# EVENT SMART ENERGY





# What is the impact of all this on Norwegian customers/consumers?

Ragnvald Naero, Founder and CEO, Smart Energy Network, SION, AUGUST 30. – 2019

### Agenda

- Norway The "milk and honey" country
- Short about the unique Nordic energy system
- About the energy transition, distributed energy solutions and the emerge of a new consumer behavior?
- Questions

### The «milk and honey» country ③



### The «milk and honey» country 😳

- Per capita income amongst highest in the world
- ✓ No 1 in United Nations quality of life index
- ✓ High average salary, hardly any unemployment
- ✓ Over 300 000 companies in Norway. 40 000 new companies every year
- ✓ 80 % of Norwegian companies have less than 20 employees
- From zero in 1969 Norway has become 3rd largest oil exporter in the world
- Activities located in North Sea, the Norwegian Sea and the Barents Sea
- Equinor one of the world's largest offshore producers of oil & gas
- Technologically very advanced supplier industry world leading competence in subsea operations
- Power generation largely owned by public sector. National grid owned and operated by the TSO, Statnett
- ✓ Municipalities and counties own most of the regional distribution grid
- Statkraft 1/3 of production capacity, largest company in Europe within renewables
- Norway amongst first in the world to liberalize power market
- ✓ First power exchange in the world, Nord Pool, established in Norway

### Agenda

- Norway The "milk and honey" country
- Short about the unique Nordic energy system
- About the energy transition, distributed energy solutions and the emerge of a new consumer behavior?
- Questions

### The unique Norwegian energy system

- More than 95 per cent of electricity is generated from hydropower
- The main challenge for the Norwegian energy system is linked to two elements:
  - Generation: varies due to changes in precipitation
  - Demand: large non-predictable variations due to changes in temperatures



### "X-ray" of Ulla-Førre



### Energy consumption in households



### Agenda

- Norway The "milk and honey" country
- Short about the unique Nordic energy system
- About the energy transition, distributed energy solutions and the emerge of a new consumer behavior?

Questions

### A paradigm shift taking place - the big pic!

	19 <sup>th</sup> CENTURY	20 <sup>TH</sup> CENTURY	Early 21st CENTRURY	End of 21st CENTURY
	Electrification of the society 'The Coal Age'	Tremendous growth within generation of electric energy 'The Age of Fossil Fuel'	The rebirth of electricity due to: 1) Demography 2) Scarcity of resources 3) Climate challenges	The New Age of Electricity: Electricity will be the dominant energy source in daily life
	NOT SUSTAINABLE	NOT SUSTAINABLE		SUSTAINABLE SOLUTIONS
/	Generation and load closely coordinated	<b>Generation follows load</b> Centralized generation,	Changes in energy systems	Load follows production Centralized/de-centralized
	Production "island" with stocastic load	and integrated distribution, one direction of enery flow	Increased decentralization, load flexibility,	generation, intelligent IT, smart energy solutions
	Fossil energy sources	Fossil energy sources,	"prosumers" Fossil energy sources,	Renewable energy (solar, wind, hydro,
	and hydro power	hydro and nuclear power	hydro, nuclear, biomass, wind and solar	biomass, clean coal), CHP and nuclear
	NO FOCUS ON ENVIRON	MENT 🕨 🕨 🕨	STRONG	FOCUS ON ENVIROMENT

Source: Siemens

## Utility trends driving the energy transition

#### Energy efficiency (EE)



- EU has set non-binding energy efficiency target as part of the 20-20-20 targets
- -> New building standards substantially tightened, however slow penetration rate

#### Distributed Energy Resources (DR)



- Steady growth across
   Europe mainly driven by government incentives
- Wide range of penetration levels across Europe

#### Smart Grids (SG)



- First step of smart grids is smart metering, where EU has set a target of 80% penetration by 2020
- Smart meters

   expected to trigger
   growth in smart
   appliances and enable
   demand response

#### Fuel Switch (FS)



- Most European governments have set aggressive targets for EV penetration by 2020; backed by incentive schemes
- Heat pump growth driven by attractive economics

Source: Statkraft/McKinsey

### Value pools and value drains



### EE and DR ~65 % of new value

Share of EBITDA 2025, Key markets (Norway, Sweden, UK, Germany)



Event Smart Energy, SION AUG. 30. - 2019

Source: Statkraft EU-project/McKinsey

### The revenge of the consumer!



### **Home Energy Manager**

The central nervous system for the net zero energy home helps homeowners optimize energy consumption \_

#### **Solar Photovoltaic**

3 kW to 4 kW solar array on the roof to meet energy requirements of the home

#### **Small Wind**

Supplementary renewable generation

#### **Smart Meter**

A communication gateway between the Smart Grid and the home

Geothermal **Heat Pumps Reduces HVAC and** 

water heating energy requirements by 30%

#### Event Smart Energy, SION AUG. 30. - 2019

**Heat Pump** Water Heater Uses less than half of

the energy of a conventional electric water heater

Water Filtration Filters, conditions and monitors home water usage

Source: General Electric

**EE Lighting** 

and OLED lighting

**Demand Response Appliances** 

**High efficiency Energy Star Appliance shed** 

load from the grid and help consumers save

Energy Storage

Battery storage for backup

power and peak loads

High efficiency CFL, LED

### What is the impact of a smarter future?





1) The boundary between Smart Energy and Smart ITC is close, some of these companies could be grouped in both categories

## Spar penger med solcellepaneler

Sjekk mulighetene til taket ditt

Adresse

Sjekk adressen





**SMART** 



### Stibber

### Slå på kraften i ditt hjem

Bruk teknologi til å kutte strømregningen gjennom lavere strømpris og smartere forbruk. Tibber abonnementet koster 39 kr per måned.

#### Last ned appen for å komme i gang.

#### DETTE ER INKLUDERT

#### Strøm til beste innkjøpspris.

Strøm fra fornybare kilder uten marginpåslag. Se fra hvilken produsent strømmen handles fra. Sammenlign strømprisene

#### Analyser om hjemmet.

Se timesforbruk (om du har ny strømmåler), analyser om hvor mye du bruker sammenlignet med nabolaget, hva strømmen går til m.m.

Styr strømforbruket.

Koble til Power-ups som elbiler, smarte termostater og mye annet - og styr forbruket smartere.

#### Enkelt å komme i gang.

Du registrerer deg enkelt på 1 minutt. Vi sørger for byttet. Ingen bindingstider. Betal via e-Faktura, Avtalegiro m.m.



Nyheter





Kontrakter og skjema



## Huseierne har fått 1 million fra Enova



### Impact on the consumer (1)

- Cost comes first Saving energy for energy's sake is a low priority. But if there is money to be saved, people get more interested
- People value control One promising market is in the area of home automation. People are intrigued by the idea of controlling their home environment
- Comfort vs. cost, time vs. investment trade-off Some consumers will sacrifice comfort and lower the thermostat in order to save money; others will not. Many consumers are skeptical to buying expensive things like insulation or solar panels, as they believe they will never see a return on their investment
- People are confused Media pushes a green message, but volume has not translated into clarity; too many choices, systems are difficult to set up

### Impact on the consumer (2)

- People prefer their utility When consumers are asked which provider they would approach for energy-related services, products and advice, their first instinct is to go to their utility
- People like customization and simplification: In planning, developing and marketing electricity management programs, consumers express distinct and often idiosyncratic needs and requirements. They value highly that an electricity management is customized to their personal needs and usage

### Summary

- Norway was first in liberalizing the electricity marked
- Leading organizations and regions have set ambitious goals to electrify Norway 100 present
- Norwegians like to be early adaptors to new technology
- Smart energy solutions is being developed at a high speed, but the domestic market is limited
- Utilities manage the centralized energy system with state of the art solutions, but are not eager to develop new business in the decentralized world
- In «the milk and honey» country household consumers are spoiled with rather cheap electricity
- However, the energy transition in the last part of the value chain is catching up



Vision and smart thinking, combined with technology and creativity will lead the way forward

www.smartenergynetwork.org, E-mail: ragnvald@naero.no