



### Gesamtbilanz AUSWERTUNG

|                            |                                                                                                                                                                                                                                                                                                                                                                     |                        |     |                          |    |                            |    |                         |    |
|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|-----|--------------------------|----|----------------------------|----|-------------------------|----|
| Projekt:                   | Studie Dietenbach - LCA Vergleichsberechnungen                                                                                                                                                                                                                                                                                                                      |                        |     |                          |    |                            |    |                         |    |
| Projektvariante:           | v03.03_Holzbau (UG mit CO2-opt. Beton + AW mit Zellulose)                                                                                                                                                                                                                                                                                                           |                        |     |                          |    |                            |    |                         |    |
| Projektnummer:             | 91.81                                                                                                                                                                                                                                                                                                                                                               |                        |     |                          |    |                            |    |                         |    |
| Bearbeiter:                | Derya Tasdemir                                                                                                                                                                                                                                                                                                                                                      |                        |     |                          |    |                            |    |                         |    |
| Stand:                     | 20.01.2026                                                                                                                                                                                                                                                                                                                                                          |                        |     |                          |    |                            |    |                         |    |
| Bilanzierungszeitraum:     | 50 Jahre                                                                                                                                                                                                                                                                                                                                                            |                        |     |                          |    |                            |    |                         |    |
| Bezugsfläche (NGF):        | 1317 m <sup>2</sup>                                                                                                                                                                                                                                                                                                                                                 |                        |     |                          |    |                            |    |                         |    |
| Masse gesamt:              | 1535,793 t                                                                                                                                                                                                                                                                                                                                                          |                        |     |                          |    |                            |    |                         |    |
| Masse NGF:                 | 1166,13 kg/ m <sup>2</sup> <sub>NGF</sub>                                                                                                                                                                                                                                                                                                                           |                        |     |                          |    |                            |    |                         |    |
| Masse BGF:                 | 984,48 kg/ m <sup>2</sup> <sub>BGF</sub>                                                                                                                                                                                                                                                                                                                            |                        |     |                          |    |                            |    |                         |    |
| Hinweis:                   | Diese Projektvariante enthält <b>3</b> Baustoffe mit einer abweichenden Nutzungsdauer.                                                                                                                                                                                                                                                                              |                        |     |                          |    |                            |    |                         |    |
| Datensätze:                | Diese Projektvariante verwendet <b>264</b> - davon <b>60</b> verschiedene - Herstelungsdatensätze, die sich wie folgt gliedern: <table><tr><td>Generische Datensätze:</td><td>178</td></tr><tr><td>Durchschnitt Datensätze:</td><td>24</td></tr><tr><td>Repräsentative Datensätze:</td><td>44</td></tr><tr><td>Spezifische Datensätze:</td><td>17</td></tr></table> | Generische Datensätze: | 178 | Durchschnitt Datensätze: | 24 | Repräsentative Datensätze: | 44 | Spezifische Datensätze: | 17 |
| Generische Datensätze:     | 178                                                                                                                                                                                                                                                                                                                                                                 |                        |     |                          |    |                            |    |                         |    |
| Durchschnitt Datensätze:   | 24                                                                                                                                                                                                                                                                                                                                                                  |                        |     |                          |    |                            |    |                         |    |
| Repräsentative Datensätze: | 44                                                                                                                                                                                                                                                                                                                                                                  |                        |     |                          |    |                            |    |                         |    |
| Spezifische Datensätze:    | 17                                                                                                                                                                                                                                                                                                                                                                  |                        |     |                          |    |                            |    |                         |    |



## Studie Dietenbach - LCA Vergleichsberechnungen

### LCA - Ökologische Qualität -

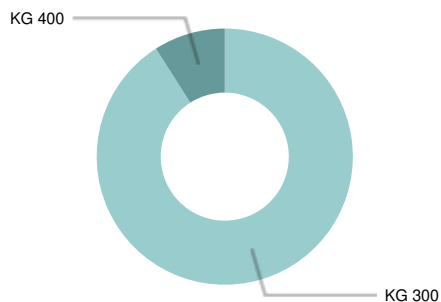
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### Gesamt INKL. A1 - A3, C3, C4

| Indikator      | Einheit                  | Gesamt / $m^2_{NGFA}$ |
|----------------|--------------------------|-----------------------|
| PENRT          | MJ                       | 84,1477807834         |
| PENRM          | MJ                       | 0,1930019215          |
| PENRE          | MJ                       | 83,9573851528         |
| PERT           | MJ                       | 49,7016010517         |
| PERM           | MJ                       | 1,2409754556          |
| PE Ges.        | MJ                       | 133,8493818351        |
| PERE           | MJ                       | 48,4606222635         |
| ADP elem.      | kg Sb-Äqv.               | 3,9284294040E-5       |
| ADP fossil     | MJ                       | 86,5892398705         |
| GWP total      | kg CO <sub>2</sub> -Äqv. | 7,1733617943          |
| GWP-biogenic   | kg CO <sub>2</sub> -Äqv. | 0,0246658003          |
| GWP-fossil     | kg CO <sub>2</sub> -Äqv. | 7,1427493140          |
| GWP-luluc      | kg CO <sub>2</sub> -Äqv. | 6,1628529358E-3       |
| AP             | mol H <sup>+</sup> eqv.  | 0,0209833946          |
| ODP            | kg CFC 11-Äquiv.         | 6,5451258256E-11      |
| POCP           | kg NMVOC-Äqv.            | 0,0193548340          |
| EP-marine      | kg N-Äq.                 | 6,1003219355E-3       |
| EP-terrestrial | mol N-Äq.                | 0,0723986522          |
| EP-freshwater  | kg P-Äqv.                | 2,2228651782E-5       |
| FW             | m <sup>3</sup>           | 0,0250311275          |
| WDP            | m <sup>3</sup> Welt-Äqv. | 0,5153943987          |
| SM             | kg                       | 0,0000000000          |

### GWP Anteile

| Bereich          | Prozent       | Gesamt / $m^2_{NGFA}$ |
|------------------|---------------|-----------------------|
| <b>GWP total</b> | <b>100,00</b> | <b>7,17336179</b>     |
| B6               | 0,00          | 0,00000000            |
| KG 300           | 90,97         | 6,52540334            |
| KG 400           | 9,03          | 0,64795846            |





## Studie Dietenbach - LCA Vergleichsberechnungen

### LCA - Ökologische Qualität -

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### A1 - A3

| Indikator      | Einheit                  | Gesamt / m <sup>2</sup> <sub>NGFA</sub> | %        |             |
|----------------|--------------------------|-----------------------------------------|----------|-------------|
| PENRT          | MJ                       | 69,5144037924                           | 82,6     | <div></div> |
| PENRM          | MJ                       | 4,6042671360                            | 2385,6   | <div></div> |
| PENRE          | MJ                       | 64,9127426902                           | 77,3     | <div></div> |
| PERT           | MJ                       | 91,7811418243                           | 184,7    | <div></div> |
| PERM           | MJ                       | 55,6916926125                           | 4487,7   | <div></div> |
| PERE           | MJ                       | 36,0894458792                           | 74,5     | <div></div> |
| ADP elem.      | kg Sb-Äqv.               | 2,1144981072E-5                         | 53,8     | <div></div> |
| ADP fossil     | MJ                       | 69,8200113170                           | 80,6     | <div></div> |
| GWP total      | kg CO <sub>2</sub> -Äqv. | 0,2898003032                            | 4,0      | <div></div> |
| GWP-biogenic   | kg CO <sub>2</sub> -Äqv. | -5,3492340874                           | -21686,8 | <div></div> |
| GWP-fossil     | kg CO <sub>2</sub> -Äqv. | 5,6355286424                            | 78,9     | <div></div> |
| GWP-luluc      | kg CO <sub>2</sub> -Äqv. | 3,7624760373E-3                         | 61,1     | <div></div> |
| AP             | mol H+ eqv.              | 0,0161613840                            | 77,0     | <div></div> |
| ODP            | kg CFC 11-Äquiv.         | 5,5639754693E-11                        | 85,0     | <div></div> |
| POCP           | kg NMVOC-Äqv.            | 0,0151105842                            | 78,1     | <div></div> |
| EP-marine      | kg N-Äq.                 | 4,7643562027E-3                         | 78,1     | <div></div> |
| EP-terrestrial | mol N-Äq.                | 0,0574411504                            | 79,3     | <div></div> |
| EP-freshwater  | kg P-Äqv.                | 1,1898873539E-5                         | 53,5     | <div></div> |
| FW             | m <sup>3</sup>           | 0,0179796893                            | 71,8     | <div></div> |
| WDP            | m <sup>3</sup> Welt-Äqv. | 0,2982312935                            | 57,9     | <div></div> |
| PE Ges.        | MJ                       | 161,2955456167                          | 120,5    | <div></div> |

### C3

| Indikator      | Einheit                  | Gesamt / m <sup>2</sup> <sub>NGFA</sub> | %       |             |
|----------------|--------------------------|-----------------------------------------|---------|-------------|
| PENRT          | MJ                       | 1,5992600518                            | 1,9     | <div></div> |
| PENRM          | MJ                       | -3,6256685042                           | -1878,6 | <div></div> |
| PENRE          | MJ                       | 5,2249286845                            | 6,2     | <div></div> |
| PERT           | MJ                       | -51,1049968720                          | -102,8  | <div></div> |
| PERM           | MJ                       | -54,9479872782                          | -4427,8 | <div></div> |
| PERE           | MJ                       | 3,8429904062                            | 7,9     | <div></div> |
| ADP elem.      | kg Sb-Äqv.               | 2,6558533827E-8                         | 0,1     | <div></div> |
| ADP fossil     | MJ                       | 2,0077586894                            | 2,3     | <div></div> |
| GWP total      | kg CO <sub>2</sub> -Äqv. | 5,6338464252                            | 78,5    | <div></div> |
| GWP-biogenic   | kg CO <sub>2</sub> -Äqv. | 5,2510483717                            | 21288,8 | <div></div> |
| GWP-fossil     | kg CO <sub>2</sub> -Äqv. | 0,3824519082                            | 5,4     | <div></div> |
| GWP-luluc      | kg CO <sub>2</sub> -Äqv. | 3,0162355673E-4                         | 4,9     | <div></div> |
| AP             | mol H+ eqv.              | 4,9362711161E-4                         | 2,4     | <div></div> |
| ODP            | kg CFC 11-Äquiv.         | 1,8863361631E-12                        | 2,9     | <div></div> |
| POCP           | kg NMVOC-Äqv.            | 4,8079231311E-4                         | 2,5     | <div></div> |
| EP-marine      | kg N-Äq.                 | 1,7222175174E-4                         | 2,8     | <div></div> |
| EP-terrestrial | mol N-Äq.                | 2,0914766746E-3                         | 2,9     | <div></div> |
| EP-freshwater  | kg P-Äqv.                | 4,8609391744E-7                         | 2,2     | <div></div> |
| FW             | m <sup>3</sup>           | 1,9694488117E-3                         | 7,9     | <div></div> |
| WDP            | m <sup>3</sup> Welt-Äqv. | 0,0679170118                            | 13,2    | <div></div> |
| PE Ges.        | MJ                       | -49,5057368202                          | -37,0   | <div></div> |



## Studie Dietenbach - LCA Vergleichsberechnungen

### LCA - Ökologische Qualität -

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#### C4

| Indikator      | Einheit                  | Gesamt / m <sup>2</sup> <sub>NGFa</sub> | %      |  |
|----------------|--------------------------|-----------------------------------------|--------|--|
| PENRT          | MJ                       | 0,6173849071                            | 0,7    |  |
| PENRM          | MJ                       | -0,7855999237                           | -407,0 |  |
| PENRE          | MJ                       | 1,4029848308                            | 1,7    |  |
| PERT           | MJ                       | -0,2580743121                           | -0,5   |  |
| PERM           | MJ                       | 0,0000000000                            | 0,0    |  |
| PERE           | MJ                       | -0,2580743121                           | -0,5   |  |
| ADP elem.      | kg Sb-Äqv.               | 6,6121677426E-9                         | 0,0    |  |
| ADP fossil     | MJ                       | 1,4025737512                            | 1,6    |  |
| GWP total      | kg CO <sub>2</sub> -Äqv. | 0,2124727328                            | 3,0    |  |
| GWP-biogenic   | kg CO <sub>2</sub> -Äqv. | 0,1062659312                            | 430,8  |  |
| GWP-fossil     | kg CO <sub>2</sub> -Äqv. | 0,1056051774                            | 1,5    |  |
| GWP-luluc      | kg CO <sub>2</sub> -Äqv. | 6,0560391912E-4                         | 9,8    |  |
| AP             | mol H+ eqv.              | 7,3213871877E-4                         | 3,5    |  |
| ODP            | kg CFC 11-Äquiv.         | 2,8327419673E-13                        | 0,4    |  |
| POCP           | kg NMVOC-Äqv.            | 5,9813234455E-4                         | 3,1    |  |
| EP-marine      | kg N-Äq.                 | 2,1061869875E-4                         | 3,5    |  |
| EP-terrestrial | mol N-Äq.                | 2,0837512783E-3                         | 2,9    |  |
| EP-freshwater  | kg P-Äqv.                | 4,0306802127E-6                         | 18,1   |  |
| FW             | m <sup>3</sup>           | 3,5725489042E-4                         | 1,4    |  |
| WDP            | m <sup>3</sup> Welt-Äqv. | 0,0116617363                            | 2,3    |  |
| PE Ges.        | MJ                       | 0,3593105950                            | 0,3    |  |

#### D GESAMT (EXPORTIERTE ENERGIE UND RECYCLINGPOTENZIAL)

| Indikator      | Einheit                  | Gesamt / m <sup>2</sup> <sub>NGFa</sub> | % |  |
|----------------|--------------------------|-----------------------------------------|---|--|
| PENRT          | MJ                       | -36,4183750646                          |   |  |
| PENRM          | MJ                       | 0,0000000000                            |   |  |
| PENRE          | MJ                       | -36,4183750646                          |   |  |
| PERT           | MJ                       | 29,5568712265                           |   |  |
| PERM           | MJ                       | 0,0000000000                            |   |  |
| PERE           | MJ                       | 29,5568712265                           |   |  |
| ADP elem.      | kg Sb-Äqv.               | -9,8618347825E-6                        |   |  |
| ADP fossil     | MJ                       | -37,1022736481                          |   |  |
| GWP total      | kg CO <sub>2</sub> -Äqv. | -2,4904925932                           |   |  |
| GWP-biogenic   | kg CO <sub>2</sub> -Äqv. | -1,8345276483E-3                        |   |  |
| GWP-fossil     | kg CO <sub>2</sub> -Äqv. | -2,4880350764                           |   |  |
| GWP-luluc      | kg CO <sub>2</sub> -Äqv. | -5,8655515612E-4                        |   |  |
| AP             | mol H+ eqv.              | -3,8097877812E-3                        |   |  |
| ODP            | kg CFC 11-Äquiv.         | -4,2044944189E-11                       |   |  |
| POCP           | kg NMVOC-Äqv.            | -3,0175249278E-3                        |   |  |
| EP-marine      | kg N-Äq.                 | -1,1200385848E-3                        |   |  |
| EP-terrestrial | mol N-Äq.                | -0,0101879887                           |   |  |
| EP-freshwater  | kg P-Äqv.                | -9,4896393831E-6                        |   |  |
| FW             | m <sup>3</sup>           | 3,5431228523E-3                         |   |  |
| WDP            | m <sup>3</sup> Welt-Äqv. | -0,0443837432                           |   |  |
| SM             | kg                       | 0,0000000000                            |   |  |
| PE Ges.        | MJ                       | -6,8615038381                           |   |  |



## Studie Dietenbach - LCA Vergleichsberechnungen

### LCA - Ökologische Qualität -

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#### D2 EXPORTIERTE ENERGIE (GEMÄSS DIN EN 15978-1)

| Indikator      | Einheit                  | Gesamt / m <sup>2</sup> <sub>NGF</sub> | % |
|----------------|--------------------------|----------------------------------------|---|
| PENRT          | MJ                       | 0,0000000000                           |   |
| PENRM          | MJ                       | 0,0000000000                           |   |
| PENRE          | MJ                       | 0,0000000000                           |   |
| PERT           | MJ                       | 0,0000000000                           |   |
| PERM           | MJ                       | 0,0000000000                           |   |
| PERE           | MJ                       | 0,0000000000                           |   |
| ADP elem.      | kg Sb-Äqv.               | 0,0000000000                           |   |
| ADP fossil     | MJ                       | 0,0000000000                           |   |
| GWP total      | kg CO <sub>2</sub> -Äqv. | 0,0000000000                           |   |
| GWP-biogenic   | kg CO <sub>2</sub> -Äqv. | 0,0000000000                           |   |
| GWP-fossil     | kg CO <sub>2</sub> -Äqv. | 0,0000000000                           |   |
| GWP-luluc      | kg CO <sub>2</sub> -Äqv. | 0,0000000000                           |   |
| AP             | mol H <sup>+</sup> eqv.  | 0,0000000000                           |   |
| ODP            | kg CFC 11-Äquiv.         | 0,0000000000                           |   |
| POCP           | kg NMVOC-Äqv.            | 0,0000000000                           |   |
| EP-marine      | kg N-Äq.                 | 0,0000000000                           |   |
| EP-terrestrial | mol N-Äq.                | 0,0000000000                           |   |
| EP-freshwater  | kg P-Äqv.                | 0,0000000000                           |   |
| FW             | m <sup>3</sup>           | 0,0000000000                           |   |
| WDP            | m <sup>3</sup> Welt-Äqv. | 0,0000000000                           |   |
| SM             | kg                       | 0,0000000000                           |   |
| PE Ges.        | MJ                       | 0,0000000000                           |   |

#### D1 RECYCLINGPOTENZIAL (GEMÄSS DIN EN 15978-1)

| Indikator      | Einheit                  | Gesamt / m <sup>2</sup> <sub>NGF</sub> | % |
|----------------|--------------------------|----------------------------------------|---|
| PENRT          | MJ                       | -36,4183750646                         |   |
| PENRM          | MJ                       | 0,0000000000                           |   |
| PENRE          | MJ                       | -36,4183750646                         |   |
| PERT           | MJ                       | 29,5568712265                          |   |
| PERM           | MJ                       | 0,0000000000                           |   |
| PERE           | MJ                       | 29,5568712265                          |   |
| ADP elem.      | kg Sb-Äqv.               | -9,8618347825E-6                       |   |
| ADP fossil     | MJ                       | -37,1022736481                         |   |
| GWP total      | kg CO <sub>2</sub> -Äqv. | -2,4904925932                          |   |
| GWP-biogenic   | kg CO <sub>2</sub> -Äqv. | -1,8345276483E-3                       |   |
| GWP-fossil     | kg CO <sub>2</sub> -Äqv. | -2,4880350764                          |   |
| GWP-luluc      | kg CO <sub>2</sub> -Äqv. | -5,8655515612E-4                       |   |
| AP             | mol H <sup>+</sup> eqv.  | -3,8097877812E-3                       |   |
| ODP            | kg CFC 11-Äquiv.         | -4,2044944189E-11                      |   |
| POCP           | kg NMVOC-Äqv.            | -3,0175249278E-3                       |   |
| EP-marine      | kg N-Äq.                 | -1,1200385848E-3                       |   |
| EP-terrestrial | mol N-Äq.                | -0,0101879887                          |   |
| EP-freshwater  | kg P-Äqv.                | -9,4896393831E-6                       |   |
| FW             | m <sup>3</sup>           | 3,5431228523E-3                        |   |
| WDP            | m <sup>3</sup> Welt-Äqv. | -0,0443837432                          |   |
| SM             | kg                       | 0,0000000000                           |   |
| PE Ges.        | MJ                       | -6,8615038381                          |   |



## Studie Dietenbach - LCA Vergleichsberechnungen

### LCA - Ökologische Qualität -

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#### Instandhaltung INKL. A1-3, C3, C4

| Indikator      | Einheit                  | Gesamt / m <sup>2</sup> <sub>NGFA</sub> | %    |             |
|----------------|--------------------------|-----------------------------------------|------|-------------|
| PENRT          | MJ                       | 12,4167320321                           | 14,8 | <div></div> |
| PENRM          | MJ                       | 3,2133637054E-6                         | 0,0  | <div></div> |
| PENRE          | MJ                       | 12,4167289472                           | 14,8 | <div></div> |
| PERT           | MJ                       | 9,2835304116                            | 18,7 | <div></div> |
| PERM           | MJ                       | 0,4972701213                            | 40,1 | <div></div> |
| PERE           | MJ                       | 8,7862602903                            | 18,1 | <div></div> |
| ADP elem.      | kg Sb-Äqv.               | 1,8106142266E-5                         | 46,1 | <div></div> |
| ADP fossil     | MJ                       | 13,3588961128                           | 15,4 | <div></div> |
| GWP total      | kg CO <sub>2</sub> -Äqv. | 1,0372423331                            | 14,5 | <div></div> |
| GWP-biogenic   | kg CO <sub>2</sub> -Äqv. | 0,0165855848                            | 67,2 | <div></div> |
| GWP-fossil     | kg CO <sub>2</sub> -Äqv. | 1,0191635859                            | 14,3 | <div></div> |
| GWP-luluc      | kg CO <sub>2</sub> -Äqv. | 1,4931494227E-3                         | 24,2 | <div></div> |
| AP             | mol H+ eqv.              | 3,5962447805E-3                         | 17,1 | <div></div> |
| ODP            | kg CFC 11-Äquiv.         | 7,6418932039E-12                        | 11,7 | <div></div> |
| POCP           | kg NMVOC-Äqv.            | 3,1653251944E-3                         | 16,4 | <div></div> |
| EP-marine      | kg N-Äq.                 | 9,5312528230E-4                         | 15,6 | <div></div> |
| EP-terrestrial | mol N-Äq.                | 0,0107822738                            | 14,9 | <div></div> |
| EP-freshwater  | kg P-Äqv.                | 5,8130041127E-6                         | 26,2 | <div></div> |
| FW             | m <sup>3</sup>           | 4,7247345049E-3                         | 18,9 | <div></div> |
| WDP            | m <sup>3</sup> Welt-Äqv. | 0,1375843572                            | 26,7 | <div></div> |
| SM             | kg                       | 0,0000000000                            |      | <div></div> |
| PE Ges.        | MJ                       | 21,7002624436                           | 16,2 | <div></div> |