

# Earthquake Risk Transfer for Iran

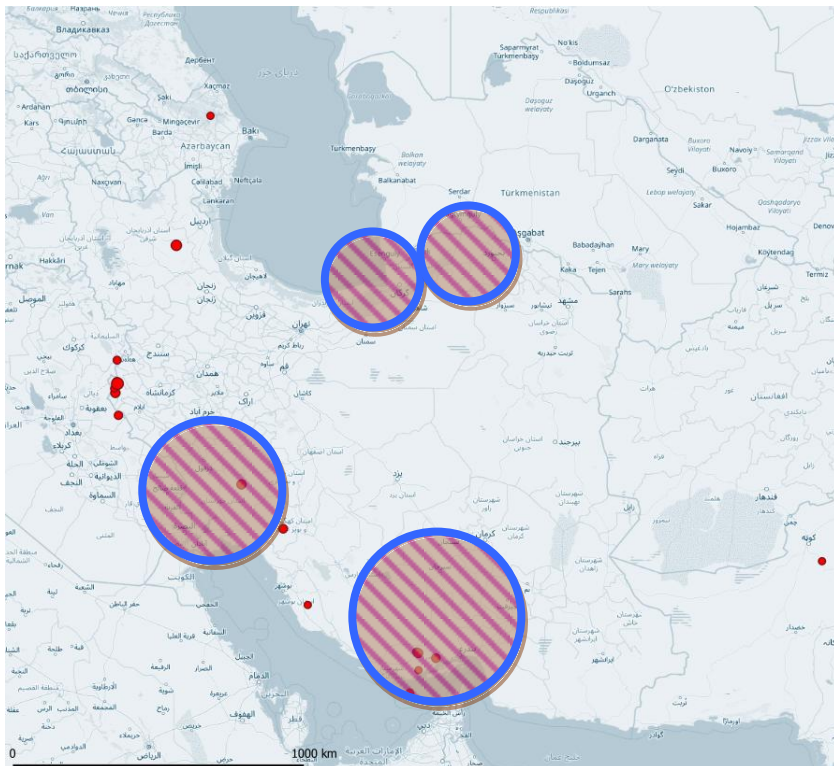


Figure 26. Hashed circles represent current Earling undercover regions.

Iran is crisscrossed by major geological fault lines and has suffered several devastating earthquakes in recent years. On 9 July, Earling issued a preparedness alert for the south of Iran focused on Hormozgan. On July 13, an M4.7 earthquake hit North of Bandarabbas, which followed by 2 M4.7 and M5.7 quakes struck Hormozgan province in the South of Iran on 22 July, a few hours after an M5.9 remained 287 injuries in West of Iran.



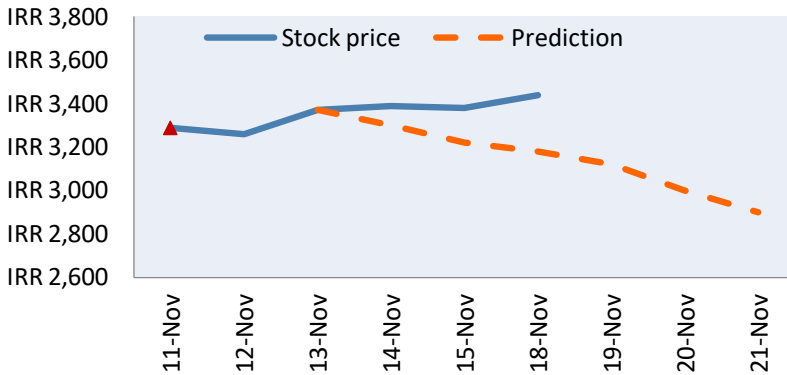


Figure 27. EPA effect in (vebimeh index) in Kermanshah 11 Mar 2017 earthquake. Earthquake insurance low percentage rate caused negligible insured losses. Earthquake losses were about \$784 million but insured losses were only \$2 million and caused the improvement in the stock market after the M7.3 earthquake. But it cannot be repeated when public EPA issued. New high-risk customer will move their risks to their insurances if insurances didn't prepare for it.

### Earling earthquake preparedness alerts

#### Hormozgan

Regions with pink color, receive more acceleration on the mean return period earthquakes in 50 years.

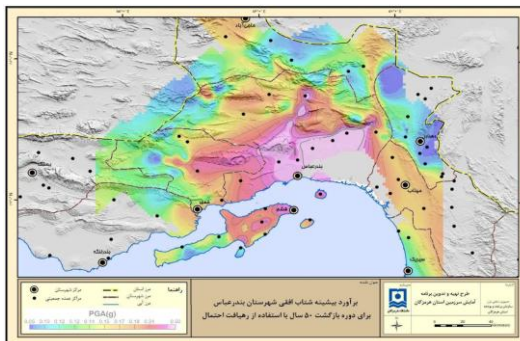


Figure 28. Hormozgan high-risk regions.



Figure 29. July 7, 2018, EPA followed by an M4.1 earthquake on July 13 in Hormozgan.



**F-E Region** Southern Iran  
**Time** 2018-07-13 09:03:24.7 UTC  
**Magnitude** 4.6  
**Epicenter** 57.13°E 27.95°N [📍](#)  
**Depth** 10 km  
**Status** C - confirmed [?](#)



Figure 30. GFZ reported an M4.1 earthquake hit Hormozgan in a few days after EPA issued by Earling.



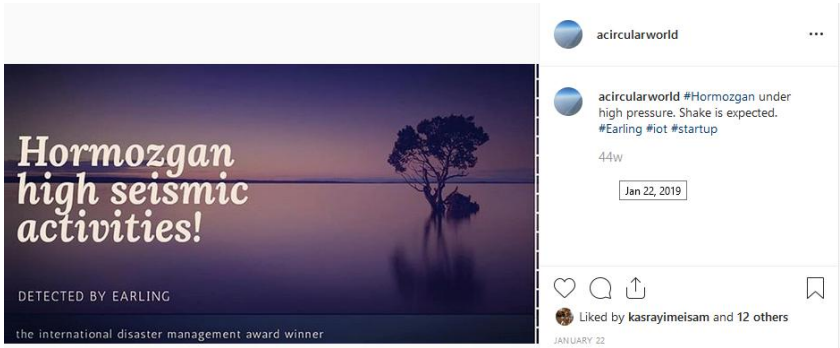


Figure 31. Jan 22, 2019, EPA<sup>5</sup>, which followed by an M4.0 earthquake in the region the day after.

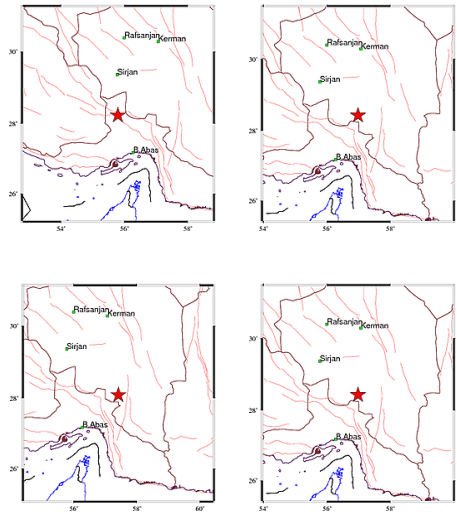


Figure 32. A couple of earthquakes recorded the day after EPA issued for Hormozgan in South of Iran

<sup>5</sup> <https://www.instagram.com/p/Bs8nHligfib/>





Figure 33. Sep 28, 2018, EPA<sup>6</sup> followed by a couple of earthquakes in the region the day after. The greatest one was M4.1.

## Golestan & Northern Khorasan

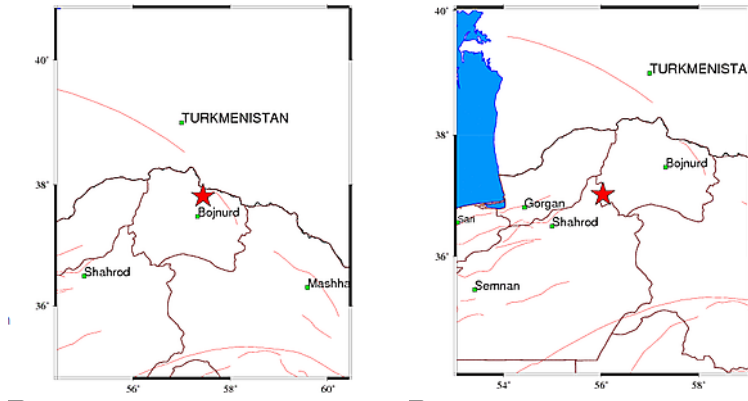


Figure 34. Alert issued for the marked region on 2 Oct 2019<sup>7</sup>.

<sup>6</sup> <https://www.instagram.com/p/BoQzz77FnMY/>

<sup>7</sup> <https://twitter.com/FarzadAzima/status/1179196537399910400>





**Magnitude 4.0, Golestan Province  
Friday, October 04, 2019 at 21:58:23 (UTC)**

**Date - Time:** Friday, October 04, 2019 at 21:58:23 (UTC), 1398/07/13 01:28:23 (local time in Tehran)

**Magnitude:** 4.0

**Magnitude type:** MN

**Location:** 36.66N, 53.88E

**Depth:** 8 km

**Location uncertainty:** +/- 0.87 km in N-S direction

+/- 1.11 km in E-W direction

**Region:** Golestan Province

**Distances:** 9 Km of Nokandeh, Golestan  
9 Km of Galooghah, Mazandaran  
12 Km of Bisheh boneh, Mazandaran

**Source:** Institute of Geophysics, University of Tehran



Figure 35. A couple of earthquakes hit the region, the day after EPA issued, the greatest was M4.0<sup>8</sup>.

## Khuzestan

<sup>8</sup> [http://irsc.ut.ac.ir/newsview.php?&eventid=155843&network=earth\\_ismc\\_\\_](http://irsc.ut.ac.ir/newsview.php?&eventid=155843&network=earth_ismc__)



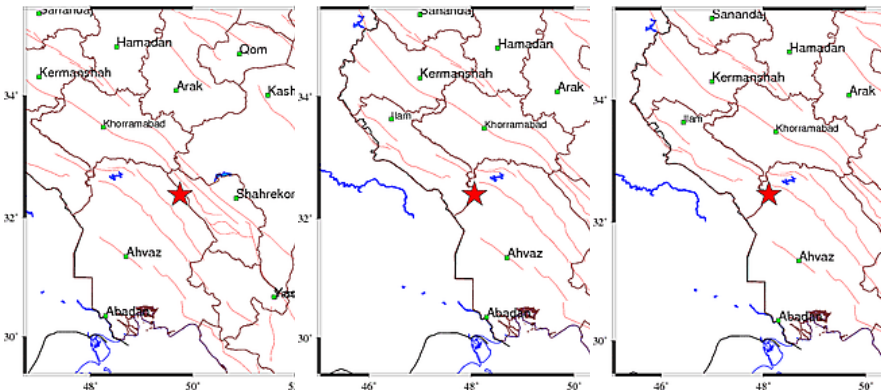
🌶️ Earling issued! South West of Iran received  
#earthquake #preparedness #alert.

#bigdata #iot #insurtech #ai #android #unisdr



12:22 PM · Oct 11, 2019 · Twitter Web App

Figure 36. EPA issued for Khuzestan, Iran on 11 Oct 2019.



<sup>9</sup> <https://twitter.com/FarzadAzima/status/1182579593150107649>





## Magnitude 4.7, Khuzestan Province Saturday, October 12, 2019 at 17:21:23 (UTC)

**Date - Time:** Saturday, October 12, 2019 at 17:21:23 (UTC), 1398/07/20 20:51:23 (local time in Tehran)

**Magnitude:** 4.7

**Magnitude type:** MN

**Location:** 32.35N, 49.73E

**Depth:** 8 km

**Location uncertainty:** +/- 0.87 km in N-S direction  
+/- 1.11 km in E-W direction

**Region:** Khuzestan Province

**Distances:** 31 Km of Ghale khajeh, Khuzestan  
39 Km of Chelgard, Charmahal va Bakhtiari  
59 Km of Izeh, Khuzestan

**Source:** Institute of Geophysics, University of Tehran

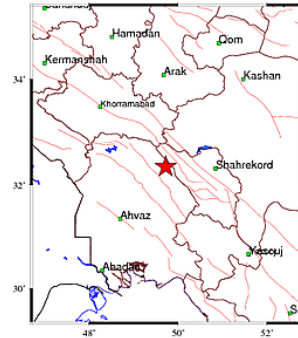


Figure 37. A couple of earthquakes, the greatest M4.7, hit Khuzestan, the day after EAP issued for the region<sup>10</sup>.

### EPA Effect on Estimated Maximum Loss

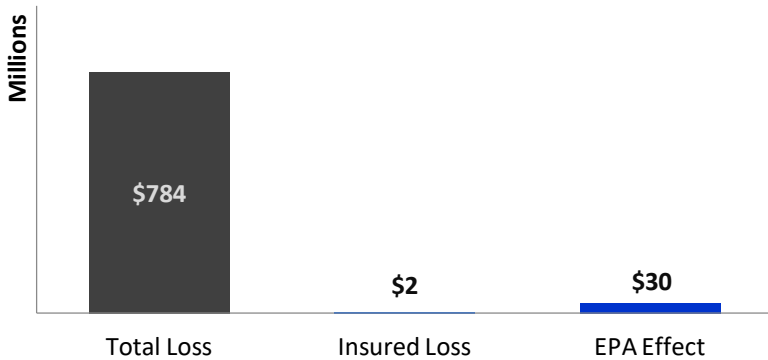


Figure 38. Kermanshah M7.3 earthquake and earthquake preparedness alert effect. EPA can increase the insured loss of the same event until \$30 million in the short-term in 2020.

<sup>10</sup> [http://irsc.ut.ac.ir/newsview.php?&eventid=156226&network=earth\\_ismc\\_\\_](http://irsc.ut.ac.ir/newsview.php?&eventid=156226&network=earth_ismc__)



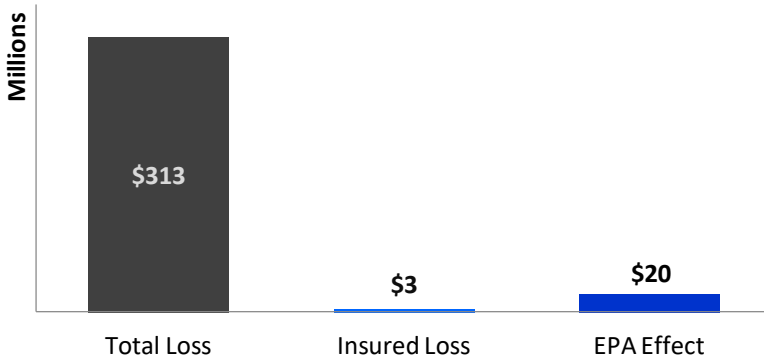


Figure 39. Bam shallow 26 Dec 2003, 6.6 earthquake losses. More than 30,000 died. Insured losses were about \$3 million. The maximum loss of life insurance after public EPA issued can be between \$1.25 and \$10 billion for such an event in 2020.

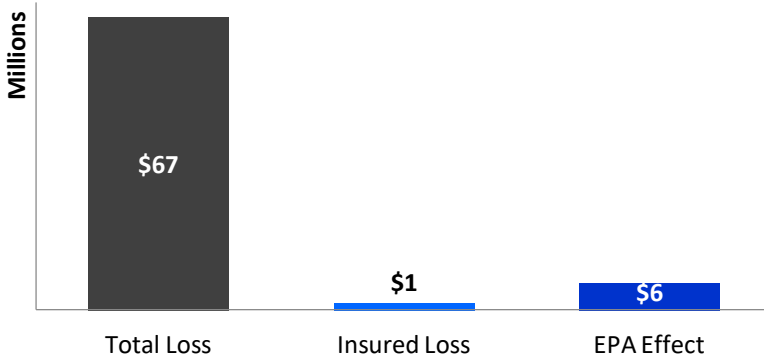


Figure 40. Bojnourd, Northern Khorasan shallow M5.8 earthquake, and EPA effect on the same events in 2020. Insured losses were about \$1 million compared with the \$67 million total loss. EPA cause extending in earthquake insurance penetration rate. Therefore insured loss increases notably as the risk of a major earthquake getting high.

### EPA Effect on Probable Maximum Loss



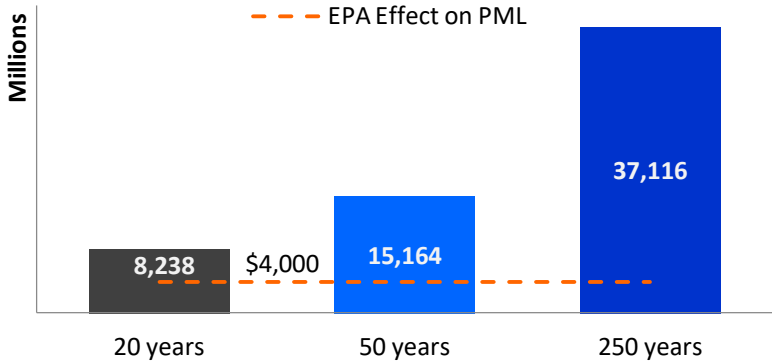


Figure 41. PML - Mean return period in years. Iran earthquake Average Annual Loss is \$4,190.90 million (Iran, Islamic Rep of - Disaster & Risk Profile, 2014) and earthquake insurance penetration rate is about 6% which means a notable capability to extend the penetration rate through EPAs.

### Iran Documented EPAs

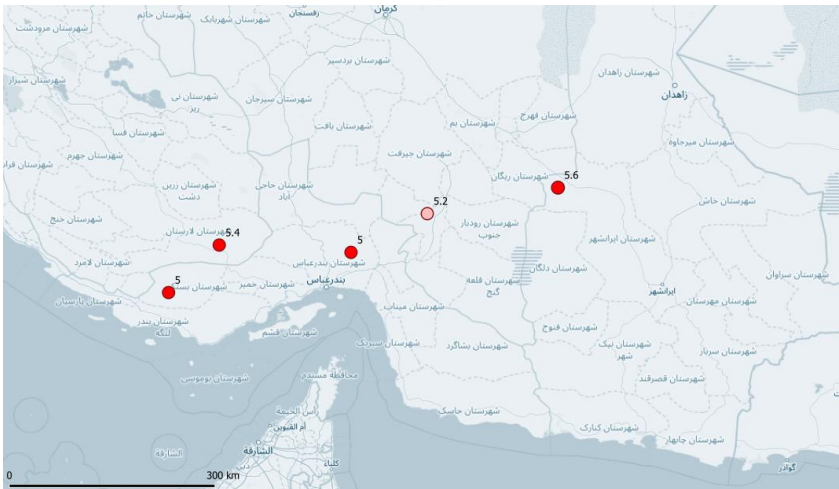


Figure 42. Hormozgan in the South of Iran encountered 5 shallow earthquakes > M5 in 2018. Earling was able to issue accurate EPAs for most of the events in 2018. All of the issued EPAs in the region, followed by an earthquake bigger than M4.



				Average Annual Loss
EPA issued date	Earthquake	Mag	Status	AAL (million)
Jul 9, 2018 <sup>11</sup>	Jul 13, 2018 <sup>12</sup>	4.6	Hit	\$4000
Aug 9, 2018 <sup>13</sup>	Aug 13, 2018 <sup>14</sup>	4.3	Hit	
Sep 28, 2018 <sup>15</sup>	Sep 29, 2018	4.1	Hit	
Sep 28, 2018	Sep 29, 2018	3.9	Hit	
Oct 26, 2018	Canceled			
Jan 7, 2019 <sup>16</sup>	Jan 8, 2019 <sup>17</sup>	Minors	Hit	
Jan 22, 2019 <sup>18</sup>	Jan 23, 2019	4.0	Hit	
Oct 11, 2019 <sup>19</sup>	Oct 13, 2019 <sup>20</sup>	4.6	Hit	

Table 5. EPAs that issued for undercover regions in Iran in 2018.

## Iran recent major earthquakes

Place	Date	Magnitude	Severity
East Azerbaijan	07-Nov-19	5.9 Mw	VIII
Khuzestan	08-Jul-19	5.7 Mw	VII
Kermanshah	25-Nov-18	6.3 Mw	VIII
Kermanshah	25-Aug-18	6.0 Mw	VII
Tehran	20-Dec-17	5.2 Mw	VI
Kermanshah	12-Nov-17	7.3 Mw	VIII
North Khorasan	13-May-17	5.6 Mw	VII
Khorasan-e Razavi	05-Apr-17	6.1 Mw	VII
Fars	06-Jan-17	5.0 Mw	VI
Ilam	18-Aug-14	6.2 Mw	VIII

<sup>11</sup> <https://www.instagram.com/p/BlBGxXcnben/>

<sup>12</sup> <http://geofon.gfz-potsdam.de/eqinfo/event.php?from=rss&id=gfz2018npia>

<sup>13</sup> [https://www.instagram.com/p/BmQ7l2mF\\_OA/](https://www.instagram.com/p/BmQ7l2mF_OA/)

<sup>14</sup> <https://m.emsc.eu/earthquake/earthquake.php?id=705894>

<sup>15</sup> <https://www.instagram.com/p/BoQzz77FnMY/>

<sup>16</sup> <https://www.instagram.com/p/BsVbqzogQoP/>

<sup>17</sup> <https://www.instagram.com/p/BsXO1mHAA6v/>

<sup>18</sup> <https://www.instagram.com/p/Bs8nHligfib/>

<sup>19</sup> <https://twitter.com/FarzadAzima/status/1182579593150107649>

<sup>20</sup> <https://twitter.com/FarzadAzima/status/1183257139399270400>



Bushehr	28-Nov-13	5.6 Mw	VII
Sistan and Baluchestan	13-Apr-13	7.7 Mw	VII
Bushehr	09-Apr-13	6.3 Mw	-
East Azerbaijan	11-Aug-12	6.4 Mw	VIII
East Azerbaijan	11-Aug-12	6.3 Mw	-
Kerman	15-Jun-11	5.3	-
Kerman	20-Dec-10	6.5 M <sub>w</sub>	IX

