

This **Final Brief** is designed to be printed and handed directly to your **Architect, Electrician, and System Integrator**. It summarizes every technical decision we have made for your new Alpine smart home.

---

## **Project Brief: Smart Alpine Timber-Home (2025)**

**Location:** Austria (Alps)

**Architecture:** Timber Frame (Holzriegelbau) with Metal Roof

**Core Strategy:** Local Control (Home Assistant), Energy Autonomy, Passive Cooling.

---

### 1. **Infrastructure & Shell (Immediate Priority)**

*These must be executed before the walls and foundations are closed.*

- **Geothermal Pre-heating (Sole-EWT):** \* **Spec:** 100m PE-RC 32mm Pipe buried at >1.5m depth (Foundation trench).
    - **Goal:** Passive frost protection (winter) and "Free AC" cooling (summer).
  - **Airtight Electrical (Wood Safety):** \* **Requirement:** All wall boxes must be **Kaiser ECON Airtight** (Luftdicht).
    - **Warning:** Standard boxes are forbidden due to moisture/rot risk in timber frames.
  - **Conduits (Leerrohre):** \* 75mm flexible conduits to: **Carport** (EV), **Garden Gate** (PoE Doorbell), and **Roof** (PV expansion/Weather Station).
  - **Ventilation Ducts:** 75mm tubes poured into concrete/timber floor layers.
- 

### 2. **Energy & Climate (The Smart Heart)**

*Specific hardware requirements for the Energy Management System.*

- **Solar: Hybrid Inverter** (Fronius Gen24 or Sungrow SH series). Must have **Modbus TCP** access enabled.
- **Heating:** Buderus Heat Pump + **EMS-ESP Gateway E32 V2** (Ethernet).
- **Ventilation:** Centralized unit (Zehnder ComfoAir Q) with **Enthalpy Exchanger** and **ComfoConnect LAN C Bridge**.
- **Shading:** **Shelly 2PM Gen4** relays in deep (60mm) wall boxes. Motors must be standard **4-wire 230V mechanical** (No radio/Somfy).

---

### 3. 🖥️ The "Spine" (Central Rack Setup)

*Located in the Utility Room.*

| Component    | Specification  |
|--------------|--|
| Cabinet      | Digitus 10" 9U Wall Mount (approx. 30x30cm).                             |
| Server       | Minix Z150-0dB (Fanless) running Home Assistant OS.                      |
| Connectivity | Home Assistant Connect ZBT-2 (Thread/Matter). <i>Mount outside rack.</i> |
| Switch       | Ubiquiti UniFi Switch Lite 8 PoE.  |
| UPS          | Eaton 3S 700 DIN. USB-linked to Minix for safe shutdown.                 |
| Termination  | Keystone Patch Panel (Shielded CAT6A).                                   |

---

### 4. 📶 Cabling & Wireless Layout

- **Star Topology:** All CAT6A S/FTP cables terminate at the Central Rack.
  - **Wi-Fi Strategy:** \* **Ground Floor:** 1x **Ubiquiti U6 Pro** (Ceiling center).
    - **First Floor:** 1x **Ubiquiti U6+** (Hallway).
    - *Note:* Wooden floors with foil vapor barriers block signal; 1 AP per floor is mandatory.
  - **Outdoor:** PoE CAT6A to 4x corners (Cameras) and 1x Terrace (AP). Use **Ubiquiti ETH-SP-G2** surge protectors for all outdoor runs.
- 

### 5. 🛡️ Safety & Alpine Protection

- **Fire Safety:** **AFDD (Brandschutzschalter)** arc-fault breakers for all bedroom and living room circuits.

- **Surge Protection:** Type 1+2 Kombiableiter in the main distribution board (Metal roof requirement).
  - **Wind Safety:** High-priority automation in Home Assistant: If Wind > 35km/h -> Retract All Blinds.
- 

## 6. 🏠 Home Assistant Dashboard Vision

The system is configured to provide a single-pane-of-glass view for:

1. **Energy Flow:** Solar production vs. Heat Pump consumption.
  2. **Climate:** CO2 levels and "Sole-EWT" temperature exchange status.
  3. **Dynamic Pricing:** Automatic shifting of heavy loads (EV/Boiler) to cheap electricity hours.
- 

Would you like me to create a "Cabling Map" list specifically for your electrician to use during the wiring phase?