

# Green Screens, Green Pixels and Green Shooting

Volker Helzle  
Animationsinstitut at Filmakademie  
Baden-Württemberg  
Germany  
volker.helzle@filmakademie.de

Simon Spielmann  
Animationsinstitut at Filmakademie  
Baden-Württemberg  
Germany  
simon.spielmann@filmakademie.de

Jonas Trottow  
Animationsinstitut at Filmakademie  
Baden-Württemberg  
Germany  
jonas.trottnow@filmakademie.de

## ABSTRACT

Sustainability and green producing are in high demand in all sectors of creative industries. Fortunately, this topic is received very well among film students providing an excellent opportunity for upcoming talent willing to apply new methods in creative processes. Virtualisation and Virtual Production in particular are predestined to play an essential role in fulfilling this demand. Factors that can be considered here are travel needs, lighting energy consumption, post-production complexity, energy sources and many more. The pandemic did propel these Virtual Production technologies to common practice, in particular large LED walls for In-Camera VFX (ICVFX). Some reports on the environmental impact of traditional film productions are available [albert 2020] estimating an average CO2 demand of 2840 tonnes for tentpole film productions. However, these tentpole productions did not consider VFX. To date, there is little to no knowledge on the sustainability of Virtual Production and how it compares to traditional offline VFX productions. We take a closer look at two comparable productions, one using traditional offline rendering and post-production, the other using an LED wall and ICVFX. Energy requirements, creative opportunities and scalability are subjects of investigation and further discussion.

This abstract is a summary of a self published report on Virtual Production and its opportunities for sustainable film productions <sup>1</sup>.

## KEYWORDS

Virtual Production, ICVFX, Green Shooting, Sustainability

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## 1 INITIAL CONDITIONS

The productions compared here are the offline production “Sprout” from 2019 and the most recent production “Awakening” realized as a Virtual Production within the Set-Extension Workshop in 2021, an annual seminar at Filmakademie Baden-Württemberg. It involves students of diverse creative departments (Production, Set

<sup>1</sup><https://go.animationsinstitut.de/3g>

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Design, Directors of Photography, Lighting, Animation and VFX) learning to work within a green-screen set. Notice that the goal of the seminar is not necessary a fully produced film. Since 2020 this workshop has been realized using an LED wall. “Awakening” used a 4x10 meter curved LED wall featuring LED panels with a pixel pitch of 1.9mm<sup>2</sup>. Pre- and post-production workstations as well as the displays power estimates were reduced by 30% to account for variations as students were also attending meetings and lectures.



Figure 1: On set the “Awakening” production

## 2 OFFLINE PRODUCTION “SPROUT”

The vast majority of power in this production was consumed in offline rendering for post-production. The studio recordings were realized in 2 days. The production had 8 shots with a total of 3233 frames including VFX. The estimate includes a usual amount of re-renders of the same shot. Our internal render management system<sup>3</sup> keeps track of all jobs in a database. Jobs were executed on blades in our data center and on idle workstations in student and class rooms. The blades provide power consumption data via an internal meter. Workstations were measured using an off the shelf power meter<sup>4</sup> and Cinebench R20 multi CPU benchmark<sup>5</sup>. We compared the measured data with spec sheets and system tools and found only minor deviations. Blades were calculated with 500 W each. The average render times were between 40 minutes and up to 2 hours. Workstations were estimated at 380 W. Pre-production (Previs, Techvis, Set Design) required 100 person days (8h a day). Post-production was accomplished within 300 person days. Displays were estimated with 80 W. Pre- and post-production involved

<sup>2</sup>[https://www.leditgo.de/files/pdf/LEDitgo\\_rXone\\_Datenblatt.pdf](https://www.leditgo.de/files/pdf/LEDitgo_rXone_Datenblatt.pdf)

<sup>3</sup><https://www.royalrender.de/>

<sup>4</sup>Dewenwils DHPM101A Energy Power Meter

<sup>5</sup><https://www.maxon.net/en/cinebench>

