**3GPP TSG SA WG5 Meeting #143e S5-223613d2**

**e-meeting, 9-17 May 2022 *was S5-223387rev1***

**Source: Samsung, EUTC, BMWK, Vodafone, Ericsson**

**Title: pCR TR 28.829 Business use case - Energy outage coordination**

**Type: pCR**

**Document for: Approval, Information, Discussion**

**Agenda Item: 6.5.19 (FS\_NSOEU: Study on Network and Service Operations for Energy Utilities)**

# 1 Decision/action requested

***SA5 is asked to approve this pCR.***

# 2 References

None

# 3 Rationale

This pCR provides an overview of the problem domain that the study will address.

3613d1 includes the following changes

1. It would be good to introduce SCADA in ‘Abbreviations’

[RESPONSE => done]

1. Clause 5.R title and its first sentence: do you mean ‘availability’ or ‘reliability’ or both?

[RESPONSE => everything in this use case concerns avaialbility. The only use of the term reliable is to describe regulation.]

1. Clause 5.5 – 4th paragraph: typo in ‘reporing’

[RESPONSE => corrected]

1. Clause 5.5 – 5th para: to report yearly all failures

[RESPONSE => now reads: "to report failures on a yearly basis". I agree this was awkwardly phrased.]

1. This sentence looks strange: ‘The telecom network can be impacted by external factors by the power grid.’

[RESPONSE => I reworded the sentence, now 'by external factors**, specifically** by the power grid.']

1. ‘Telecom act is controlling the telcom regulation’ appears twice

[RESPONSE => fixed]

1. ‘Telecom Service Providers’: I would propose to replace this by ‘Network Operators’ and refer to TS 28.530 clause 4.8.

[RESPONSE => changed as suggested]

1. ‘… since the~~re~~y are operating a mobile network …’

[RESPONSE => changed as suggested. Sorry you had to copy edit the contribution!]

1. In clause 6.A.1, is ‘energy utility operator’ the same as the DSO? If yes, it would be better to use the same acronym / term. Or is it another role? If yes, it would be good to define it.

[RESPONSE => as for the previous contributions, energy utility operator is more general than DSO - so we use the term DSO for the use case and energy utility operator for the general discussion and motivation. I add a NOTE as I did for the other two contributions. We can add a definition in the next meeting.]

1. In 6.A.2: ‘…Thus, utilities find that helping MNOs …’: what do ‘utilities’ represent here?

[RESPONSE => I change the term 'utilities' to 'energy utility operator' throughout.']

1. Wrt ‘Unfortunately, these procedures and standards to support management coordination between DSO and MNO networks do not exist’: this sentence could be a little too strong. I understand that existing standards are not in practice yet but what would prevent a DSO and a MNO to communicate based on e.g. SA5-defined management services APIS?

[RESPONSE => though this is strong, this reflects the actual situation as I understand it, from numerous discussions with subject matter experts amongst energy utilities. Remember this is specifically related to recovery from energy outage events. You wrote: "what would prevent a DSO and a MNO to communicate based on e.g. SA5-defined management services APIS?" Answer: there are no SA5-defined management APIs that would help for the problem of energy outage recovery. This gap is exactly what we want to study with FS\_NSOEU.

To clarify that the statement is restricted in scope, not general, I add the following text: ‘Unfortunately, these procedures and standards **specifically to support management coordination for recovery from energy outage events** between DSO and MNO networks do not exist’]

1. About the same sentence: such procedures would not be standardized by 3GPP.

[RESPONSE => I add a NOTE after the paragraph, stating
NOTE: It is acknowledged that 3GPP does not specify standard procedures.]

1. Clause 6.A.3: I’m not sure if the ‘MNO service desk’ is the more relevant term to be used here. In TS 28.530 clause 4.8, we split CSP (Communication Service Provider) from MNO (Mobile Network Operator). Though a MNO is generally a CSP as well, a CSP may or may not be a MNO. I leave it up to you to adopt roles from TS 28.530 or not ;-)

[RESPONSE => I add an Editor's Note that the terminology, use of the term MNO, will be reviewed, taking into account 28.530.]

S5-223513d2 includes one change (as the current NOTE is inacurate.)

The new note ' NOTE: It is acknowledged that 3GPP does not specify standard procedures' is reformulated as:

NOTE: It is acknowledged that 3GPP does not specify **procedural standards**.

# 4 Detailed proposal

This document adds a discussion of energy outages, how they are currently handled, and the coordination that is not done between MNO and DSO.

BEGIN FIRST CHANGE

# 2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non‑specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TS 22.104: "Service requirements for cyber-physical control applications in vertical domains".

[3] 3GPP TS 22.261: "Service requirements for the 5G system".

[4] 3GPP TR 28.824: " Study on network slice management capability exposure"

[5] IT Process Wiki – The ITIL Wiki:. https://wiki.en.it-processmaps.com/index.php/ITIL\_Service\_Operation Content is available according to Creative Commons Attribution-NonCommercial-ShareAlike 3.0 Germany License. Access 08.12.21.

[X] Connected Nations 2020, UK Report, Ofcom. https://www.ofcom.org.uk/\_\_data/assets/pdf\_file/0024/209373/connected-nations-2020.pdf Access 20.4.22.

[Y] Telecom Services Security Incidents 2019 Annual Analysis Report, ENISA European Agency for Cybersecurity, July 23, 2020. https://www.enisa.europa.eu/publications/annual-report-telecom-security-incidents-2019 This publication is intended for information purposes only and is accessible free of charge. Reproduction is authorised provided the source is acknowledged. Access 20.4.22.

[A] DIRECTIVE (EU) 2019/ 944 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL - of 5 June 2019 - on common rules for the internal market for electricity and amending Directive 2012/ 27/ EU (europa.eu)
<https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32019L0944&from=EN>

[B] IEC TC 57 <https://www.iec.ch/ords/f?p=103:7:511571509228708::::FSP_ORG_ID,FSP_LANG_ID:1273,25>

[C] 3GPP TR 22.867: "Study on 5G smart energy and infrastructure".

BEGIN SECOND CHANGE

3.1 Terms

For the purposes of the present document, the terms given in 3GPP TR 21.905 [1] and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in 3GPP TR 21.905 [1].

**~~Distribution System Operator:~~** ~~This is an energy utility service provider that is responsible for delivery of energy to energy consumers.~~

**Distribution System Operator**: a natural or legal person who is responsible for operating, ensuring the maintenance of and, if necessary, developing the distribution system in a given area and, where applicable, its interconnections with other systems, and for ensuring the long-term ability of the system to meet reasonable demands for the distribution of electricity, see Article 2, definitions in DIRECTIVE (EU) 2019/ 944 [A].

SCADA: the operating system in energy company. This is for controlling the power grid. The management system of power grid is standardized by IEC TC 57, see Dashboard, scope [B].

3.2 Symbols

For the purposes of the present document, the following symbols apply:

<symbol> <Explanation>

3.3 Abbreviations

For the purposes of the present document, the abbreviations given in 3GPP TR 21.905 [1] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in 3GPP TR 21.905 [1].

DSO Distribution System Operator

SCADA Supervisory Control And Data Acquisition

BEGIN THIRD CHANGE

# 5 Concepts

## 5.R Energy Service is Critical for Telecommunications Service Availability

It is important to note that energy outages are one of the principal factors that in telecommunication service availability failures.

Ofcom analyzed service outages between September 2019 and August 2020 in the UK and found that power cuts were the #2 most common causes of telecommunications failure incidents during that period. [X]

ENISA analyzed European data and found that in 2019, the second most common cause of telecommunications service failure were power cuts. " Power cuts are the second most common detailed cause: Overall, independent from the underlying root cause, power cuts are either a primary or a secondary cause in over a fifth of the major incidents." [Y]

Governments in each country settle requirements for reporting of failure of power grid. In some cases, the the consumer can claim economic compensations due to caused damage.

As a common principle in all countries worldwide, a state autority is responsible to report failures on a yearly basis in the power grid but deviations do exist.

The telecom network can be impacted by external factors, specifically by the power grid. If there is a failure in the grid, then the faulty part needs to be disconnected to avoid risk for fire or human injuries due to short circuit. Further, the telecom network requires electricity and has a limited capacity to operate without energy from the power grid.

The telecom network can be impacted due to internal power system failure at the site. This can be a short circuit or damaged batteries. This is part of telecom operator’s incident management or fault management system and out of scope of this study.

The startup of electrical power grid can be cumbersome. As common a top-down approach is performed in centralized energy distribution system. However, in future a bottom-up approach may be the best alternative, since some of the micro grids may still work to the extent that they can operate autonomously. Detailed assessment of micro-grids is outside the scope of this study.

Each country sets their own requirements and regulations for the energy sector and telecom sector operating in that country. It is common for there to be the following regulation:

* Telecom act is controlling the telecom regulation. This is setting requirement for how the telecom service in the country is handling. This can include reliable operation.
* Energy act is controlling the energy regulation

Disaster act is giving guidance when major problem is impacting the countries.Network Operators do have backup system installed at site since they are operating a mobile network 24/7. There can be external power failure and then the backup system can have internal problem or limited capacity.

BEGIN FOURTH CHANGE

# 6 Business use cases and potential requirements

## 6.A Business use case Energy Outage Coordination current practice

### 6.A.1 Description

Energy outage incidents occur as a result of storms, accidents (e.g. a distribution line is broken due to construction work) and other unforseen factors beyond the control of the energy utility operator. When an energy outage occurs, it will affect a specific region. Service contracts and regulations make a rapid recovery of energy essential.

If the power grid is faulty, then the energy utility operator localizes the fault to solve the problem and perform necessary recovery actions. Some power grid equipment may also require “manual” actions for equipment that are not capable of remote management and automatic recovery. Other equipment can be remotely managed by means of smart energy services that allow recovery operations without requiring manual intervention.

There are several Smart Energy services that can greatly increase the recovery time: SCADA for remote control and monitoring of distribution systems and Distribution Automation specifically are quite important. Without these services it is generally necessary to send a technician to affected sites. While Smart Energy services cannot entirely eliminate the possibility of manual intervention (e.g. to restore damaged cables, etc.) in many cases, hours of service interruption can be reduced to minutes or even seconds.

Smart Energy services depend on telecommunications, increasingly. If there is an energy outage that affects telecommunications services in the same area where recovery is required, then there is a 'vicious circle': The energy system requires telecommunications to support smart energy services for a rapid recovery. The telecommunication system requires energy services in order to function at all.

This use case considers how this unfortunate system is addressed today.NOTE: An energy utility operator is a more general term than a DSO. For the purpose for the purpose of the use case, the term DSO is more appropriate, while the more general term is applicable to the motivation above.

### 6.A.2 Details

The ambition of a DSO is to provide an always-on electricity service, with the agreed quality and the costs fixed by Regulators. DSOs understand the criticality of some electricity services they provide (e.g., hospitals), and try to prioritize the availability of these services. This applies not only to business-as-usual situations, but to disaster recovery circumstances. There are plans to provide emergency electricity service through ancillary devices, but also to restore the service in selected areas considering priorities.

MNO services are also considered in these plans. Although many institutions (blue light services) do not depend on MNO networks for disaster recovery, MNO public service is highly relevant for regular citizens. Thus, energy utility operators find that helping MNOs to recover their normal electricity service is relevant for the society.

A second aspect of the above is to be considered with the MNO service for energy utility operators. DSOs do not rely on MNO service to help recover the grid from a blackout, as they know that there is no certainty that the MNO will work when needed in a blackout.

It is acknowledged that it would be of great value, if upon blackout recovery circumstances, some procedures and supporting management operations existed to allow DSO service recovery through the MNO network. Unfortunately, these procedures and standards specifically to support management coordination for recovery from energy outage event coordination between DSO and MNO networks do not exist. See 3GPP TR 22.867 [C] for more details.NOTE: It is acknowledged that 3GPP does not specify procedural standards.

Communication between DSOs and MNOs for resolving incidents might be necessary. As there are so many actors (DSOs and MNOs) and each DSO has only information about a limited part in energy sector, resolving the incident could be very complex.

### 6.A.3 Use case actors

**DSO response team member**: A representative of the DSO's incident response team who is responsible for communication with service providers, officials and key customers during power cuts.

**MNO service desk team member**: A representative of a mobile network operator's incident response team who can be reached by 'enterprise customers.'

Editor's Note: The term 'MNO' will be reviewed, as it may need to be aligned with terminology in TS 28.530.

### 6.A.4 Use case service flow

1. An energy system incident occurs in which a power cut results.

2. A DSO response team member may contact a MNO service desk team member. The DSO informs the MNO of the incident and the expected time until its resolution. It is usually not required by regulations and often not required by service contract that the DSO inform the MNO except as they would 'any energy service customer.'

3. The MNO may have the capability to continue to operate their network despite the power cut for a limited time, as they may support an uninterruptable power supply capability in the affected region. The DSO will not know this.

4. The DSO may have the ability to restore energy services rapidly using Smart Energy Services. However, the DSO does not have any means to identify this opportunity nor IT support to coordinate their recovery with the MNO so as to provide communication services for this operation. The DSO cannot use their Smart Energy Services to accellerate recovery and must send a technician to affect manual operations to restore electrical services.

**Service flow result**

The power cut is resolved manually. Even if there is the possibility to intervene using Smart Energy Services, lack of telecommunications service during the power cut prevents this. There is no standard based coordination of energy system recovery between the MNO and DSO, so only ad hoc communication regarding energy system recovery is possible.

### 6.A.3 Potential requirements

TBD.

END OF CHANGE