

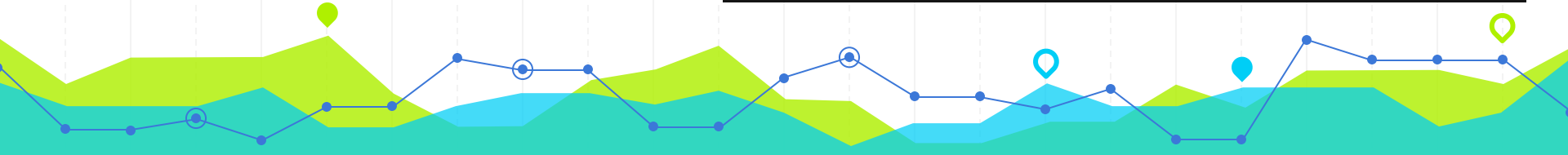
Living Off the Grid

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Background

What is Off the Grid Living?

- A general non-dependence on “grid resources” - sewer, gas, power, and phones
- Around 200,000 Americans live OTG
- Different “levels” of grid disconnection
- Off the grid communities becoming popular



Why do people choose to live off the grid?

CARBON



Resources Required to Live Off Grid

1. Water

- Wells
- Rain barrels

2. Building materials

- Recycled (car tires, aluminum cans)
- Naturally-occurring (packed earth, wood)

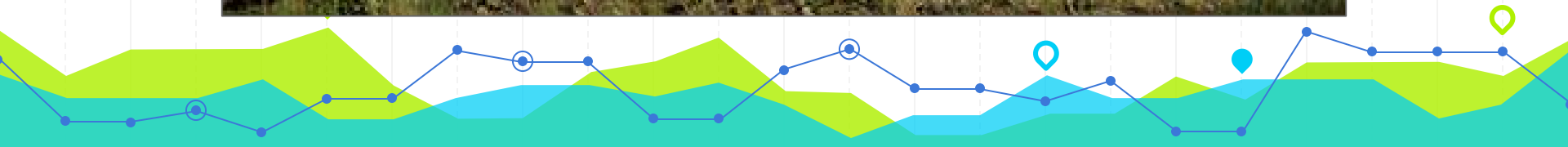
3. Sewage system

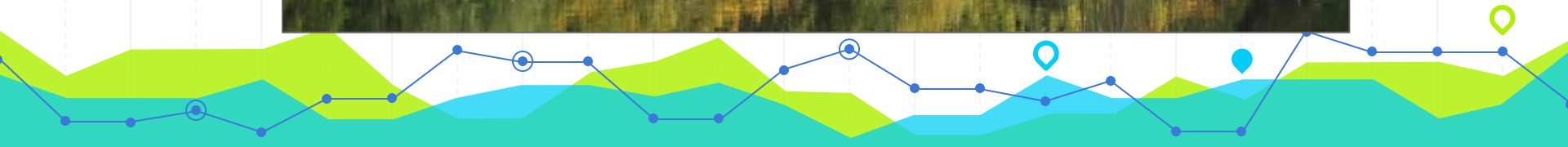
- Septic Tanks
- Zero-Water Composting Toilets
- Plant system for water filtration

4. Renewable power

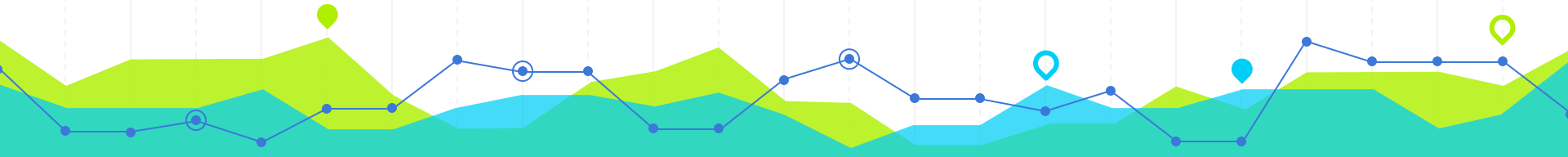
- Usually solar, wind, geothermal







Spectrum of Off-Grid Living



Example 1: Earthship

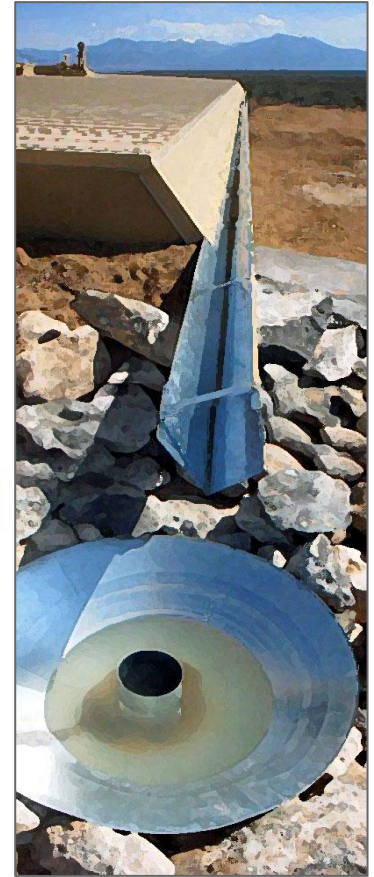
- Concept developed in early 2000s
- 5 models: Custom, Global, Simple Survival, Tropical, Packaged
 - Cost for non-custom models comparable to cost of a conventional home
 - \$225 per sf for “global” model
- “Biotecture” building method



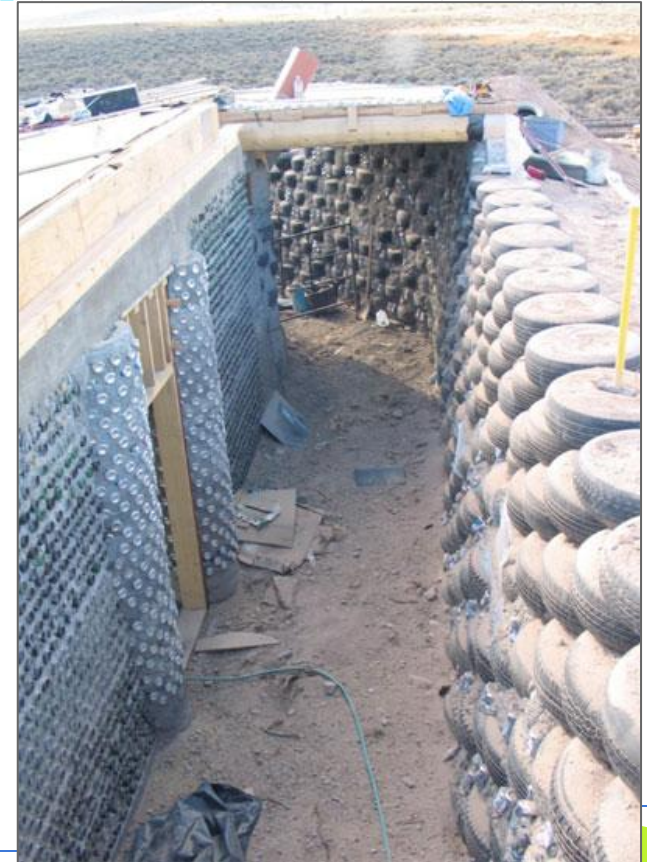
Example 1: Earthship, cont.

Features:

- Harvests own electricity
 - Renewable resources
- Harvests own water
 - Rain/snowmelt
- Contains/Treats own sewage
 - Mimics wetlands
- Heats/cooling itself without fuel
 - Uses earth's coolness, sun's warmth
- Produces own food
 - Indoor greenhouse
- Built from 45% recycled materials



Example 1: Earthship, cont.





Spectrum of Off-Grid Living



Example 2: Net Positive House in Lincoln, MA

- 2800 sq. ft
- Consumes 70% less energy than a code-built house
- Produces 48% more energy annually than it consumes
- Certified by Living Building Challenge



Example 2: Net Positive House, cont.

Features:

- Superior insulation
- Triple-glazed windows
- EnergyStar appliances
- Design for passive solar heating
- 13.1 kW solar panel array
- Energy use monitoring system



Spectrum of Off-Grid Living



Example 3: SOL in Austin, TX

- “Solutions Oriented Living”
- Attempt at net-zero housing development
- Pre-built homes
 - \$190,000 starting price
 - 1000-1800 sq. ft.



Example 3: SOL in Austin, TX

Features:

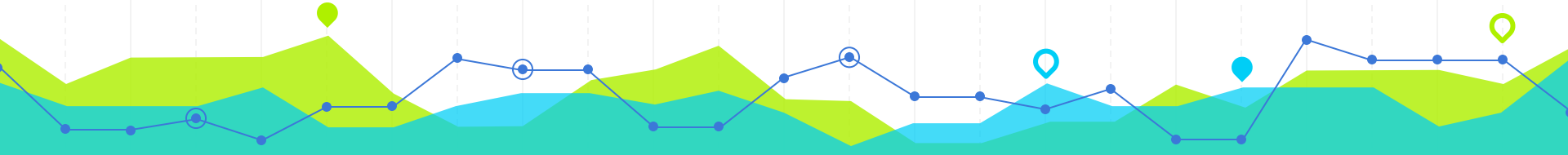
- Windows designed for passive ventilation & daylighting
- Energy-efficient appliances
- Solar panels (electricity)
- Geothermal wells (HVAC)
- Drought-resistant landscaping
- Superior insulation



Example 3: SOL, cont.



Spectrum of Off-Grid Living



Advantages

Advantages:

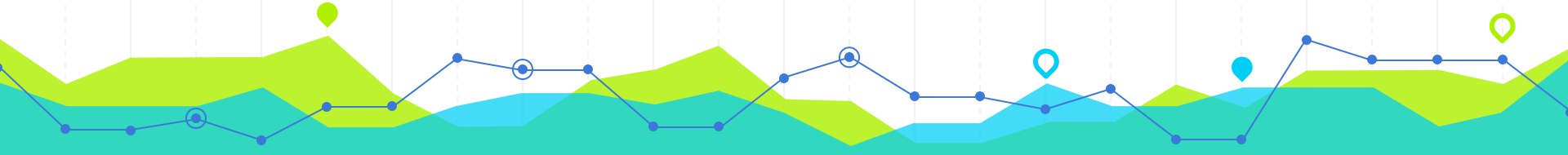
- Long-term financial savings
 - Utility bills
- Reduce carbon footprint
- Boost energy use efficiency
- Self-sufficiency in case of electric grid failure
- Independence from effects of economic fluctuations



Disadvantages

Disadvantages:

- High initial costs
 - Solar arrays, wind turbines, water pumps, low energy requirement appliances etc.
- Potential inability to obtain electricity/energy if building technology fails
- Maintenance of home & equipment
 - May require homeowners to perform repair tasks themselves
- Personal hygiene issues



Potential Proponents

Businesses

- Renewable energy
- Homestay owners
- Architecture/Construction companies
- Industries depending on living off-grid



Individuals

- Personal choice of living style
- Saving money
- Environmentalists



Potential Opponents

Government

- Zoning laws to force people onto the grid
- “Nuisance abatement teams” designed to intimidate off-grid homeowners
- Fining/Jailing of off-grid residents
 - Colorado, California, Florida, Canada etc.

Energy utility companies

Wildlife protectionists



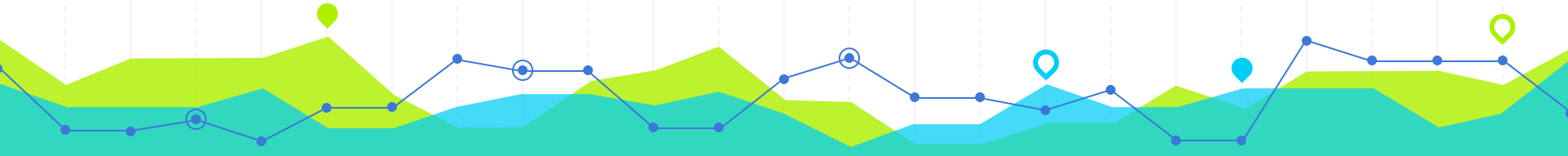
Ethical Considerations

● Utilitarianism

- 1) Needs of today vs. Needs of future generations
- 2) Convenience of traditional fuel usage vs Living off grid
- 3) Public health risk of living off grid vs. Environmental benefit

● Deontology

- 1) Intent vs. Consequence



Conclusion

- Many concepts/technologies applicable in urban infrastructure systems
 - Energy-efficient appliances
 - Solar roof panels
 - Green roofs
- Emergence of organizations promoting “green” construction



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