Project challenge:

Poor load control limits the efficiency of renewable energy

Country challenge-owner: China
Current situation overview

Installed capacity:
- Solar 163 GW (+53 GW)
- Wind 130 GW (+15.5 GW)

Trends:
- Decarbonization (more RES – less pollution – 2030 up to 800 GW)
- Digitalization (smart metering, Prosumer, P2P)

Chinese consumption profile, 2017
- 72% Commercial Companies
- 26% Residence & Services
- 2% Agriculture

Electricity flow

Unidirectional Information (data) flow
Why residence?

Average daily load curve

- Stable heavy industry load
- Smart meter coverage – 99%
- Peak loads reason

Demand Response

Chinese digital ecosystem, e.g. WeChat

Mind-change

Why WeChat?

- 1 bln WeChat users (residence & services are already in)
- Digital infrastructure with different services (rental, social, business contacts etc.)
Proposed business model

Current business model

Proposed business model
Digitalization. Data flow

Current data flow

Generation

<table>
<thead>
<tr>
<th>Residence</th>
<th>Industry</th>
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Industry

Bonuses:
- Cashback
- Air miles
- Promo-codes
- Discounts
- Decrease of interest rate
- Subway passes
- Bicycle rent

Proposed data flow

Generation

Automated

Semi-Automated

Automated

Digital SGCC Department

Chinese digital ecosystem

Smart Meter

Semi-Automated

Automated
Digital solution

- On-line distribution power system’s mode analysis
- Short recommendation messages for devices’ end users based on information gathered from generation & consumption
- Automated load control with enforced demand response
- Dynamic tariff during peaks (16.00 – 20.00)
- Overall bonus system integration and electricity payments into WeChat

WeChat allows

- Additional value from new data
- Bonuses for each consumer of residential sector
- Transparency of services for power grid company as well as for consumer
Pilot

Jiangsu province, Sūzhōu city

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
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<tbody>
<tr>
<td>Maximum load, GW</td>
<td>22-25</td>
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<tr>
<td>Households and services, % of load</td>
<td>20-30</td>
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<tr>
<td>Population, mln ppl</td>
<td>10.7</td>
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<tr>
<td>WeChat users, mln ppl</td>
<td>7.6</td>
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<td>Smart metering coverage, %</td>
<td>99.3</td>
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Using Demand Response to decrease the load by 2.4% will lead the reducing of the price to 0.07¥.
# Road map

<table>
<thead>
<tr>
<th>№</th>
<th>Name of stages</th>
<th>2018</th>
<th>2019</th>
<th>2020</th>
<th>2021</th>
<th>2022</th>
<th>2023</th>
<th>2024</th>
<th>2025</th>
<th>2026</th>
<th>2027</th>
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<td>Creation of business model</td>
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<td>Creation of technical solution</td>
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<td>3</td>
<td>Regulation and technical facilities development</td>
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<td>Application development</td>
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<td>5</td>
<td>Testing period in imitation model</td>
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<td>Application implementation</td>
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<td>Testing period in pilot region</td>
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<td>8</td>
<td>Implementation of the system on the national scale</td>
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## Results:

- Reduce up to **5%** of load capacity *(up to 1,25 GW)* → tariffs for industry from **0,94 ¥/kWh** to **0,74 ¥/kWh**
- Creation of unified bonus system
- Benefit for end consumer **34 ¥** per month
- Profit for industry **67 mln ¥** per month
- CAPEX+OPEX for grids decrease for **10%**
- Expenditures for Fossil Fuel Generation decrease for **12,5%**
- Opportunities for **1,25 GW RES** capacity implementation without loosing stability