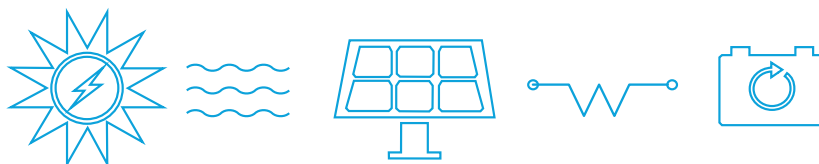
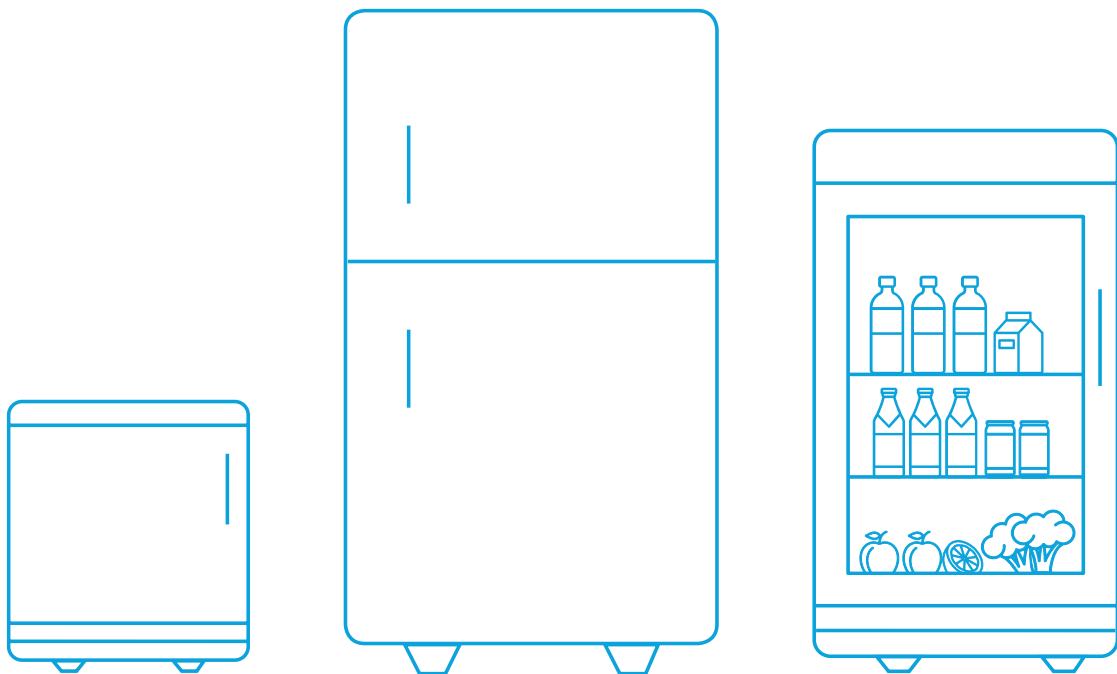


Global LEAP Awards



2017 Buyer's Guide for
Outstanding Off-Grid Refrigerators



The Global LEAP Awards Buyer's Guide

The Global LEAP Awards Buyer's Guide is a catalog of the world's best off-grid appliances. This edition contains information about off-grid refrigerators that were named Winners and Finalists in the 2016-17 Global LEAP Awards. The Buyer's Guide serves as a procurement tool for off-grid solar companies and off-grid solar product distributors, and provides general market intelligence to other interested stakeholders. It includes rated product specifications, performance metrics based on laboratory testing, and sales contact information.

The Global LEAP Awards identify one Winner as the best overall product nominated for each size and form factor-based category, with other high-quality products in that category identified as Finalists. The 2017 Buyer's Guide lists seventeen off-grid refrigerators.

The 2016-17 Global LEAP Awards Off-Grid Refrigerator Buyer's Guide is published by Global Lighting and Energy Access Partnership (Global LEAP), an initiative of the Clean Energy Ministerial (CEM) with support from Power Africa's Beyond the Grid Initiative.

The Global LEAP Awards

An international competition that identifies and promotes the world's best, most energy-efficient off-grid appliances

High-quality, energy-efficient appliances ensure that un- and under-electrified households and businesses can make the most out of off-grid energy. They are also essential to the growth of off-grid energy markets—they create demand for off-grid energy while reducing energy costs.

The Global LEAP Awards—a program within the framework of the Clean Energy Ministerial (CEM)—help accelerate the global off-grid clean energy market. They incentivize innovation and send the off-grid market clear and actionable signals about appliance quality, energy efficiency, and appropriateness of design and functionality.

All Global LEAP Awards Winners and Finalists undergo testing in accredited laboratories for their energy performance, quality, and reliability, and an evaluation by a panel of off-grid market experts. The products recognized by the Global LEAP Awards offer a strong balance of price, energy efficiency, performance, and reliability.

Off-grid market actors—from manufacturers to distributors, from investors to policymakers—are strongly encouraged to use the Buyer's Guide as a resource in their exploration of the off-grid appliance market, and to contact the suppliers of Global LEAP Awards Winners and Finalists about the products listed here.

Global LEAP Awards Winners and Finalists are eligible to participate in an affiliated Global LEAP procurement incentives program. This program drives large-scale procurement and distribution of best-in-class off-grid appliances in key off-grid markets. Further details about this program are available at www.globalleap.org/incentives.

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* WINNER: Overall Value Innovation Prize

† WINNER: Energy Efficiency Innovation Prize

The 2016–17 Global LEAP Awards Off-Grid Refrigerator Competition

In partnership with the Scaling Off-Grid Energy Grand Challenge for Development, the U.S. Agency for International Development, the U.K. Department for International Development's Ideas to Impact Programme, and Power Africa's Beyond the Grid initiative, the 2016-17 Global LEAP Awards included the first-ever off-grid refrigerator competition.

Refrigerators hold unique potential to unlock economic and social progress for the billions of un- and under-electrified people globally. Access to refrigeration can facilitate the development of income-generating micro-enterprises, prolong the shelf life of fresh foods, reduce spoilage and waste, and reduce the time that households, particularly female household members, spend shopping for or gathering food.

In order to be viable in off-grid settings and suitable for off-grid customers, however, refrigerators must be considerably smaller, cheaper, and run on far less energy than most conventional products. The nascent market for highly energy-efficient, appropriately designed and priced off-grid refrigerators constrains the availability of such products. To address this challenge and catalyze necessary technological advancements, the competition offered three innovation cash prizes of \$200,000 each for products that demonstrated market-leading advancement in Energy Efficiency, Overall Value, and Appropriate Design and User Experience.

The Buyer's Guide includes the winners of the Energy Efficiency and Overall Value Innovation Prizes. The winner of the Appropriate Design and User Experience Innovation Prize will be determined based on the results of field testing conducted in early 2018.

The Importance of Off-Grid Appliance Quality Assurance

Confidence in product quality is essential to the development of the off-grid market. As the off-grid market grows, the threat of low-quality, inefficient products eroding confidence in the market grows with it. Experiences with inferior products are quickly spread by word of mouth in off-grid communities, leading consumers to distrust the products. Decreased consumer confidence poses significant challenges to off-grid business models and undermines efforts to build self-sustaining, robust commercial markets.

More importantly, off-grid populations are typically among the world's poorest people. A small off-grid energy system and the appliances it powers represent big improvements in an off-grid household's quality of life, but require a large investment of very limited income. It's important that the products work as promised.

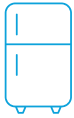
The Importance of Off-Grid Appliance Super-Efficiency

By enhancing and enabling off-grid consumer demand for energy services, off-grid appliance super-efficiency is also essential to the growth of clean energy access markets.

Super-efficient off-grid appliances offer greater service. A 40Wp solar module and a 70Ah battery can power a 25W incandescent bulb for 5 hours each day, but the same system can power a super-efficient 21" flat panel TV, two high-quality LED lights, a super-efficient fan, mobile phone charger, and radio. This expanded service enhances consumer demand.

Super-efficiency can also enable sales by reducing system cost. Most of the cost of off-grid energy is attributable to energy supply-related equipment like solar PV and batteries. Super-efficient off-grid appliances radically reduce the need for energy supply investment, lowering prices and opening up vast new markets of consumers who could otherwise not afford off-grid energy services.

In other words, by providing greater service and greater cost-effectiveness, super-efficient appliances help off-grid clean energy companies serve more customers.



EXPLANATION OF OFF-GRID REFRIGERATOR PRODUCT SPECIFICATIONS

To help readers understand the information included for each product in the Buyer's Guide, this page provides explanations of the product details, rated specifications, and laboratory test results for refrigerators.

Product Model Number	Identifies the specific product model
Total Capacity (L)	Total volume of the interior of the product (<i>combines refrigerator and freezer compartments for refrigerator-freezer combination units</i>)
Freezer Capacity (L)	Volume of the interior of the freezer compartment (<i>only applicable to refrigerator-freezer combination units</i>)
Rated Power Consumption (W)	On-mode power consumption as stated by the manufacturer
Daily Energy Consumption at 32°C (kWh/day)	Energy consumption of the product in steady operation at 32°C ambient temperature, based on laboratory testing
Pull Down Time (hours)	Time that the product took to cool down from 32°C to 4°C target temperature, based on laboratory testing
Autonomy (hours)	Time that the product's compartment stayed below 12°C with no external power supply, at 32°C ambient temperature, based on laboratory testing
Freezing Performance (hours to reach -6°C)	Time that the product took to cool down the freezer compartment from 32°C to -6°C target temperature, based on laboratory testing (<i>only applicable to refrigerator-freezer combination units</i>)
Refrigerant(s)	Indicates the refrigerant type(s) contained in the product
Product Weight (kg)	Weight of the product, as declared by the manufacturer
Product Dimension h/w/d (cm)	External measurements (height/width/depth) of the product, as declared by the manufacturer
Power Supply as Shipped	Whether the product operates with AC or DC power, or both
Customizable Power Supply (AC/DC)	Whether the product can be customized to operate with a different power supply

DISCLAIMER

The Clean Energy Ministerial, Global LEAP, and associated partners and agents make no claims about the quality, energy performance, or off-grid appropriateness of any product not listed here. The inclusion in this Guide of a manufacturer's product should not be construed as an endorsement of that manufacturer or of its entire product line.

Global LEAP made every effort to provide transparent and accurate testing results for the product performance metrics included in the Buyer's Guide. The performance data included here is the result of testing randomly selected product samples at ISO/IEC-accredited test laboratories. Product performance may vary based on different product configuration, test environments or other factors.

Products were tested in "as shipped" mode.

Data used in the Buyer's Guide should only serve as an indication of product performance. Bulk purchasers considering appliance products are strongly encouraged to request detailed test results from manufacturers and/or conduct independent testing. For guidance on how to interpret the data included here, or on identifying appropriate test laboratories and test methods, please contact Global LEAP.

SunDanzer DCR50

WINNER: Small Refrigerator

WINNER: *Overall Value Innovation Prize*



SPECIFICATIONS

Product Model Number	DCR50
Total Capacity (L)	50
Rated Power Consumption (W)	45
Daily Energy Consumption at 32°C (kWh/day)	0.118
Pull Down Time (hours)	0.55
Autonomy (hours)	1.35
Refrigerant(s)	R134a; R600a
Product Weight (kg)	45
Product Dimension h/w/d (cm)	77/68/55
Power Supply as Shipped	DC
Customizable Power Supply (AC/DC)	Yes



SunDanzer DC-Powered Refrigeration

Company SunDanzer
Sales Contact Billy Amos
Phone +1-915-821-0042
Email Billy@sundanzer.com
Website www.sundanzer.com

Solageo SOL-REF-T30

FINALIST: Small Refrigerator



SPECIFICATIONS

Product Model Number	Portable DC Compressor Refrigerator (30L)/SOL-REF-T30
Total Capacity (L)	30
Rated Power Consumption (W)	10
Daily Energy Consumption at 32°C (kWh/day)	0.394
Pull Down Time (hours)	0.78
Autonomy (hours)	0.52
Refrigerant(s)	R134a
Product Weight (kg)	14
Product Dimension h/w/d (cm)	36/37/57
Power Supply as Shipped	DC
Customizable Power Supply (AC/DC)	Yes



Company Solageo
Sales Contact Joseph Fernandez
Phone +852-9185-1610
Email contact@solageo.com
Website www.solageo.com

Palfridge LC86

WINNER: Medium Refrigerator



SPECIFICATIONS

Product Model Number	LC86
Total Capacity (L)	86
Rated Power Consumption (W)	49
Daily Energy Consumption at 32°C (kWh/day)	0.154
Pull Down Time (hours)	1.13
Autonomy (hours)	1.22
Refrigerant(s)	R600a
Product Weight (kg)	32
Product Dimension h/w/d (cm)	86/80/62
Power Supply as Shipped	DC
Customizable Power Supply (AC/DC)	Yes



**THE FRIDGE
FACTORY**

Company Palfridge
Sales Contact Sales Manager
Phone +268-2518-4104
Email info@palfridge.com
Website www.thefridgefactory.com

SureChill GVR75DC

FINALIST: Medium Refrigerator



SPECIFICATIONS

Product Model Number	GVR75DC
Total Capacity (L)	75
Rated Power Consumption (W)	60
Daily Energy Consumption at 32°C (kWh/day)	0.538
Pull Down Time (hours)	Not Achieved*
Autonomy (hours)	Not Achieved**
Refrigerant(s)	R600a
Product Weight (kg)	100-120
Product Dimension h/w/d (cm)	147/60/64
Power Supply as Shipped	DC
Customizable Power Supply (AC/DC)	Yes

*Unable to achieve 4°C in Pull Down test. Lowest temperature achieved in refrigerator compartment and duration of time from start of test was 5.5°C and 20 hours, respectively.

**Product could not start Autonomy test at 4°C. Starting temperature and duration of time for refrigerator compartment to rise to 12°C was 5.5°C and 139 hours, respectively.



SURECHILL | COOLING TECHNOLOGY

Company	The Sure Chill Company
Sales Contact	Natacha Celie-Bone
Phone	+44-292-052-8192
Email	natacha.celie-bone@surechill.com
Website	www.surechill.com

Palfridge LC221

WINNER: Large Refrigerator



SPECIFICATIONS

Product Model Number	LC221
Total Capacity (L)	192
Rated Power Consumption (W)	49
Daily Energy Consumption at 32°C (kWh/day)	0.281
Pull Down Time (hours)	0.76
Autonomy (hours)	0.76
Refrigerant(s)	R600a
Product Weight (kg)	30
Product Dimension h/w/d (cm)	86/80/60
Power Supply as Shipped	DC
Customizable Power Supply (AC/DC)	Yes



THE FRIDGE
FACTORY

Company Palfridge
Sales Contact Sales Manager
Phone +268-2518-4104
Email info@palfridge.com
Website www.thefridgefactory.com

Palfridge LC120

FINALIST: Large Refrigerator



SPECIFICATIONS

Product Model Number	LC120
Total Capacity (L)	104
Rated Power Consumption (W)	49
Daily Energy Consumption at 32°C (kWh/day)	0.446
Pull Down Time (hours)	1.2
Autonomy (hours)	0.49
Refrigerant(s)	R600a
Product Weight (kg)	20
Product Dimension h/w/d (cm)	87/46/55.5
Power Supply as Shipped	DC
Customizable Power Supply (AC/DC)	Yes



THE FRIDGE
FACTORY

Company Palfridge
Sales Contact Sales Manager
Phone +268-2518-4104
Email info@palfridge.com
Website www.thefridgefactory.com

SureChill GVR99AC

FINALIST: Large Refrigerator



SPECIFICATIONS

Product Model Number	Vaccine Refrigerator - GVR99AC
Total Capacity (L)	124
Rated Power Consumption (W)	172
Daily Energy Consumption at 32°C (kWh/day)	0.853
Pull Down Time (hours)	Not Achieved*
Autonomy (hours)	Not Achieved**
Refrigerant(s)	R600a
Product Weight (kg)	100-120
Product Dimension h/w/d (cm)	165/59/62
Power Supply as Shipped	AC
Customizable Power Supply (AC/DC)	Yes

*Unable to achieve 4°C in Pull Down test. Lowest temperature achieved in refrigerator compartment and duration of time from start of test was 5°C and 20 hours, respectively.

**Product could not start Autonomy test at 4°C. Starting temperature and duration of time for refrigerator compartment to rise to 12°C was 5°C and 120 hours, respectively.



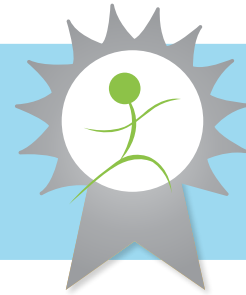
SURE CHILL | COOLING TECHNOLOGY

Company	The Sure Chill Company
Sales Contact	Natacha Celie-Bone
Phone	+44-292-052-8192
Email	natacha.celie-bone@surechill.com
Website	www.surechill.com

SunDanzer DCR165

FINALIST: Large Refrigerator

WINNER: *Energy Efficiency Innovation Prize*



SPECIFICATIONS

Product Model Number	DCR165
Total Capacity (L)	163
Rated Power Consumption (W)	150
Daily Energy Consumption at 32°C (kWh/day)	0.191
Pull Down Time (hours)	0.64
Autonomy (hours)	1.83
Refrigerant(s)	R134a; R600a
Product Weight (kg)	40
Product Dimension h/w/d (cm)	87/95/67
Power Supply as Shipped	DC
Customizable Power Supply (AC/DC)	Yes



SunDanzer DC-Powered Refrigeration

Company SunDanzer
Sales Contact Billy Amos
Phone +1-915-821-0042
Email Billy@sundanzer.com
Website www.sundanzer.com

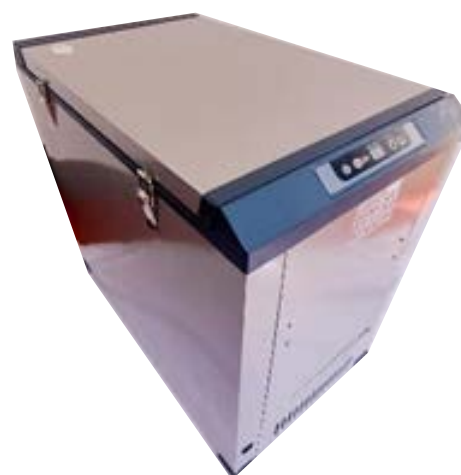
SolarNow 112L

FINALIST: Large Refrigerator



SPECIFICATIONS

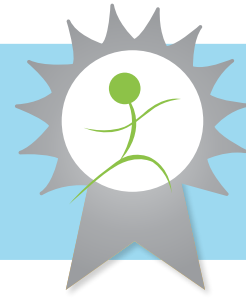
Product Model Number	Fridge 112L/12-24Vdc
Total Capacity (L)	112
Rated Power Consumption (W)	65
Daily Energy Consumption at 32°C (kWh/day)	0.441
Pull Down Time (hours)	0.66
Autonomy (hours)	0.61
Refrigerant(s)	R134a
Product Weight (kg)	28
Product Dimension h/w/d (cm)	71/90/45.5
Power Supply as Shipped	DC
Customizable Power Supply (AC/DC)	No



Company Solar Now
Sales Contact Lukia Nabawanuka
Phone +256-788-916-648
Email lukian@solarnow.eu
Website www.solarnow.eu

Phocos FR240MP

FINALIST: Large Refrigerator



SPECIFICATIONS

Product Model Number	FR Series DC Refrigerators/ FR240MP
Total Capacity (L)	240
Rated Power Consumption (W)	40
Daily Energy Consumption at 32°C (kWh/day)	0.28
Pull Down Time (hours)	0.95
Autonomy (hours)	1.53
Refrigerant(s)	R134a
Product Weight (kg)	70
Product Dimension h/w/d (cm)	85/115/69
Power Supply as Shipped	DC
Customizable Power Supply (AC/DC)	No



Company Phocos
Sales Contact Dean Middleton and James Polcyn
Phone +1-541-999-6789; +1-520-777-7906
Email Dean.Middleton@phocos.com
james.polcyn@phocos.com
Website www.phocos.com

Phocos FR170MP

FINALIST: Large Refrigerator



SPECIFICATIONS

Product Model Number	FR Series DC Refrigerators/ FR170MP
Total Capacity (L)	170
Rated Power Consumption (W)	40
Daily Energy Consumption at 32°C (kWh/day)	0.273
Pull Down Time (hours)	0.86
Autonomy (hours)	1.15
Refrigerant(s)	R134a
Product Weight (kg)	50
Product Dimension h/w/d (cm)	88/92/68
Power Supply as Shipped	DC
Customizable Power Supply (AC/DC)	No



Company Phocos
Sales Contact Dean Middleton and James Polcyn
Phone +1-541-999-6789; +1-520-777-7906
Email Dean.Middleton@phocos.com
james.polcyn@phocos.com
Website www.phocos.com

Simusolar DCR165

FINALIST: Large Refrigerator



SPECIFICATIONS

Product Model Number	DCR165E / C165SA
Total Capacity (L)	163
Rated Power Consumption (W)	75
Daily Energy Consumption at 32°C (kWh/day)	0.222
Pull Down Time (hours)	0.69
Autonomy (hours)	26.8*
Refrigerant(s)	R600a
Product Weight (kg)	50
Product Dimension h/w/d (cm)	87/95/62
Power Supply as Shipped	DC
Customizable Power Supply (AC/DC)	Information not provided

*Model included an internal battery system that engaged during Autonomy testing.



Company Simusolar
Sales Contact Michael Kuntz
Phone +1-415-598-8934
Email mkuntz@simusolar.com
Website www.simusolar.com

Metropolitan MEFR48C1

WINNER: Small Refrigerator-Freezer Combination Unit



SPECIFICATIONS

Product Model Number	Mini Refrigerator/MEFR48C1
Total Capacity (L)	46
Freezer Capacity (L)	4
Rated Power Consumption (W)	50
Daily Energy Consumption at 32°C (kWh/day)	0.543
Pull Down Time (hours)	0.84
Autonomy (hours)	0.63
Freezing Performance (hours to reach -6°C)	Not Achieved
Refrigerant(s)	R600a
Product Weight (kg)	17
Product Dimension h/w/d (cm)	50/44/48
Power Supply as Shipped	AC
Customizable Power Supply (AC/DC)	No



Company Metropolitan Electrical Appliance
Mfg Co. Ltd
Sales Contact Lotis Lau
Phone +86 139 2491 7846
Email lotis@metropolitanfan.com
Website www.metropolitanfan.com

Basil RF50

FINALIST: Small Refrigerator-Freezer Combination Unit



SPECIFICATIONS

Product Model Number	RF50
Total Capacity (L)	50
Freezer Capacity (L)	5
Rated Power Consumption (W)	25
Daily Energy Consumption at 32°C (kWh/day)	1.227
Pull Down Time (hours)	0.85
Autonomy (hours)	0.38
Freezing Performance (hours to reach -6°C)	7.5
Refrigerant(s)	R134a
Product Weight (kg)	15
Product Dimension h/w/d (cm)	51/45/45
Power Supply as Shipped	DC
Customizable Power Supply (AC/DC)	Yes



Control the Future, Invent it

Company	Basil Energetics Private Limited
Sales Contact	Dr. R. Ramarathnam
Phone	+91-928-21-7-0292
Email	rramarathnam@basilenergetics.com
Website	www.basilenergetics.com

Niwa Coolio 100

FINALIST: Small Refrigerator-Freezer Combination Unit



SPECIFICATIONS

Product Model Number	Coolio 100
Total Capacity (L)	100
Freezer Capacity (L)	10
Rated Power Consumption (W)	20
Daily Energy Consumption at 32°C (kWh/day)	0.8
Pull Down Time (hours)	Not Achieved*
Autonomy (hours)	Not Achieved**
Freezing Performance (hours to reach -6°C)	12
Refrigerant(s)	R134a
Product Weight (kg)	22
Product Dimension h/w/d (cm)	85/47.5/47.5
Power Supply as Shipped	DC
Customizable Power Supply (AC/DC)	Yes

*Unable to achieve 4°C in Pull Down test. Lowest temperature achieved in refrigerator compartment and duration of time from start of test was 5°C and 10 hours, respectively.

**Product could not start Autonomy test at 4°C. Starting temperature and duration of time for refrigerator compartment to rise to 12°C was 5°C and 0.9 hours, respectively.



Company NIWA - Next Energy Products Ltd.
Sales Contact Rea Yip
Phone +852 2110 4955
Email sales@niwasolar.com
Website www.niwasolar.com

Basil DC170L

WINNER: Large Refrigerator-Freezer Combination Unit



SPECIFICATIONS

Product Model Number	Refrigerator/DC170L
Total Capacity (L)	170
Freezer Capacity (L)	11
Rated Power Consumption (W)	30
Daily Energy Consumption at 32°C (kWh/day)	1.02
Pull Down Time (hours)	0.9
Autonomy (hours)	0.65
Freezing Performance (hours to reach -6°C)	6.1
Refrigerant(s)	R134a
Product Weight (kg)	25
Product Dimension h/w/d (cm)	113/48/54
Power Supply as Shipped	DC
Customizable Power Supply (AC/DC)	Yes



Control the Future, Invent it

Company	Basil Energetics Private Limited
Sales Contact	Dr. R. Ramarathnam
Phone	+91-928-21-7-0292
Email	rmarathnam@basilenergetics.com
Website	www.basilenergetics.com

MAKS MR-139

FINALIST: Large Refrigerator-Freezer Combination Unit



SPECIFICATIONS

Product Model Number	Refrigerator/MR-139
Total Capacity (L)	139
Freezer Capacity (L)	45
Rated Power Consumption (W)	100
Daily Energy Consumption at 32°C (kWh/day)	1.221
Pull Down Time (hours)	4.13
Autonomy (hours)	1.12
Freezing Performance (hours to reach -6°C)	10.9
Refrigerant(s)	R134a
Product Weight (kg)	35
Product Dimension h/w/d (cm)	126/48/50
Power Supply as Shipped	DC
Customizable Power Supply (AC/DC)	Yes



Company MAKS Powertech Ltd
Sales Contact Nessar Khan
Phone +880-255-042-097
Email nessar65@gmail.com
Website www.maksgroupbd.com



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CLASP serves as Administrator of the Global LEAP Awards and other Global LEAP initiatives.



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 info@GlobalLEAP.org

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Global LEAP
Lighting and Energy Access Partnership

CLEAN ENERGY
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Accelerating the Global Clean Energy Transition