

Electronic Supplementary Information

Analysis of Biofuels Production from Sugar Based on Three Criteria: Thermodynamics, Bioenergetics, and Product Separation

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Table S1. The data used for the calculation in Figure 6.

| Biofuel | Status | η | $\eta_{P/S}^{The}$ | $A_{X/S}$ | η_S | Note |
|----------|-------------|--------------|--------------------|-----------|----------|--|
| Ethanol | Theoretical | 0.971 | 1 | NA | NA | |
| | Current | 0.721 | 0.96 | 0.1 | 0.141 | 12% ethanol |
| | Future | 0.809 | 0.99 | 0.02 | 0.141 | 12% ethanol |
| Butanol | Theoretical | 0.953 | 1 | 0 | 0 | |
| | Current | 0.451 | 0.7 | 0.12 | 0.232 | 2% butanol |
| | Future | 0.781 | 0.95 | 0.02 | 0.12 | 5% butanol |
| FEE | Theoretical | 0.904 | 1 | BA | NA | |
| | Current (i) | 0.092 | 0.7 | 0.5 | 0.71 | intra lipids (45%) based on algal separation |
| | Current (s) | 0.310 | 0.7 | 0.5 | 0.02 | liquid/liquid separation |
| | Future (s) | 0.644 | 0.9 | 0.2 | 0.01 | liquid/liquid separation |
| Hydrogen | Theoretical | 1.220 | 1 | NA | NA | |
| | Current | 1.012 | 0.95 | 0.1 | 0.03 | CO ₂ /H ₂ separation |
| | Future | 1.208 | 1 | 0.001 | 0.00845 | No separation for fuel cells |