



Aalto University
School of Business

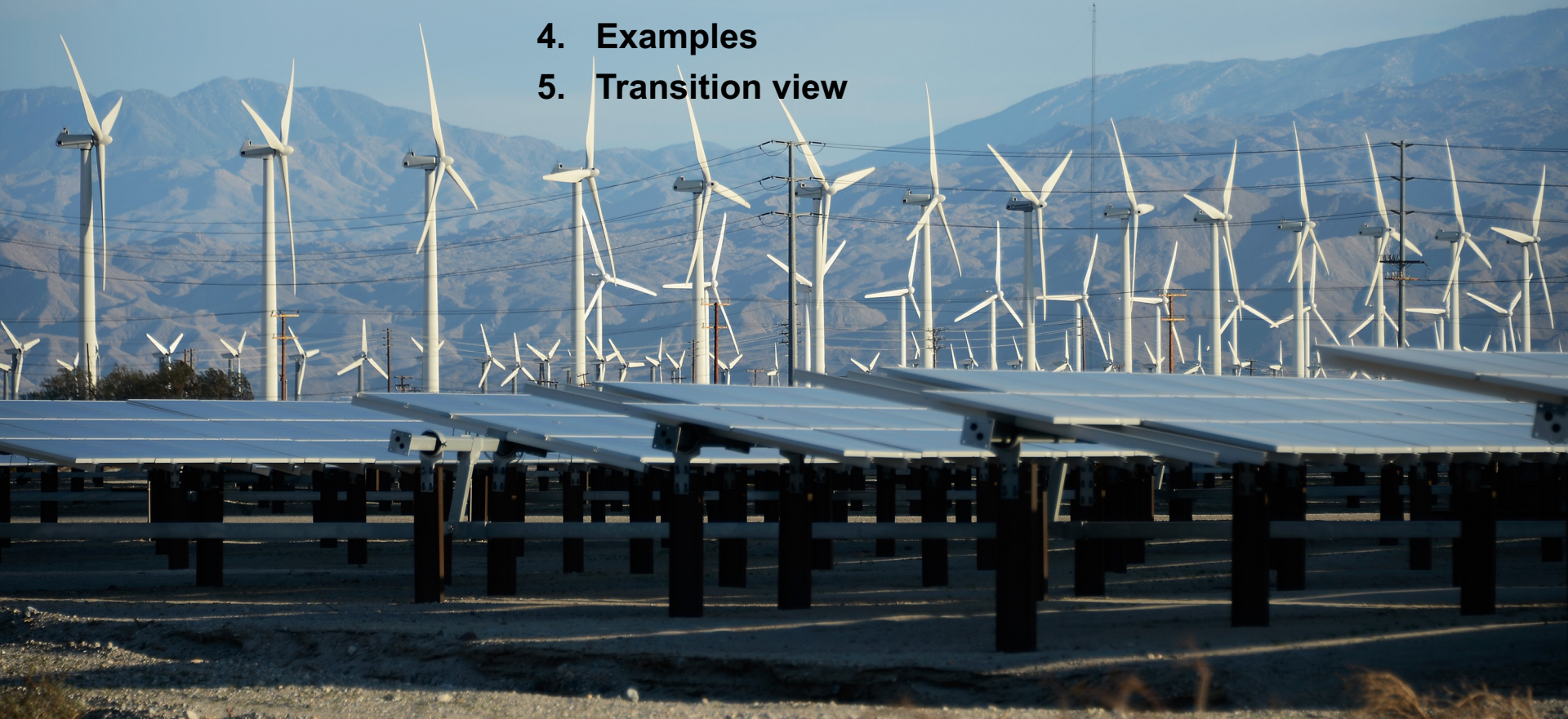
Business models – Reshaping socio-technical systems

Energy Business and Innovation (21E16100)

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Outline

1. What is a business model and why it matters?
2. Utility and consumer side business models
3. Link to PSSs
4. Examples
5. Transition view



<https://hbr.org/video/5072479512001/the-explainer-what-is-a-business-model>

Business model in general - definitions

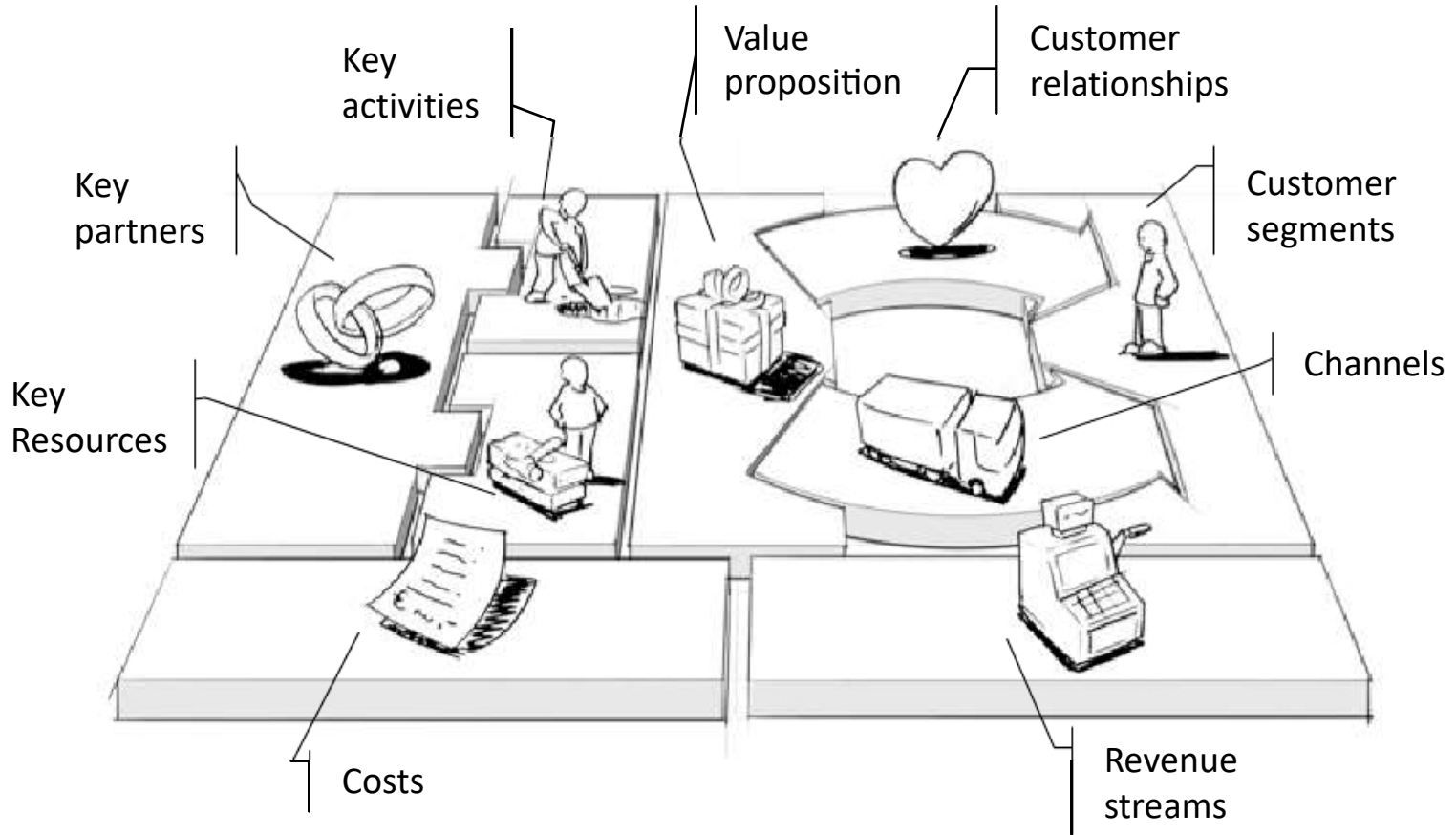
“All it really meant was how you planned to make money” (Lewis 2000)

Joan Magretta: ‘Who is the customer? And what does the customer value?’ It also answers the fundamental questions every manager must ask: How do we make money in this business? What is the underlying economic logic that explains how we can deliver value to customers at an appropriate cost?” referencing to Peter Drucker (1909-2005)

The essence of a business model is in defining the manner by which the enterprise delivers value to customers, entices customers to pay for value, and converts those payments to profit (Teece 2010)

“the rationale of how an organization creates, delivers, and captures value” (Osterwalder, Pigneur 2009)

Business model canvas

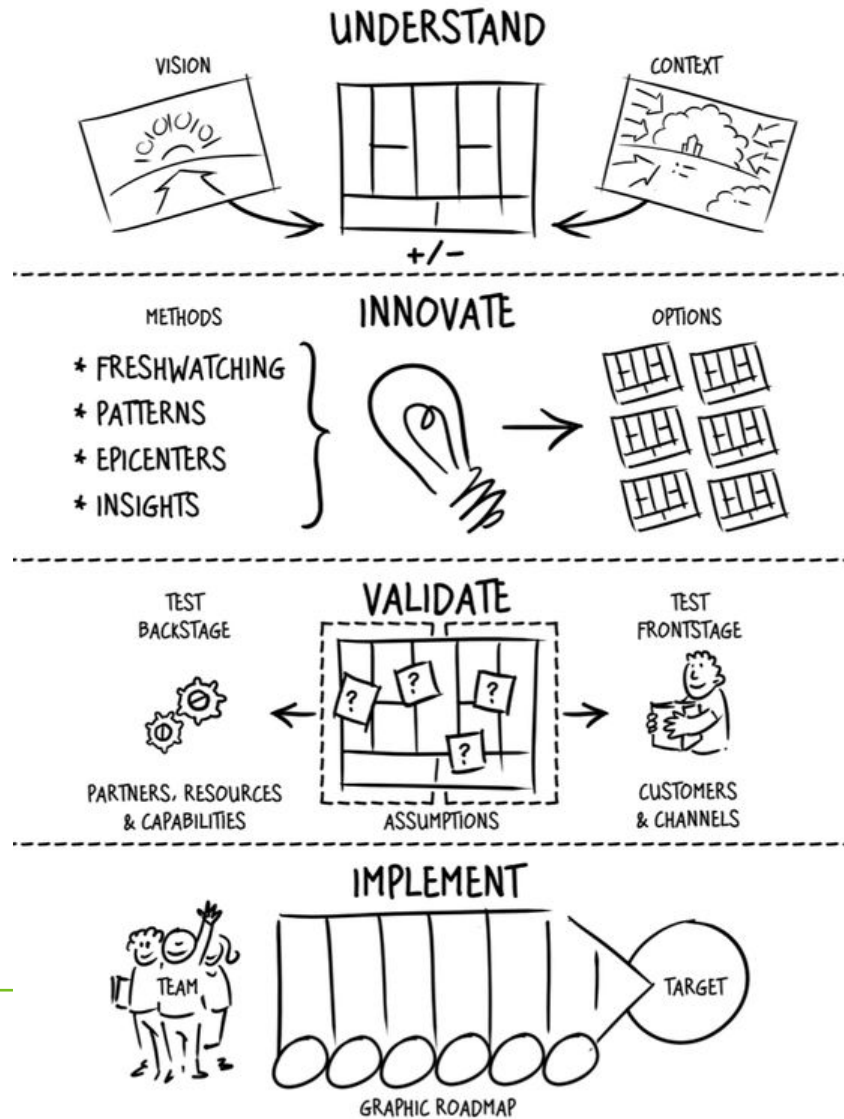


Business model canvas

| | | | | |
|---|--|--|---|---|
| <p>● Key partners Who are your most important partners? Which key resources do you acquire from partners? Which key activities do your partners perform?</p> | <p>● Key activities What are the activities you perform every day to create & deliver your value proposition?</p> | <p>● Value propositions What is the value you delivery to your customer? Which of your customer's problems are you helping to solve? What is the customer need that your value proposition addresses? What is your promise to your customers? What are the products and services you create for your customers?</p> | <p>● Customer relationships What relationship does each customer segment expect you to establish and maintain?</p> | <p>● Customer segments For whom are you creating value? What are the customer segments that either pay, receive or decide on your value proposition?</p> |
| | <p>● Key resources What are the resources you need to create & deliver your value proposition?</p> | | <p>● Channels How does your value proposition reach your customer? Where can your customer buy or use your products or services?</p> | |
| <p>● Cost structure What are the important costs you make to create & delivery your value proposition?</p> | | | <p>● Revenue streams How do customers reward you for the value you provide to them? What are the different revenue models?</p> | |



Process view



Why conceptualizing and understanding business model matters?

- **A valuable tool for analysis and management in research and practice**
 - **For industries undergoing fundamental changes.**
 - **The business model concept enables the examination and comparison of markets and companies in a structured way, thus, providing the basis for the identification of critical success factors.**
 - **The business model helps managers to capture, visualize, understand, communicate and share the business logic.**
 - **Appropriately designed model is important opportunity to overcome some of the key barriers to the market diffusion of sustainable energy technologies.**
-

The electricity value chain



- **Generation of electricity means the transformation of primary energy resources into electric power.**
- **Transmission comprises the transport of electricity at high voltage over long distances via the transmission grid.**
- **Distribution networks are designed to deliver electricity to the end customers at low voltage level.**
- **Retail can be considered a mainly administrative task that includes the communication with the end customer. Retailers purchase power from producers, traders, or an exchange and sell it to end customers.**
- **Consumption of energy takes place on the customer-side of the meter.**

Two Generic business models (Richter 2012)

Typical technologies are on- and off- shore wind farms, large scale photovoltaic projects, biomass power plants, and solar thermal power plants

What is new is that renewable energy enables consumers to become energy producers as well.

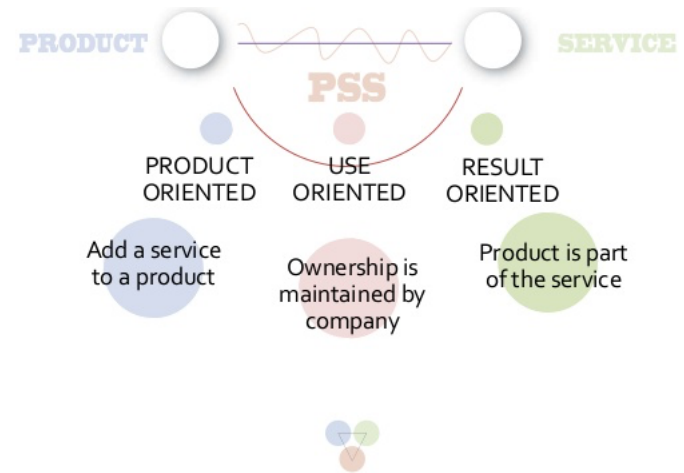


Consumer side models

- **Utilities need to develop new value propositions to maintain competitiveness in the changing energy landscape.**
 - from simple commodity suppliers to comprehensive energy solution providers.
- **Public Service Electric & Gas Company (PSE&G). New Jersey's largest utility offers a Solar Loan Program, providing financing for solar energy systems on homes, businesses and municipal buildings throughout its electric service area.**

Product service systems vs business models

- **Service based business models are sometimes referred to as product service systems.**
- **System of products, services, supporting networks and infrastructure that is designed to be: competitive, satisfy customer needs and have a lower environmental impact than traditional business models” (Mont, 2002: 239)**



Product service systems of solar home systems – (i.e. revenue streams)

Cash

The consumer pays for and receives the SHS, which is installed by the consumer himself or by the company. On completion, ownership is transferred to the consumer.

Credit

The consumer receives an SHS and pays regular instalments plus possibly a down payment. The loan may be provided by the company that sells the products or by a financial institution.

Leasing

The consumer is allowed to use the SHS and pays regular instalments. Initially, the company owns the system. Later, once the system is fully paid for by the consumer, the ownership is transferred.

Fee-for-Service (aka esco model)

The consumer is allowed to use an SHS that is owned by the company. The consumer pays either a fixed fee for the system uptime or a variable fee depending on the kWh used (aka Power purchase agreement PPA).

PSSs differences

| | Sales model | | Service model | |
|---|--|--|--|--|
| | Cash | Credit | Leasing | Fee-for-Service |
| Market potential | Low (< 3%) | Medium (< 20%) | Large (< 50%) | Large (< 70%) |
| Ownership | Consumer becomes owner upon payment | Consumer becomes owner through contractual agreement | Service provider is owner during the leasing period, then consumer | Service provider |
| Initial investment cleared by | Consumer | Financial institution plus down payment by consumer | Service provider and eventually Financial institution | Service provider |
| Regular instalments | No | Yes, to cover the credit | Yes, to cover the rent | Yes, to cover the use of service |
| Responsibility for maintenance | Consumer | Consumer and eventually service provider | Consumer or Service provider | Service provider |
| Typical maintenance service | No | Often included for a certain time period | At least included during payment period | Included during contract duration |
| Major risk for consumer | High technical risk | Low technical risk | Low technical risk | Very low risk |
| Major risk for service provider | Technical risk covered by manufacturer, low financial risk | Technical risk and eventually financial risk | High technical and financial risk | Very high technical and financial risk |
| Major risk for financial institution | n.a. | High financial risk | Medium financial risk (for refinancing the service provider) | Medium financial risk (for refinancing the service provider) |

Finnwind – sales (Dealer) model in Finland

- A dealer model is the oldest available basic model for micro-generation.
- Final user (prosumer) is in the center of dealer model. It cannot be considered as green servicizing although operations during the lifecycle can be bought as a service. Ownership of the system stays with household.
- In this model investment on micro-generation requires upfront capital expenditure.
 - In developed countries households often use savings although it is important that there are credit options available.
 - Credit should be easy to access (micro-generation equipment or real estate are accepted as collateral).
 - Low interest rate for credit is crucial.



Helen Designated Panels Model in Finland



- Centralized option for solar production
- Designated panels that are “leased” to consumers. Fixed fee regardless of production output.
- Utility operates the unit
- Grid utilization
- Does it change user role from traditional centralized generation?

Solar City- Solar PV leasing in US



SolarLease Example for Typical 3-Bedroom Home

For a home with a monthly electricity bill of \$200, we would recommend installing a 16 panel solar power system. This size system will generate enough electricity to offset what you are currently paying to the utility company from \$200—down to \$75 per month. Your monthly SolarLease payment would be \$85. So you could actually save \$40 per month from day one.

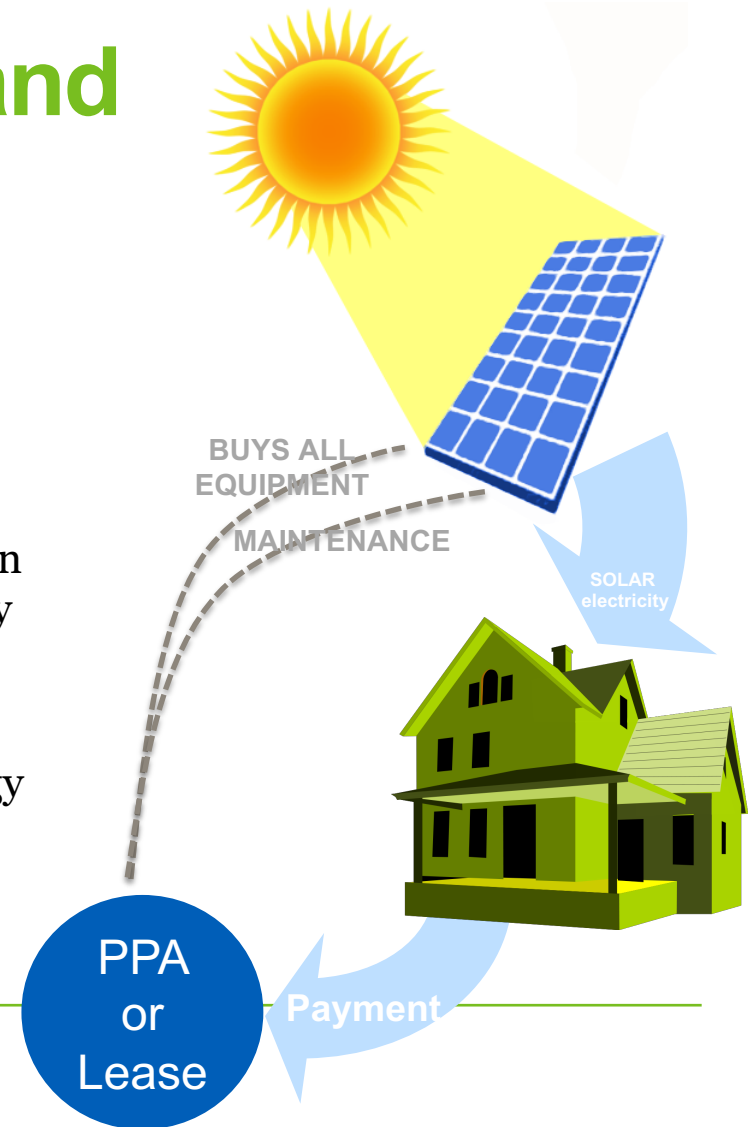
**Business model:
Lease model**

20 year lease agreement.

Also PPA or Loan from SolarCity

Service based models and households

- **Service based business models are increasingly used by households and communities for renewable micro-generation of energy.**
 - Lowers the barrier of installing micro-generation and provide savings for households immediately after the installation without upfront payment.
 - Easy solution to finance renewable energy
 - Leads potentially to rapid local renewable energy capacity scale-up.
- **Consequently, servicizing have an impact on possible consumer roles**



Small scale renewable energy systems (e.g. home solar) Business models: proximity view

Ownership
and finance

Management
and operation

Distribution
of energy

Distant
Proximity

Utility and 3rd party driven models

*universal distribution
grid connected*

Solar city

Medium
Proximity

Community driven models

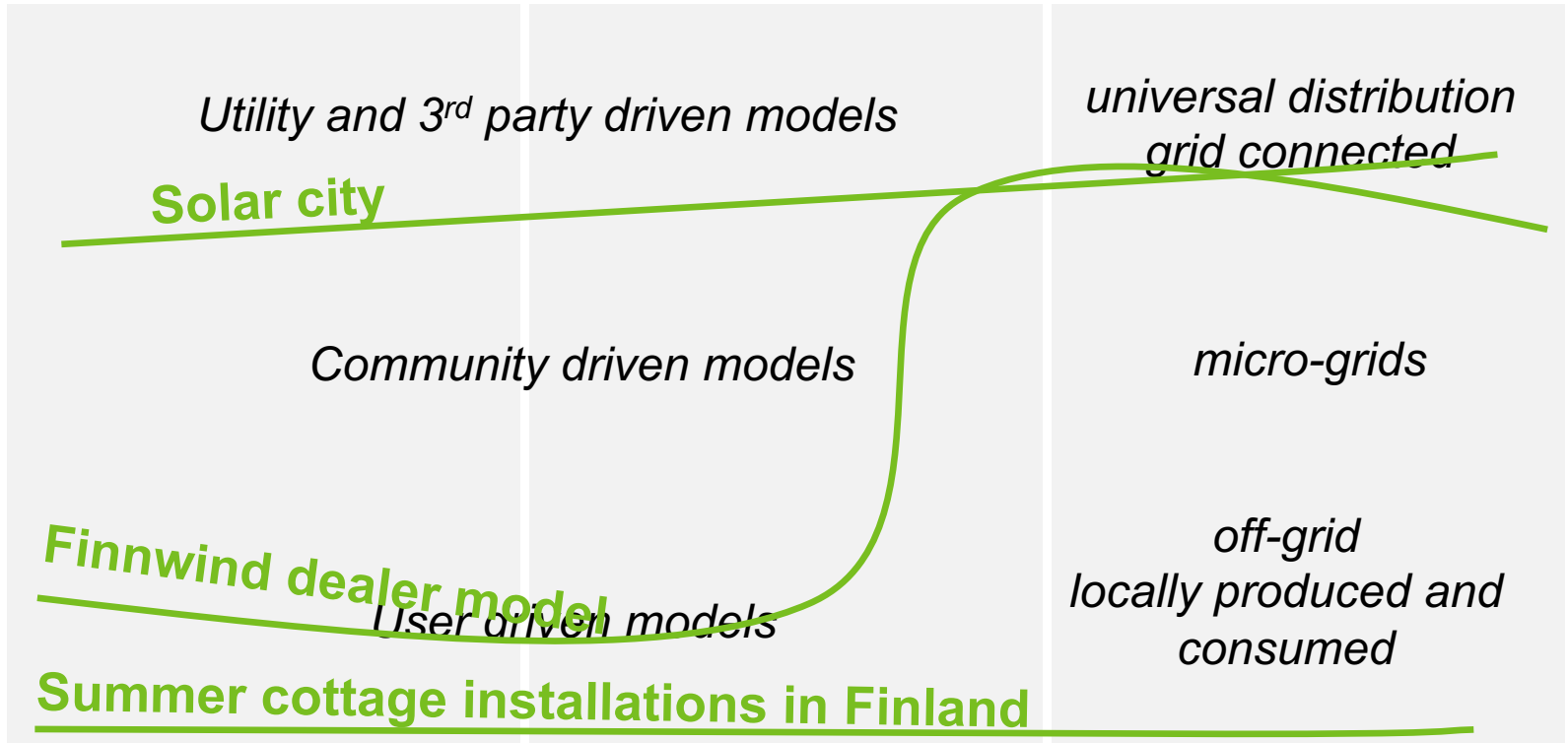
micro-grids

Close
Proximity

Finnwind dealer model
User driven models

*off-grid
locally produced and
consumed*

Summer cottage installations in Finland



New business models are shaping the market

- **Service based business models might take step back in liberalization and decrease the freedom for changing the provider.**
 - Main concern lies on how contracts are done?
 - How dynamic markets are maintained in service-based business?
- **From the viewpoint of energy autonomy distributed production can be problematic .**
 - Service based business models reduce the households' flexibility to freely select their providers or move towards greater energy autonomy and prosumption locally.

Transition view: Challenging (replacing) or changing existing players (Bolton & Hannon 2016)

- **The role of innovative business models in the transformation of socio-technical systems.**
- **An empirical study of two Energy Services Company (ESCO) models: combined heat and power with district heating (CHP/DH)**
- **Energy supply contracts (ESCs) focus on the management of supply and distribution infrastructure**
- **Thamesway energy Ltd (TEL)**
 - Create own ESCOs which supply heat and power to LA buildings: arms length model. Council is a majority shareholder but company is a separate legal entity
- **Birmingham District Energy Company Ltd. (BDEC)**
 - LA makes a supply contract with a separate private company. Energy service provider model.
- **The content of the ESCOs (i.e. what activities are performed) were broadly similar, primarily the sale of heat and electricity using CHP/DH infrastructure.**

TEL

Thamesway energy Ltd

BDEC

Birmingham District Energy Company Ltd.

| | | | |
|------------|----------------------------|--|---|
| Content | <i>Founding principles</i> | Promote council's sustainability objectives, <u>compete with incumbents</u> , trial new technologies and promote decentralised solutions | Achieve carbon savings, reduce council energy bill and fuel price risk, promote economic development and regeneration, address fuel poverty |
| | <i>Activities</i> | Lower carbon heat, cooling and electricity supply to domestic, commercial and public sector customers | Lower carbon heat, cooling and electricity supply to domestic, commercial and public sector customers |
| Structure | | <ul style="list-style-type: none">• Electricity sales through private wires, trialing new technologies• Expansion to other cities, willingness to risk and create new demand• Projects judged primarily on the basis of how they feed into an integrated sustainability policy framework | <ul style="list-style-type: none">• A low risk approach, expansion only on a proven demand or the availability of government grants, more likely to be piecemeal in the short term• Less integration between ESCo activities and wider sustainability objectives |
| Governance | | <ul style="list-style-type: none">• Predominantly LA controlled ESCo• Strong operational ties with LA departments• ESCo is a separate legal entity but part of a wider public sector governance structure | <ul style="list-style-type: none">• Long term contract between LA and a private operator• Private ESCo has operational autonomy for the duration of the contract• LA one of a number of stakeholders consulted |

Interaction with incumbent regimes

- The TEL's retail offering of the ESCo is benchmarked against the incumbent alternative and the ESCo is owned and operated by a non-incumbent player.
- TEL approach. the business model enables local actors to become increasingly autonomous from the incumbent regime, for example through the development of localised infrastructure and markets.
- TEL is clearly more disruptive, both in terms of institutions and infrastructure, but may be more difficult to standardise and replicate as it requires significant entrepreneurial activity and risk taking on the part of the Local Authority.
- In order for this pathway to succeed significant structural changes to the existing socio-technical regime will be required
- The BDEC ESCo contract was awarded to a company which is itself owned by a multi-national energy company i.e. an incumbent player. This case cautions against a simplistic reading of the MLP narrative with regard to business models i.e. where innovative business models are framed as niches struggling against incumbent regimes. Rather it supports Bidmon and Knab's contention that innovative business models act as translation devices between niches and regimes
- Business model is more closely aligned with the existing market based logic of the system and more closely controlled by incumbent actors.

- **Inconclusive outcome what is the most appropriate business model for accelerated CHP/DH (in the UK)**
 - An adapted version of the existing regime logic – “continuity-based” change
 - A niche based/disruptive pathway