



A new Energy concept for Urban Domain, Energy in the cities

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Can 100% of a city's electricity produced by itself?

Background

- According to UN report (world urbanization prospect) from 2014, 54% of the world population live in Urban regions.
- This figure will increase and it is expected to be 66% by 2030 2.5 billion people will be added to existing and new cities.
- Now a day 74% of the European inhabitants live in the cities.
- In Israel more than 90% of the Israelis live in an urban surroundings.



- Around 80% of the energy is consumed in the cities.
- More than 80% of the GDP is produced in cities.
- The energy market as we knew in the past is transforming to be decentralized.
- Energy from various sources, many producers, mixed market, not producers and consumers but also “prosumers” is likely to be immersed. This caused cities to think differently on energy as on city level. We already indicate in the world an immersing market, also in Israel we can see some cities that show interest.

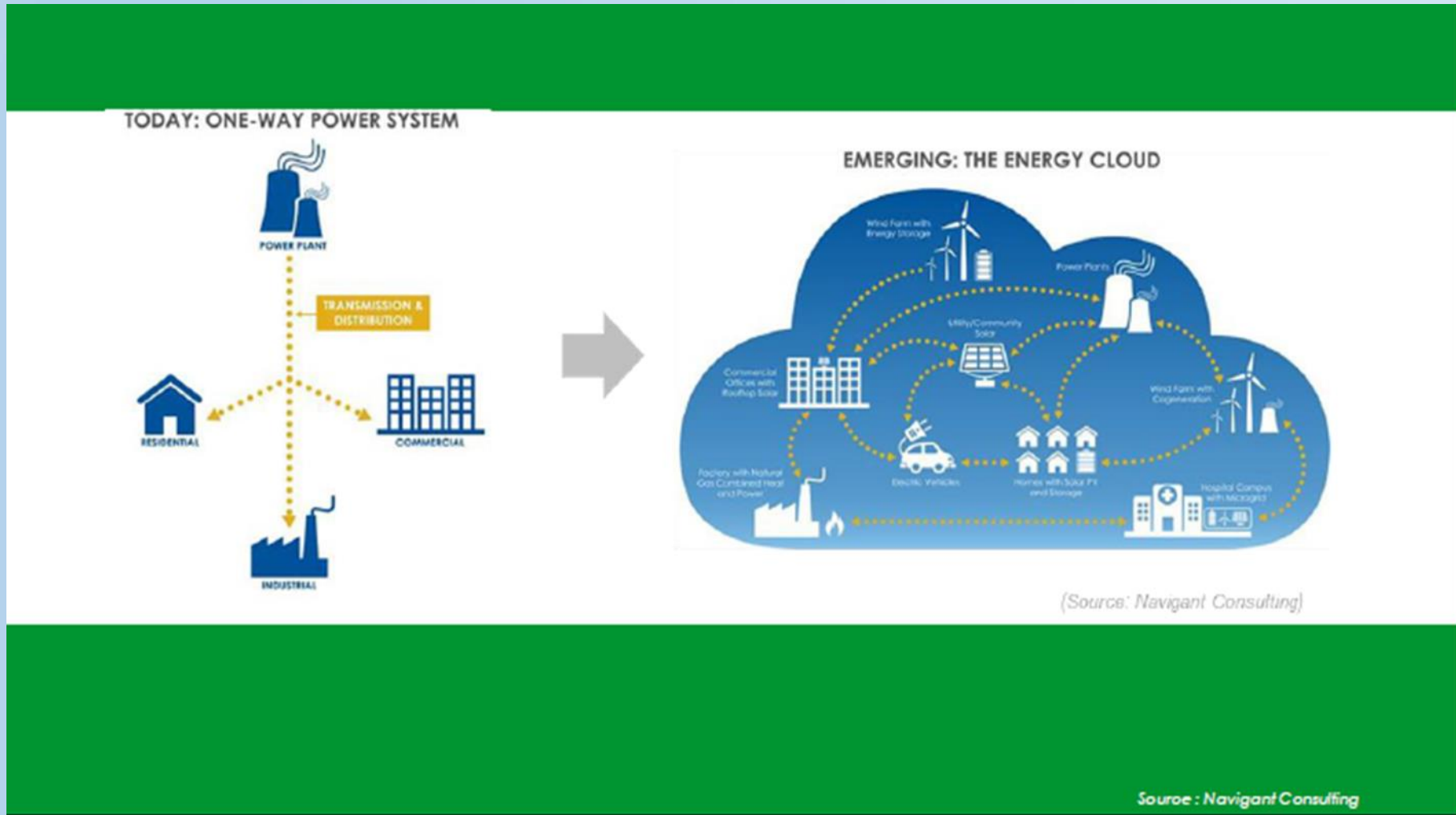
Energy in the city - Dictionary

- **District Heating** – supplying hot water from an external producers to distanced consumers (this can be found in Europe USA and other places in the world).
- **District Cooling** - supplying cold water (usually produced from waste heat) from an external producers to distanced consumers for air cooling.
- **Cogeneration** or **combined heat and power (CHP)** - is the use of a heat engine or power station to generate electricity and useful heat at the same time.
- **3generation** or **combined cooling, heat and power (CCHP)** refers to the simultaneous generation of electricity and useful heating and cooling from the combustion of a fuel or a solar heat collector.
- **Energy storage** either electrical or thermal.

- **Energy management** - includes planning and operation of energy production and energy consumption units efficiently.
- **Energy cloud** – indicate various of activities producing selling consuming and management of energy in the city.
- **Prosumer** – energy producer and consumer.
- **Smart grid** - is an electrical grid which includes a variety of operational and energy measures including smart meters, smart appliances, renewable energy the smart grid transfer information and rules all along the grid.
- **Sustainable energy** - is the practice of using [energy](#) in a way that "meets the needs of the present without compromising the ability of future generations to meet their own needs"
- **Renewable Energy** – all kind of energy resources

- **Smart meters** - is an electronic device that records consumption of electric energy in intervals of an hour or less and communicates that information to the utilities.
- **Local electrical grid** – local electrical grid that transfer electricity with in the consumer premises, local grid can be autonomies or synchronize with the national grid.
- **Renewables** – use of all kind of renewable recourses such as sun wind waste ect.
- **Energy storage** – restoring energy electrical and thermal by all means
- **City Energy Analysis** – Energy audit that indicate the use and the need of energy that consumed or will consumed in the city.

Energy Cloud



Source : Navigant Consulting

Policy measures to promote energy in the city

Henceforth few example for city energy level:

- City energy needs analysis
- A plan to supply and manage energy in the city
- Urban energy awareness, energy efficient demands in planning new infrastructures buildings neighborhoods.
- City energy management
- Plan for - Sustainable and green buildings neighborhoods
- Public transportation parking and mobility plan
- Urban GHG reduction plan
- Use of advanced communication technologies for management in general and energy in particular.
- City sustainable energy plan

Energy in smart cities

- Most of the activities in the cities has something to do with energy directly or indirectly.
- Thus energy services should be part of the services that city should supply. Most of the Energy consumed in Israel is also in the cities or very closes to the cities. Cities in the world have discovered the potential of the energy services and maintain companies as “energy services companies”, that supply and manage energy of all kind (electricity thermal Gas and so) to most of the energy consumers in the cities. Cities develop business plan in which consumers could be also producers, citizens energy consortiums.
- Energy Mix - Using of all kind of renewable energy including waste to energy as part of the city energy resources
- While having NG arrive close to the city or and the city industrial zone, cities can produce energy with a low cost and high efficiency using cogeneration.

- Thinking on the demand side is not enough we have to think also on supply side and the management of both. There are many cities in the world that buy the commodities “electricity, district heating and cooling, Natural Gas and other energy resources” and the city manages and sell it to its consumers. The management of the demand and supply together is very important.
- Having use NG will increase efficiency by cogeneration power plants.
- Using energy storage is needed as well.
- A comprehensive holistic approach on energy consumption and energy production, consumers and producers should lead the way.

- the use of CHP will increase efficient energy production up to 85% if we find consumers for all kinds of energy, energy should be produced where ever it is consumed.
- Co-generation is suitable where ever there are consumers that consume other kinds of energy except of electricity.
- Local systems such as local electrical grid local thermal pipes (grid) can supply a good cheap and very efficient solution to energy costs.
- “Cities around the world are increasingly shifting to renewable electricity. More than 80 UK towns and cities have now committed to switching to 100% clean energy by 2050, it was announced last month by the UK100 network of local government leaders. This includes major cities, Manchester, Birmingham, Newcastle and Glasgow, and 16 London boroughs” (world economic forum)

- Momentum is growing in the US too: 58 cities and towns have now committed to transition to 100% clean, renewable energy, including the big cities of Atlanta and San Diego. Earlier this month, the US municipalities of Denton, Texas, and St. Louis Park, Minnesota, became the latest communities to establish 100% renewable energy targets”. (IPCC)

- Some cities established consortium of citizens that share investment in electricity from wind solar biomass CHP and become “Shareholders”.
- Energy management that done in the city can give a better solution to demand and supply it can also shift the consumption to low consumption time, and contribute to the efficiency of the energy system.
- Energy efficiency that lead by the cities will achieve a better results.

Stanford Energy System Innovations (SESI)



District heating and cooling



- The Gothenburg system is 1300 km long
- Covers 90% of all apartment buildings
- Recycle waste from industry, waste incineration, sewage water etc



Source: Euroheat & Power

A SUSTAINABLE CITY – OPEN TO THE WORLD

Eilat energy plan

EILAT

- 65,000 Residents
- Leading tourist city in Israel
- Port City
- Green, Smart City
- Academic City
- World Center of Marine Biotechnology

Background

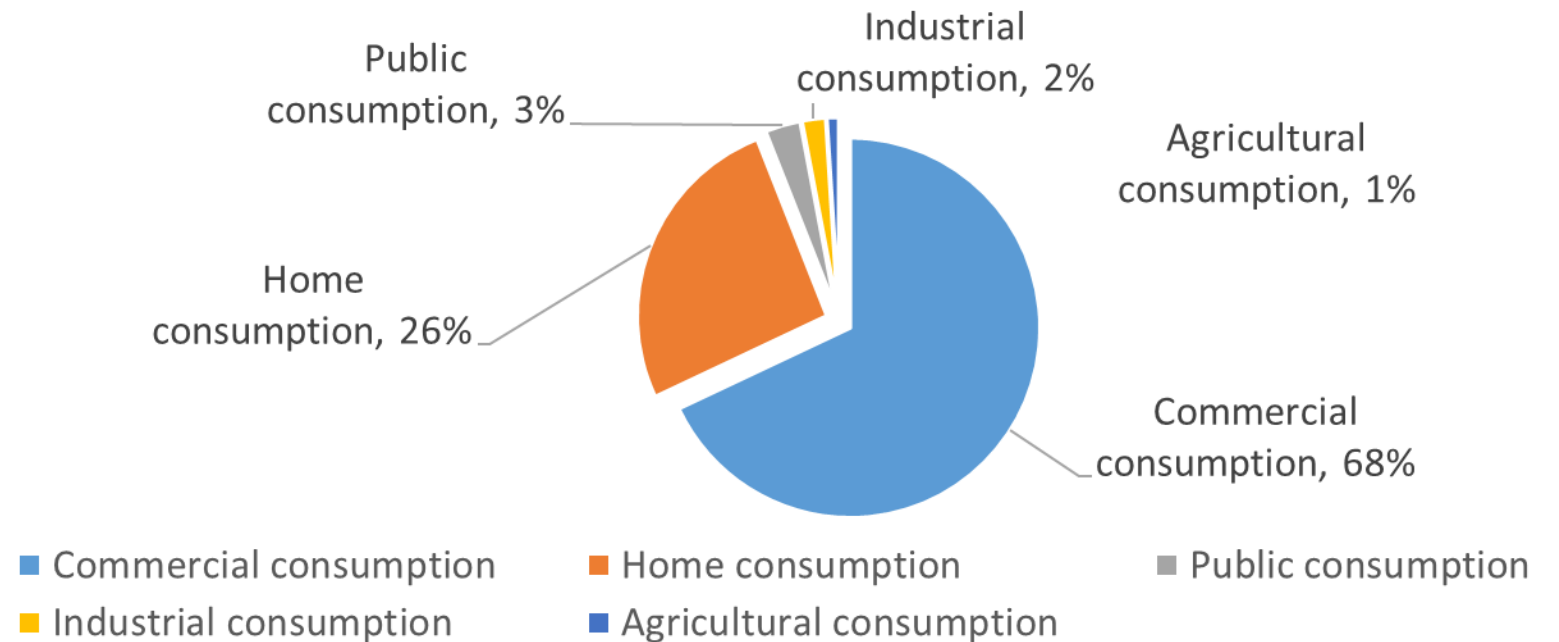


Energy Independence

5 Year Plan

- Innovation - Urban living lab
- Working with households
- Street Lights LED
- Solar PV
- EMS
- A/C preventative Maint

Breakdown of emissions from electricity consumption by sector



LED & Efficiency

Changing to LED (outdoor and indoor).

Assimilating EMS in Public buildings.

Working with home-owners on efficiency.



Solar PV

Today, Eilat and Eilat Region Produce 75% of its daily consumption from Solar PV.



75

%

Solar PV

Development of App for the residents of the city for the installation for PV systems.



Next Steps:

1. Working with the commercial sector.
2. Continue working with households.
3. Empowering local technical managers.
4. Storage and Micro-grids.



Thank you

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