. BSP South Pool Energy Exchange: Day-ahead Trading Results, Auction Trading. <www.bsp-southpool.com/day-ahead-trading-results-si.html> [Accessed: 2.9.2019]; 2019.

4. Delft University of Technology: The Model of the Eco-costs / Value Ratio (EVR). www.ecocostsvalue.com/ [Accessed: 27.4.2019]; 2019.

5. SimaPro: LCA software for fact-based sustainability. <simapro.com> [Accessed: 2.9.2019]; 2019.

6. IPCC (The Intergovernmental Panel on Climate Change): IPCC Data. <www.ipcc.ch/data/> [Accessed: 3.9.2019]; 2019.

7. Zore Ž, Čuček L, Kravanja Z: Syntheses of sustainable supply networks with a new composite criterion–Sustainability profit. *Computers & Chemical Engineering* 2017, 102:139-155.

**PART B: Nomenclature**

***Sets***

|  |  |
| --- | --- |
|  | Set of daily time periods with elements |
|  | Set of harvesting zones within *L1* with elements |
|  | Set of collection, storage and primary conversion facilities within *L2* with elements |
|  | Set of storage and secondary conversion facilities within *L3* with elements and |
| *NI* | Set of intervals for linearization with elements |
|  | Set of hourly time periods with elements |
|  | Set of demand zones within *L4* with elements |
|  | Set of elements *k* in a sequence |
|  | Set of all items involved in the model with elements |
|  | Set of all technology options considered with elements |
|  | Set of monthly time periods with elements |
|  | Set of transportation options with elements |

***Subsets***

|  |  |
| --- | --- |
|  | for all anaerobic digestion options considered in *L2* with elements |
|  | Set of pairs of maximum number of daily periods |
|  | for all electricity sources required for primary and secondary conversion with elements |
|  | Set of pairs of maximum number of hourly periods |
|  | for all manure inputs leaving *L1* with elements |
|  | for all materials that should not be stored with elements |
|  | for all biomass leaving *L1* with elements . |
|  | for purchased raw materials with elements |
|  | for directly used products from *L2* to *L4* with elements |
|  | for intermediate products with elements leaving the inlet storage of primary conversion facilities in *m*. |
|  | for transportation modes () pipeline and electricity transmission |
|  | for stored produced products with primary conversion (intermediate products) with elements leaving the outlet storage of primary conversion facilities in *m.* |
|  | for directly used products from *L1* to *L4* with elements |
|  | for recycled produced products from one technology at *L3* to another at *L2* with elements |
|  | for recycled produced products from one technology at *L3* to another at *L3* with elements |
|  | for produced products coming from the layer *L3* with elements . |
|  | for products coming from inlet storage of layer *L3* with elements . |
|  | for pairs of resource and product produced with primary conversion with elements |
|  | for pairs of intermediate product and their applicable process technology with elements |
|  | for intermediate products in *L3* and desired product with elements |
|  | for pairs of products *pz* and their applicable process technology with elements |
|  | for pairs of technology and intermediate product with elements |
|  | Set of pairs of maximum number of monthly periods |

***Scalars***

|  |  |
| --- | --- |
|  | Cardinality of set (number of intervals) |
|  | Capacity of electricity production (1 or 5 MW) |
|  | Fraction of time biogas production is operating equivalent to the number of operating hours in a year divided by the total number of hours in a calendar year |

***Parameters***

|  |  |
| --- | --- |
|  | Cost of feedstocks and raw materials in monthly-period *tp*, M$/kt or M$/GWh |
|  | Eco-benefit coefficient of materal *p*, $/kg or $/kW |
|  | Eco-cost coefficient of material *p* related to transport, $/kg.km or $/kWh.km |
|  | Eco-cost coefficient of material *p*, $/kg |
|  | GHG emission coefficient of material *p* related to the released GHG emissions (burdening) |
|  | GHG emission coefficient of material *p* related to transport) |
|  | GHG emission coefficient related to unburdening or avoided GHG emissions |
|  | Average country social transfer, $ |
|  | Average organization social charge, $ |
|  | Average monthly state social transfer of unemployed people, $ |
|  | Distance between object *x* in layer *La* and object *y* in layer *Lb*, km |
|  | Conversion factor of *pi* to *pm* using technology *t* in *L2*, Mm3/kt or kt/kt |
|  | Conversion factor of *pz* to *pp* using technology *t* in *L3*, GWh/Mm3 or kt/kt |
|  | Substitution factor of material *p* |
|  | Harvest yield of feedstocks type *pb* in harvesting zone *i* at time-period *tp*, kt/(km2∙month) |
|  | Price of material *p* varying over months, M$/Mm3 or M$/kt or M$/GWh |
|  | Prices of allowances in the EU ETS |
|  | Price of direct product *pd* varying over months, days and hours, M$/Mm3 or M$/kt or M$/GWh |
|  | Price of material *pn* varying over months, days and hours, M$/kt |
|  | Price of final product *pp* varying over months, days and hours, M$/Mm3 or M$/kt or M$/GWh |
|  | Social Security, $/month |
|  | Average monthly gross salaries, $/month |
|  | Average monthly net salaries, $/month |
|  | Deterioration rate of products *p* in storage in monthly-period *mp*, %/month |
|  | Deterioration rate of products *p* in storage in monthly-period *mp*, daily-period *dp*, and hourly-period *hp*, %/hour |
|  |  |

***Integer Variables***

|  |  |
| --- | --- |
|  | 0 – 1 variable, equal to 1 if primary conversion facility with technology *t* is located at site *m* |
|  | 0 – 1 variable, equal to 1 if secondary conversion facility with technology *t* is located at site *n* |

***Variables***

|  |  |
| --- | --- |
|  | Available area for growing *pb* (seasonal, and year-round, ) at *L1* in each month-period *mp*, km2 |
|  | The quantity of *pi* stored in the inlet of *L2* at monthly-period *mp*, daily-period *dp,* and hourly-period *hp*, kt |
|  | -period The quantity of *pm* stored in the outlet of *L2* at month-period m*p*, daily-period *dp* and hourly-period *hp,* kt |
|  | The quantity of *pz* stored in the inlet of *L3* month-period m*p*, daily-period *dp* and hourly-period *hp,*kt |
|  | The quantity of *pp* stored in the outlet of *L3* at monthly-period *mp*, daily-period *dp* and hourly-period *hp,* kt |
|  | Benefits related to creation of new jobs, $ |
|  | Social cost, $/y |
|  | Total costs incurred in the supply chain, M$/y |
|  | Discounted Capital Cost, M$/y |
|  | Demand for electricity in each considered time period, MW |
|  | Eco-benefits of material *p*, M$/y |
|  | Eco-costs of material *p*, M$/y |
|  | Cost/benefits from greenhouse gas (GHG) emissions, M$/y |
|  | Environmental unburdening objective, kt/y |
|  | Greenhouse gases burdening of material *p*, M$/y |
|  | Greenhouse gases unburdening of material *p*, M$/y |
|  | The net flowrate of *pb* from *L1* to *L2* at month-period m*p*, daily-period *dp* and hourly-period *hp*, kt/hour |
|  | The flowrate of intermediate feedstocks *pi* leaving *L2* using technology *t* at month-period m*p*, daily-period *dp* and hourly-period *hp*, kt/hour or Mm3/hour |
|  | The net flowrate of *pn* from *L1* to *L4* at monthly-period *mp,* daily period *dp* and hourly period *hp*, kt/hour |
|  | The net flowrate of pd from *L2* to *L4* at month-period *mp*,daily period *dp and* hourly period *hp* , kt/hour |
|  | The flowrate of *pm* produced from *pi* with technology *t* at *L2* at monthly-period *mp*, daily-period *dp* and hourly period *hp,* kt/hour or Mm3/hour |
|  | The quantity of materials *pbuy* purchased in *L2* over time-period m*p,* daily period *dp* and hourly period *hp*, kt/hour or Mm3/hour |
|  | The quantity of materials *pbuy* purchased in *L3* over monthly-period *mp*, *,* daily period *dp* and hourly period *hp,* kt/hour or Mm3/hour |
|  | The net flowrate of *pp* to *L4* at month-period *mp,* daily period *dp* and hourly period *hp*, GWh/hour or kt/hour |
|  | The net flowrate of recycled materials *poutpim* leaving *L3* to *L2* at at month-period m*p*, daily-period *dp* and hourly-period *hp*, GWh/hour or Mm3/hour |
|  | The quantity of materials *p* transported from La to Lb with transportation mode *tropt* at monthly-period *mp*, daily-period *dp*, and hourly-period *hp* GWh/hour or Mm3/hour |
|  | Labour cost, M$/y |
| *MC* | Maintenance cost, M$/y |
|  | Number of new jobs created, $/month |
| *MSC* | Other miscellaneous cost, M$/y |
|  | Eco-profit after tax, M$/y |
|  | Maximum economic profit after tax, M$/y |
|  | Social profit after tax, M$/y |
|  | Sustainability Profit, M$/y |
|  | Production rate of any feedstock *pb* at site *i* in month-period *tp,* daily period *dp* and hourly period *hp*, kt/hour |
|  | Total revenue, M$/y |
|  | Total storage cost for product *p*, M$/y |
|  | Total transportation cost of all materials conveyed in the supply chain, M$/y |

***Greek letters***

|  |  |
| --- | --- |
|  | Logical condition (dollar operator) |
|  |  |