1
00:00:02,600 --> 00:00:04,710
Imagine that these 100 pennies

2
00:00:04,730 --> 00:00:09,590
represent the total energy input from the sun to Earth.

3
00:00:09,610 --> 00:00:11,600
That energy fluctuates over time.

4
00:00:11,620 --> 00:00:14,280
For a long time, scientists have known

5
00:00:14,300 --> 00:00:18,750
that the sun’s energy changes in a fairly regular “solar cycle”.

6
00:00:18,770 --> 00:00:20,530
The period from minimum to maximum

7
00:00:20,550 --> 00:00:23,600
and back to minimum is about eleven years,

8
00:00:23,620 --> 00:00:29,020
but even with those cycles, there’s very limited variation in total energy output.

9
00:00:29,040 --> 00:00:34,490
These are solar energy measurements collected by a variety of missions over the years.

10
00:00:34,510 --> 00:00:36,680
The question, however, is precisely—

11
00:00:36,700 --> 00:00:38,180
—precisely—

12
00:00:38,200 --> 00:00:41,650
—how much does the sun’s energy output change?

13
00:00:41,670 --> 00:00:44,260

Experts think the number is pretty small:

14
00:00:44,280 --> 00:00:47,130
perhaps just one tenth of one percent…

15
00:00:47,150 --> 00:00:49,470
…a tenth of a penny.

16
00:00:49,490 --> 00:00:55,470
But one tenth of one percent from the sun can have a profound influence on Earth.

17
00:00:55,490 --> 00:00:58,850
In terms of climate change research, scientists need to understand

18
00:00:58,870 --> 00:01:02,140
the balance between energy coming in from the Sun

19
00:01:02,160 --> 00:01:07,540
and energy radiating out from Earth, as modulated by Earth's surface and atmosphere.

20
00:01:07,560 --> 00:01:10,190
That's why NASA is launching TSIS,

21
00:01:10,210 --> 00:01:14,150
the Total and Spectral Solar Irradiance Sensor.

22
00:01:14,170 --> 00:01:15,770
An accurate solar energy measurement

23
00:01:15,790 --> 00:01:18,560
enables other influences on Earth's energy balance

24
00:01:18,580 --> 00:01:21,270
to be isolated and more accurately quantified.