

PREFACE

THIS document is meant to provide a relatively casual, non-exhaustive, slightly hand-wavy-but-not-too-bad introduction into the concept of how power flows throughout the electric power grid. It is targeted towards individuals who do not necessarily have an electrical engineering background but are interested in better understanding the detail behind how one of the most complex human-made systems works.

To facilitate understanding of the most important concepts and takeaway messages, I will attempt to minimize the amount of jargon and domain knowledge necessary to understand the document. This will necessarily come at the cost of exact, exhaustive scientific explanations for each topic, but I will indicate resources that may be utilized for the interested reader. Equations are shown because it's challenging to explain some concepts without them, but they are kept confined to boxes in the text, so they can't escape too easily. But this isn't a thorough "textbook", so I caution anyone who is expecting a rigorous technical document.

Each chapter will build up in complexity until the concept of power flow is introduced. Something called "optimal" power flow (OPF) will also be discussed, which I'm passionate about, if the reader cares to read on that far. When some case studies/practical applications are introduced, they will lean towards applications of AC electrical systems and the U.S. grid in particular, since that's the one I'm most familiar with.

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