

STROMDAO

Digital infrastructure for decentralised energy markets

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Digital infrastructure for decentralised energy markets



Decentralisation

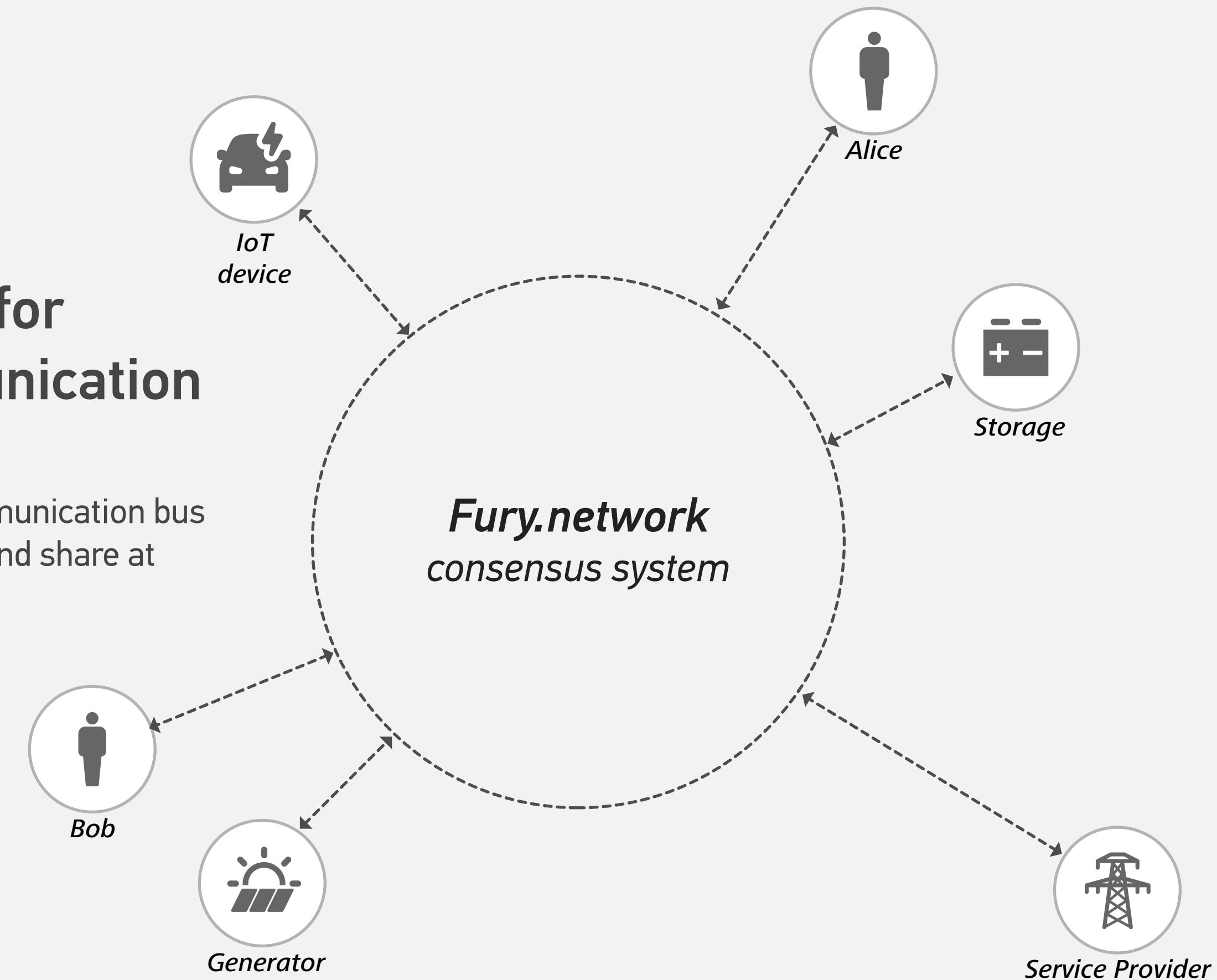


FURY NETWORK

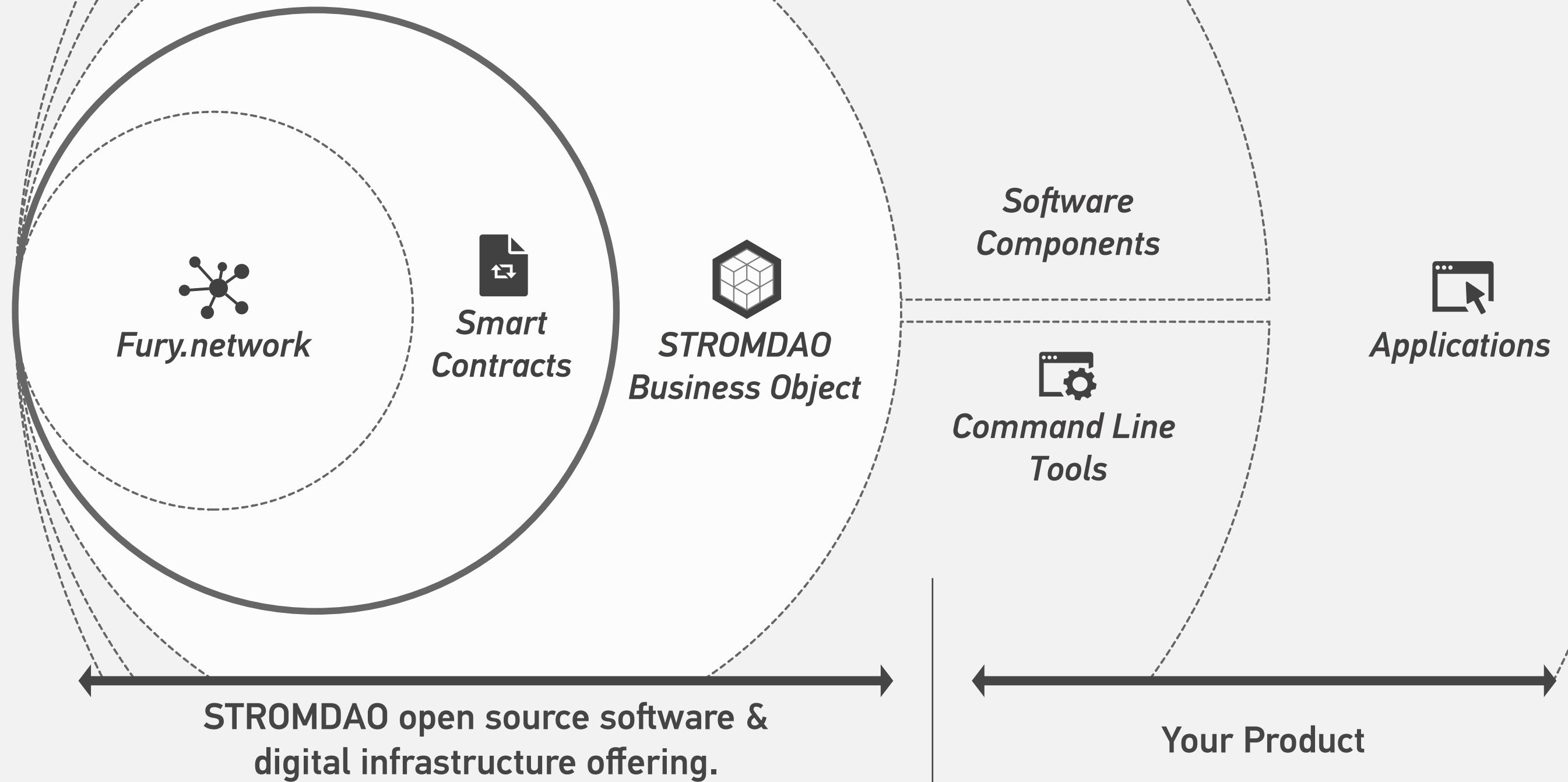
A blockchain network for energy market communication

A blockchain that acts as a single communication bus that all market participants each own and share at the same time

Fury.network
consensus system



Fury energy market consensus system



Applications

SHOWCASE

Stromkonto

Making the flows of energy and money between customer and provider transparent in realtime.

The screenshot shows a web browser window with the URL <https://app.stro...>. The page displays a summary of an electricity account for 'Mieter X'. The layout is as follows:

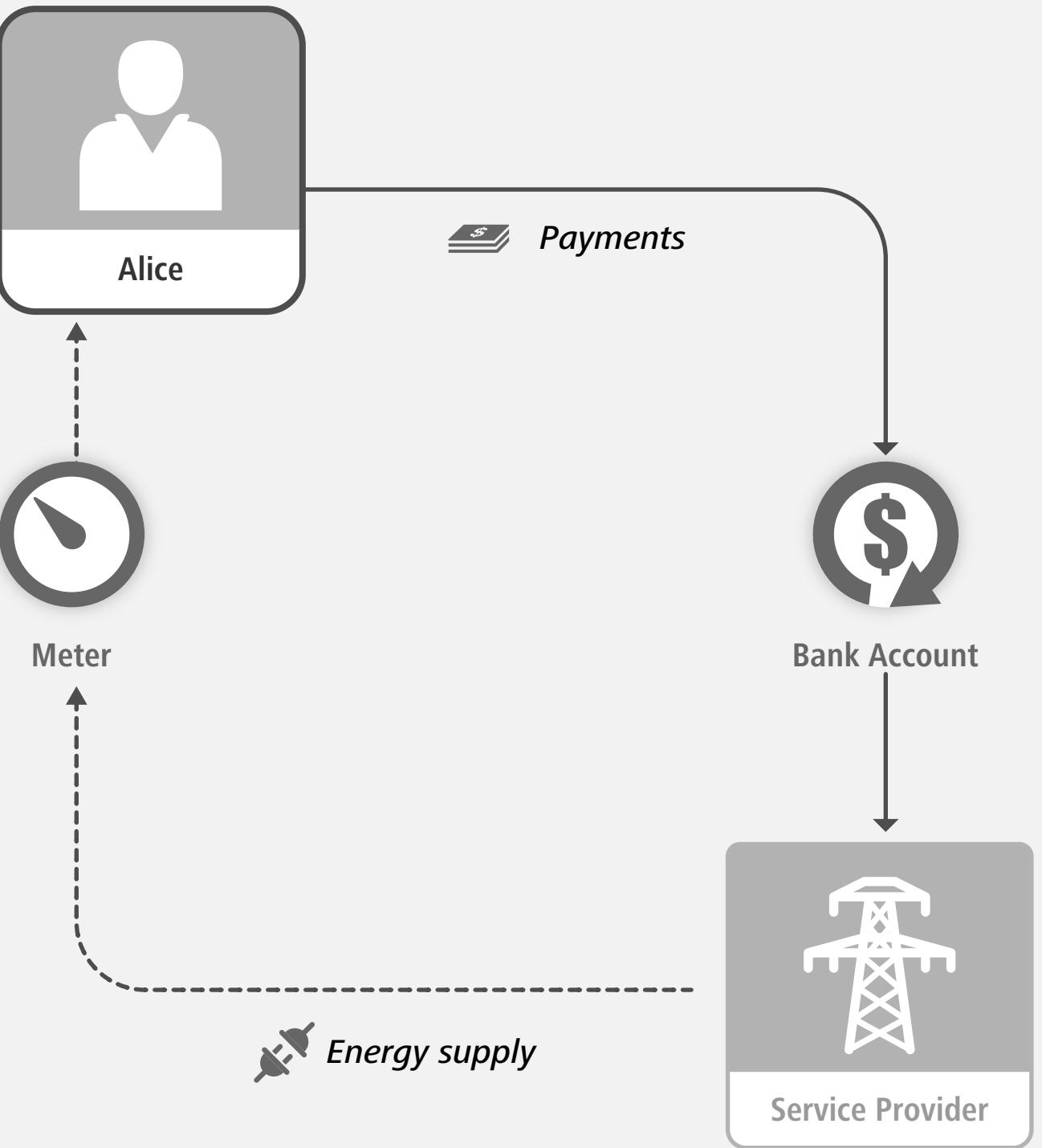
- Soll (Abbuchungen)	+ Haben (Einzahlungen)	=Saldo (Kontostand)
3.348,57 €	3.355,02 €	6,45 €
GrünStrom 35,0 K	GrauStrom 46,4 K	Nachhaltigkeit 43%
» <u>Ablesung</u>		
Entnahme Letzte Ablesung 3:13:15 PM	Letzte Abrechnung 12:09:20 AM	Ausstehender Betrag*) -0,64 €
Zählerstand: 3.180,427 KWh	Es gibt einen Mindestbetrag von 0,00 €.	

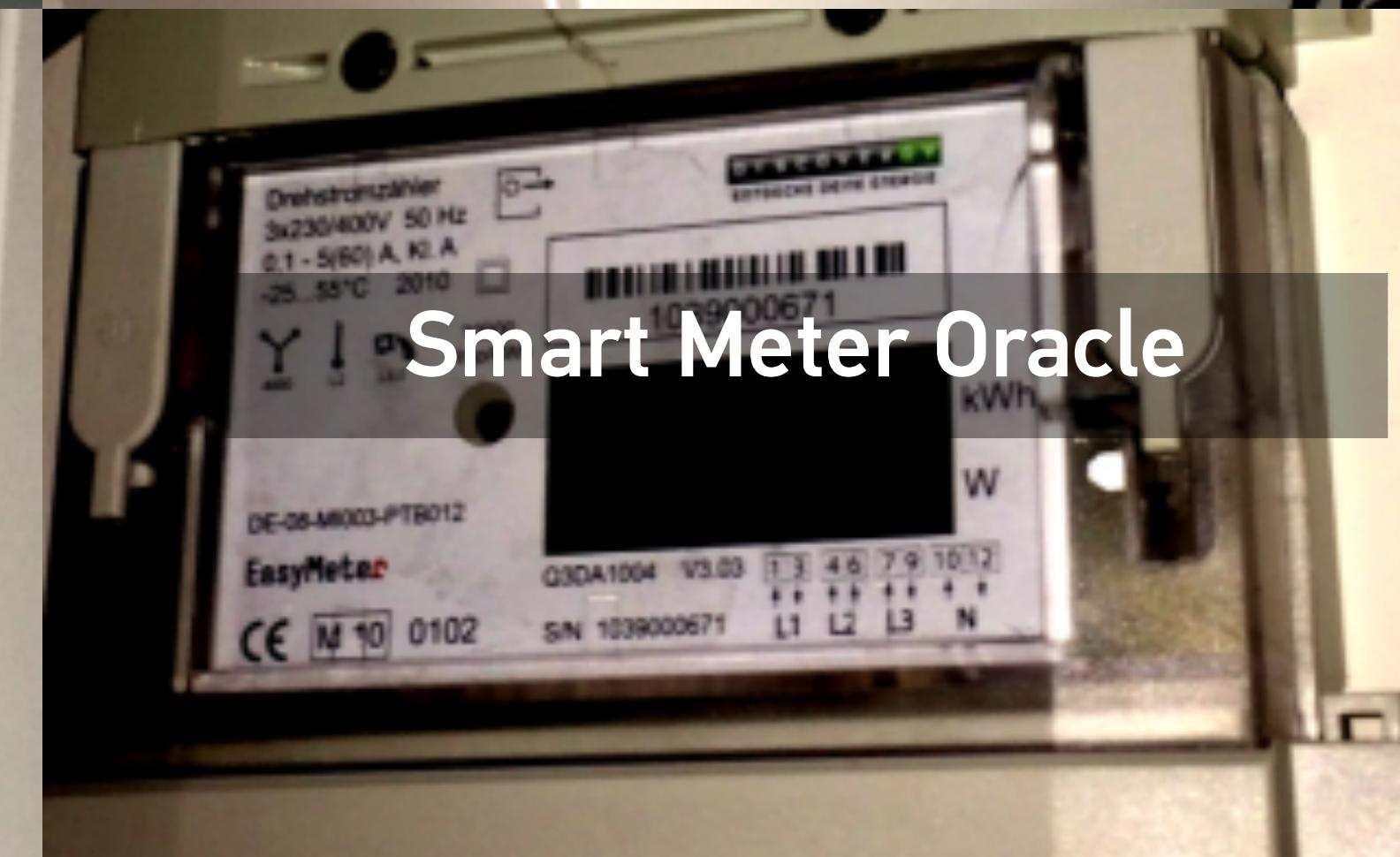
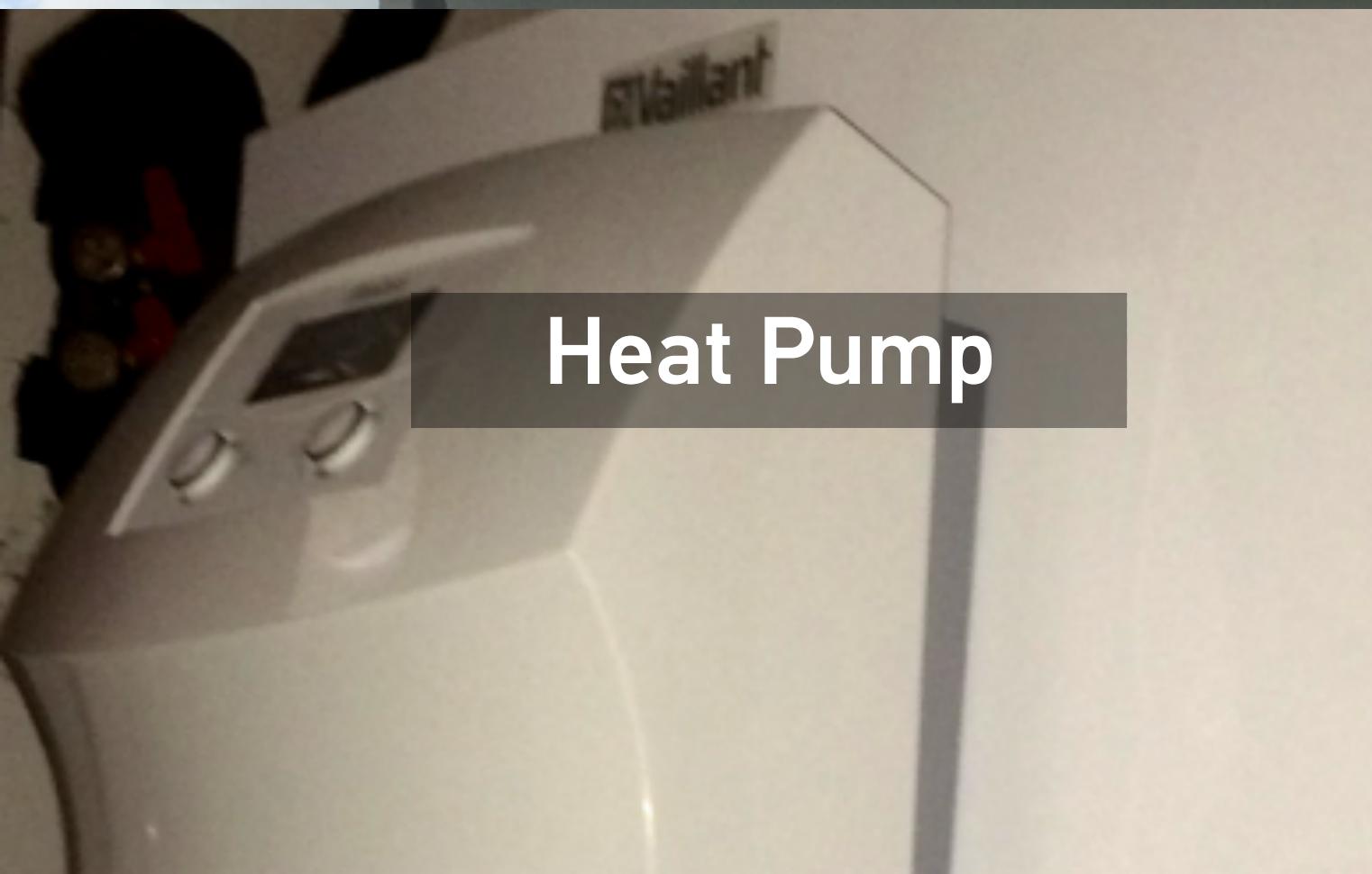
Additional details visible on the page include:

- Header bar with various icons and links: Apps, DevDocs/CSS, Baseline - keyes.ie, Unicode® character, git/github guide.
- Search and edit icons in the top right corner.
- Text at the bottom: "Es gibt einen Mindestbetrag von 0,00 €."

Power supply delegation

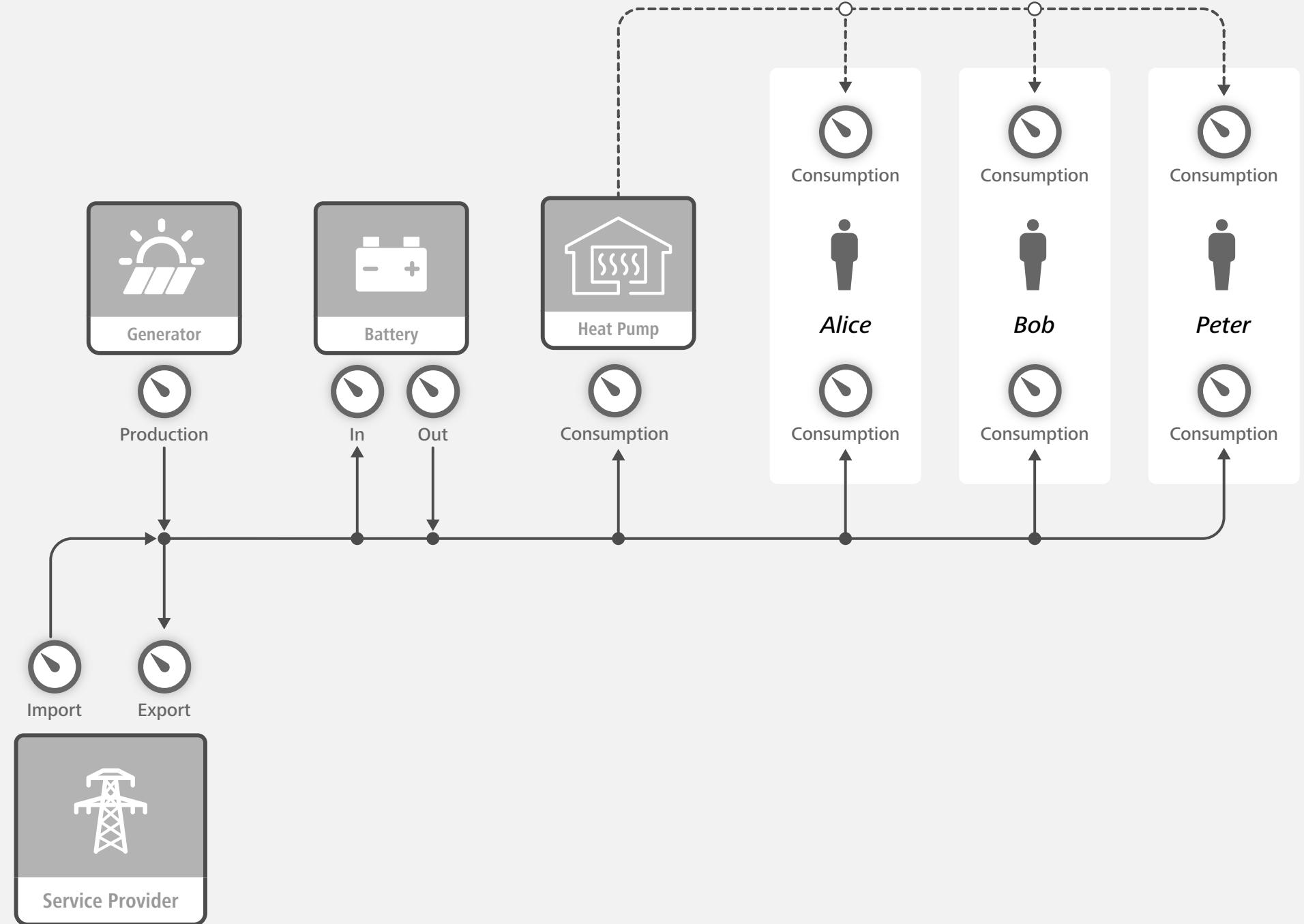
The Fury Network supports traditional power supply arrangements, supporting micro transactions, dynamic pricing and pay-as-you-go tariffs.





Industrial and residential microgrids

Fury native smart contracts are capable of balancing the flow energy production and consumption within distribution networks of any size and shape.



SHOWCASE

Microgrid capacity utilisation billing

Simplified billing and invoicing of microgrid consumers
by charging for pro-rata utilisation of installed capacity.

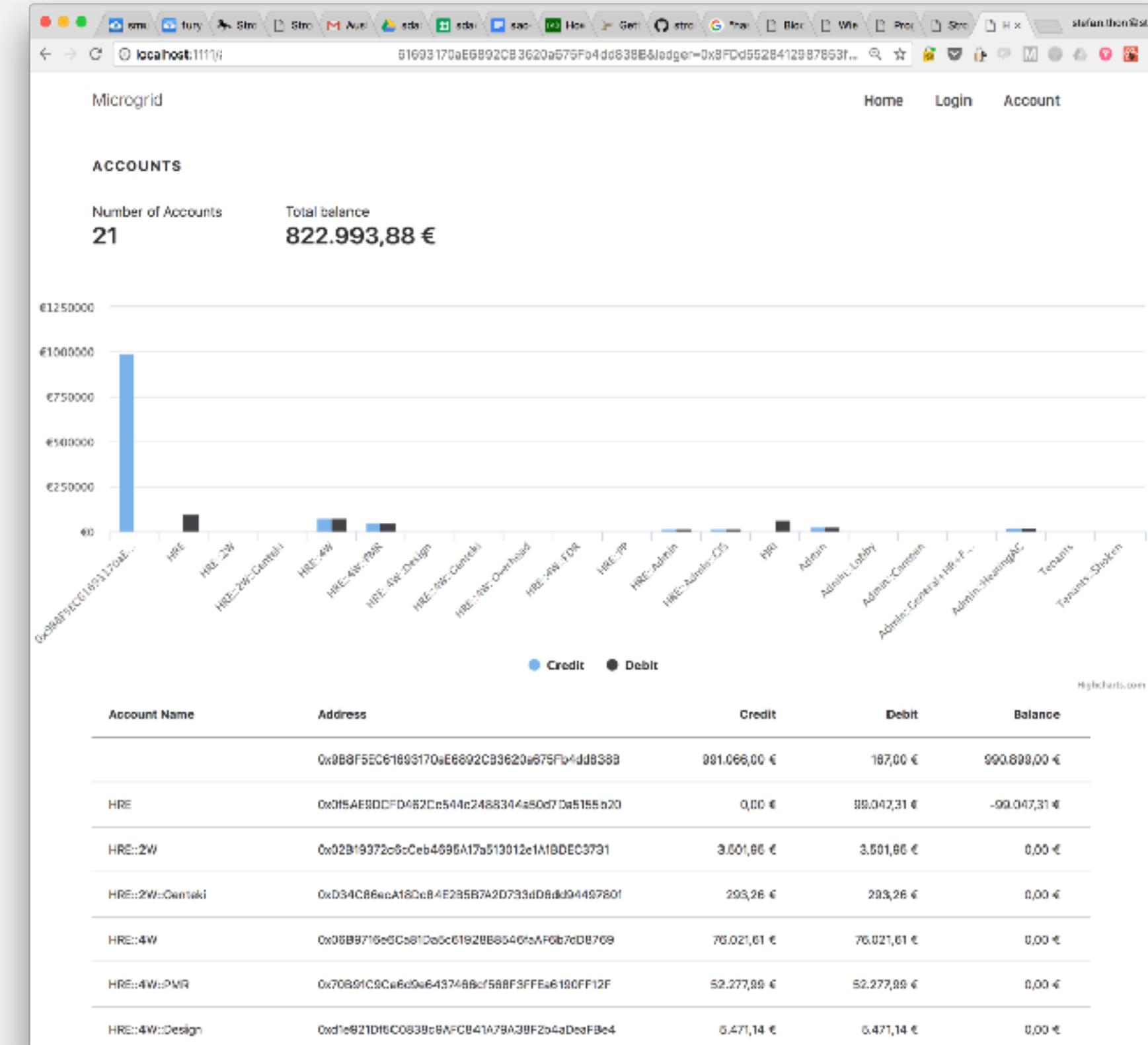
The screenshot shows a web-based energy bill interface for a consumer named "Mieter: Musterfamilie". The interface is divided into several sections:

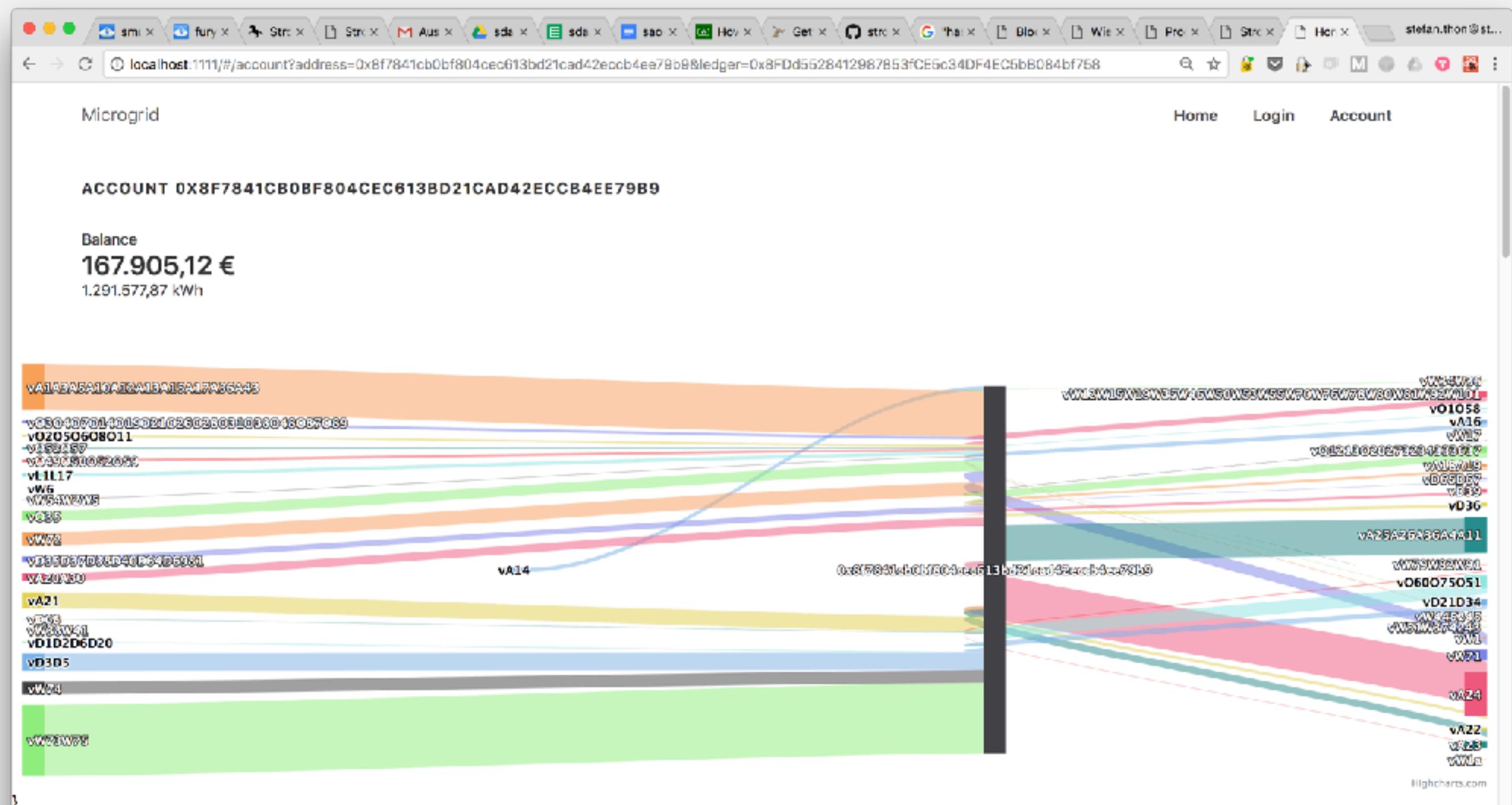
- Anschluss:** Max Mustermann, Gerhard Waiser Ring 29, 69266 Mauer.
- Energiekosten:** Stromverbrauch (Consumption): Zählerstand 3,898.636 kWh, Zeitpunkt 1/21/2018, 2:07:16 AM, Energiemenge (abrechenbar) -158.789 kWh, Energiekosten 36.51 €. Gutschriften aus Lokaler Erzeugung (Credits from local generation): Energiequelle Photovoltaik, Vergütung 0.16 €/kWh, Bezogene Menge 7.715 kWh, Gutschrift 1.39 €. Steuern, Abgaben und Umlagen (Taxes, levies, and surcharges): EEG Umlage für 158.789 kWh -10.76 €, Umsatzsteuer für 36.51 € -6.83 €, Konzessionsabgabe für 158.789 kWh -2.10 €, KWK Umlage für 158.789 kWh -0.74 €, Strom NEV §19 für 158.789 kWh -0.62 €. Saldo Energiekosten (Total energy costs): 34.69 €, 5% savings.
- Ihre Energiekosten Ersparnis:** 5%

SHOWCASE

Industrial microgrids

Simplified billing and invoicing of microgrid consumers by charging for pro-rata utilisation of installed capacity.





Consensus Date from to Energy

16/05/2018, 12:36:54 vA14 0x8f7841cb0bf804cec613bd21cad42eccb4ee79b9 14.075,24 kWh

16/05/2018, 12:36:25 vW34W36 0x8f7841cb0bf804cec613bd21cad42eccb4ee79b9 702,70 kWh

Microgrid

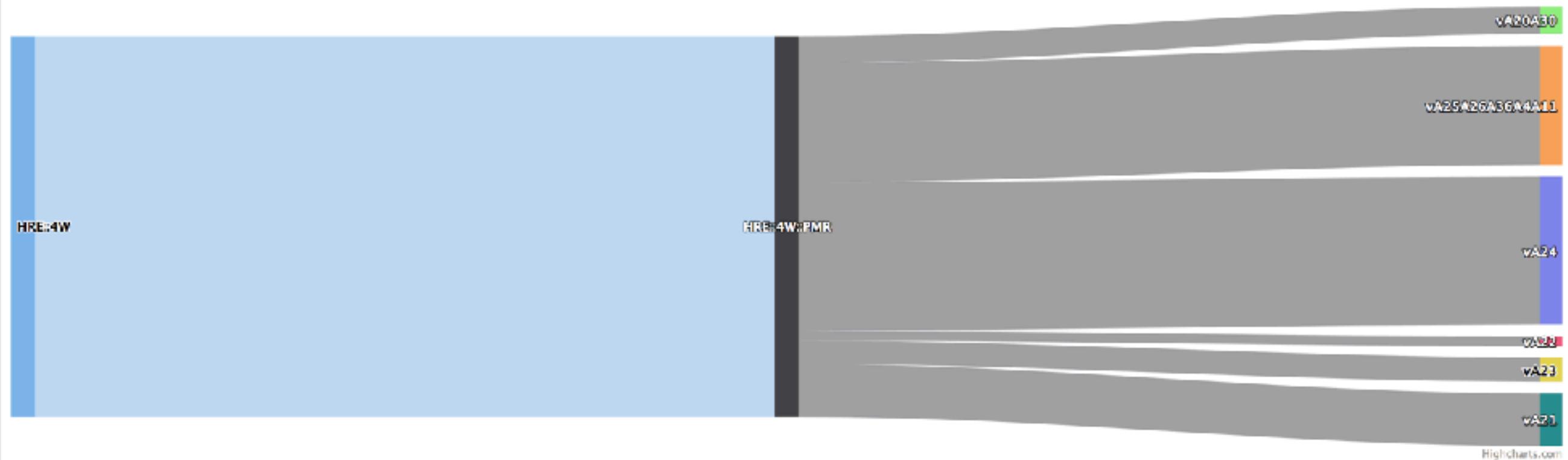
Home Login Account

ACCOUNT HRE::4W::PMR

Balance

0,00 €

0 kWh



Consensus Date	From	To	Energy	Money
16/06/2018, 12:15:16	HRE::4W	HRE::4W::PMR	26.652,83 kWh	3.724,87 €
16/06/2018, 12:15:16	HRE::4W::PMR	vA20A30	26.652,83 kWh	3.724,87 €

SHOWCASE

Sales partner entitlements

The screenshot shows a web browser window with the title "Stromkonto Abrechnung". The URL in the address bar is https://www.stromkonto.net/?account=0x4a1018fa6a091699181352d8ba4f1930277a726f&sc=0x6... The page displays a table titled "Geld" (Money) showing account balances. The table has columns for Konto (Account), Soll (Planned), Haben (Holding), and Saldo (Balance). The balance column uses green for positive values and red for negative values. Below the "Geld" section is another section titled "Energie" (Energy).

Konto	Soll	Haben	Saldo
Bank	0.00	23.41	23.41
Wasser	147.80	1,888.03	1,718.43
Gas	17.07	854.24	837.16
Internet	10.49	482.19	471.70
Abwasserabfuhr	0.04	329.65	329.61
Strom	0.12	10.64	10.52
Wärme	2.11	509.42	507.31
Abfall	0.00	6.09	6.09
Wasser	1,729.54	5,679.56	3,950.02
Wasser	79.23	3,061.17	2,971.94
Wasser	0.18	8.08	7.89
Wasser	0.00	39.11	39.11
Wasser	1.39	51.51	50.12
Wasser	0.18	2.63	2.46
0x40E64ac9a8D6db81EarfbE6e0090806372F33328B	0.00	0.00	0.00

Konto	Soll	Haben	Saldo
Wasser	0.000	0.366	0.366

Electric vehicle charging

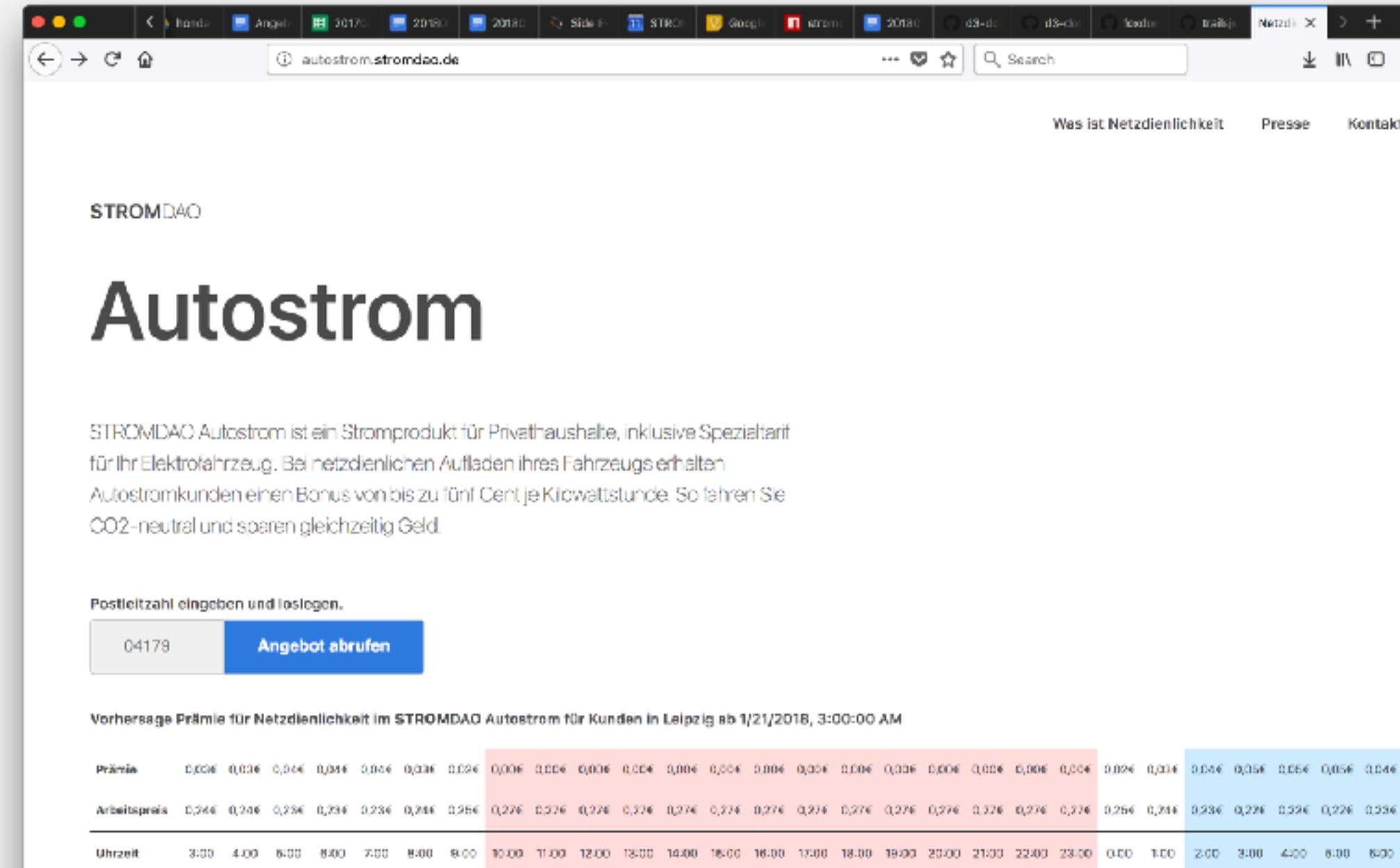
Flexible energy balancing and settlement capabilities support vehicle charging use cases across domestic and public settings.



SHOWCASE

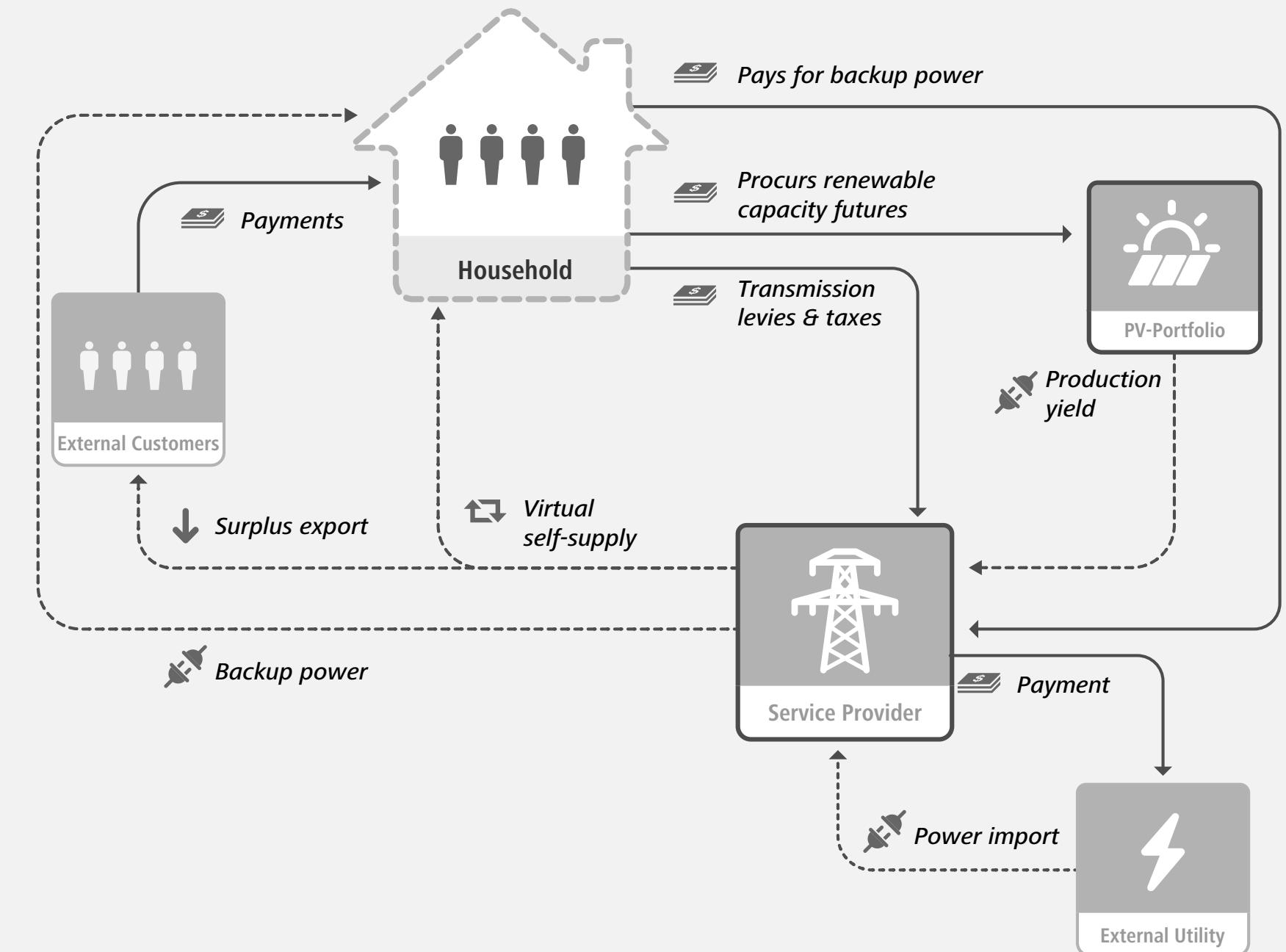
Dynamic grid happiness pricing

Autostrom's grid aware vehicle charging implements a dynamic electricity pricing, that correlates with the ratio of renewable power in the mix at charge time.



Virtual self consumption in hybrid power markets

The Fury Network implements the hybrid electricity market model. It thus supports advances and novel usage scenarios such as virtual self consumption.



WORK IN PROGRESS

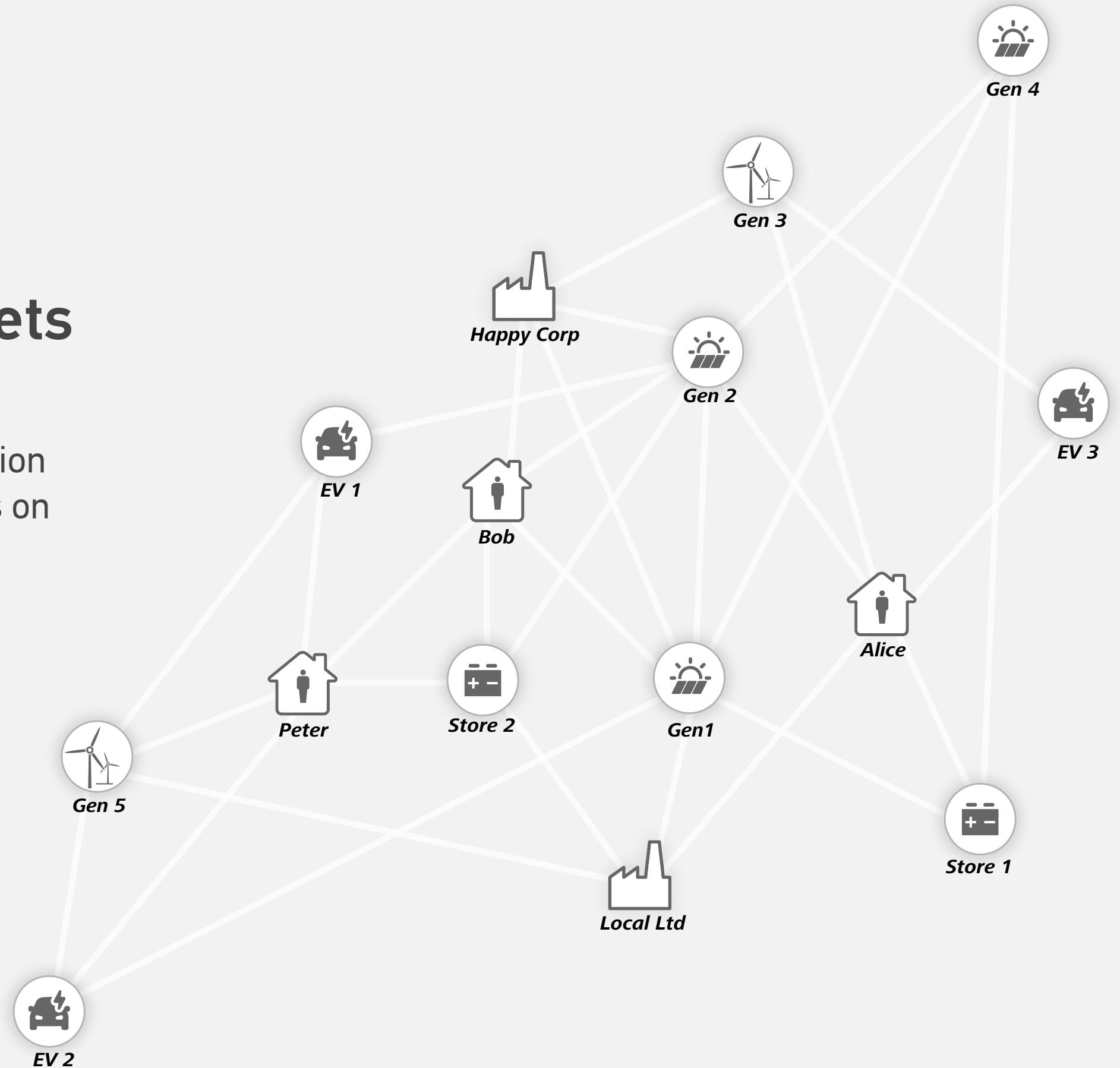
Micro communities

STROMDAO currently investigates autonomous swarm orchestration capabilities to connect distributed energy assets into micro markets that operate seamlessly on the public grid.



Energy asset pooling & decentralised micro markets

Pooling distributed production and consumption into co-productive micro community markets on top of the public grid infrastructure.



Collaborative networks of co-production

Linking consumers, producers, service providers and everyone in between into value networks of co-productive peers.

Blockchain technology will be the transactional backbone of the energy systems of the future.

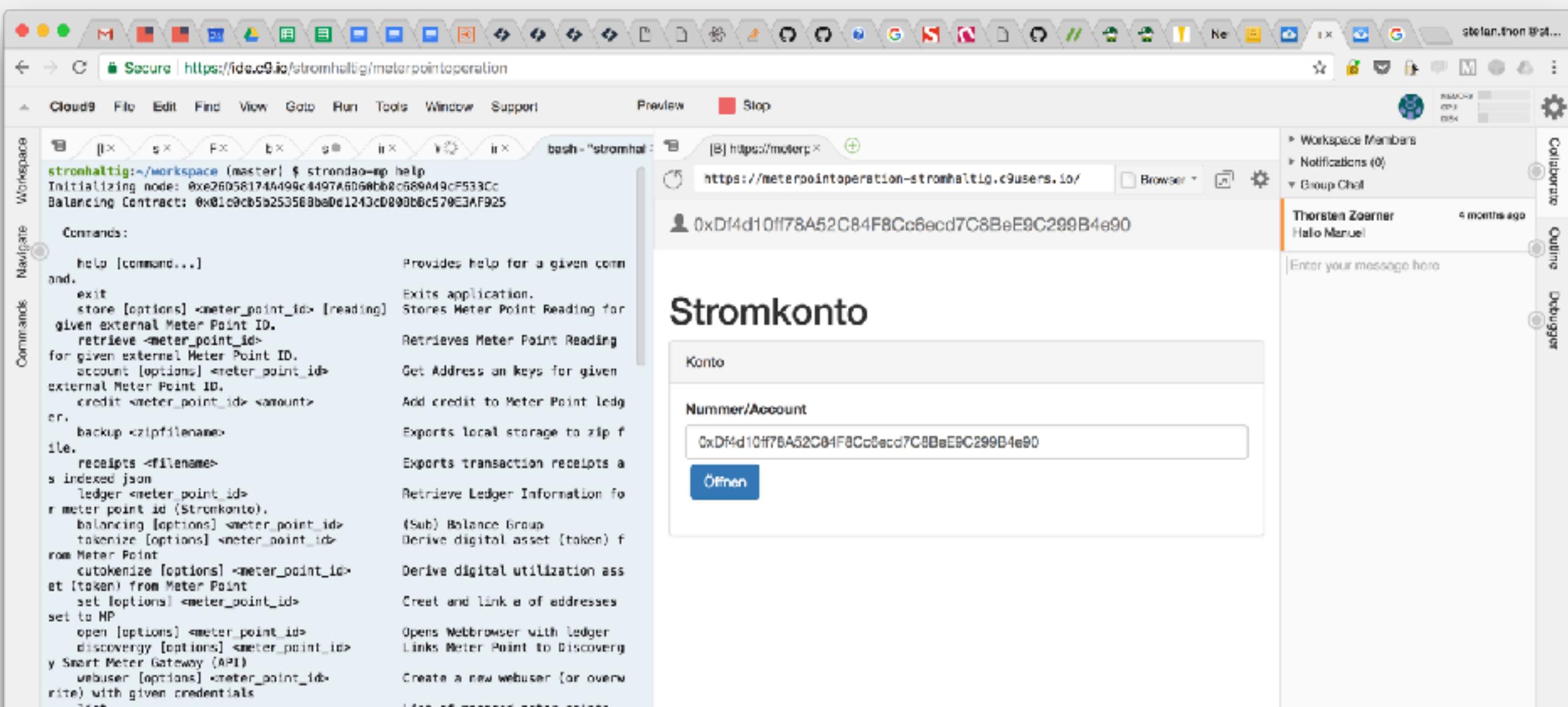
Join the bleeding edge of the energy revolution

Sign up at <https://stromhltig.de>

The screenshot shows a web browser window with the URL <https://stromhltig.de/zuhause-strom/> in the address bar. The page features a large green leaf against a dark background with the text "STROMHALTIG" and "Zuverlässig.Nachhaltig.Digital.". Below the header, there are navigation links for "Stromhltig", "Blog", and "Kunden Login". A search bar with a placeholder "Postleitzahl" and a magnifying glass icon is visible. To the right of the search bar, there is a bulleted list of features: "• Kurze Vertragslaufzeit", "• Keine Bonustricks", and "• 100% Ökostrom".

Get your hands dirty

Book 1:1 online training at: <http://stromdao.de/quickstart/>



kontakt@stromdao.com

A consensus system for energy market transactions

Establishing and maintaining irrevocable consensus among market participants.

Blockchain technology can be utilised to facilitate and enshrine any kind of energy transaction between market participants with diverging interests.

FURY NATIVE CONTRACTS

Smart Contracts enforcing market processes and statutory regulations

Network-native market logic enshrines the mandatory rules that regulate and effect the transfer of value

```
1 pragma solidity 0.4.18;
2 contract SimpleMultiSig {
3
4     uint public nonce;           // [only] mutable state
5     uint public threshold;      // immutable state
6     mapping (address => bool) isOwner; // immutable state
7     address[] public ownersArr;   // immutable state
8
9     function SimpleMultiSig(uint threshold_, address[] owners_) public {
10        require(owners_.length <= 10 && threshold_ <= owners_.length && threshold_ != 0);
11
12        address lastAdd = address(0);
13        for (uint i=0; i<owners_.length; i++) {
14            require(owners_[i] > lastAdd);
15            isOwner[owners_[i]] = true;
16            lastAdd = owners_[i];
17        }
18        ownersArr = owners_;
19        threshold = threshold_;
20    }
21
22    // Note that address recovered from signatures must be strictly increasing
23    function execute(uint8[] sigV, bytes32[] sigR, bytes32[] sigS, address destination, uint
24    value, bytes data) public {
25        require(sigR.length == threshold);
26        require(sigR.length == sigS.length && sigR.length == sigV.length);
27
28        // Follows ERC191 signature scheme: https://github.com/ethereum/EIPs/issues/191
29        bytes32 txHash = keccak256(byte(0x19), byte(0), address(this), destination, value, data,
30        nonce);
31
32        address lastAdd = address(0); // cannot have address(0) as an owner
33        for (uint i = 0; i < threshold; i++) {
34            address recovered = ecrecover(txHash, sigV[i], sigR[i], sigS[i]);
35            require(recovered > lastAdd && isOwner[recovered]);
36            lastAdd = recovered;
37
38            // If we make it here all signatures are accounted for
39            nonce = nonce + 1;
40            require(destination.call.value(value)(data));
41        }
42
43    }
44}
```

STROMDAO BUSINESS OBJECT

Software libraries to integrate blockchain technology into existing IT systems

Open-source software facilitates the integration of the Fury Energy Blockchain into existing business processes and IT architectures.

```
26 const businessObject = document StromDAOBO
27
28 /**
29 * function createFuryNode (businessObj, bus
30 // return new businessObj.Node(businessObj
31
32 /**
33 * Routes description */
34 const routesDescription = [
35   { name: 'Home', route: '/' },
36   { name: 'Login', route: '/login' },
37   { name: 'Item', route: '/item/:id' }
38 ]
39
40 /**
41 * hard coded ethereum addresses for testing*/
42 const ethAddresses = {
43   mp: '0x83F8B15eb816284ddcF2ff005Db7a19196d86ae1',
44   smpc: '0x2F516D1e3dcB330BB44c00cb919ab5081075C77E',
45   sk: '0x19BF166624F485f191d82900a5B7bc22Be569895'
46 }
47
48 /**
49 * settings export */
50 export default {
51   apiHost: apiHost,
52   businessObject: businessObject,
53   createBusinessObjectConfig: createBusinessObjectConfig,
54   ethAddresses: ethAddresses,
55   // routePrefix: '/',
56   defaultRoute: '/',
57   routesDesc: routesDescription
58 }
```

Title dark

Subtitle dark

Title light

Subtitle light