Video extrapolation/prediction methods are often used to synthesize new videos from images. For fluid-like images and dynamic textures as well as moving rigid objects, most state-of-the-art video extrapolation methods use non-physics-based models that learn orthogonal bases from a number of images but at high computation cost. Unfortunately, data truncation can cause image degradation, i.e., blur, artifact, and insufficient motion changes. To extrapolate videos that more strictly follow physical rules, this paper proposes a physics-based method that needs only a few images and is truncation-free. We utilize physics-based equations with image intensity and velocity: optical flow, Navier-Stokes, continuity, and advection equations. These allow us to use partial difference equations to deal with the local image feature changes. Image degradation during extrapolation is minimized by updating model parameters, where a novel time-varying energy balancer model that uses energy based image features, i.e., texture, velocity, and edge. Moreover, the advection equation is discretized by high-order constrained interpolation profile for lower quantization error than can be achieved by the previous finite difference method in long-term videos. Experiments show that the proposed energy based video extrapolation method outperforms the state-of-the-art video extrapolation methods in terms of image quality and computation cost.