

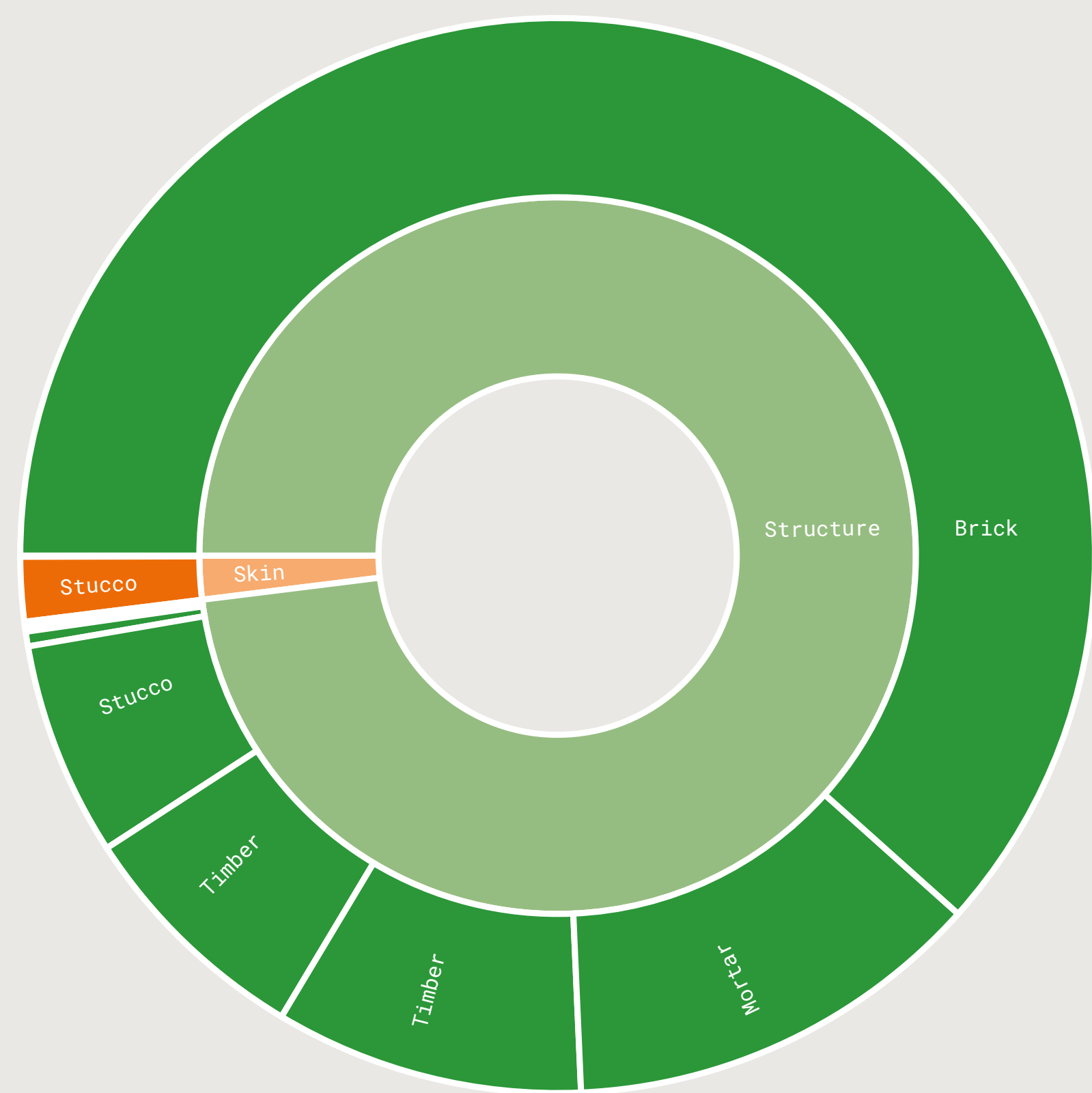
# Backstein und Beton: Material Estimates for Berlin's Building Stock

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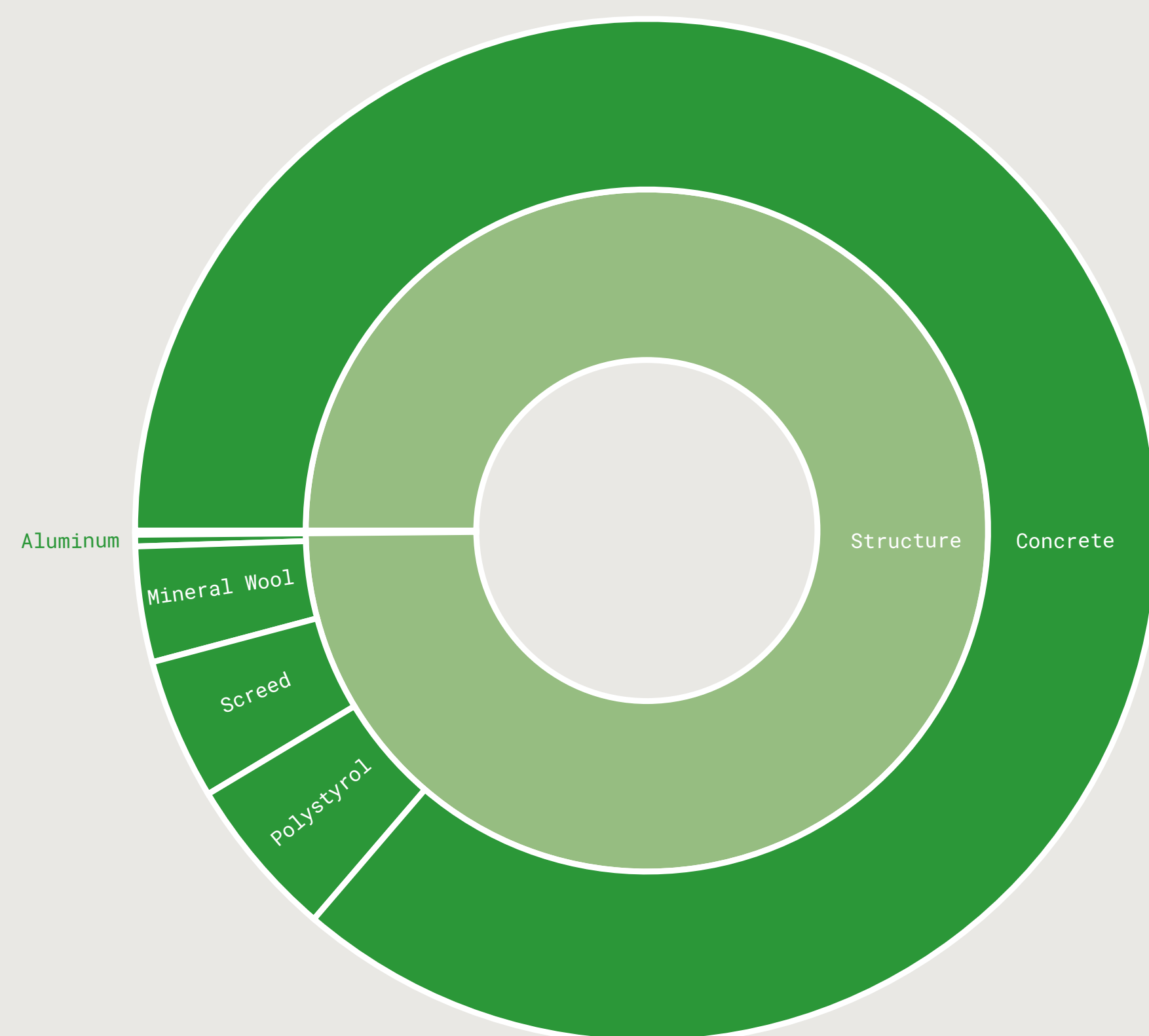
| ALTBAU  | Material  | Total                   | Structure               | Skin                    |
|---------|-----------|-------------------------|-------------------------|-------------------------|
| Mineral | Stucco    | 0.017292 m <sup>3</sup> | 0.013309 m <sup>3</sup> | 0.003983 m <sup>3</sup> |
|         | Glass     | 0.000072 m <sup>3</sup> |                         | 0.000072 m <sup>3</sup> |
|         | Screed    | 0.000225 m <sup>3</sup> | 0.000225 m <sup>3</sup> |                         |
|         | Terrazzo  | 0.000225 m <sup>3</sup> | 0.000225 m <sup>3</sup> |                         |
|         | Coal ash  | 0.000908 m <sup>3</sup> | 0.000908 m <sup>3</sup> |                         |
|         | Brick     | 0.127034 m <sup>3</sup> | 0.127034 m <sup>3</sup> |                         |
|         | Mortar    | 0.026167 m <sup>3</sup> | 0.026167 m <sup>3</sup> |                         |
| Timber  | Timber    | 0.034094 m <sup>3</sup> | 0.034094 m <sup>3</sup> |                         |
|         | Cardboard | 0.000163 m <sup>3</sup> | 0.000163 m <sup>3</sup> |                         |
| Metal   | Steel     | 0.000241 m <sup>3</sup> | 0.000240833             |                         |



Typical Altbau urban Fabric and Construction.  
Image: Google Earth / Erhard

The building industry is on the search for new construction methods to reign in the stubbornly high emissions of the sector, largely coupled with the production of building materials themselves. Renovating an existing building is considered to almost always be more carbon- and material-efficient than constructing a new building of comparable size – but this difference can be hard to quantify.

Using two architectural typologies common in the city of Berlin, Germany, we estimate the amount of building materials present in the two major residential typologies of Berlin. The "Altbau" and "Plattenbau" types together represent a major share of the building stock of the city of Berlin and form the basis of our estimate. Figures were gathered from existing sources, and gaps were filled by analysis of archival documentation and detail schedules. This methodology could be applied to further building typologies, both in Berlin and in other contexts. These figures can be used as the base of an inventory of materials in cities where these two typologies constitute a considerable segment of the building stock, enabling embodied carbon calculations as well as paving the way toward urban mining practices as we transition to a more circular de/re/construction process.



| PLATTENBAU | Material         | Total                     | Structure               | Skin                    |
|------------|------------------|---------------------------|-------------------------|-------------------------|
| Mineral    | Concrete         | 0.141100 m <sup>3</sup>   | 0.146700 m <sup>3</sup> |                         |
|            | Screed           | 0.007600 m <sup>3</sup>   | 0.007600 m <sup>3</sup> |                         |
| Windows    | Glass            | 0.005800 m <sup>2</sup> - |                         | 0.029400 m <sup>2</sup> |
|            | Wood Frames      | 0.000046 m <sup>3</sup> - |                         | 0.000046 m <sup>3</sup> |
| Insulation | Polystyrol       | 0.008700 m <sup>3</sup>   | 0.008700 m <sup>3</sup> |                         |
|            | Mineral Wool     | 0.006200 m <sup>3</sup>   | 0.006200 m <sup>3</sup> |                         |
| Metals     | Steel Structural | 0.000619 m <sup>3</sup>   | 0.000619 m <sup>3</sup> |                         |
|            | Aluminum         | 0.000002 m <sup>3</sup>   | 0.000002 m <sup>3</sup> |                         |



Typical Plattenbau urban Fabric and Construction.  
Image: Google Earth / DDR Bildarchiv

Results for the two building types studied . All figures in Material per m<sup>3</sup> of gross Building Volume.