

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