Appendix B

TABLE BI

The Branch Length Data

|  |  |  |  |
| --- | --- | --- | --- |
| Branch | Length (km) | Branch | Length (km) |
| L1 | 3.885 | L18 | 3.850 |
| L2 | 2.100 | L19 | 4.550 |
| L3 | 2.100 | L20 | 3.500 |
| L4 | 3.850 | L21 | 1.925 |
| L5 | 3.500 | L22 | 2.800 |
| L6 | 1.925 | L23 | 1.575 |
| L7 | 2.975 | L24 | 3.500 |
| L8 | 1.925 | L25 | 1.400 |
| L9 | 2.100 | L26 | 2.275 |
| L10 | 2.100 | L27 | 2.800 |
| L11 | 4.550 | L28 | 2.100 |
| L12 | 2.100 | L29 | 1.750 |
| L13 | 2.800 | L30 | 2.100 |
| L14 | 2.275 | L31 | 2.800 |
| L15 | 4.200 | L32 | 2.625 |
| L16 | 1.225 | L33 | 2.625 |
| L17 | 2.100 | L34 | 1.575 |

TABLE BII

The Carbon Emission Parameters

|  |  |
| --- | --- |
| Carbon emissions factor | Value |
| Wind electricity | 20 (kgCO2/MWh) |
| Solar electricity | 36 (kgCO2/MWh) |
| Grid electricity | 586 (kgCO2/MWh) |
| Electricity from NG through SOFC | 400 (kgCO2/MWh) |
| Use of electrolytic tank | 0.083 (kgCO2/kgH2) |

TABLE BIII

The Price Parameters

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | |  | Value |
| Electricity from TG | Time period | 0:00-8:00; | 0.062$/kWh |
| 9:00-11:00; 24:00-24:00 | 0.114$/kWh |
| 12:00-23:00; | 0.155$/kWh |
| NG | Time period | 0:00-6:00; | 0.035$/kWh |
| 7:00-8:00; 14:00-17:00  21:00-24:00 | 0.045$/kWh |
| 9:00-13:00; 18:00-20:00 | 0.062$/kWh |
| Carbon emissions | | Stage1 | 65$/ton |
| Stage2 | 84$/ton |
| Stage3 | 118$/ton |
| Hydrogen transportation | | / | 0.704$/kg |

TABLE BIV

The Maximum Node Load

|  |  |  |  |
| --- | --- | --- | --- |
| Node | Load (kW) | | |
| Stage1 | Stage2 | Stage3 |
| 1 | 3645 | 4261.5 | 4878 |
| 2 | 702 | 895.5 | 1089 |
| 3 | 2322 | 3042 | 3582 |
| 4 | 288 | 369 | 441 |
| 5 | 252 | 333 | 423 |
| 6 | 1053 | 1174.5 | 1296 |
| 7 | 3636 | 3780 | 3924 |
| 8 | 648 | 747 | 846 |
| 9 | 1026 | 1309.5 | 1593 |
| 10 | 1404 | 1836 | 2160 |
| 11 | 0 | 1719 | 2520 |
| 12 | 0 | 837 | 1161 |
| 13 | 0 | 1035 | 1215 |
| 14 | 0 | 2745 | 2844 |
| 15 | 0 | 1458 | 1458 |
| 16 | 0 | 0 | 1098 |
| 17 | 0 | 1944 | 2160 |
| 18 | 0 | 0 | 1890 |
| 19 | 0 | 0 | 1629 |
| 20 | 0 | 0 | 3411 |
| 21 | 0 | 0 | 0 |
| 22 | 0 | 0 | 0 |
| 23 | 0 | 0 | 0 |
| 24 | 0 | 0 | 0 |

\* in (A10) = load factor in [22] maximum node load in Table BIV