

EV FLEXIBILITY WITH RADIUS

Charlotte Sand, CEO & Founder
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7 AFFORDABLE AND
CLEAN ENERGY



11 SUSTAINABLE CITIES
AND COMMUNITIES



12 RESPONSIBLE
CONSUMPTION
AND PRODUCTION



13 CLIMATE
ACTION



AGENDA

- True Energy's system
- Learnings
- Perspectives



SYSTEM

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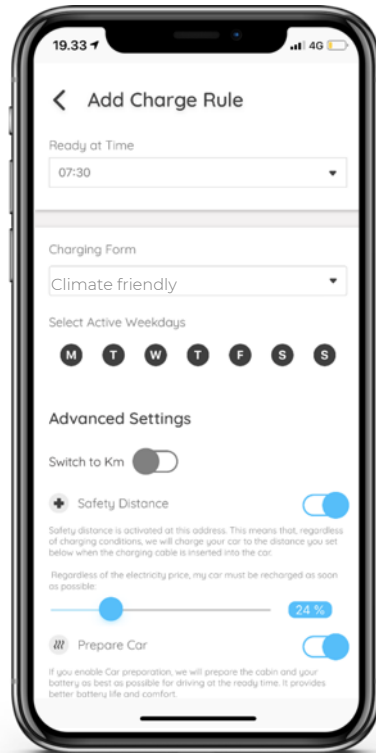


13 CLIMATE
ACTION



true

PREREQUISITE: SMART CHARGE YOUR EV WITH TRUE ENERGY APP



PERSONAL PREFERENCES



CHARGE PLAN



STATE OF CHARGE

EV OWNERS SAVE MONEY & CO2

SET & FORGET

WE SUPPORT EVERY CAR BRAND
and MODEL



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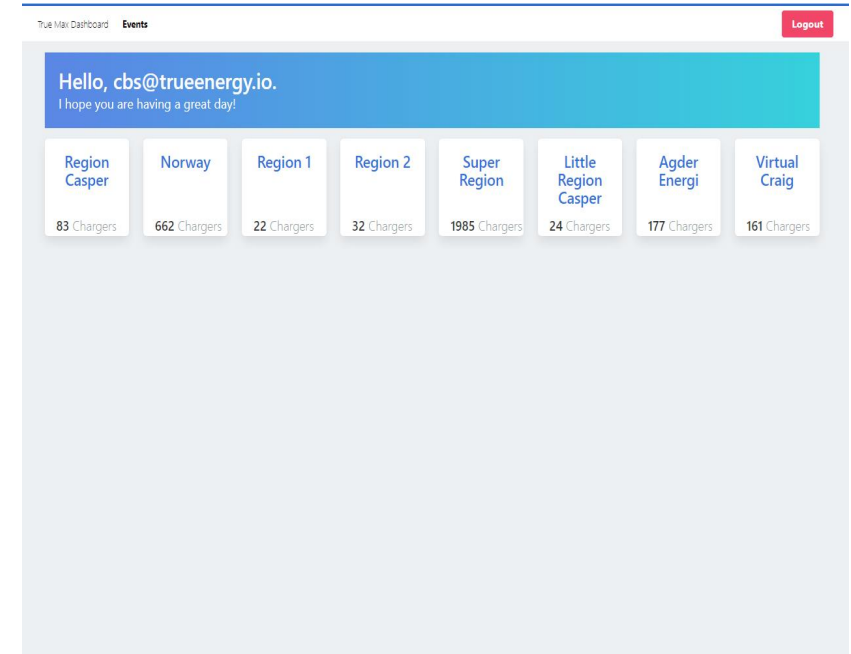
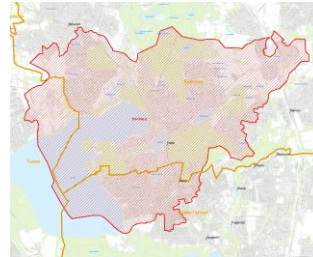


13 CLIMATE
ACTION



REGIONS

- DSO provides data about relevant areas/regions
- Regions created in system



OPERATOR DASHBOARD

True Max Dashboard **Events** [Logout](#)

Hello, cbs@trueenergy.io.
I hope you are having a great day!

Region Casper	Norway	Region 1	Region 2	Super Region	Little Region Casper	Agder Energi	Virtual Craig
83 Chargers	662 Chargers	22 Chargers	32 Chargers	1985 Chargers	24 Chargers	177 Chargers	161 Chargers

Create events

- Start and end time: Now or later
- Regions incl fall back region
- Power (volume)
- Reason
- Notes

True Max Dashboard **Events** [Logout](#)

Events in the Future

Events in the Past

2021-08-10 09:00	2021-08-10 10:00	0.002	Sell	Norway	Modify
2021-08-09 15:00	2021-08-09 16:00	0.002	Sell	Virtual Craig	Modify
2021-08-09 15:00	2021-08-09 16:00	0.002	Sell	Norway	Modify
2021-02-11 04:00	2021-02-11 05:00	0.6	NyaTest3	Region 1	Modify
2021-02-06 16:00	2021-02-06 17:00	0.9	NyaTest2	Region 1	Modify
2021-03-06 04:00	2021-03-06 06:00	0.6	MaxTest1	Region 1	Modify

Add New Event

Start Date
21-06-2021 13:46

End Date
22-06-2021 13:46

Region
Region Casper

Fallback regions

- ☐ Region Casper
- ☐ Norway
- ☐ Region 1
- ☐ Region 2
- ☐ Super Region
- ☐ Little Region Casper
- ☐ Agder Energi
- ☐ Virtual Craig

Power (MW)

Reason
Reason

Notes
Notes

[Submit](#)



EVENT: PEAK LOAD SHAVING

- Event in the system triggers **all EVs in region to stop charging**
- Charging will start again when event has finished
- User can see charge plan in App: Red column for blocked charging
- Exeptions: Cars on safety and manual charging (EV owners trust car will always be fully charged according to individual preferences)

Start Date
19-01-2022 17:00

End Date
19-01-2022 18:00

Region
Region 1

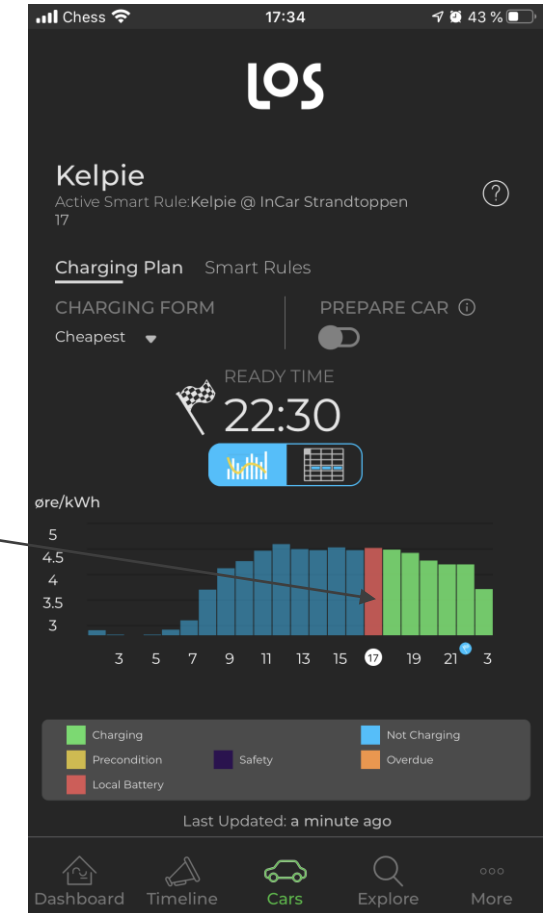
Fallback regions

- ☐ Region Casper
- ☐ Barbu
- ☐ Bjorbekk
- ☐ Kristiansand
- ☐ Bjorendal
- ☐ Engene
- ☐ Eydehavn
- ☐ Fjære
- ☐ Norway
- ☐ Region 1
- ☒ Region 2
- ☐ Super region
- ☐ Little Region Casper
- ☐ Agder Energi
- ☐ Virtual Craig
- ☐ Frikstad
- ☐ Grimstad
- ☐ Kragenes
- ☐ Moen
- ☐ Timenes
- ☐ Torbjørnsbu
- ☐ Arendal sentralnettpunkt

Power [MW]
1,00

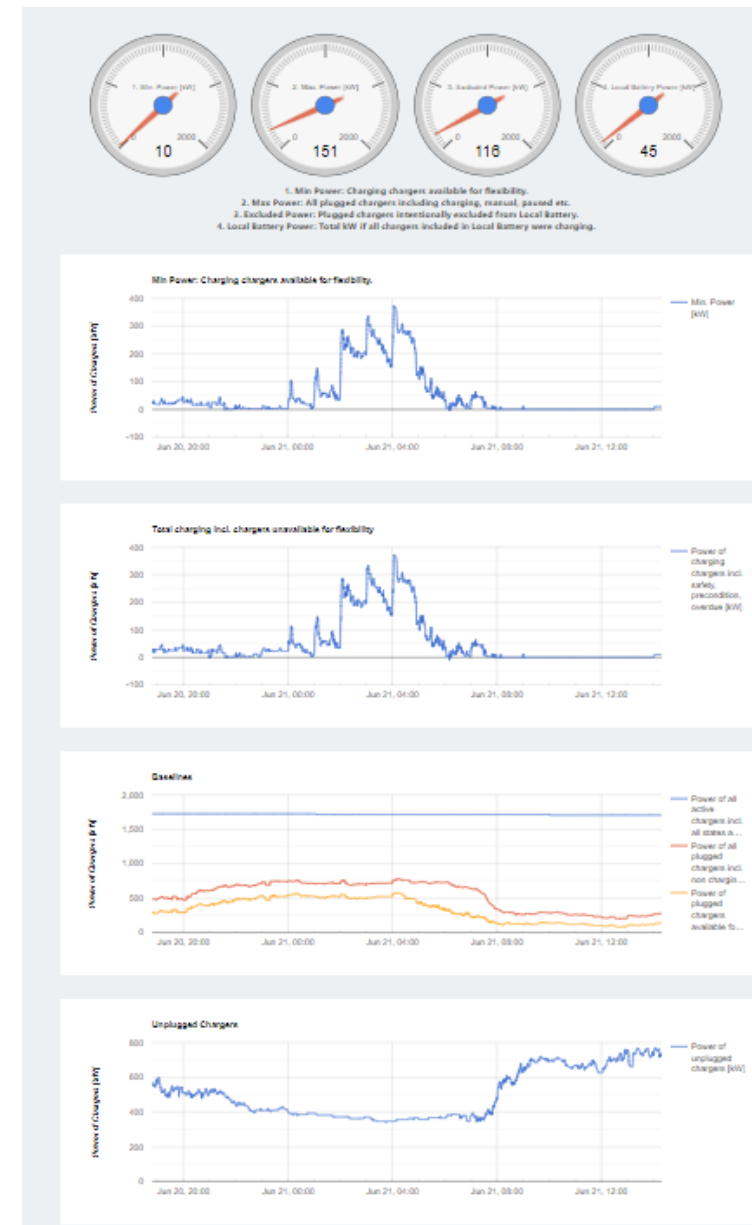
Reason
Maintenance

Notes
Planned maintenance according to Department Service&Operations



DASHBOARD AND LOGS

- During event charging activities can be followed on dashboard
 - Charging chargers available for flexibility
 - Power of plugged charges available for flexibility (charging or paused)
 - Total charging incl. unavailable for flexibility (incl. safety, precondition, overdue)
 - Power of all chargers incl. unplugged
- Log/reports can be generated after event and used for validation



WHAT'S IN IT FOR THE USER/EV OWNER?

- Cable Discount
- Paid out by True's partner or True

Tesla

Smart Charge Big Battery Toplister Elpriser

NUVÆRENDE STØRRELSE PÅ DIN KABELRABAT (TM)



0 DKK
Optjent kabelrabat™
Næste Big Battery:
00:00 - 02:00 tirsdag

I dag 7 dage Måned **Al tid**

172 DKK
Optjent kabelrabat™

3h 0m
Deltagelse

Tidligere deltagelse

Dato	Bil & ladeboks	Samlet deltagelse	Besparelser
17/08	Tesla InCar Agern Alle 5A	3h 0m	2.59 DKK

 Del

Dashboard Tidslinje Biler **Explore** Mere



LEARNINGS



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true

The happy ones

- System worked fine
- EV owners willing to participate
 - Or didn't care...
 - Prioritize EV owners' needs (car always charged)
- Challenges and needs are the same across countries
 - Market for scalable solutions
- Radius: Forward looking and action oriented
 - Need to develop solutions *now* when grid is not challenged in order to be prepared for future needs
 - Players like True needs funding from buyers



The happy ones

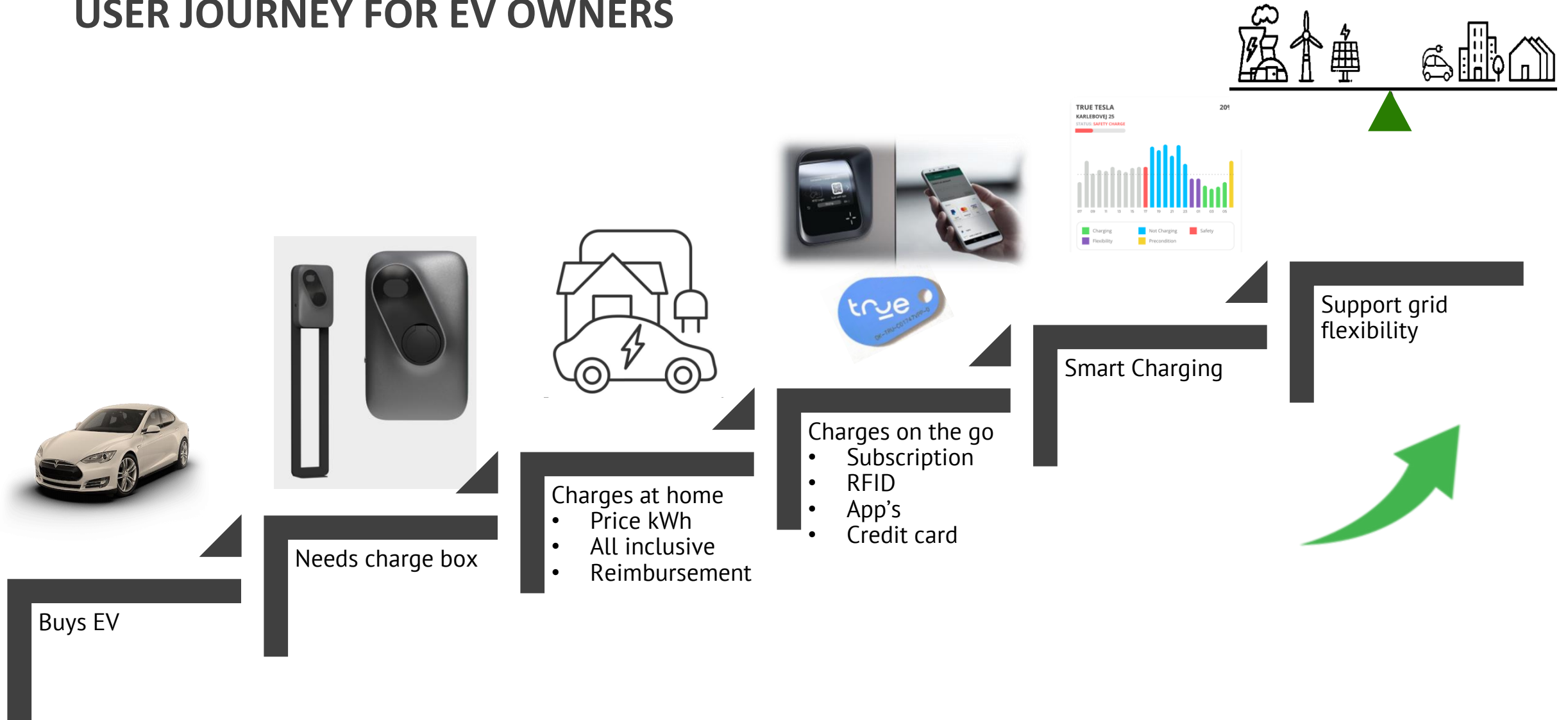
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The harder ones

- GDPR
- Baseline (and payment models) to True and EV owners
- Cannibalization: New solutions must be defined and valued in relation to SmartCharge (spot price and time-differentiated tariffs)
- Volume of cars
 - Corona lockdowns
 - Recruit cars locally
 - More flexible user engagement agreements
 - Customer journey (time works for us)



USER JOURNEY FOR EV OWNERS



PERSPECTIVES



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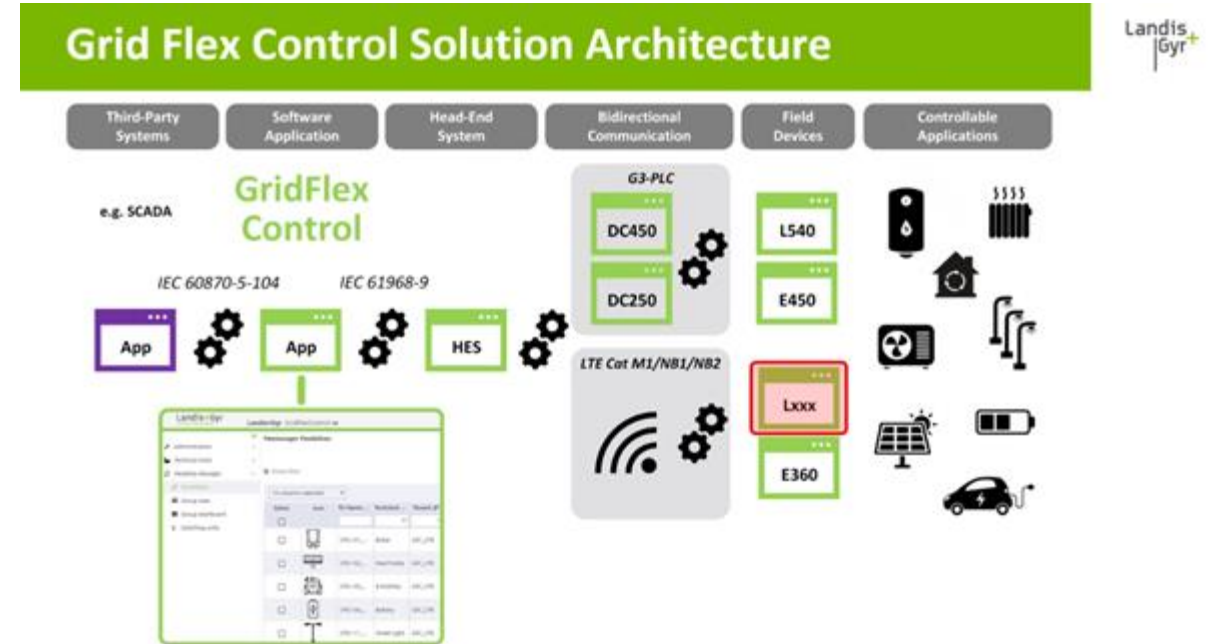
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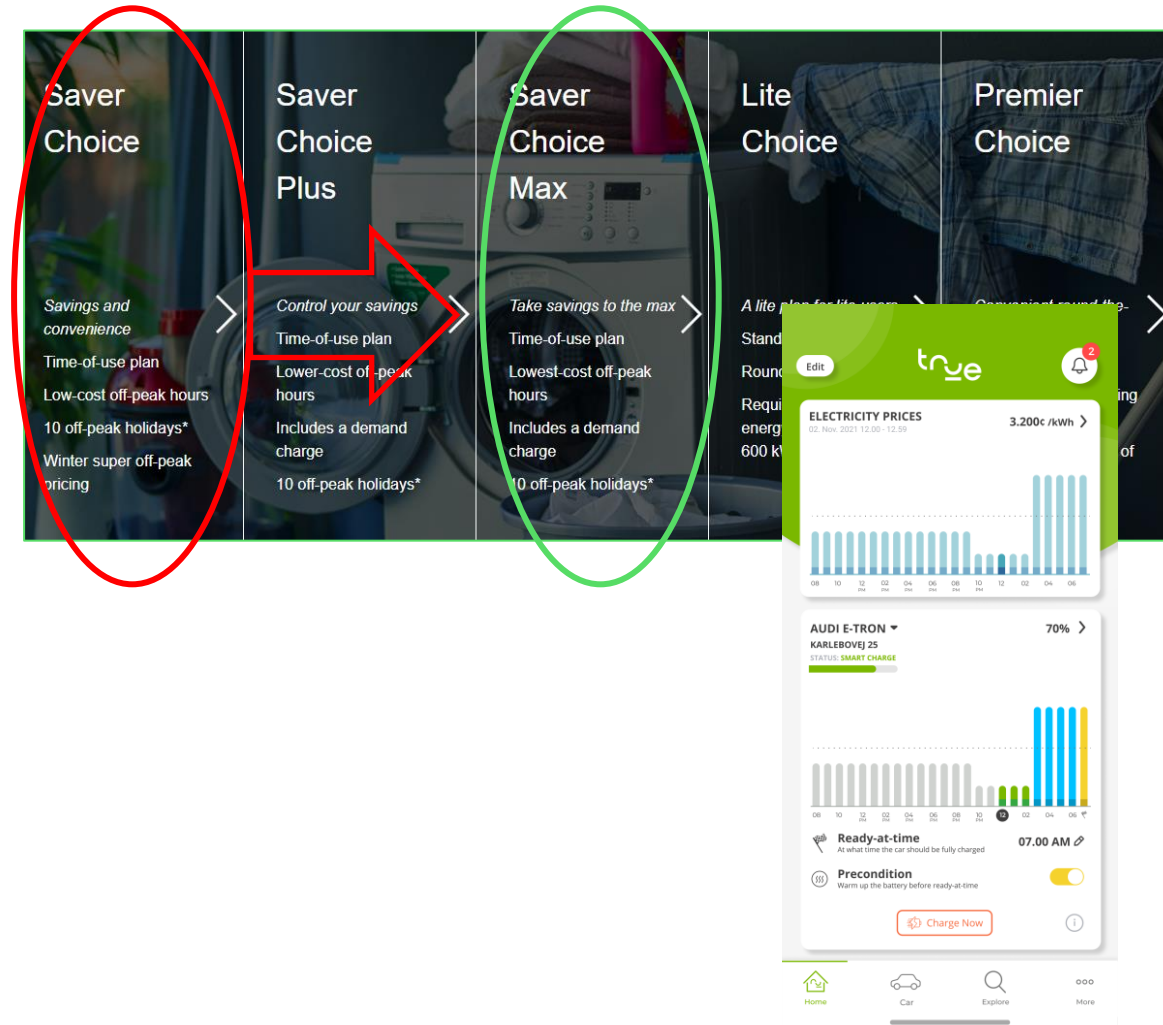
Grid flex in Switzerland: Mandatory relays in meters and DSO control

- Concept:
Control of heating pumps and boilers via mandatory relay in meters
- System:
 - Edge computing in each meter.
 - Each household has weekly schedules based on profile: Heating pumps and boilers switched on and off through relays to flatten out total household consumption
 - DSO has access to switching off assets in specific local areas in case of emergencies
 - Controls a total of 1,2 mio assets
- Business model:
DSO Pays Landis+Gyr for service and software
- Running since:
1945 and onwards...
- Barriers for use in Denmark:
 - Lack of meters with relay that can control outputs
 - Permissions to control output



Arizona flex: Advantage of integrated value chain

- Concept: Price signals controls consumption based on transmission and distribution grid needs.
- Arizona Electricity is vertical integrated (production, grid and retail in same company).
- Needs, revenue, customer relations in same company
- No spotprice, but tariffs that change during the day. 3 seasons and 13 holidays with different tariffs.
- System:
 - True Energy app => control of EV charging
 - Flatten out consumption by tariffs (~SmartCharge)
 - Transmission grid: If unusual/urgent need for load increase: Change tariff.
 - Decentral grid: Risk of overload of transformer or local bottlenecks => Local Battery stops charging in local area
- Business model / payments:
 - SaaS (DSOs pays True)
 - Arizona Electricity provides charge boxes at discounted prices if EV owner accepts flexible charging. And electricity at cheaper prices.
- Running since: 2022est
- Barriers for use in Denmark: Decoupling



Norflex in Norway: Subsidized market

- Concept
 - Local peak load shaving delivered by several suppliers based on different assets.
 - Agder Energi (DSO) buys best bid
- System & business model:
 - Nodes delivers market platform
 - Each seller (aggregator or plant owner) bids available assets at their desired price
 - Buyer (DSO) accepts bid
 - Market platform collects baselines, activates event in supplier's system and provide logs
 - Suppliers' system run the event
 - Market platform bills buyer and pays seller
- Running since: 2021
- Barriers for use in Denmark?
 - Subsidised: Public funded payments to sellers.
To be consideren when volume is still small
 - No market place (system) and substantial efforts in recruiting sufficients players

Grid Areas		
Grid Area: Ellevio City	Status: Active	✓
DSO: Energa DSO Grid Area: Energa_I	Status: Active	✓
DSO: Haugaland Kraft Nett Grid Area: Haugaland Kraft Nett	Status: Active	✓
DSO: Glitre Energi Nett Grid Area: Glitre Energi Nett 1	Status: Active	✓
DSO: Glitre Energi Nett Grid Area: Glitre Energi Nett 2	Status: Active	✓
DSO: Glitre Energi Nett Grid Area: Glitre Energi Nett 3	Status: Active	✓



Impossible to do in Denmark???



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true



"Houston, we've had a problem"

APOLLO 13



IMPOSSIBLE???



IMPOSSIBLE???



Electricity grids of Ukraine and Moldova were switched from Russian to European grids in March 2022

”...doing a year’s work
in two weeks...”

Commissioner for Energy Kadri Simson

IMPOSSIBLE???

Commission européenne
European Commission

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Change regulation and make heating pumps, EVs etc interruptible (relays in meters as part of tenders; compensate with lower tariffs)

Engage users and pay them for each interruption – take advantage of App's, automation, individual behaviour

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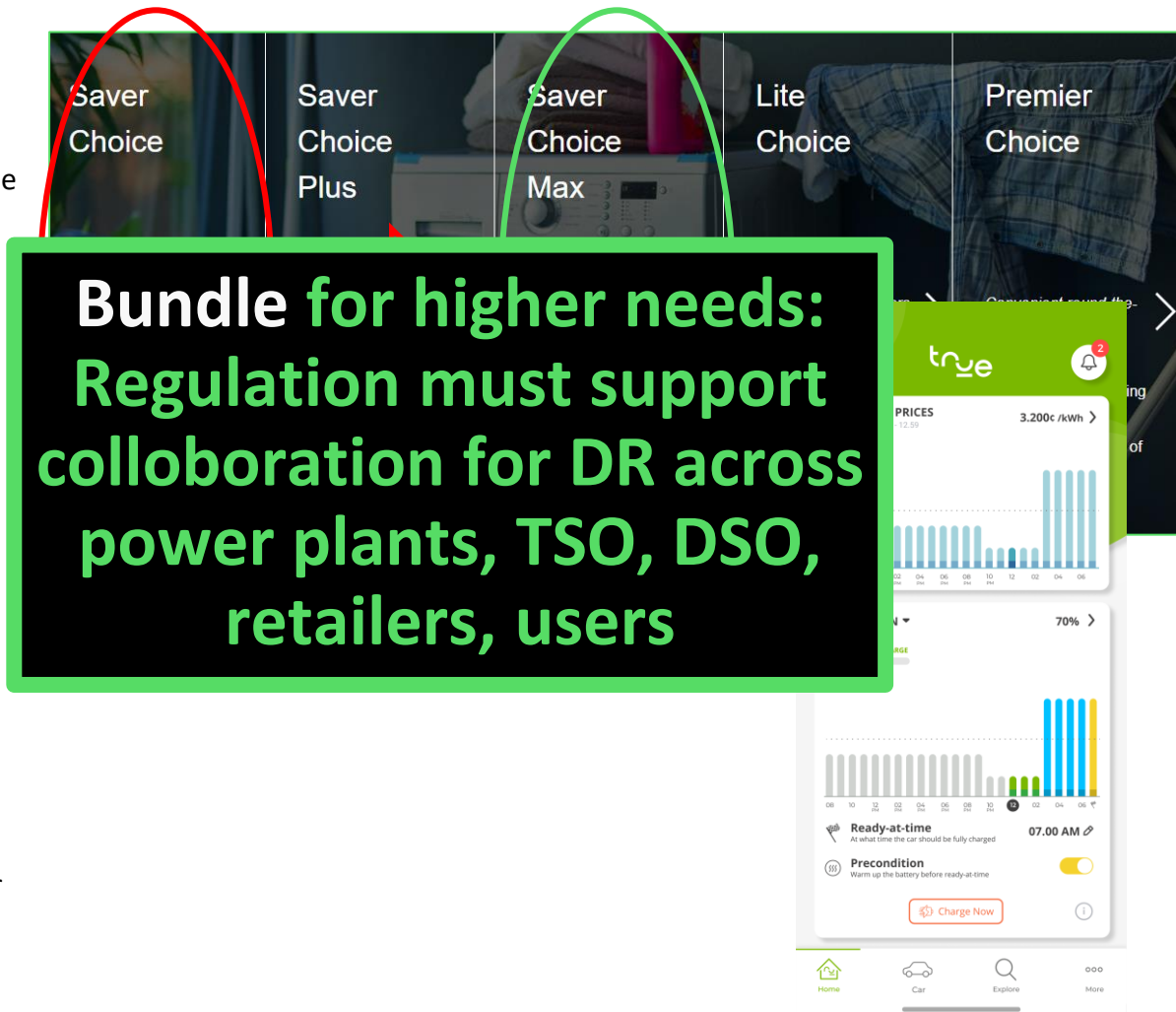


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Public funds for buying flexibility in projects / market place development

Minimum prices:
Copy succesfull public support of wind power eg. 25 øre/kW flexibility



✓ **System works**

➤ **Volume**

User uptake, recruitment, GDPR

Communication, engagement,
individual flexibility

➤ **Payment**

Compensation to suppliers and
users

Baselines & Validation of
deliveries

**MOVING
FORWARD**

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true

Questions?
Thank you 😊



Download on the
App Store



GET IT ON
Google Play

true
a Landis+Gyr company



true