# Smart Home?

**An exploration of the smart home and what it might mean for you and the environment**

Christopher Anderson

# A gadget lovers paradise!

# A gadget lovers paradise!

# So What IS a Smart Home?

- Everyday home devices that can sense, decide, and act automatically
- You can control them manually (app / voice) or let them run on their own
- They respond to:
  - Your habits
  - Time of day
  - Whether you're home or away
  - The environment (temperature, light, motion)
- You don't need to do everything at once — one device can still be useful

# Smart Home Adoption in the UK

- 39% of UK households now use smart home devices (2024)
- 80% own at least one smart device (including smart TVs)
- Projected to reach 50%+ household penetration by 2027
- Most popular: smart speakers (35%), smart thermostats (21%), smart TVs (76%)

# Where Does Our Energy Go?

UK household energy breakdown:

- 80% - Heating and hot water
- 15% - Appliances - This covers everything from fridges, washing machines and TVs to other plug-in devices and smaller electrical loads.
- 5% - Lighting and cooking - Together these account for a small portion of total energy use compared to heat.

# The Big Win — Smart Thermostats

- Smart thermostats can save 8-16% on heating bills
- Typical UK savings: £96-£240 per year
- How they work:
  - Learn your schedule
  - Detect when you're away
  - Adjust based on weather
  - Room-by-room control options

# Real-World Impact — Hive Case Study

- Hive smart thermostat users have collectively saved £500 million on energy bills (2013-2025)
- Prevented 1.5 million tonnes of $CO_2$ emissions
- Equivalent to over 1 million return flights London-New York
- Average user saves £192/year at current energy prices
- Savings through features like occupancy sensing, adaptive schedules, weather compensation, and zoning are standard capabilities

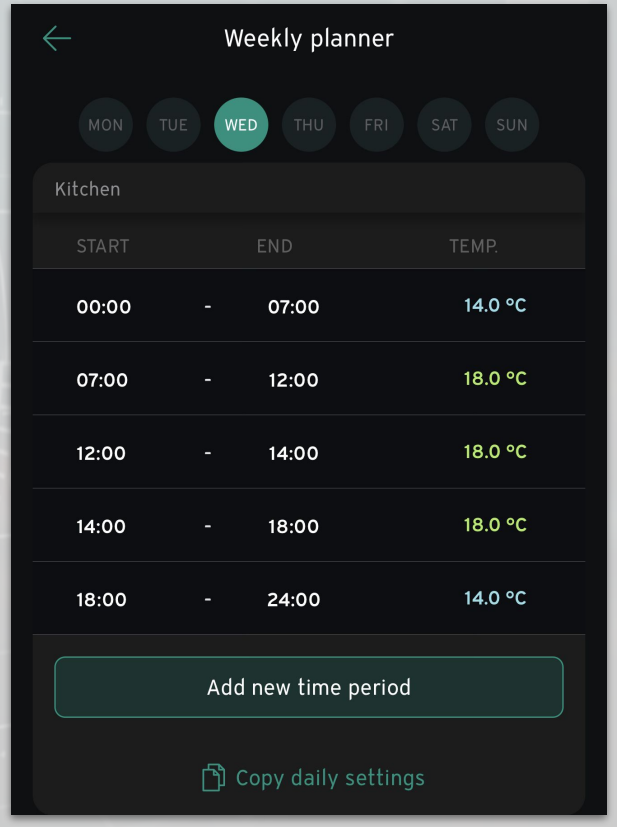
# Typical Smart Thermostat Costs (UK)

- Hive Active Heating Smart Thermostat: ~£119
- tado Smart thermostat 104501: ~£72
- Bosch Smart Home Room Thermostat II: ~£59
- Honeywell Home T6R Smart Thermostat: ~£134
- Google Nest Learning 3rd Generation Thermostat: ~£90–£206

- Typical installation - £30 - £80 but can go as height as £350

# Example


Crimsworth Farm
3.0°
1 Notification(s)
Quick access
Living
18.0°
Current: 19.0°
Kitchen
18.0°
Current: 18.0°
Bedroom
18.0°
Current: 18.9°
Small Guest
18.0°
Current: 20.4°
Cocktail Lounge
18.0°
Current: 18.5°
Office
18.0°
Current: 18.6°
Domestic hot water
55°
Home
Status

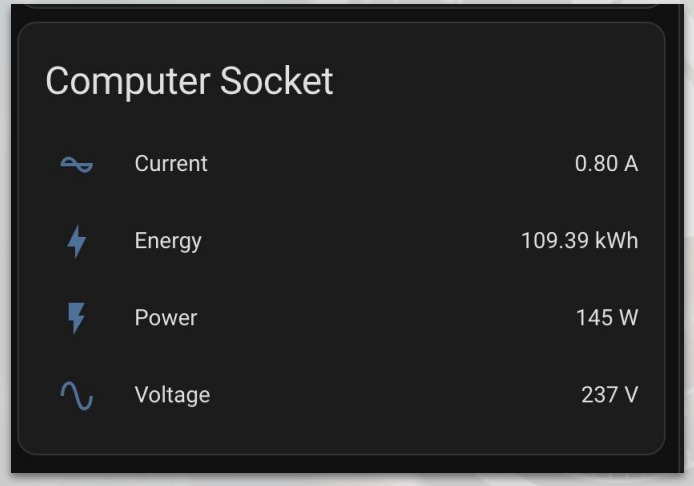

Weekly planner
MON
TUE
WED
THU
FRI
SAT
SUN
Kitchen
START
END
TEMP.
00:00 - 07:00 14.0 °C
07:00 - 12:00 18.0 °C
12:00 - 14:00 18.0 °C
14:00 - 18:00 18.0 °C
18:00 - 24:00 14.0 °C
Add new time period
Copy daily settings

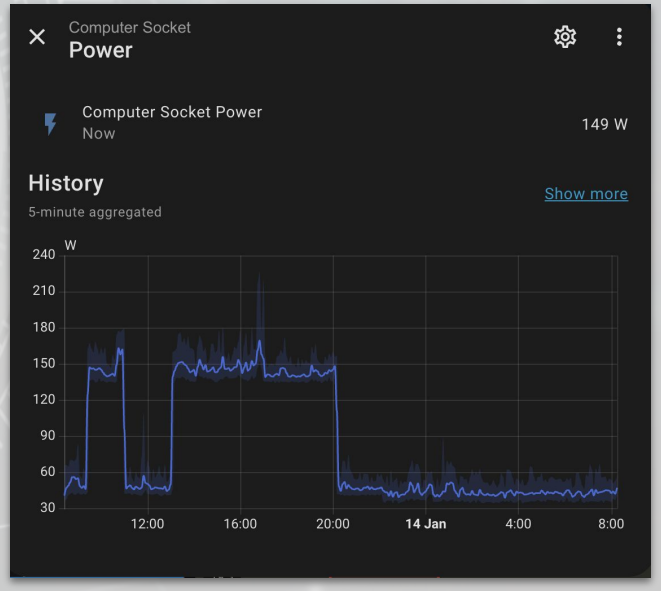
# Smart Lighting

- Lighting = ~5% of energy usage
- LED bulbs use 75-90% less energy than incandescent bulbs
- Last 15-25 years (vs 1-2 years for incandescent)
- Smart features add extra savings:
  - Scheduling (lights off when you're away)
  - Motion sensors
  - Dimming (reduces energy further)
- Standby power: smart bulbs use 0.5-2 watts when "off" (£1-3/year)

# Smart Plugs

- Can turn a none-smart device into a smart device
- Can monitor energy usage



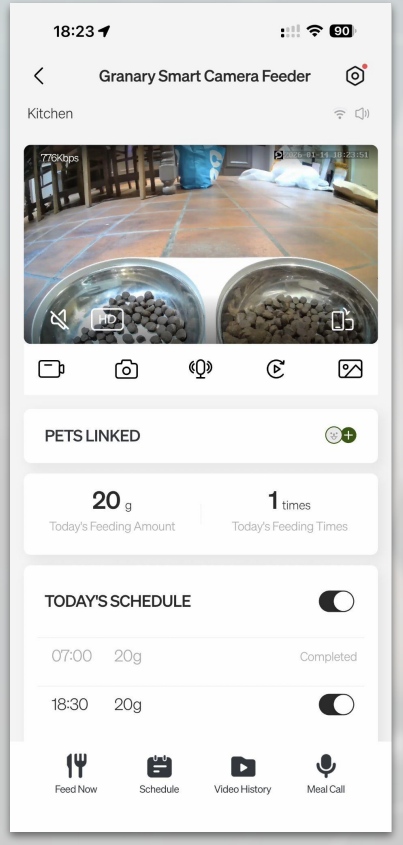



# Smart Sensors

- Motion Sensors
- Contact Sensors
- Microwave Sensors
- Water Sensors

# Smart Cameras

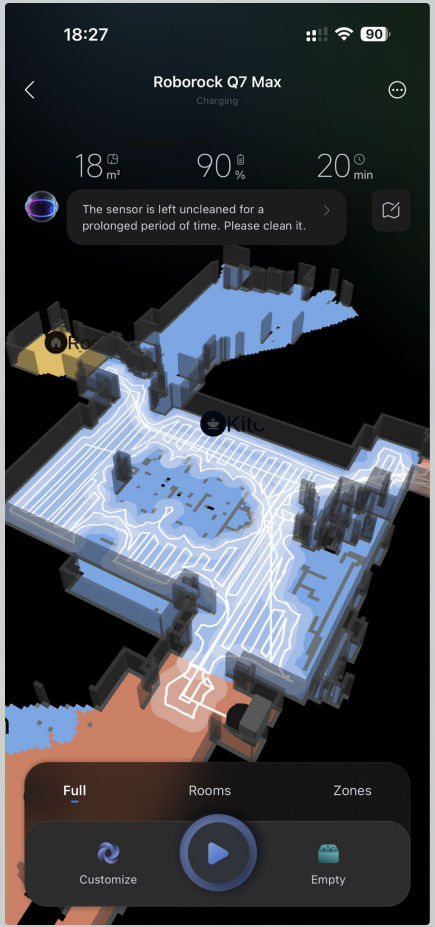

# Smart Cameras = Wildlife/Cat/Owl Camera





# Smoke Alarms


# Smart Vac

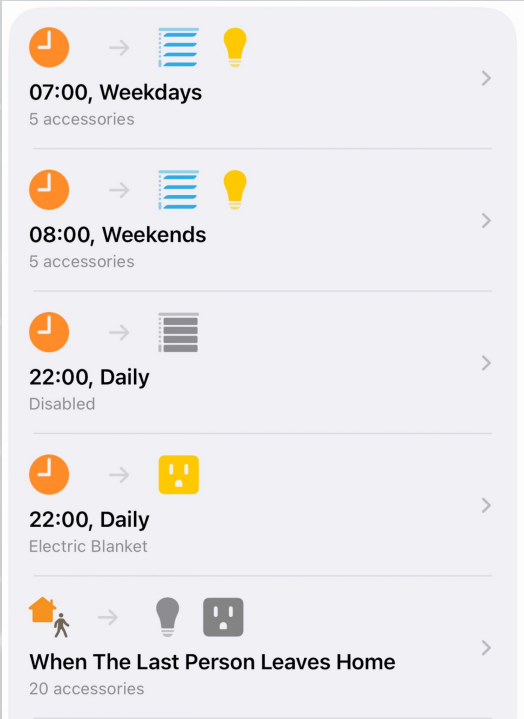

18:27
90
Roborock Q7 Max
Charging
18 m²
90 %
20 min
The sensor is left uncleaned for a prolonged period of time. Please clean it.
Full
Rooms
Zones
Customize
Empty

# Other Smart Devices

- Smart meters — Free from energy suppliers, show real-time usage
- Smart blinds
- Cat Feeder
- Smart appliances — Fridges, Ovens, washing machines (10-15% more efficient)
- Solar/battery integration — Optimise when you use self-generated power

# Automations

- This is where the fun is!
- If X then do Y
- When it's X o'clock do Y



# Why is smart home stuff so confusing?

- Different Brands
- Different hubs
- Devices don’t always work together
- That’s not your fault — it’s how the industry grew

# The good news: things are converging

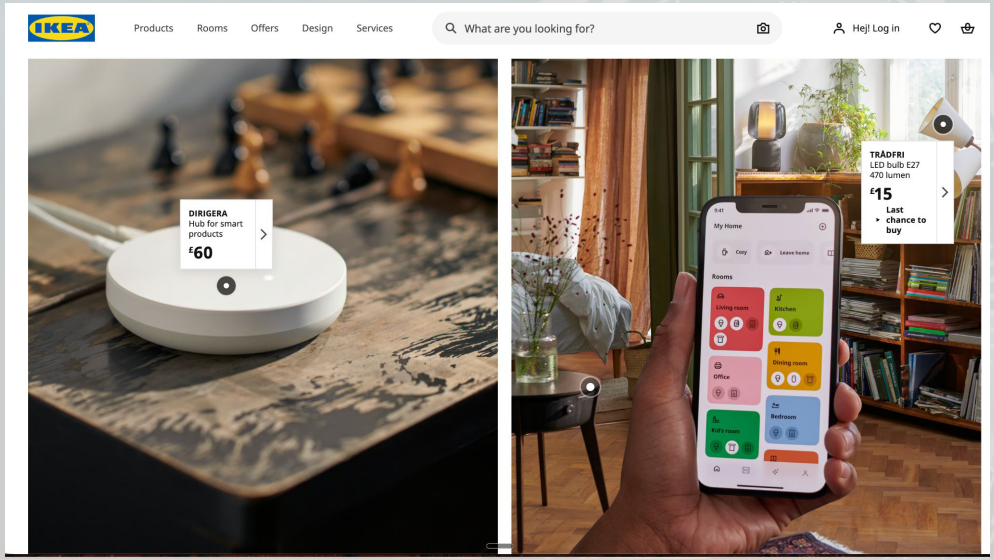
- Zigbee / Thread
  - Low-power wireless used by many sensors
  - Good for batteries
  - Devices talk locally, not just via the cloud

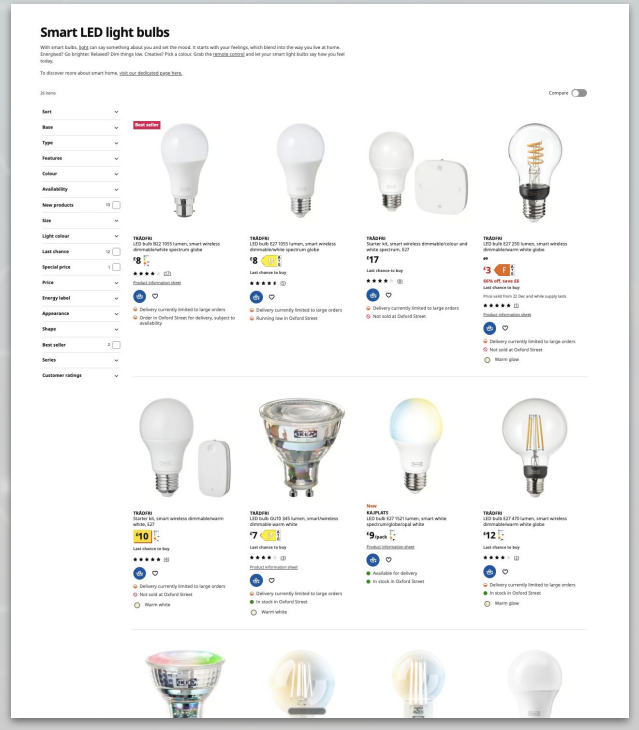
- Matter
  - A shared “language”
  - Reduces lock-in and e-waste

# Getting Started — Practical Tips

- **Smart thermostat** — Biggest impact, brands like Hive, Nest, Tado
- **Smart meter** — FREE from your energy supplier
- **Smart plugs** — Cheap way to monitor and control existing devices
- **Smart bulbs** — Don't need to be "smart" to save energy

# Getting Started — IKEA



# The Environmental Promise

- Overall smart home energy reduction: up to 30% (best case studies)
- Peak demand reduction: up to 20% (helps grid stability)
- Key benefits:
  - Reduced carbon emissions from lower energy use
  - Better integration with renewable energy
  - More efficient use of existing resources
  - Data to understand and change behaviour

# The Other Side — Embodied Carbon / E Waste

- Every electronic device has a carbon footprint before you even plug it in
- Smart devices contain: Rare earth materials, plastics, complex electronics
- What happens when they die?
  - Only 17-20% of e-waste is properly recycled
  - Smart devices can become obsolete quickly (software updates stop)

# Privacy & Security Considerations

- Smart devices collect data about your habits and home
- Questions to consider:
  - Who has access to your data?
  - What happens if the company goes bust?
  - Is your network secure?
- Not reasons to avoid, but reasons to be informed
- Choose reputable brands, keep devices updated

# Do I need this in my life?

- I don’t know where to start
- Worried about getting stuck in the wrong echo system
- If it’s not broke don’t fix it!

# Exciting Future Directions

From smart devices → smart systems

- **Predictive homes, not reactive ones** - Your home automatically adjusts heating, lighting, and energy around how you live
- **Whole-home energy orchestration** - Heating, hot water, appliances, solar, and EV charging act as one system
- **Saving money without thinking about it** - Energy is used more when it's cheaper and cleaner, with no effort from you
- **Waste reduction built in** - Smarter kitchens and energy systems help reduce food and energy waste.