



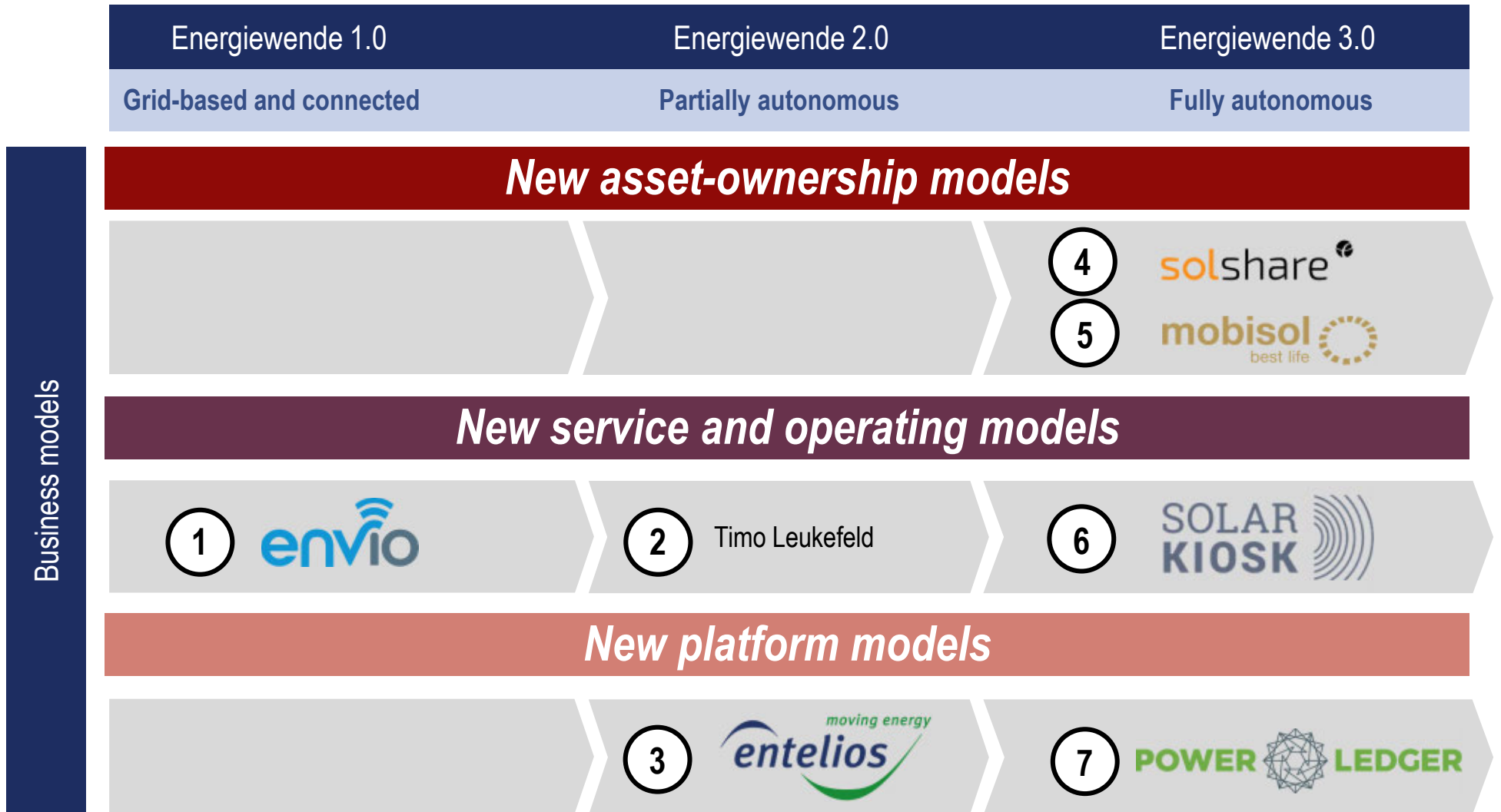
# New business models transforming the energy sector in the global north and south

Dr. Jens Weinmann, ESMT Berlin

LABEX URBAN FUTURES NETWORK 'CITY AND ENERGY' WORK GROUP

Champs-sur-Marne, 6 April, 2018

# Energiewende 1.0–3.0: A taxonomy of business models, with examples



# Energiewende 1.0: New asset-ownership models, and new service and operating models

Energiewende 1.0	Energiewende 2.0	Energiewende 3.0
Grid-based and connected	Partially autonomous	Fully autonomous

Business models

## New asset-ownership models

Financed by subsidies

- Individuals (prosumers)
- Energy associations
- Commercial providers: **SolarCity**

## New service and operating models

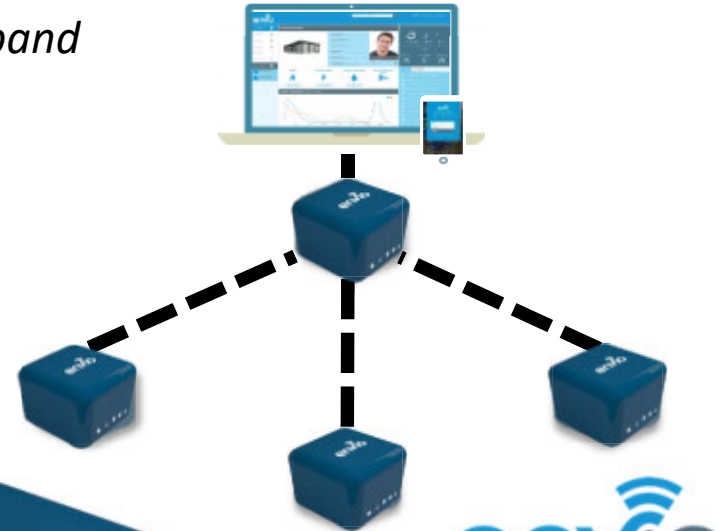
① **envio**

## New platform models

# 1) Envio Systems: A low-cost solution for retrofitting commercial buildings



Reza Alaghehband



Johnson  
Controls

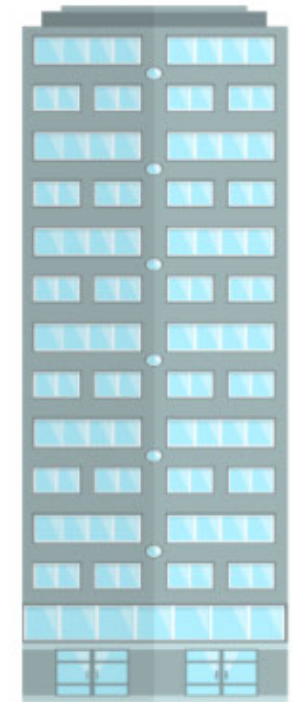
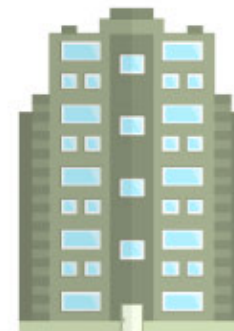
SIEMENS

Schneider  
Electric

Honeywell



GRIDPOINT



1 ~~Shared savings~~

2 Hardware-as-a-service model

MARKET SIZE  
(Buildings: Europe & North America)

10.600.000

600.000

Source: Envio Systems (2017)

# Energiewende 2.0: New asset-ownership models, and new service and operating models

Energiewende 1.0	Energiewende 2.0	Energiewende 3.0
Grid-based and connected	Partially autonomous	Fully autonomous

## *New asset-ownership models*

Financed by subsidies

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- Commercial providers: **SolarCity**

Financed by market-based mechanisms

- Online crowdfunding



## *New service and operating models*



## *New platform models*

- Virtual power plants



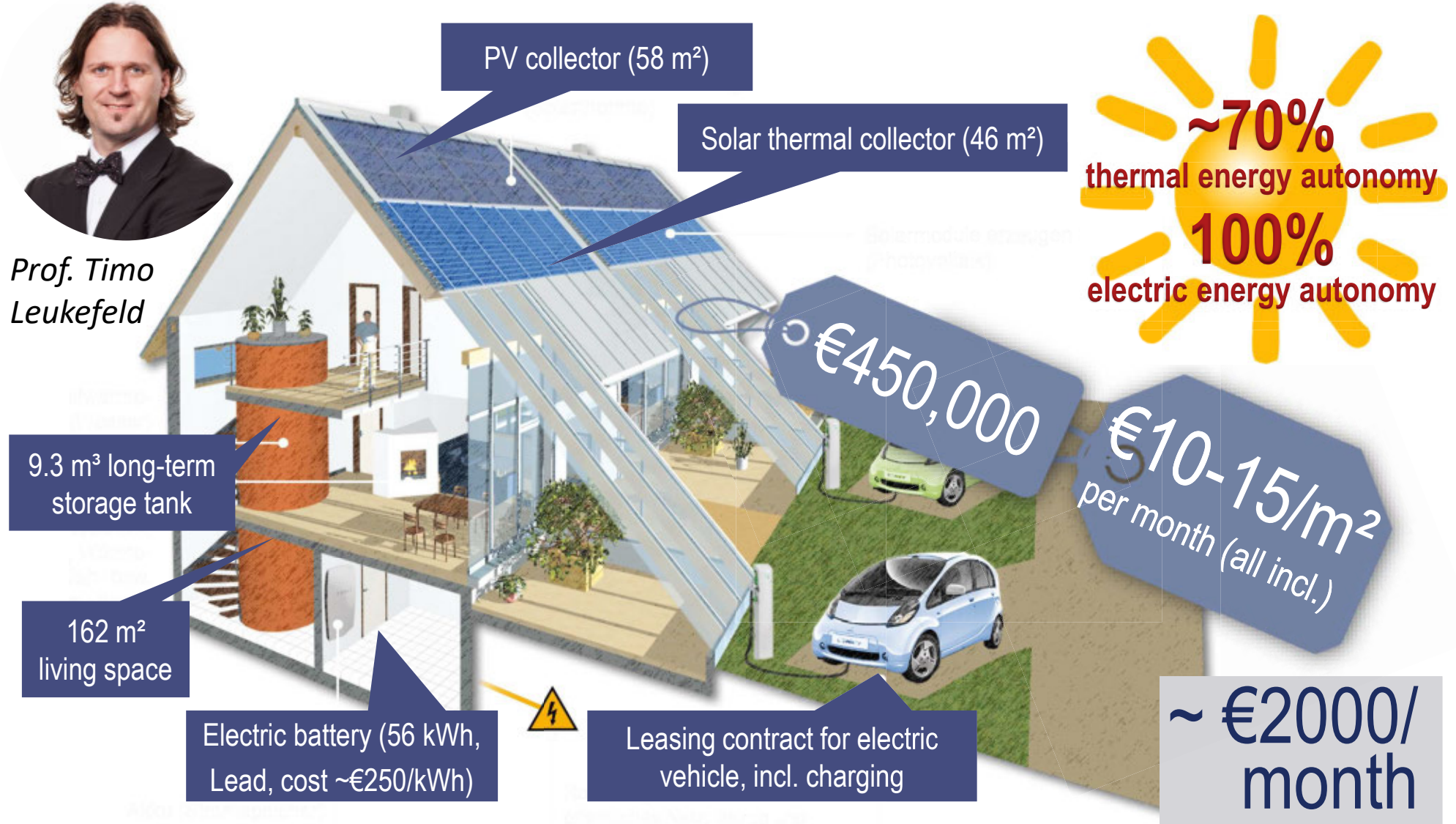
Business models



## 2) Timo Leukefeld offers energy-efficient residential dwellings with energy & mobility flatrate



Prof. Timo  
Leukefeld



Sources: Timo Leukefeld (2016), <http://www.solarthermalworld.org/content/germany-independent-energy-utilities> (2011), Michael Löwa/FAZ (2011); Sonnenhaus-Institut (2016)

# Energiewende 2.0: New platform models – aggregators and Demand Response

Energiewende 1.0	Energiewende 2.0	Energiewende 3.0
Grid-based and connected	Partially autonomous	Fully autonomous

## New asset-ownership models

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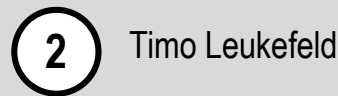
Financed by market-based mechanisms

- Online crowdfunding



Business models

## New service and operating models



## New platform models

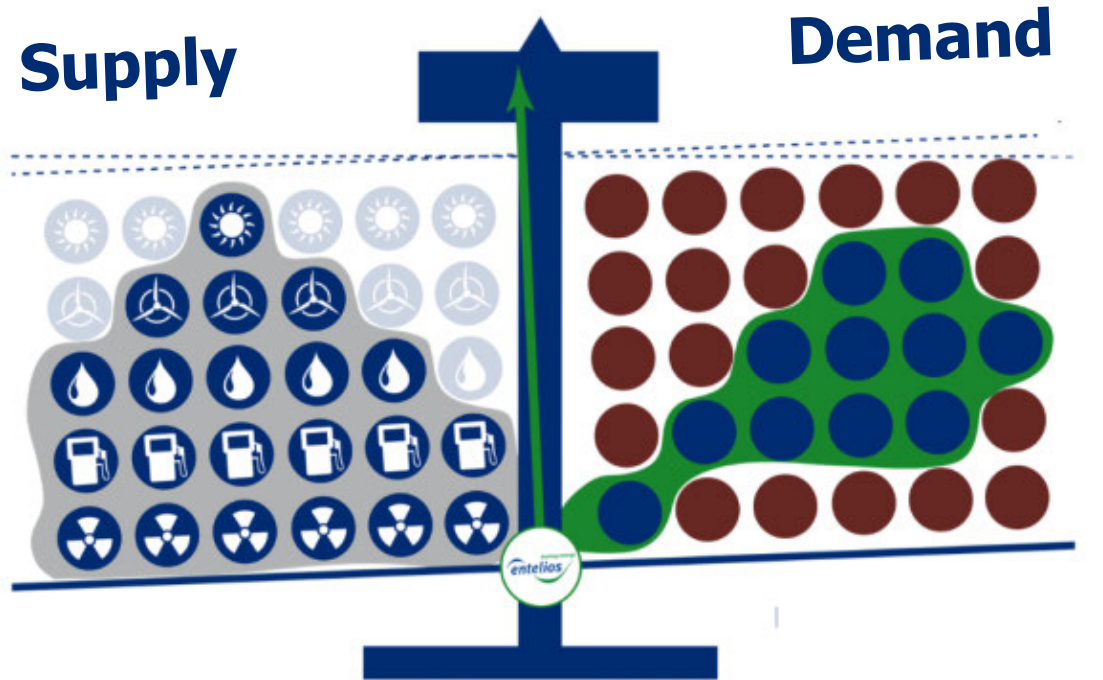
• Virtual power plants



### 3) Entelios acts as an aggregator and platform for flexible demand / interruptible loads



Oliver Stahl



Fluctuating renewable energy ...

... to be balanced with intelligent demand-side management

Entelios Network Operation: Center (NOC)	Energy consumers	Energy consumers networked with NOC	Hydro
Solar	Wind power	Fossil fuels	Nuclear power

1 Independent aggregator

2 Service provider for larger utilities

Source: Entelios (2018)

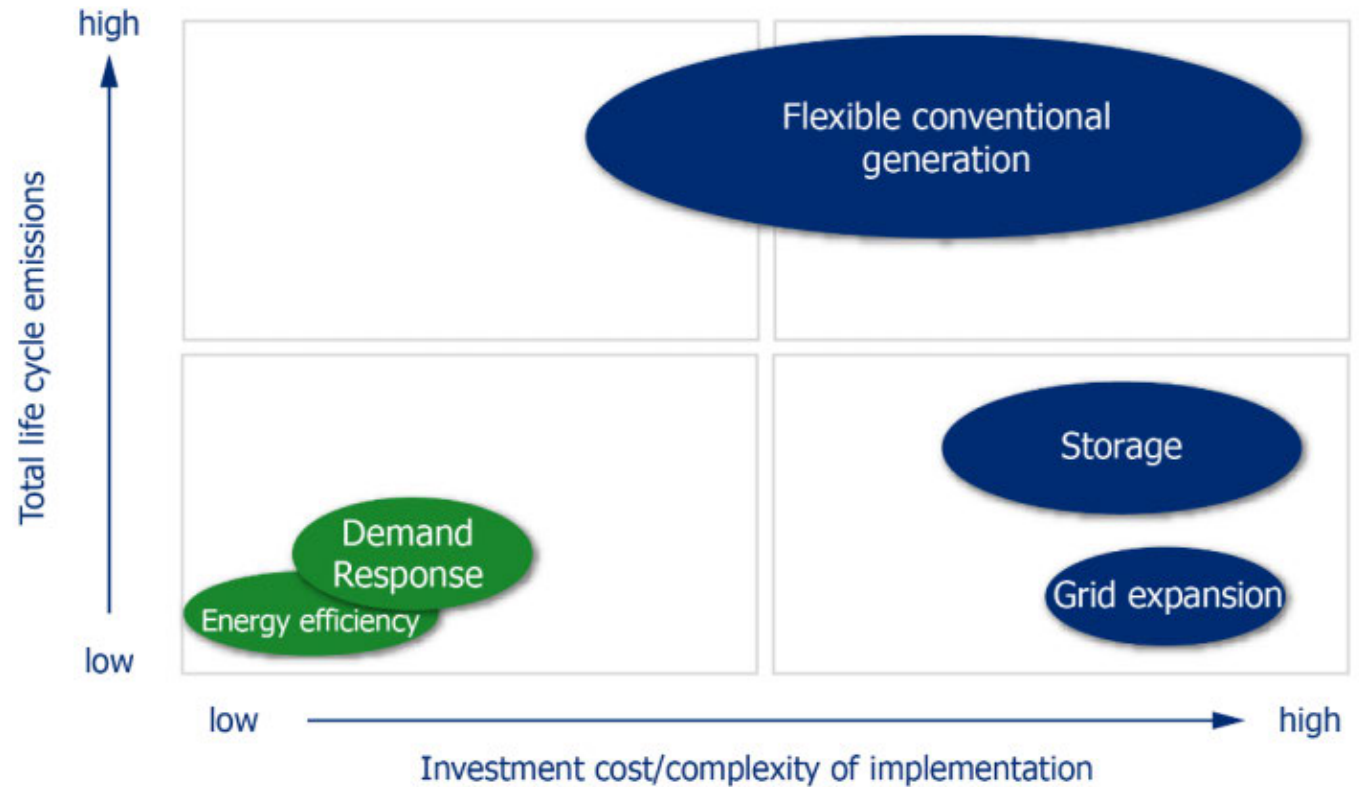


### 3) Demand response's potential to complement renewable energies in the energy transition



Oliver Stahl  
moving energy  
**entelios**

#### “Five pillars of the energy revolution” (according to Entelios)



Source: Entelios (2018)

# Energiewende 3.0: New asset-ownership models in the global south (I)

Energiewende 1.0	Energiewende 2.0	Energiewende 3.0
Grid-based and connected	Partially autonomous	Fully autonomous

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Business models

## New service and operating models



## New platform models

• Virtual power plants



# 4) SOLshare: A peer-to-peer solar electricity trading platform that leverages existing solar home systems in an off-grid context to create a bottom-up smart grid



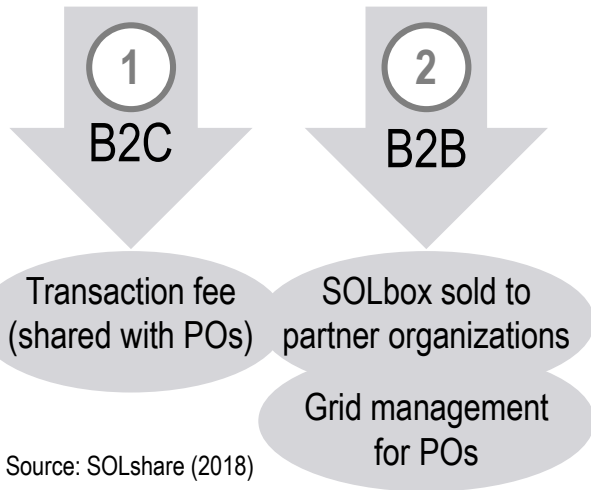
Dr. Sebastian Groh



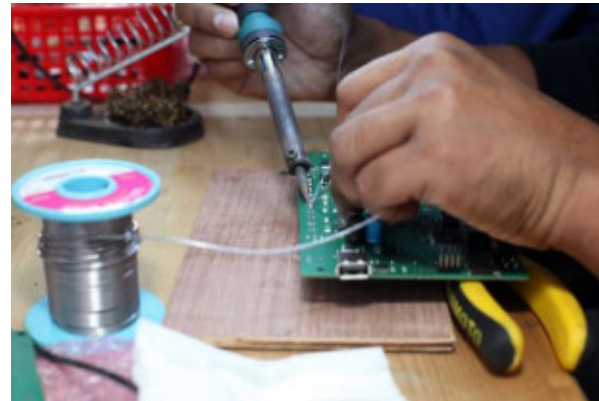
The SOLbox



**solshare**  
COSTUMER SUPPORT



Source: SOLshare (2018)



Local production facilities in Dhaka, Bangladesh



Local field operations team providing technical support

## 4) SOLshare has developed a peer-to-peer solar electricity trading platform that leverages existing solar home systems in an off-grid context to create a bottom-up smart grid



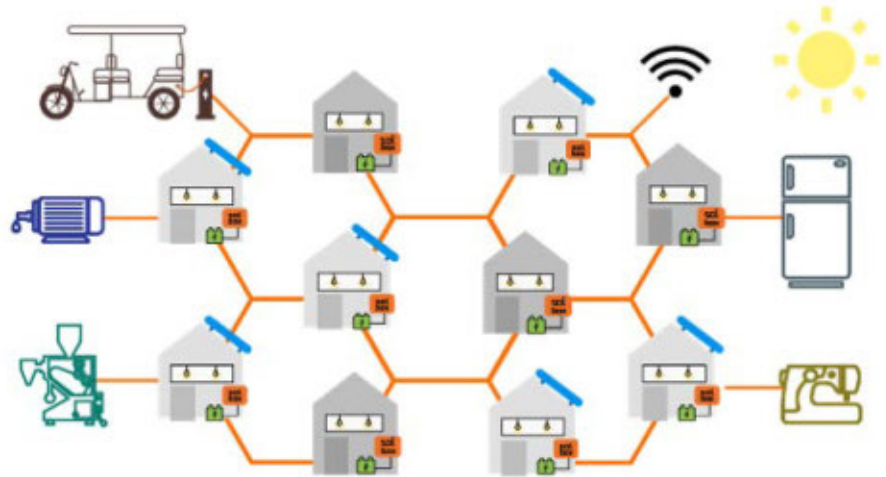
Dr. Sebastian Groh



1

### Micro-grids

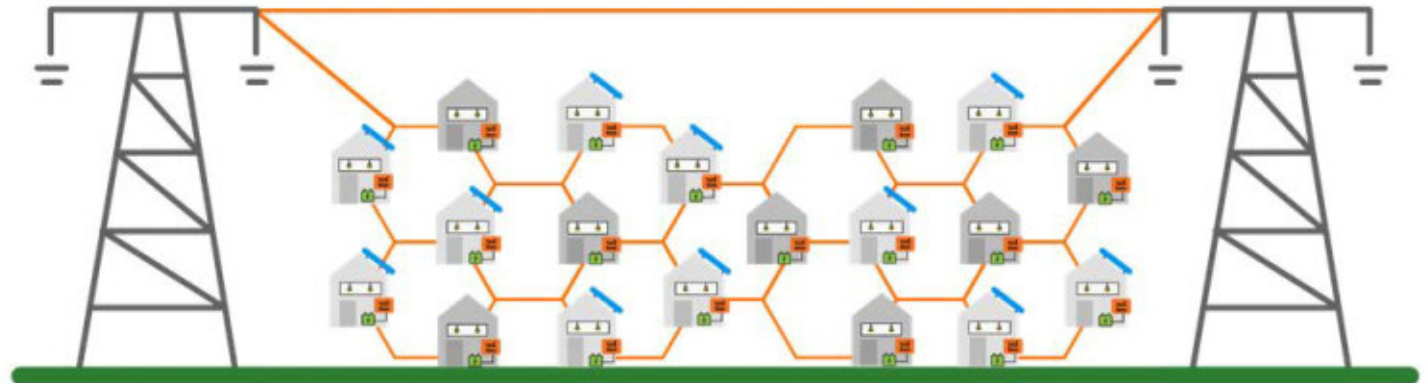
Plug-and-play technology of the SOLbox allows the trading network to grow dynamically from the 'bottom-up' as more users connect over time



2

### Integration with the rural electricity grid

Last-mile power distribution infrastructure, metered at a single, central location, operating in island mode when the grid is unavailable



Source: SOLshare (2018)

# Energiewende 3.0: New asset-ownership models in the global south (II)

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4

**solshare**

5

**mobisol**  
best life

## New service and operating models

1

**envio**

2

Timo Leukefeld

## New platform models

• Virtual power plants



3

**entelios**  
moving energy

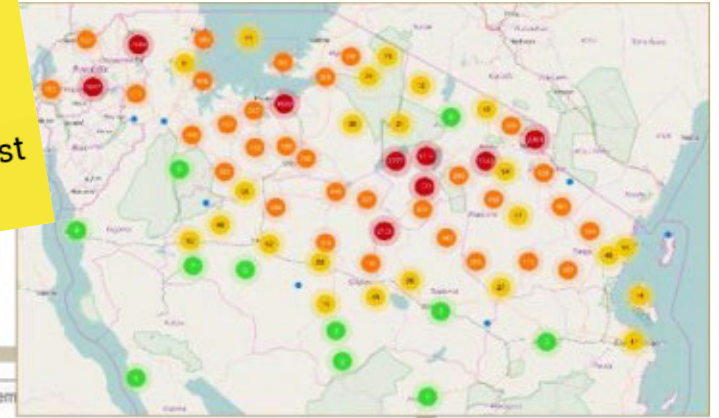


# 5) Mobisol develops and provides affordable stand-alone solar solutions designed for the needs of households and small-businesses

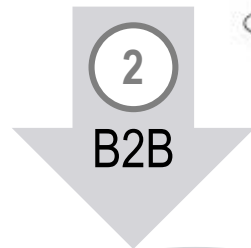
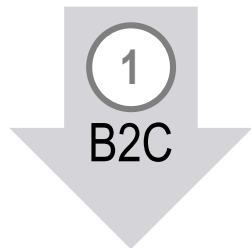


Klara Lindner

**Celebrating 500,000 people electrified!**  
 Mobisol Largest Off-Grid Provider in East Africa with 10MW Installed Capacity



Mobisol's maintenance interface, Berlin (Germany)



Rent-to-own solar systems with DC appliances

Business appliances such as multiple phone chargers and barber salon packages

Software suite SolarHub, a digital foundation for pay-as-you-go (PAYG) business models

Mobisol Academy in Eastern Africa



Source: Mobisol (2018)

# Energiewende 3.0: New service and operating models in the global south

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4  
5



ICOs

## New service and operating models

1



2

Timo Leukefeld

6



## New platform models

• Virtual power plants



3

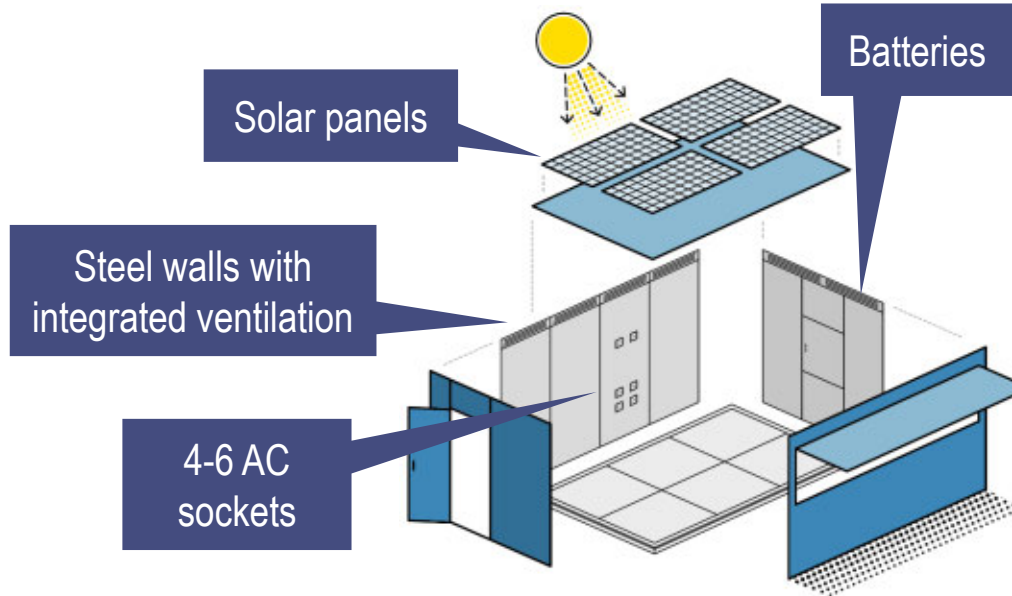


Business models

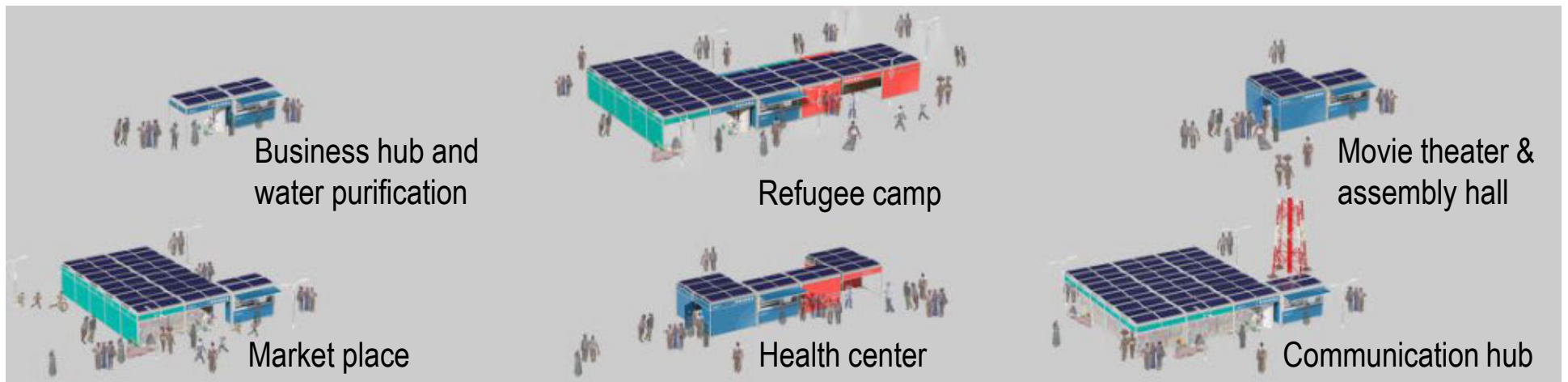
## 6) Solarkiosk: Social enterprise with a grid-independent off-the-shelf architecture solution



Lars Krückeberg



SHIP FLAT-PACKED WITH 3 MONTHS LEAD-TIME	IMPLEMENTED IN 3 DAYS BY 4 PEOPLE ANYWHERE IN THE WORLD
LOW MAINTENANCE	PORTABLE DESIGN FOR RELOCATION WHENEVER NECESSARY



Source: Solarkiosk (2018)



## 6) Solarkiosk as a stand-alone business model or in partnership with corporate players



Lars Krückeberg



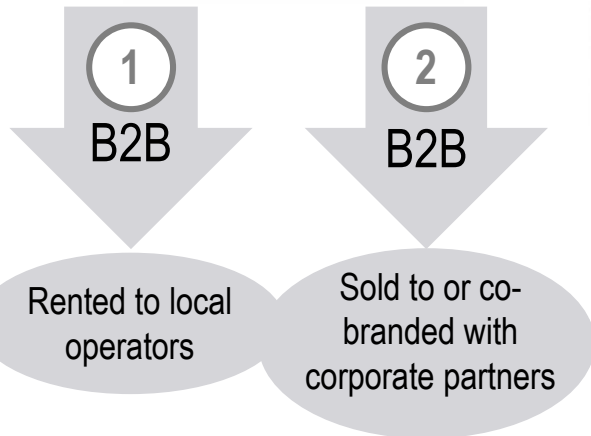
Botswana



Kenya



Tanzania



Source: Solarkiosk (2018)

# Energiewende 2.0: New platform models – P2P trading and ICOs

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4

**solshare**



5

**mobisol**  
best life

ICOs

## New service and operating models

1



2

Timo Leukefeld

6



## New platform models

• Virtual power plants



3



7



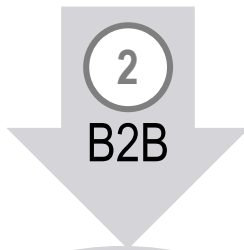
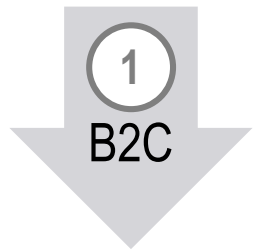
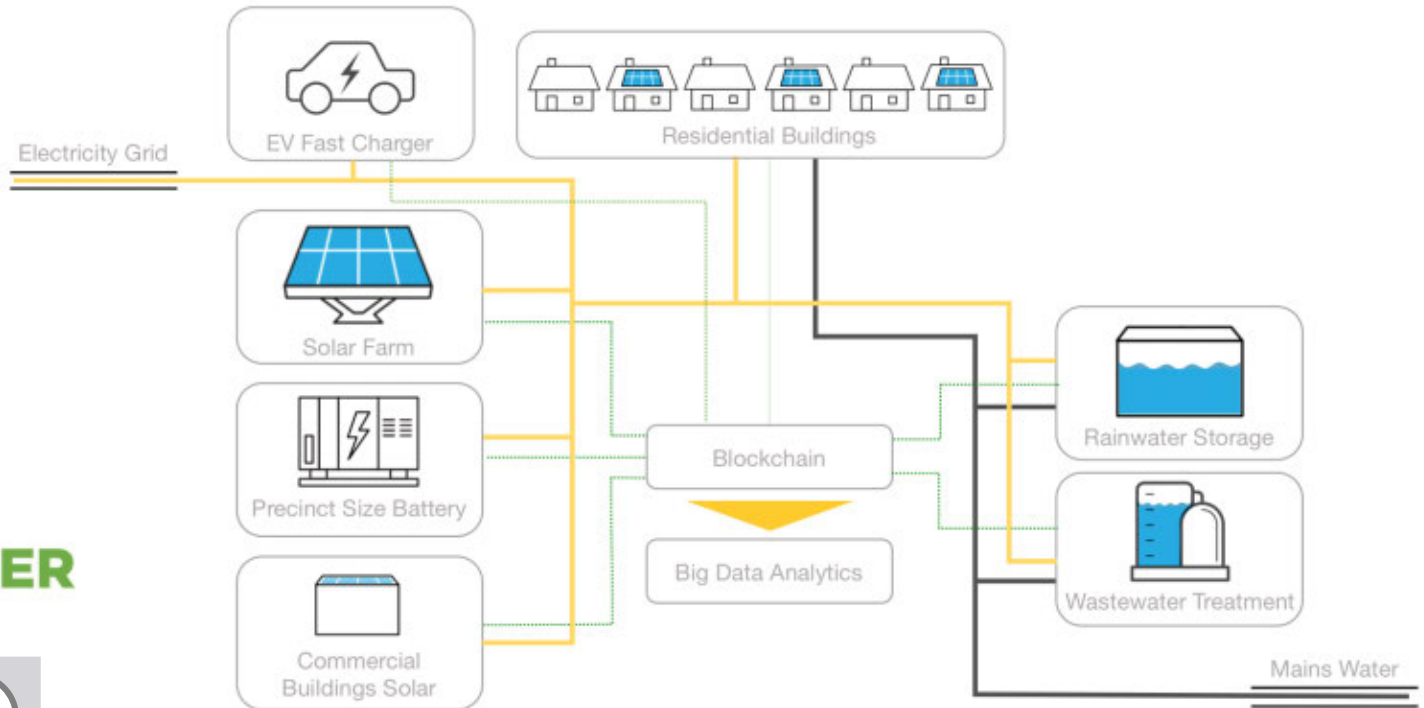
Business models



# 7) Power Ledger: Peer-to-peer trading with Blockchain as decentralized transaction technology



Dr. Jemma Green



P2P transaction fees

Daily fixed supply charge as service provider for real estate developers and independent power producers

Source: Power Ledger (2018)



Gen Y Housing Project



City of Fremantle

## 7) New forms of asset ownership: Power Ledger has launched the first Initial Coin Offering (ICO) in the energy sector



Dr. Jemma Green



### Power Ledger Applications

WHOLESALE MARKET SETTLEMENT	P2P TRADING	POWER PORT	MICROGRID/EMBEDDED NETWORK OPERATOR/STRATA	DISTRIBUTED MARKET MANAGEMENT
AUTONOMOUS ASSET (AA) MANAGEMENT	CARBON TRADING	TRANSMISSION EXCHANGE	NEO-RETAILER	ELECTRIC VEHICLES

Source: Power Ledger (2018)

# Analysis: Six core characteristics of new business models in the energy transformation

1

Expertise in digitalization

2

Customer-centricity

3

Financing and enabling of asset ownership

4

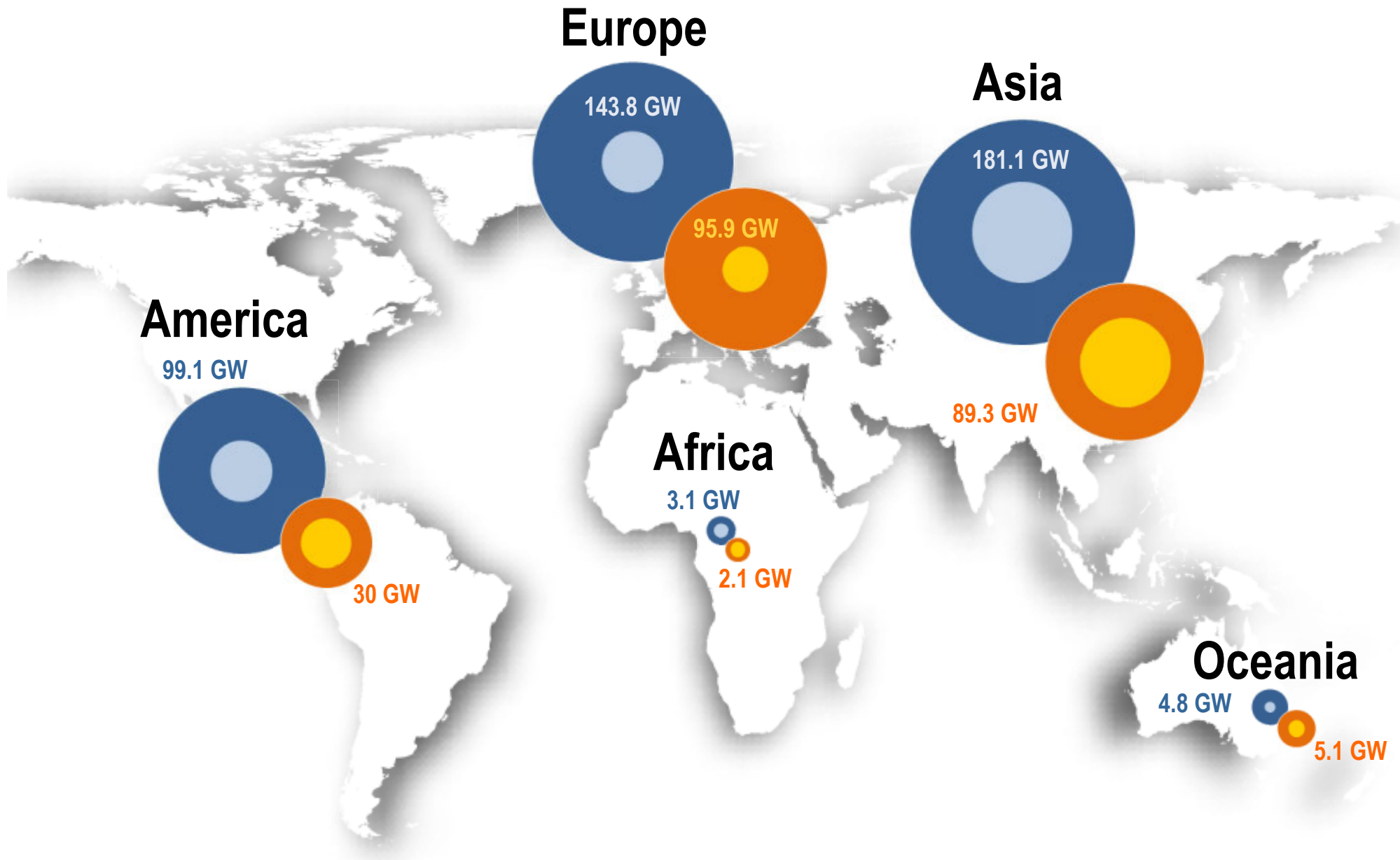
Technology leads and product innovation

5

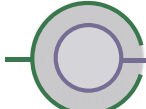
Partnerships and bundled services

6

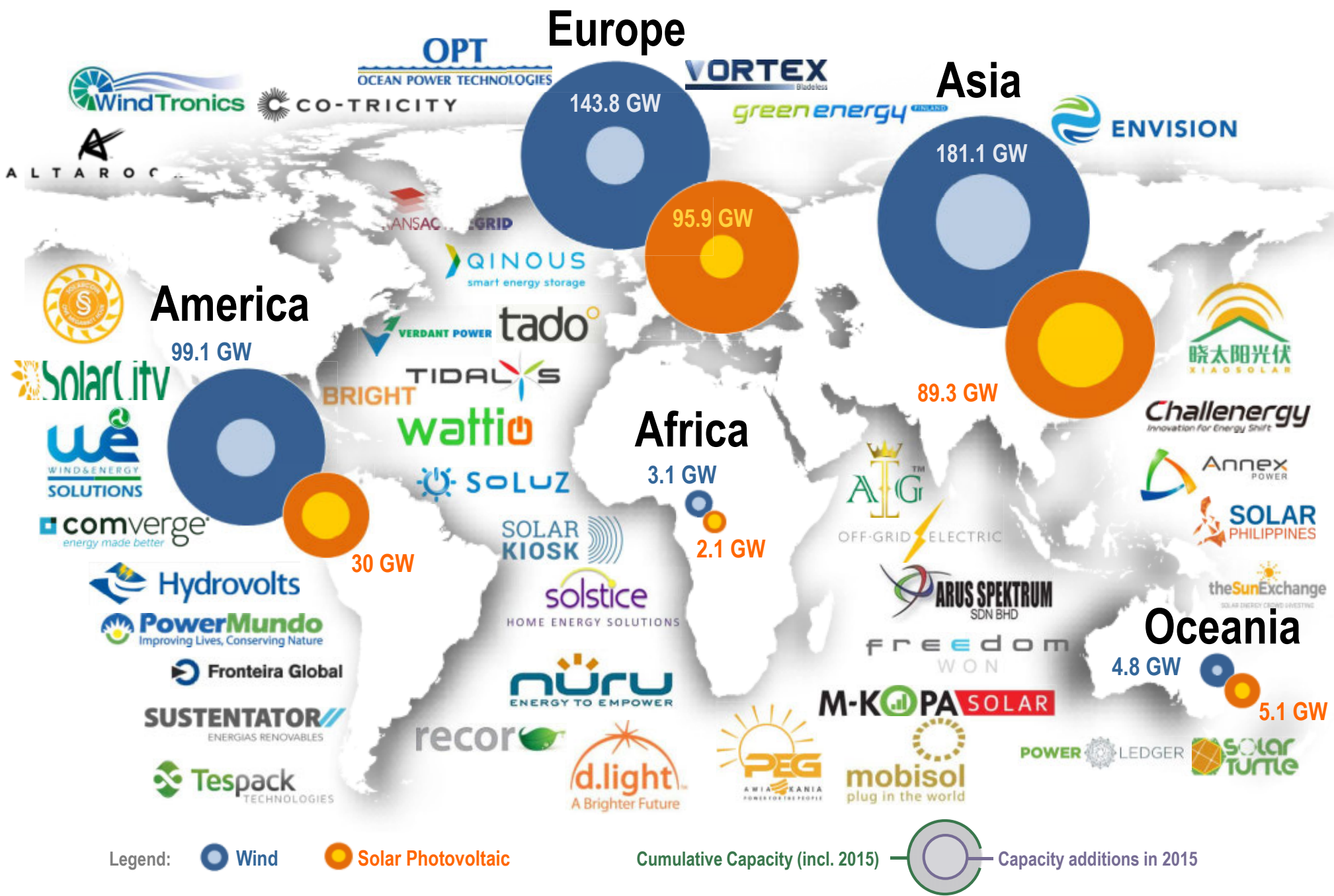
Platforms/ ecosystems



Legend:  Wind  Solar Photovoltaic

Cumulative Capacity (incl. 2015)  Capacity additions in 2015

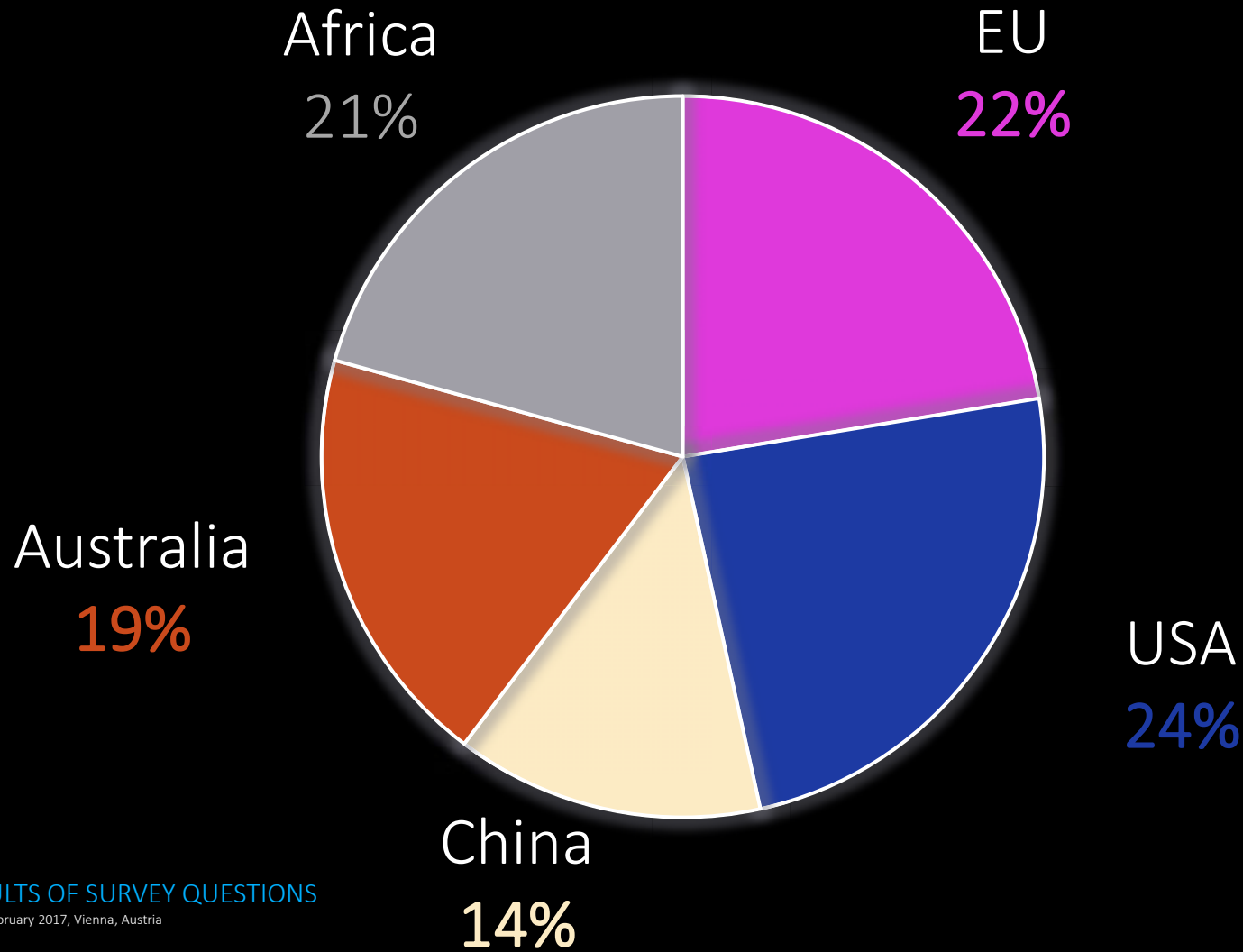




Source: Company websites and IRENA's RENEWABLE CAPACITY STATISTICS 2016



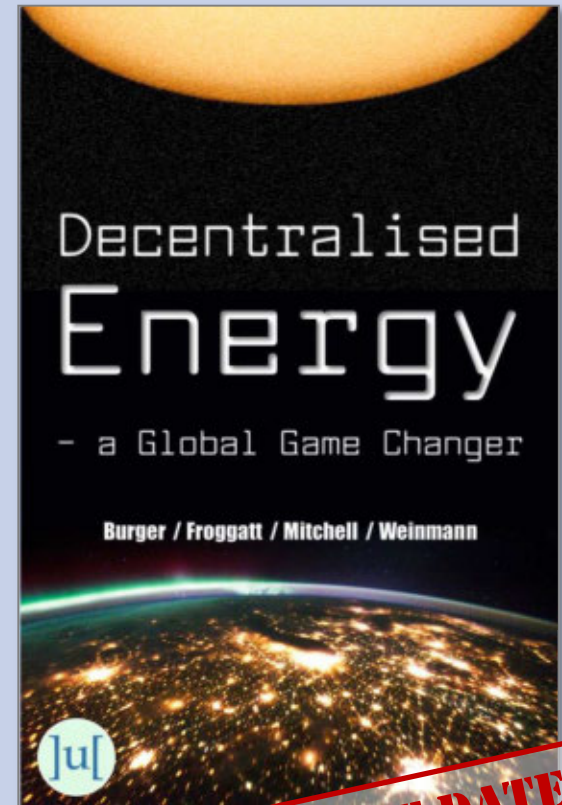
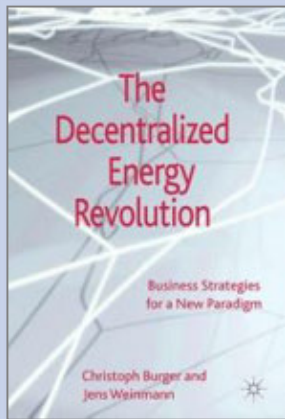
# WHICH WILL BE THE FASTEST COUNTRIES/ REGIONS TO ADOPT THE ENERGY BLOCKCHAIN TECHNOLOGY?



RESULTS OF SURVEY QUESTIONS

14-15 February 2017, Vienna, Austria

# To be released in Autumn 2018: “Decentralised Energy – a Global Game Changer”, with Christoph Burger, Antony Froggatt, and Catherine Mitchell



**RELEASE DATE  
AUTUMN 2018**

]u[ **ubiquity press**  
open scholarship

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thank you