This paper presents the evolution and design of the Swiss reserve market and describes its two-stage stochastic market-clearing model. In Switzerland, the reserve market comprises weekly and daily auctions. The decision-making problem is to determine the amount of reserves that should be procured in each market stage. The stochasticity stems from daily offers which are not available at the beginning of the week, when the first-stage decisions are made. The new market-clearing model minimizes expected procurement costs of reserves, while taking reserve dimensioning criteria and market properties into consideration. Since the last week of January 2014, this model has been clearing the reserve market in Switzerland. To our knowledge, this is the first real-world implementation of a stochastic market-clearing model in electricity markets.