



Senato della Repubblica

Ufficio Valutazione Impatto
Impact Assessment Office

FOCUS

Reconstructing. L'Aquila, Po Valley, Central Italy: post- earthquake plans and resources

August 2018

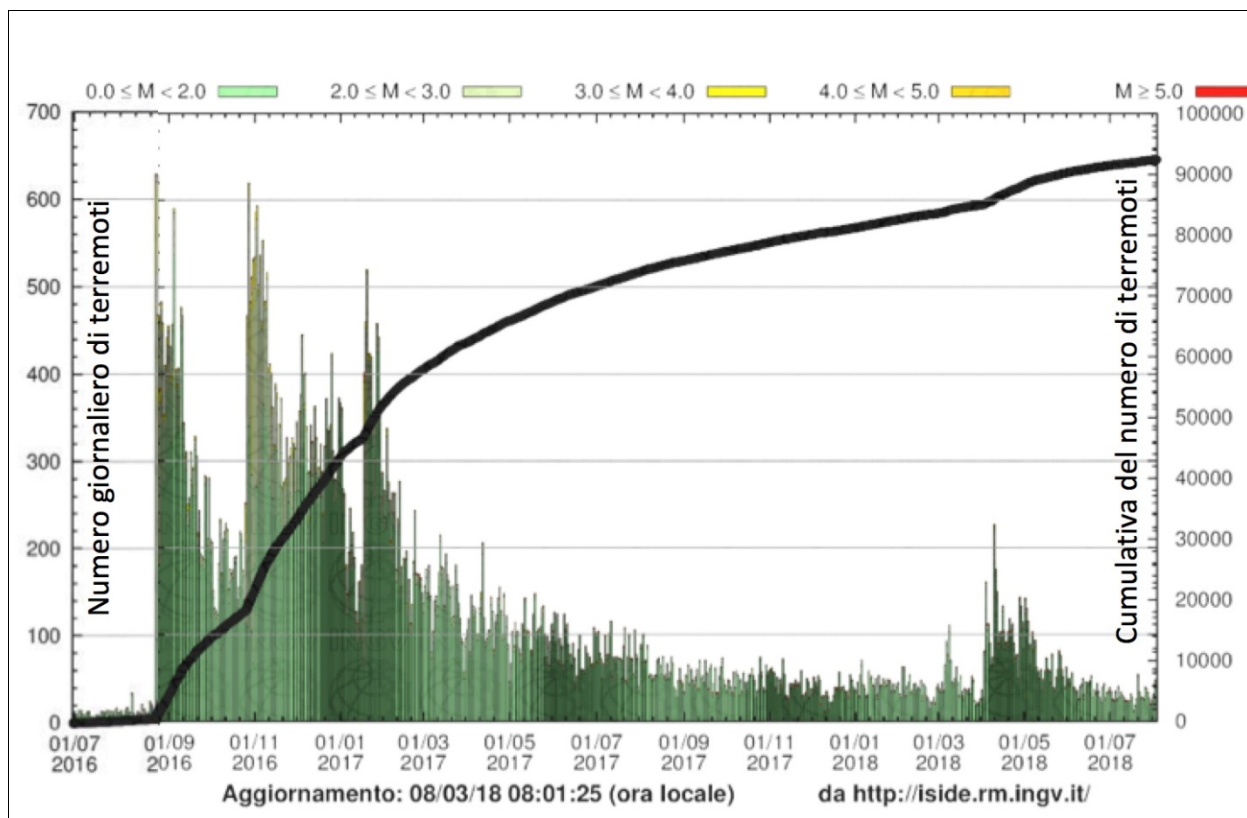
*On **24 August 2016, at 3:36 am**, an earthquake measuring 6.0 on the Richter scale rocked Central Italy, destroying the towns of Accumoli, Amatrice, Arquata and Pescara del Tronto. At 4:33 am, another 5.4 magnitude quake devastated Norcia. As of that moment, Umbria, the Marches and Abruzzo never stopped shaking: the national seismic network of the INGV (National Geophysics and Volcanology Institute) has recorded **over 92,000 quakes** in the epicentre region over the past two years.*

The destructive seismic sequence left in its wake an impressive death toll as it shattered the economy and destroyed cultural heritage sites. The material damage, estimated by the Civil Defence to be about 23,530,000,000 Euros, adds on to the significant damage previously caused by the quakes that struck L'Aquila in 2009 and the Po Valley in 2012.

*This paper analyses the financial resources allocated to deal with the aftermath of the three earthquakes (totalling **40.58 billion Euros between 2009 and 2047**) and describes, for the latest quake, **an increasingly complex regulatory framework**, which is hard to interpret and implement. The **response to the people's housing emergency** is also being examined.*

The Starting Point

Italy is an earthquake-prone country. From the year 2000 to present day, the INGV national seismic network has recorded 39 quakes topping a magnitude of 5, ten of which in 2016 and 2017. About 72,400 tremors were recorded in the first 12 months that followed the seismic sequence that began on 24 August 2016, and 20,000 more in the second 12 months (latest update: 6 August 2018).

Figure 1 – July 2016 – August 2018. Daily quakes and cumulative frequency

Source: INGV

Seismic activity in 2016-2017 developed in an area lying between the 1997 sequence (Umbria-Marches) to the north, and the 2009 sequence (L'Aquila). **From 24 August 2016 to 6 August 2018, 92,526 tremors were recorded in central Italy.** Seismic activity peaked three times (24 August 2016, 30 October 2016, 18 January 2017) and **increased in April 2018**. From 1 July 2016 to 23 August 2018, basic seismic activity was below 10-15 events per day. Today, it reaches 35-40 over the 24-hour period, and this proves that **the seismic sequence is not over yet**: it will take months, or perhaps years, to go back to the previous situation.

What do seismologists say?

Italy stands on the border between three lithospheric plates: the Adriatic one, the European one and the African one. The converging or diverging movement between these plates causes a build-up of energy and deformation, which are occasionally released as earthquakes, with a variable magnitude.

Every year, the national seismic network of the INGV (National Geophysics and Volcanology Institute) records roughly 20,000 earthquakes, the vast majority of which have a very low magnitude (less than 2.0). **But in 2016, over 53,000 quakes were recorded.** Compared with the previous years, the number of quakes increased significantly: more than double vis-a-vis 2014 and more than triple compared with 2015.

Seismic activity in 2014 and 2015 was characterised by many seismic sequences (sizeable too, such as the one that rocked the Gubbio area), while the many quakes of 2016 were mainly due to the **seismic sequence in central Italy that began on 24 August**: starting from the quake that destroyed Accumoli, Amatrice, Arquata del Tronto and Pescara del Tronto, up to 6 August 2018, **95,526 tremors were recorded in the area, nine of which with a local magnitude exceeding 5 and 67 with a local magnitude between 4 and 5.**

Table 1 -Central Italy, Po Valley, L'Aquila: allocated resources, 2009-2047 (million Euros)

Quakes	2009-2017	2018-2047	Total
Central Italy	3.267	11.432	14.698
Emilia region and neighbouring areas	4.304	4.102	8.406
L'Aquila	12.616	4.860	17.476
Total	20.187	20.394	40.581

Source: UVI. The table does not consider the resources allocated to the single local bodies for assigning the financial slots set forth under article 1, paragraph 492, letter Oa) of Law no. 232 of 2016, enforcing the so-called "National vertical solidarity pact": the Ministerial Decree of 26 April 2017 allocated, for 2017, about 7 million Euros for the overall investments to be made in the towns inside the earthquake-struck perimeter, while Ministerial Decree no. 20970 of 9 February 2018 has allocated, for 2018, almost 24 million Euros.

Table 2 - Central Italy earthquake: overall allocated funds 2014-2047 (million Euros)

Centro-Italia	2014-2020	2016	2017	2018	2019	2020	2021	2022	2022-2047	2023	2024	2025	2021-2047	2026-2047	Totale
D.L. 189/2016		847,0	475,2	88,9	70,3	23,0	11,9								1.516,3
D.L. 244/2016 (Proroga termini)			32,0												32,0
L. 232/2016 (L. bilancio 2017)	300,0		300,0	500,0	550,0	350,0	200,0		5.200,0						7.400,0
D.L. 8/2017			547,4	261,1	4,0	10,8	8,8		228,0						1.060,0
D.L. 50/2017			979,6	990,7	965,5	-37,5									2.898,3
D.L. 91/2017			0,2	5,2	0,1	0,1	50,1	50,1		50,1	50,1	50,1		1,1	256,8
D.L. 148/2017			85,2	170,4											255,6
L. 205/2017 (L. bilancio 2018)				87,9	4,3								1.000		1.092,2
D.L. 55/2018				91,0	88,1	8,2									187,3
Totale	300,0	847,0	2.419,5	2.195,2	1.682,2	354,5	270,7	50,1	5.428,0	50,1	50,1	50,1	1.000	1,1	14.698,5

Source: UVI. The value of the 2014-2020 period refers to the use of resources of the structural funds' operational programmes for 2014-2020.

Financial analysis

The government plans to allocate **40.58 billion Euros**, between 2009 and 2047, to reconstruct the areas devastated by the last earthquakes; **about 1.8 billion Euros** have been allocated over the past year.

Almost 85% of the funds allocated for the three quakes **are for reconstruction**, 9% are aimed at supporting productive activities, almost 4% are for the local public administration and 2.5% are for addressing emergencies.

From September 2017 to July 2018, **three new funding measures** were approved.

- Decree-law no. 148 of 2017 (fiscal decree) **considerably postponed tax payments** for taxpayers living in the ar-

eas of central Italy affected by the earthquake.

- The budget law for 2018 (no. 205 of 2017), aside from updating tax benefits and granting municipalities a deferral on mortgage instalments, refinanced, **with 1 billion Euros, public reconstruction in central Italy.**

The budget law also introduced measures for

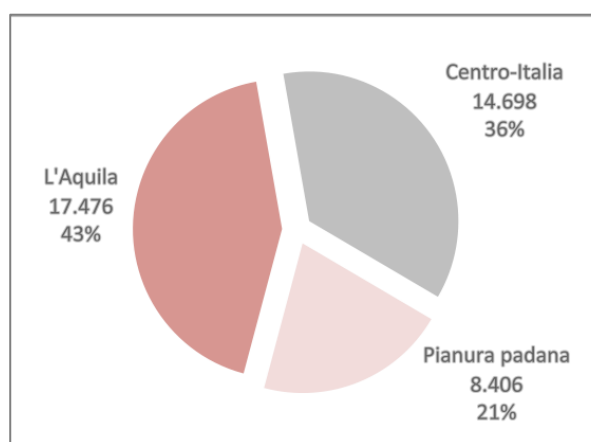
- **the Po Valley** area, rocked by the 2012 quake, by allocating **9 million Euros**, on a yearly basis, to grant 25-year mortgages for public reconstruction and extending – through an allocation of **10 million Euros** – allowances for the free urban zone of Lombardy municipalities;
- the areas of **Abruzzo** destroyed by the 2009 quake, by allocating an extraordinary sum of **2 million Euros** to the mu-

municipalities falling within the quake-affected perimeter and 10 million Euros to L'Aquila.

The Earthquake Decree-law (no. 55 of 2018) envisages an allocation of almost **190 million Euros for the 2018-2020 period**, introducing or extending tax-related benefits to citizens and enterprises in the affected regions of **Central Italy**.

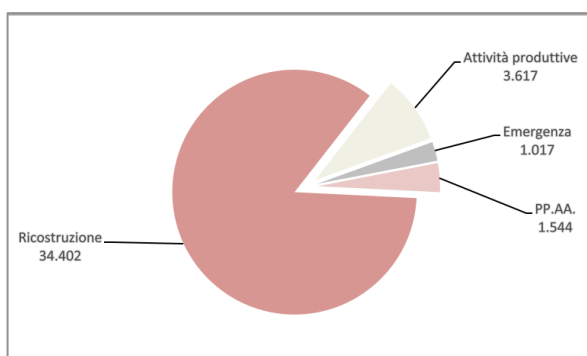
The budget law also introduces measures for **preventing** seismic risks, while decree-law no. 50 of 2017 allocated 202 million Euros for the designing and purchase of anti-seismic houses.

Figure 1 – Sharing out of allocated resources



Source: UVI

Figure 2 – Purposes of allocated resources



Source: UVI; L-R (clockwise): Reconstruction, Productive Activities, Emergencies, Public Administration Offices

The planned resources for public reconstruction measures envisaged by the extraordinary commissioner's decree currently total 1.931 billion Euros.

Regulatory analysis

The first year that followed the strong quake of 24 August 2016 was characterised – owing to

the seismic series that followed – by the need to constantly update the laws, since the perimeter had to be extended and because of the new, different requirements of emergency handling.

One year after the quake, **three decree-laws** (greatly amended and modified), **35 extraordinary commissioner's decrees** and **26 Civil Defence orders** had been passed. The post-earthquake benchmark text, decree-law no. 189 of 2016, had been amended several times.

Between August 2017 and August 2018 **further regulatory measures** were approved, through **emergency decrees** (which still seem to be the most commonly used channel for earthquake-related laws) and **decrees** (so far, **61** of the extraordinary commissioner and **35** of the Civil Defence). Further provisions are set forth under the **budget law 2018**.

Earthquake Decree (no. 55 of 29 May 2018). This decree extended the state of emergency for the third time and introduced a pardon for unauthorised constructions in the affected areas of Central Italy. It confirmed the suspension of mortgage and tax payments and provided indications for the recollection of the funds assigned to Abruzzo-based enterprises following the 2009 quake (and not only that), declared illegal by the EU.

Fiscal Decree (no. 148 of 16 October 2017). This decree modified the regulation for the reconstruction of Central Italy, it postponed tax payments, extended contracts for the personnel hired in the special post-2009 offices and extended the state of emergency in the municipalities affected by the 2012 quake.

Ministry Reorganisation Decree (no. 86 of 12 July 2018). This decree transferred to the Presidency of the Council of Ministers the functions of the eliminated Department Casa Italia.

Mille-proroghe Decree (no. 91 of 25 July 2018). This decree postponed by one year the payment of utility bills (water, electricity, landlines and insurance) for the earthquake-affected people of Central Italy, and it amended the criticalities of the pardon for post-quake unauthorised buildings (including in areas subject to landscape protection restrictions).

Budget law 2018 (no. 205 of 27 December 2017). This measure extended the suspension of payments of mortgage instalments and IMU local property tax for the buildings destroyed by the 2012 quake. It offered a similar suspension for condemned buildings in Ischia, postponed the payment of mortgage instalments in the Ischia-area municipalities and in the quake-affected municipalities of Central Italy, set up a

fund for the reconstruction of Casamicciola and Lacco Ameno (9.9 million Euros for 2018, 19.38 million for 2019 and 19.69 million for 2020) and, finally, it provided for the classification of SAEs (emergency housing units) as municipal assets.

Two years after the earthquake, the reconstruction regulatory framework still appears not to be fully defined.

The dominating trend seems to be that of a **very consistent regulatory stratification** that makes it **difficult to enforce and interpret the provisions themselves**, as reported by the extraordinary commissioner and by the subjects involved in the reconstruction.

The state of emergency, recently extended for the third time, has not come to an end.

Europe? It funds, monitors and recollects. The Abruzzo case

The support the EU announced it would give to Italy has been crucial: after an advance payment of **30 million Euros** in December 2016, the European Commission undertook to allocate financial aid totalling **1.2 billion Euros** and to exclude emergency and reconstruction costs from the stability pact. A structural amendment to the EU norm on financial aid following natural disasters set forth the possibility of establishing a separate priority axis, envisaging a **co-financing rate up to 95%**. But due monitoring follows.

In **2011** the Commission found out that **several measures introduced by the Italian government between 2002 and 2011** to cut taxes for enterprises whose legal head office or operational office was based in the areas affected, between 1990 and 2009, by the following natural disasters:

- earthquake in eastern Sicily in 1990
- floods in northern Italy in 1994
- earthquake in Umbria and the Marches in 1997
- quake and Mt Etna eruption in 2002
- earthquake in Molise and Apulia in 2002
- earthquake in Abruzzo 2009

In the **Abruzzo region** in particular enterprises had enjoyed **suspensions and postponements of tax payments** up to 30 November 2009. The overall sum was then reduced by 60%.

The Commission conducted an inquiry that ended in 2015, with a decision **against Italy**: such measures represented **State aid not compatible with the internal market**. Furthermore, not asking the enterprises to prove the total damage suffered, nor the direct nexus between aid and damage, all entrepreneurs with a legal head office based in the quake-affected areas declared by the Italian authorities benefited from such aid, regardless of them having suffered damages, being physically present or conducting an economic activity on the site.

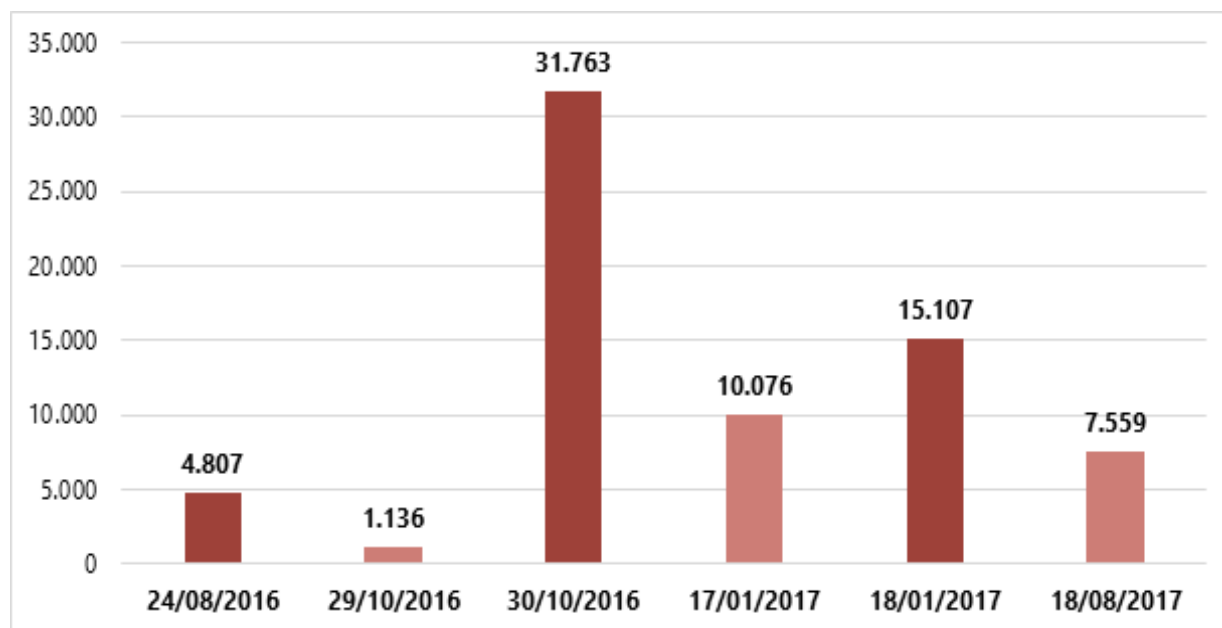
On 14 August **2015**, The European Commission therefore ordered the Italian authorities to recollect the state aid allocated to Abruzzo-based enterprises and other recipients with no operating office in the areas affected by natural disasters. As for the financial aid allocated to entrepreneurs in eastern Sicily, Apulia and Molise, the Commission acknowledged that recollecting them is impossible, considering that in Italy, keeping administrative documents and bookkeeping entries is no longer compulsory after ten years.

On 14 November **2017** the Italian government appointed an **extraordinary commissioner for the recollection of State aid declared to be illegal**. The procedure apparently is about **75 million Euros**, involving **320 enterprises** and natural persons in Abruzzo alone. However, considering that between 2009 and 2011 the European Union raised the irrelevance threshold of the *de minimis* state aid regulation, from 200,000 Euros to **500,000 Euros** (the so-called **Temporary Framework**), the local authorities in L'Aquila asked – awaiting official talks with the Commission on the matter – that such threshold be enforced for Abruzzo enterprises too, excluding from the procedure those who received up to 500,000 Euros as state aid, instead of 200,000 Euros.

The **Earthquake decree** established a **term of 180 days**, as of the announcement of the recollection, **to submit documents and remarks** to the extraordinary commissioner. The ***mil-leproroghe* decree** extended this term to **300 days**.

A closer look. The response to the housing emergency

Figure 3 – Central Italy earthquake: population directly assisted by the Civil Defence (2016-2017)



Source: UVI processing of data taken from the Civil Defence http://www.protezionecivile.gov.it/jcms/it/assistenza_alla_popolazio.wp

After the first tremors of 24 August 2016, **43 shelter camps** were set up, and **temporary shelter** was offered in the available habitable multi-purpose facilities (gymnasiums and indoor stadiums). At the end of October only one single shelter camp was still open: the vast majority of the people had found alternative solutions.

On 30 October, following new collapses, the homeless population directly assisted by the Civil Defence reached its peak: **almost 32,000 people**. A similar situation (15,000 homeless) emerged after the quakes of 18 January 2017.

On 18 August 2017 about **7,500** people were still directly assisted by the Civil Defence. Plus, over **40,000 more were assisted in other ways**, particularly through the CAS (contribution for autonomous resettlement). **Two years after the earthquake**, assistance to the population included the aforesaid CAS measures and hospitality in hotels, containers and SAEs (emergency housing units).

Containers must meet **short-term requirements** and must have a **limited impact** on the territory: they are supposed to be **removed** when no longer required. In March 2017, based on the requirements identified by the mayors, **1,306 containers** had been installed in nine municipalities (seven in the Marche, two in Umbria). On the day of the third quake (18 January 2017), most of the containers were still being installed, with a few differences between Umbria and the Marche. **The installation was completed in March 2017, 7 months after the earthquake of 24 August.**

Table 3 – Contributions for autonomous resettlement

Region	People
Abruzzo (as at June 2018)	4.638
Lazio (as at November 2017)	2.025
Marches (as at April 2018)	28.036
Umbria (as at July 2018)	5.212
Total	39.911

Source: Data published by the regional governments of Abruzzo, Lazio, Marche and Umbria

Table 4 – People living in hotels

Region	People
Abruzzo (as at June 2018)	999
Lazio (as at July 2018)	120
Marches (as at September 2017)	3.400
Umbria (as at July 2018)	7
Total (early summer 2018)	1.126

Source: Civil Defence data, processed by UVI

Table 7. SAEs (emergency housing units) requested and delivered: situation as at 31 July 2018

Region	First SAEs requested by the mayors	SAEs requested after 27.11.2017	Total SAEs requested	SAEs delivered to mayors as at 31.07.2018
Abruzzo	238	62	300	217
Lazio	824	3	827	815
Marches	1.825	123	1.948	1.720
Umbria	752	28	780	748
Total	3.639	216	3.855	3.500

Source: Civil Defence data, processed by UVI

Table 5 – Installed Containers (March 2017)

Municipality	Containers
Amandola	37
Caldarola	21
Camerino	346
Petriolo	12
Pieve Torina	74
Tolentino	299
Visso	51
Marches total	840
Cascia	81
Norcia	385
Umbria total	466
Overall total	1.306

Source: Civil Defence data, processed by UVI

The temporary rural housing units (**MAPRE**) are meant to be a **short-term** solution assigned to **farmers** until their homes are declared to be habitable. In August 2017, **225** were being either assigned or delivered.

The **SAEs** (emergency housing units, the so-called “little houses”) are **medium-long term** solutions that allow the people to **stay in their own territory** whilst finding them a home. They are assigned to people whose houses are in the red zone and have been declared condemned or have suffered very heavy damage. The SAEs are anti-seismic, can be dismantled and recon-

verted, and are considered by the Civil Defence to be suitable in all weather conditions. Surface area ranges from 40 to 80 square metres and they cost less than € 1,100 per square metre.

Table 6. Housing units for farmers

Region	MAPRE
Abruzzo (delivered)	11
Lazio (made)	59
Marches (made)	98
Umbria (assigned)	57
Total	225

Source: Civil Defence data, processed by UVI

According to the Civil Defence's outlook, the instalment of SAEs requires **about seven months**, while data suggests **longer periods on average**. From the actual delivery to the enterprises operating in the SAE-assignment area – once completed all bureaucratic procedures – to the final delivery to the mayor, it takes **eight months on average**:

- 7.9 months in Abruzzo
- 7.2 months in Lazio
- 9.1 months in the Marches
- 7.7 months in Umbria

At **31 July 2018**, **3,855 SAEs** have either already been assembled or are being assembled: 51% in the Marches, 21% in Lazio, 20% in Umbria, 8% in Abruzzo.

The **completion percentage of the areas** where SAEs are to be installed is currently **85%**: 63% in Abruzzo, 97% in Lazio, 83% in the Marches and 91% in Umbria.

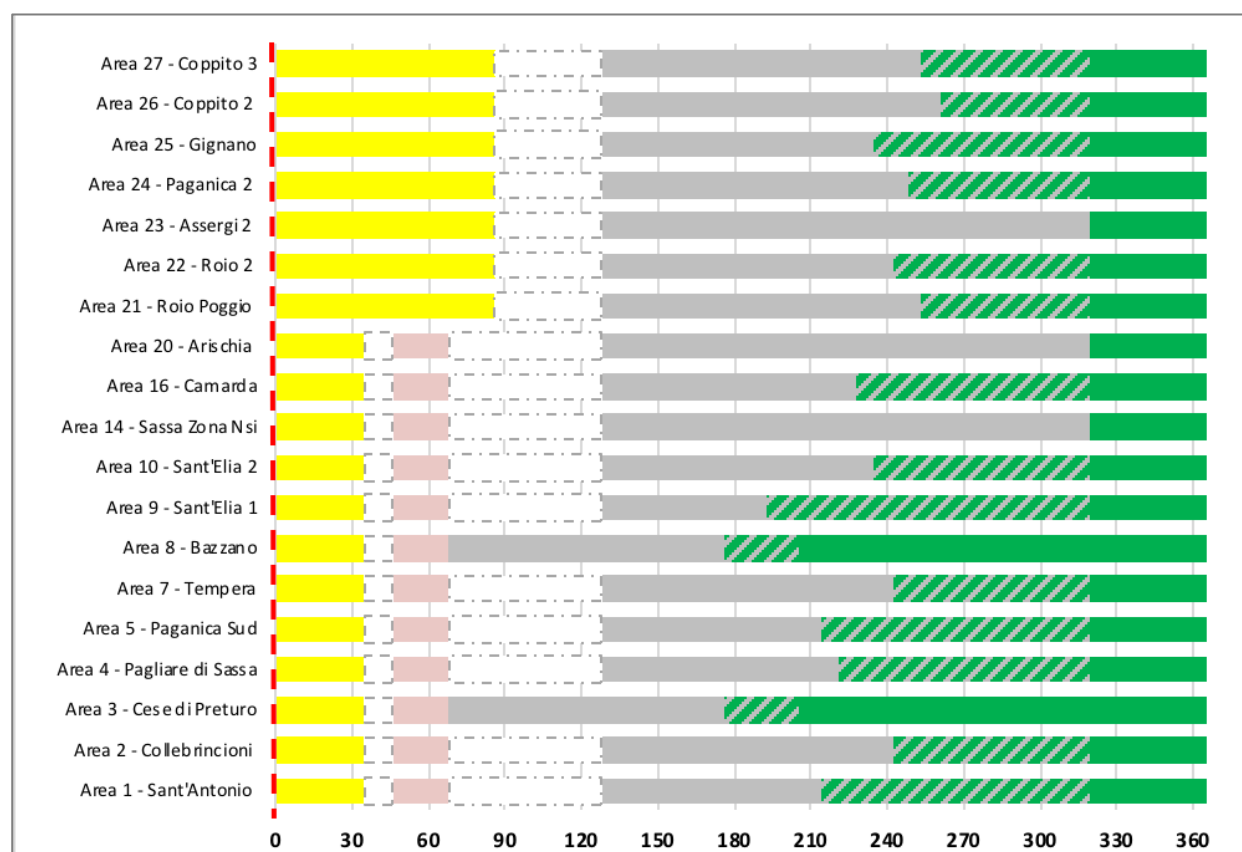
The SAEs currently being assembled may host between **8,500 and 13,500 people**.

A comparison. The Abruzzo 2009 experience.

A part of the quake-affected population in Central Italy – particularly in Lazio and Abruzzo – was assisted, in terms of housing, with the **CASE** (Sustainable and Environment-friendly Anti-seismic Compounds) and **MAP** (Temporary Housing Units) solutions available (**previously used after the 2009 and 1997 quakes in Abruzzo and Umbria respectively**).

CASE solutions were set up in **19 areas** of the L'Aquila municipality, they are **permanent** and include **185 two or three-floor earthquake-proof buildings** that rest on seismically isolated foundations, offering a total of about **4,500 apartments** that can host up to **14,500 people**. These are actually entire neighbourhoods designed in compliance with sustainability criteria and made using suitable material indicated by the Civil Defence.

Figure 4 – Duration of CASE assembling in the L'Aquila municipality (at 6 April 2010)



Source: Data provided by the Civil Defence and taken from "L'Aquila. Il progetto C.A.S.E." Costruttori for C.A.S.E. IUSS Press by various authors, processed by UVI

L-R: area identification; pause; enterprise identification; pause; yard; yard/delivery; delivery.

As for the completion of the apartments, **duration varied**: the first 300 were delivered to the citizens on 29 September 2009, **less than 8 months after the quake**. As of that date, every week over 200 apartments were delivered on average, the last ones being delivered before the end of February 2010 (less than 11 months after the quake) The overall number of people living in CASE units in February 2010 was **14,653**

The **MAPs** (temporary housing units) are similar to the SAEs assembled after the earthquake that struck Central Italy. Overall, **3,535** were assembled (369 of which donated): 1,273 (160 donated) in the L'Aquila municipality, in 21

districts, on 26 areas; 2,262 (209 donated) in other 50 municipalities in the quake-affected perimeter, on 115 areas. The call for bids envisaged a cost of €760 per square metre for the single MAP.

Detailed data for L'Aquila's single areas and phases are not available, with the exception of the Arischia area, where – on 31 March 2010 – all the 1,113 expected MAPs were assembled. According to the data concerning assistance given to the population, provided by the Commissioner for Reconstruction in Abruzzo, **on 1 June 2010 the MAPs in the L'Aquila municipality were hosting about 2,100 people**.

In the other municipalities of the perimeter, **delivery of MAPs began on 31 October** in Barete (L'Aquila) and it carried on in the subsequent months, but the **procedure completion dates are not available**.

In March 2011 the overall number of people living in MAPs was **2,881 in the L'Aquila municipality and 4,231 in the perimeter**.

What about private reconstruction?

According to the data submitted to the Senate by the extraordinary commissioner for reconstruction in June 2018, 18 months after the seismic sequence was triggered, **2,600 post-quake repairs projects**, including the strengthening of slightly damaged buildings, had been presented. At 8 June 2018, **1,442 decrees granting funds** had been issued, **983 of which concerned reconstruction** and 459 for temporary relocation, worth a total of **146 million Euros**. **More than 1,000 reconstruction yards are currently open**.

From Friuli to Central Italy: comparing reconstruction periods

In **Friuli** (1996 earthquake) the average amount of time people had to wait to return to their homes was **three years (for slightly damaged houses) and ten years (for seriously damaged houses)**. In **Umbria**, after the 1997 quake, yards for light reconstruction were opened at the end of the second year and the vast majority of works were completed within four years from the seismic sequence. **Heavy reconstruction** of isolated buildings began three years after the quake and ended **ten years** after.

In **Abruzzo** too, according to the extraordinary commissioner, **the repairing of slight damage was done quite swiftly**. As for the **Po Valley** (2012 quake), in the first four post-quake years, funds were granted for **slightly damaged buildings** and the works are now **almost all completed** (96% of the allocated funds has been used). As for **heavy reconstruction**, **65% of grants** have been issued and the allocated funds total 70% of the opened yards. In the Po Valley it is safe to assume that reconstruction **works were completed within 8-9 years** of the seismic crisis. That kind of timing seems to be confirmed for **Central Italy** as well: **18 months after the seismic sequence began, 2,600 projects** had been presented for the repairing and strengthening of damaged buildings.

Conclusions

From September 2007 to July 2018 **new financing measures** were approved for quake-affected areas and people, for a total of 1.8 billion Euros, thus raising the overall allocation **(for 2009-2047) to 40.581 billion Euros**.

The sums allocated for Central Italy currently total 14.698 billion Euros, which accounts for 36% of the total. Funds for the L'Aquila quake top the list with 17.646 billion (43%), while 8.4 billion were allocated for the 2012 quake.

Typically, less funds have been allocated for **preventing** seismic risks: 202 million Euros were allocated by decree-law no. 50 of 2017, plus the newly introduced tax allowances for the anti-seismic renovation works of IACP (council housing autonomous institute) buildings, as provided for by the budget law for 2018.

Two years after the earthquake, the **regulatory framework** for reconstruction in Central Italy apparently still has not been defined. Between August 2017 and August 2018, **further regulatory measures** have been approved,

through **emergency decrees** (still the preferred regulatory means when it comes to earthquakes) and **ordinances**. Plus, we have further provisions set forth under the **budget law 2018**. The tendency is that of a **very consistent regulatory stratification that makes it difficult to enforce and interpret the provisions themselves and calls for** – as the extraordinary commissioner pointed out in parliament – **an overall reorganisation of the framework**.

The **answer to the housing emergency**, due – among other things – to the complex bureaucratic procedures to be followed, varied considerably in terms of timing:

- the assembling and installation of **containers** was completed in March 2017, almost **seven months after** the first seismic events. Most of them still had not been assigned on the 18 January, day of the third quake.
- the assembling and installation of **SAEs** (emergency housing units) is yet to be completed: two years after the quake, **3,500 out**

of **3,855 (85%)** have been delivered. The theoretical operational phase lasts 7 months on average.

Remarks

The **frequent legislative measures** and the resulting **resource fragmentation** call for a **better prediction of economic and financial needs following seismic events**.

The remarkable experience gathered by Italy in managing post-quake emergency and reconstruction could perhaps lead to greater **standardisation of response measures** (legislative too) to seismic events, depending on the magnitude and intensity and on the repercussions on the several local realities. This could in turn **facilitate the planning of the resources required**, to be allocated consistent with the national and international commitments of public finance.

The dossier

Updates the picture of the financial resources allocated for the last three big earthquakes that rocked the country, as well as the resources allocated for prevention.

Updates the national regulatory analysis (emergency decrees, budget laws, amendments and ordinances), as well as the European regulatory framework.

Provides a first analysis (solutions, timing and procedures) of housing assistance

given to the people affected by the 2016/2017 quakes in Central Italy and the 2009 quake in Abruzzo.

Publishes, in its appendix, the **latest INGV data** on Italy's seismic situation.

This study was conducted by
LUANA IANNETTI AND MELISSA BOSCHI

Senate of the Republic

In collaboration with

NATIONAL GEOPHYSICS AND VOLCANOLOGY
INSTITUTE (INGV) for the part on seismic
activities

FRANCESCA TIRONI, ABRUZZO REGIONAL
COUNCIL, for the part on housing

Other collaborators:

SIMONE BONANNI, CRISTIANO LENZINI,
LAURA LO PRATO, VLADIMIRO SATTA AND
MAURIZIO SOLE

Senate of the Republic

Focus by

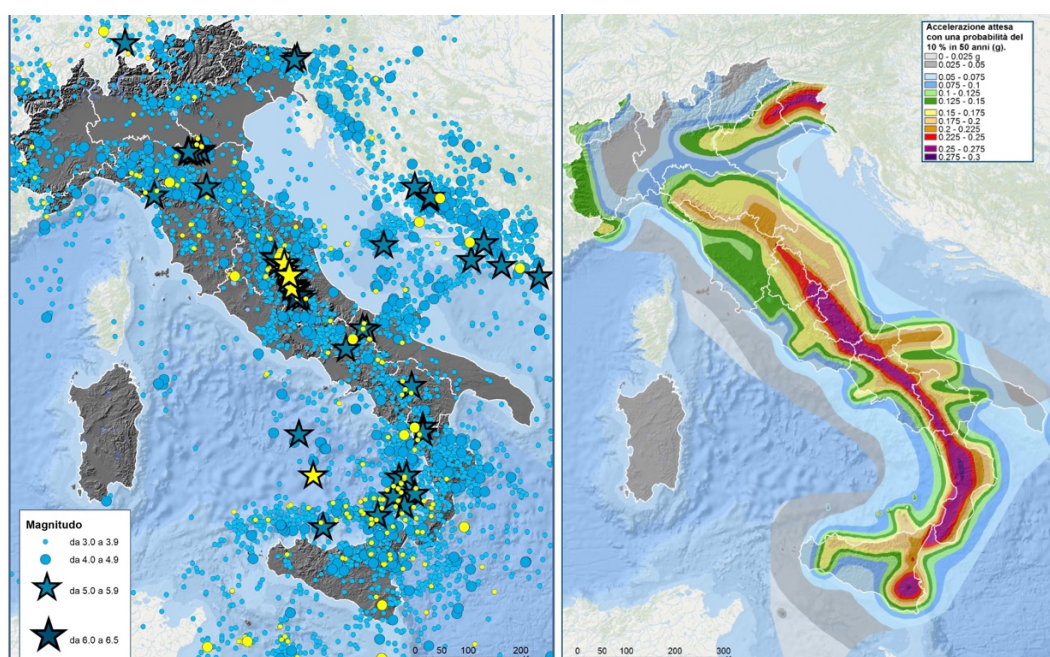
UFFICIO VALUTAZIONE IMPATTO – IMPACT
ASSESSMENT OFFICE

uvi@senato.it



Quest'opera è distribuita con Licenza
Creative Commons Attribuzione - Non commerciale
- Non opere derivate 4.0 Internazionale

Figures 5 and 6. Seismic activity map (1985-2017) and map of Italy's seismic risk areas



Source: INGV. To the left, the seismic activity map: the yellow stars indicate the 2016 and 2017 quakes.