HOMER History

1992 Earth Summit in Rio, NREL creates Village Power Program

1993 HOMER v.0 created in GAMS Optimization Software

1997 HOMER v.1 ported to Windows

2002 HOMER v.2, many options added: Multiple generators, grid extension

2009 HOMER Energy LLC formed to commercialize and expand

2014 HOMER Pro released with modular design

2015-2019 Components and options expanded, new licensing options

2018 HOMER Grid released, focusing on demand charge reduction

2020 UL acquires HOMER Energy LLC, expanding resources

Key Office Locations - Renewables

500+
RENEWABLE ENERGY EXPERTS

35+ *years of*
EXPERIENCE IN RENEWABLE ENERGY

UL has assessed
100+
UTILITY-SCALE SOLAR PROJECTS SINCE 2013

UL has issued
350+
Type certificates on over 150 wind turbines

UL has performed
700+
WIND TURBINE POWER PERFORMANCE TESTS

ADVISED 90%
of the wind industry's top project developers and plant owners

Forecast provider for
70+ GIGAWATTTS
OF INSTALLED RENEWABLE ENERGY PROJECTS

Independent Engineer/Owner's for
600+
WIND AND SOLAR PROJECTS SINCE 2012

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HOMER Energy by UL

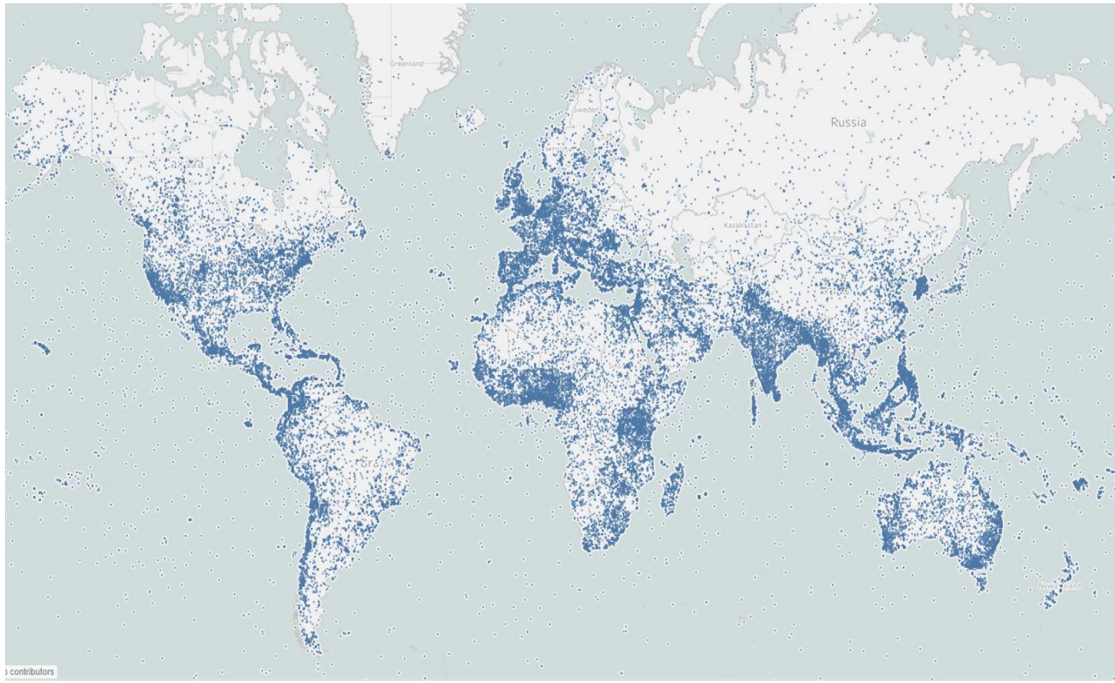
Designing Hybrid Systems for over 25 years

De-facto Global Standard

- >250,000 people have used HOMER
- >100,000 opted-in to our hybrid system design network
- 8th Annual HOMER International Microgrid Conference
  - 100% Virtual, October 12-16 www.microgridconference.com

Global Data

- >3 million HOMER files
- >75,000 projects modeled since 2014



HOMER Energy by UL

Microgrid / DER Optimization & Design in HOMER®

Inputs

Economics

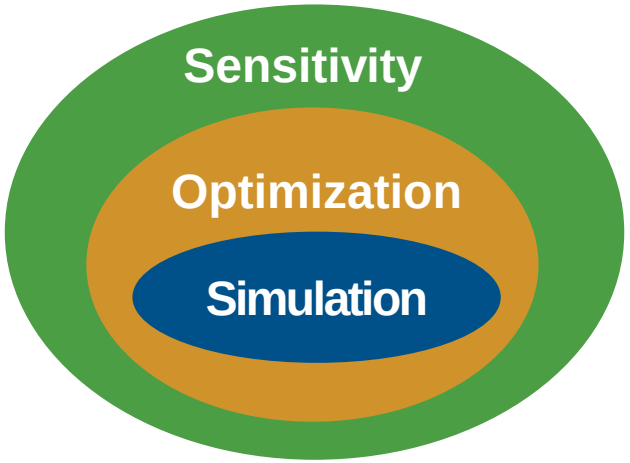
Load Profile

Site-Specific Renewable Resources

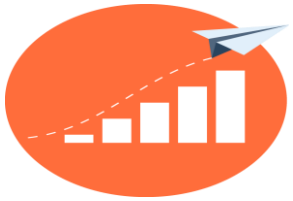
System Components

Analysis

HOMER Pro / HOMER Grid



Results



Economics & Engineering

System Sizing

Performance Details

Financials

Proposal & Detailed Reports

HOMER Energy by UL

Too Many Choices

Solar

Ocean Energy

Fuel Cells

Wind

Hydro

Micro-turbines

Geothermal

Micro-grids

Biomass

Demand Response

New Storage Techs.

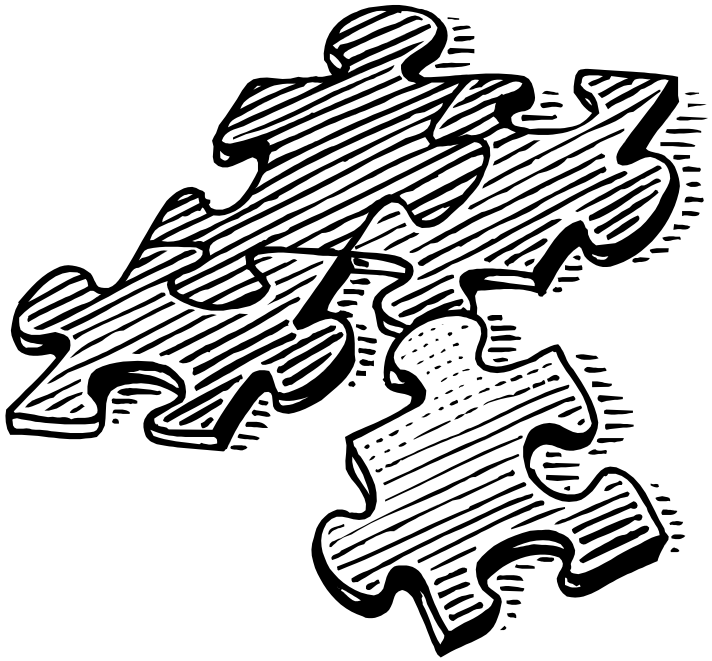
Load Management

Electric Vehicles

Smart grids

What Is Best?

- It depends on:
  - Resources
  - Loads
  - Equipment prices
  - Equipment performance



- **A confused mind says “No!”**
- **HOMER fits the pieces together**

Technology Evolution

What used to be

- Early wind-based systems
- Lead batteries
- Unreliable inverters
- No monitoring
- Grant projects without community engagement

What works

- Inexpensive solar
- Hybrid technologies
- More & better storage choices
- Reliable electronics
- Remote monitoring
- Real commercial approach

Designing Hybrid Systems

- Degrees of design freedom
  - PV sizing
    - Daytime power
    - Battery charging
  - Battery sizing
    - 24-hour power
  - Tariff considerations
  - Reliability
    - Backup requirements

- Lots of choices, often with incomplete data
- **Sensitivity Analysis**

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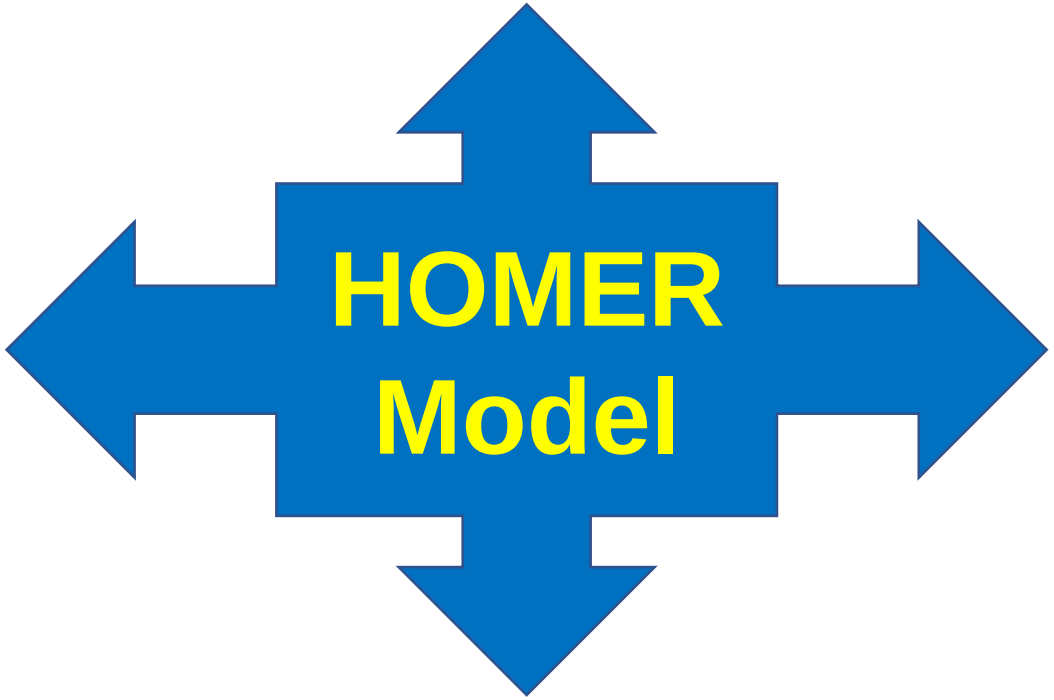
Communication

Renewable Advocates

Power Engineers



Financiers

Utility Operators

HOMER bridges different worlds

HOMER Product Suite

- HOMER Pro:
  - Off-grid, Isolated Grids, Island Grids
- HOMER Grid:
  - Grid-connected, Behind The Meter DG & Microgrids
- HOMER for Front of the Meter Projects
  - New Product
  - Available through UL Advisory Services
  - Public release in 2021