**3GPP TSG-SA WG1 Meeting #107 S1-242503**

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**pCR Title: pCR on TR 22883 Collection of Network Energy-Saving Adjustment Information Related to Individual Impacted UEs**

**Draft Spec: 3GPP TR 22883**

**Agenda item: 7.2**

**Document for: Approval**

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*Abstract: This pCR introduces a new use case on Collection of Network Energy-Saving Adjustment Information.*

**1. Introduction**

This pCR introduces a new use case on Collection of Network Energy-Saving Adjustment Information.

**2. Reason for Change**

To provide a new use case on Collection of Network Energy-Saving Adjustment Information.

**3. Conclusions**

None

**4. Proposal**

It is proposed to agree the following changes to 3GPP TR 22883 v.0.1.0.

\* \* \* First Change (new text)\* \* \* \*

## 5.x Use Case: Collection of Network Energy-Saving Adjustment Information Related to Individual Impacted UEs

### 5.x.1 Description

As 5G networks expand and the demand for new services and applications grows, network energy consumption has become an increasingly prominent issue. To achieve sustainable development goals, operators need to adopt various measures to reduce network energy consumption.

Renewable energy sources, such as solar and wind power, offer a more promising solution for reducing reliance on traditional power grids and building a cleaner, more sustainable mobile communication ecosystem.

In addition to increasing the use of renewable energy, operators can also achieve energy savings at the network level by optimizing network configurations and service parameters. Existing research on energy-efficient services has presented numerous use cases that explore the utilization of renewable energy and the adjustment of network configurations and service parameters based on user preferences defined in subscribed energy-saving services.

The collection of information related to energy-saving service adjustments, particularly when associated with individual impacted UEs, can provide valuable data reference for billing, external system incentives, and proof of energy-saving contributions for users and operators.

This use case describes how the 5G network collects energy-saving adjustment information related to individual impacted UEs, including the trigger criteria, adjustment type, adjusted parameters/characteristics, and adjustment time. It also explains the purposes for which this information can be used.

The term "individual impacted UEs" refers to each single user directly affected by the energy-saving adjustments, with a specific focus on individual user-level impact rather than collective impact. For instance, the following adjustments will not be considered, including operations that involve shutting down an idle base station and migrating users to other stations.

### 5.x.2 Pre-conditions

The Operator T has deployed a 5G network that supports multiple energy-saving adjustment strategies, such as dynamically adjusting network configuration and service parameters based on factors like user energy-saving preferences.

The 5G network can obtain various information related to energy savings, such as user energy-saving preferences.

### 5.x.3 Service Flows

1. Energy-saving Adjustment Trigger: When the 5G network detects an event that meets preset conditions, such as fulfillment of the user's subscribed energy-saving options and preferences, it triggers the network energy-saving adjustment process.

2. Energy-saving Adjustment Decision: Based on pre-configured policies or algorithms, the 5G network decides on the appropriate energy-saving adjustment type, such as re-selecting the UPF, adjusting the service hosting environment, or reducing the data transmission rate.

3. Service Adjustment Execution: The 5G network executes the energy-saving adjustment operation, such as re-selecting the UPF, adjusting the service hosting environment, or reducing the data transmission rate.

4. Adjustment Information Collection: The 5G network collects the following information related to the energy-saving adjustment operation:

* Trigger Criteria: The event or condition that triggered the energy-saving adjustment. This may be associated with an identifier of the user's energy-saving related subscription or service agreement (e.g., the ID of a "green communication service option" as described in Use Case 5.12 of [2]).
* Adjustment Type: The energy-saving adjustment strategy or algorithm used, such as re-selecting the UPF or reducing the data transmission rate.
* Adjusted Parameters/Characteristics: The network configuration parameters or characteristics that were adjusted.
* Adjustment Time: The time when the energy-saving adjustment operation was executed.

### 5.x.4 Post-conditions

The 5G network has collected energy-saving adjustment information related to individual impacted UEs.

Operators can access this information and use it for the following purposes:

* Charging: Implement differentiated charging policies based on users' contributions to energy savings.
* Auditing and Accounting: Verify and track energy-saving adjustments, assess the effectiveness of energy-saving strategies, and generate reports for internal analysis and regulatory compliance.

The 5G network can generate generic information based on the collected detailed energy-saving adjustment information, excluding any internal network architecture details.

This generic information includes removing sensitive data such as specific base station locations, cell configurations, routing information, and other network architecture details, as well as UE-specific information like precise location tracking data, IP addresses, and device identifiers.

However, generic information retains data directly relevant to energy-saving adjustments, such as data transmission rates and other related network parameters, and non-sensitive UE-related information like chosen energy-saving options and the activation time of energy-saving modes.

This generic information can then be provided to authorized third parties and users for the following purposes:

* External system incentives: Provide energy-saving information to external systems, such as business support systems for loyalty programs or rewards points, to incentivize users to save energy and reduce emissions.
* Proof of energy-saving contributions: Provide users with proof of their energy-saving contributions for submission to relevant authorities for purposes like tax deductions.

### 5.x.5 Existing features partly or fully covering the use case functionality

There are existing requirements in [3].

* " The 5G system shall provide a mechanism to include Energy related information as part of charging information."
* " Subject to user consent and operator policy, 5G system shall be able to provide means to modify a communication service based on energy related information criteria based on subscription policies, " describes the functionality of the 5G system to modify a communication service based on energy-related information criteria based on subscription policies.

Use cases in this document also include requirements for adjusting communication services, such as:

* Requirement [PR 5.2.6-1] of Use Case 5.2: “Subject to user consent, operator policy, and regulatory requirements, the 5G network shall be able to provide means to reduce service performance at the flow level in response to energy constraints."
* Requirement [PR.5.4.6-1] of Use Case 5.4: “Based on regulatory requirements, operators’ policy and agreement with 3rd party, 5G network shall provide mechanisms to adjust communication service (e.g. reselection of UPF, service hosting environment) considering the change of energy supply mix of the network as one of the factors."

### 5.x.6 Potential New Requirements needed to support the use case

[PR.5.x.6-1] Subject to regulatory requirements, user consent and operator policy, the 5G network shall be able to include, as part of charging reference information, information about energy-saving adjustment related to individual impacted UEs, including trigger criteria, adjustment type, adjusted parameters/characteristics, and adjustment time.

NOTE 1: This requirement supports internal use by the operator for purposes such as charging, auditing, and accounting.

[PR.5.x.6-2] Subject to regulatory requirements, user consent and operator policy, the 5G network shall be able to expose to authorized 3rd parties generic information based on energy-saving adjustments information.

NOTE 2: Generic information refers to consolidated information derived from the collected detailed energy-saving adjustment information after removing sensitive data, such as information related to the operator's network architecture, and further removing any user-privacy related data. This information is relevant to the impacted UE's contribution to energy saving.

\* \* \*End of Change \* \* \* \*